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Ragamala Architecture: Architecture of Melodic Garlands

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ABSTRACT

Excluding limited exemptions, the mainstream architecture of Bangladesh is now lost into oblivion. The current architecture is ensuing, the aesthetic of the Western-hemisphere, blind folded, negating the necessity of the Eastern-hemisphere, precisely tropical Dhaka, Bangladesh, portraying high air temperatures and torrential rainfall. The architecture of Bengal, partial India and Bangladesh has affluent architectural history rooted in its culture, religion, and heritage. Traveling back to the centuries in search for insights, the author stumbled upon Ragamala and Bangla Ragamala Paintings, traditional Indian and Bengali paintings, depicting musical modes. Traveling forward to the present, this study quests for a climate receptive core elements that the contemporary architecture could embrace upholding the culture and heritage of Bengal. Conducting literature review and field survey from ancient to modern and contemporary architecture of Indian subcontinent, Bengal and Pavilion models including Ragamala and Bangla Ragamala paintings, this research finds some fundamental features that could work magic in present Dhaka. This research terminates at the framework of designing buildings with extended roof protecting from scorching-sun and torrential-rain, higher plinth, and bare minimum or almost no wall allowing soothing-breeze on a lush-green and water-based landscape could be climate responsive solution for this region. This research culminates quoting Gautama Siddhartha during his nirvana, "Architect, you shall not build your house again,". This research is not abandoning building architecture like Buddhist Metaphor, rather restating the metaphor, Architect, you shall build, merely break the walls of your house, almost. This research usher an inception of a novel era of architecture towards a sustainable city evolving from the core building models of indigenous essence.

1. Introduction

Excluding limited honorable and ensuable exemptions, the mainstream architecture of Bangladesh

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is now lost into oblivion. Where the current architecture is ensuing, the esthetic of the Western hemisphere, blind folded, without ensuring the need and comfort of the Eastern hemisphere, precisely tropical Bangladesh, characterized by high air temperatures, high relative humidity, and heavy seasonal rainfall.

The architecture of Bangladesh has a rich history and is rooted in the country's culture, religion, and antiquity. It has evolved over centuries and integrated influences from social, religious, and exotic communities. Various notable architectural relics and monuments in Bangladesh date back thousands of years.

Then again, the architecture of the Indian subcontinent is lavish and diverse, with numerous styles and traditions. The notorious architectural styles include the various varieties of Hindu temple architecture and Indo-Islamic architecture, especially Rajput architecture, Mughal architecture, South Indian architecture, and Indo-Saracenic architecture depicted by Kamiya et al., 2004 [4]

Nonetheless, Bengali architecture is a rare blend of Islamic, Hindu, and Buddhist ascendancy, with an affluent history dating back to centuries. The Bengal region, covering parts of present-day India and Bangladesh, is marked for its distinctive architectural styles that reveal the cultural and historical influences that have molded the region over time [8].

Traveling back to the centuries in search for insights, the author stumbled upon Ragamala Paintings. Ragamala paintings are a characteristics of traditional Indian miniature paintings that initiated in the Indian subcontinent, remarkably during the 16th to 19th centuries. The term "Ragamala" is an amalgamation of two Sanskrit words, "raga" (denotes musical mode or melody) and "mala" (denotes a wreath). These paintings are pictorial illustrations of classical Indian musical genres, or ragas, and are often complemented by verses of poetry.

Granting the perception of Ragamala paintings is mainly coupled with North Indian classical music traditions, there is a related tradition in Bengal established as "Ragachitra" or "Ragamala" paintings. These paintings, as their North Indian counterparts, depict various musical modes or ragas through visual representation. Nonetheless, there are distinct stylistic and thematic differences between the Ragamala paintings of the North and the Ragachitra paintings of Bengal.

In retrospect, tracing back to the inception of this research, a conspicuous void emerges in the realm of traditional architectural practices concerning climatic responsiveness. The rapid urbanization of Dhaka has witnessed the proliferation of modern structures, predominantly characterized by extensive glass facades. These transparent edifices, while aesthetically appealing, inadvertently function as thermal conductors, exacerbating the already elevated temperatures within Dhaka's microclimate.

To address this pressing issue, the author advocates for a multifaceted solution that harmonizes contemporary architectural needs with a sense of reverence for the indigenous architectural heritage. This research seeks to strike a delicate balance: one that not only caters to the demands of the present but also pays homage to the vernacular architecture of Dhaka. By integrating sustainable design principles, innovative materials, and adaptive strategies, the author aims to innovate shelters that efficiently mitigate the trials posed by the tropical climate. In summary, this study endeavors to bridge the gap between tradition, modernity and contemporarily, fostering architectural spirit that not only withstands the rigors of time but also embraces the unique context of Dhaka's climatic conditions.

Now traveling back to the current time from where this research commenced, this study quests for the essential elements that the present-day architecture of Bangladesh could embrace to generate the most efficient climate sensitive space upholding the culture and regionality of Bengal. This research looks for that core elements of architecture that could offer a minimal structure on which the dynamic architecture of current time and place could be built upon.

2. Methodology

In search for climate responsive indigenous framework of architecture, this research conducts rigorous literature survey from ancient to modern architecture including Indian subcontinent and Bengali architecture. It furthermore investigates a special type of paintings of Indian subcontinent and Bengal, called Ragamala paintings and Bangla Ragamala paintings or Ragachitra paintings. This research likewise investigates Pavilion architecture in search for inspiration of climate sensitive local architecture. This research conducts some field survey to find crucial specimens of this type of architecture in the native surroundings as well. Photographs, paintings, tonal sketches, architects' and critics' evaluation, painters' opinion and author's subjective perception were utilized for scrutinizing the selected building models as well. Analysing all these outcomes, this research tends to find a basic framework to build upon for a climate sensitive local architecture for recent Bangladesh, especially Dhaka.

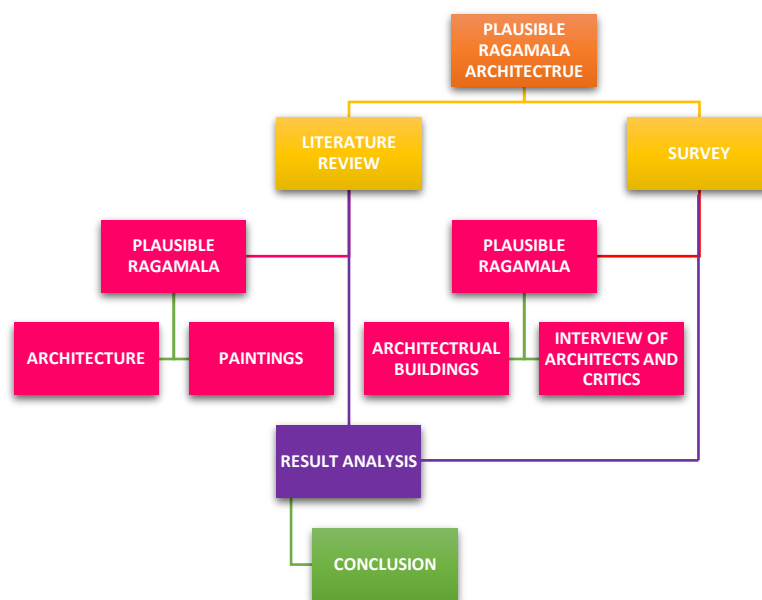


Diagram 1: Flowchart diagram of Methodology

3. Elucidation

1.1 Ragamala Paintings

Ragamala paintings are a form of Indian miniature painting that depict variations of the Indian musical modes called ragas. They stand as a classic example of the amalgamation of art, poetry, and classical music in medieval India. The Ragamala paintings from Bundi, Rajasthan, India, are particularly famous for their depiction of the theme of love and longing. Significant characteristics of Ragamala paintings involve the following.

1.1.1 Portrayal of ragas

Each painting represents a specific raga, linked with a specific mood, time of day, or season in classical Indian music. The paintings capture the emotional and aesthetic qualities of the ragas visually. Ragamala means garland of melodies, a compendium of the musical modes and the emotions associated with them.



Fig. 1. Bhairavi ragini/ The Manley Ragamala

The Manley Ragamala (Fig. 1) is the 'Bhairavi Ragini'. It depicts a woman with a female attendant worshipping a Śiva-linga, placing garlands on it and chanting, keeping time with the cymbals she holds in her hands. She sits in a pavilion set in a lake, which is filled with lotuses and water birds. At the base of the linga are various ritual vessels and a diminutive.

1.1.2 Amalgamation of music and visual arts

Ragamala paintings are a sole fusion of music and visual arts. They frequently depict scenes of pastoral life, landscapes, and human emotions, conveying the essence of the musical aura through visual imagery.

1.1.3 Vibrant and detailed compositions

These paintings persist vibrant colors and intricate details. Artists precisely depicted the attire, charms, musical media, and the natural surroundings enhancing the entire pictorial appeal.

1.1.4 Human and celestial figures

Ragamala paintings usually showcase human figures, frequently in the form of raginis (feminine melodic modes) and ragas (masculine melodic modes), in consort with divine or mythical beings. The characters are illustrated engaging in various activities that reflect the mood of the raga.

1.1.5 Poetic accompaniment

Innumerable Ragamala paintings are escorted by verses or poetry that portray the emotions, tales, or narratives affiliated with the depicted ragas. These verses render an immersed insight of the artistic and cultural context.

1.1.6 Symbolism

The paintings often integrate symbolic components, as animals, plants, and other objects, to emanate explicit meanings related to the mood or theme of the raga.

Ragamala paintings are deemed precious cultural artifacts, offering intuitions into the vivid cultural and artistic traditions of India. They bestow a visual interpretation of the connexion of music, poetry, and visual arts in the Indian classical tradition. Today, Ragamala paintings are treasured both for their artistic grace and their historical significance.

1.2 Bangla Ragamala Paintings

The term "Bangla Ragamala" refers to a series of paintings that depict the ragas, or musical modes, of Indian classical music, particularly in the context of Bengal (Bangla). These paintings are a unique and traditional form of art that combines music and visual representation.

In the Indian classical music tradition, ragas are melodic frameworks used to create mood and emotion. Each raga has its own set of characteristic notes, ascending and descending patterns, and associated emotions. The Bangla Ragamala paintings (Fig. 2) visually represent these ragas, capturing the essence and mood of each musical mode through colors, symbols, and artistic expression.

These paintings often feature intricate and colorful depictions of musicians, instruments, and sometimes, abstract representations of the ragas themselves. Artists use various styles and techniques to convey the nuances and emotions associated with each raga.

The Bangla Ragamala paintings are not merely factory of art but also perform as a method of sustaining and spreading the rich cultural heritage of Indian classical music. They are a visual representation of the deep intimacy between music and visual arts in the Indian tradition.

In Bengal, Ragachitra paintings evolved as a form of folk art, often created by local artists. Bengal's Ragachitra paintings involve the following essential attributes.



Fig. 2. Gauda Malhara Ragini, Bundi, c. 1670. (Photo: Francesca Galloway)

1.2.1 Folk art influence

Ragachitra paintings are more folk-art essence contrasted with the sophisticated and comprehensive nature of North Indian Ragamala paintings. The style is often more pastoral, with bold colors and simple compositions.

1.2.2 Influence of Baul tradition

The Baul tradition, a unique form of folk music and spirituality in Bengal, has influenced Ragachitra paintings. The paintings integrate elements affiliated to Baul musicians, their instruments, and the mysticism mingled with their tradition.

1.2.3 Depiction of local culture

Ragachitra paintings in Bengal often involve scenes from everyday life, local festivals, and cultural events. The themes move beyond classical music and stir upon the eclectic cultural landscape of the region.

1.2.4 Limited influence of poetry

Whereas several Ragachitra paintings have accompanied verses or poetry, the emphasis is frequently less on poetic depictions of the ragas and more on portraying the essence of the musical mood through visual components.

1.2.5 Regional variations

The style and themes of Ragachitra paintings vary in different regions of Bengal. Local influences, traditions, and artistic inclinations contribute to this diversity.

It is notable that the terminology used for these paintings can vary, and the distinction between Ragamala paintings and Ragachitra paintings is not constantly rigid. Both traditions share the cohesion of applying visual art to represent the emotive and aesthetic attributes of classical music, nonetheless the explicit details and artistic approaches may differ based on regional and cultural dynamics. The following painting (Fig.3) depicts a serene outdoor scene with three individuals seated under a pavilion-like structure with a blue dome and pillars. The structure is surrounded by water, a pond, with lily pads and blooming flowers. Trees and foliage in the background contribute to the tranquil atmosphere of the setting. The style of this painting suggests relevancy to Ragamala painting and Indian subcontinental art, culture, and history.

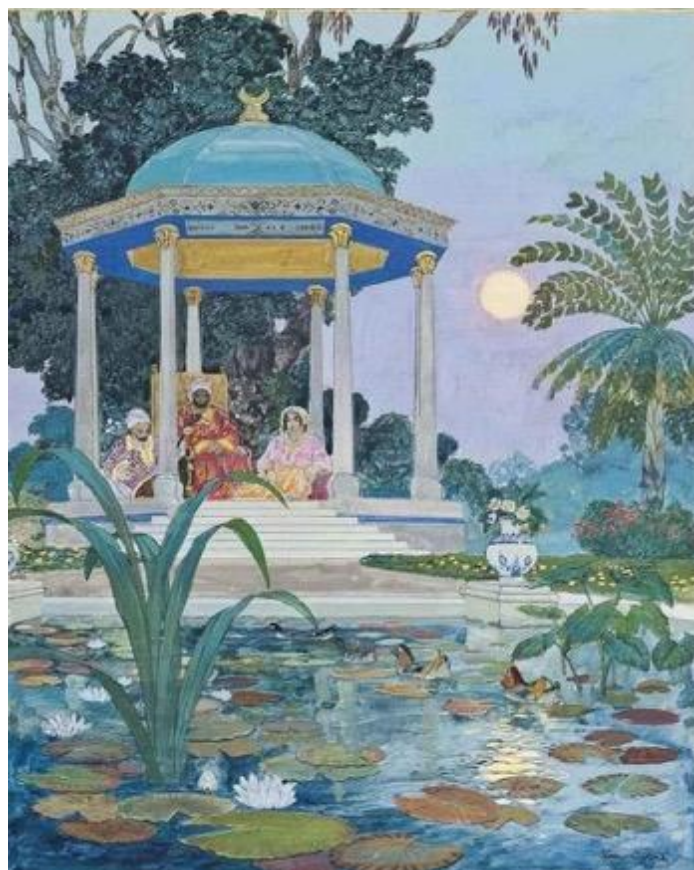


Fig. 3. A painting relevant to Ragamala paintings and Indian subcontinental culture and history.

1.3 The Architecture of the Indian Subcontinent

Early Indian wooden architecture did not endure due to decay and instability. The earliest surviving structures are rock cut, including many Buddhist, Hindu, and Jain temples. Hindu temple architecture is divided into the Dravidian style of southern India and the Nagara style of northern India, with other regional variations. Housing styles vary amid region, influenced by climate.

The Delhi Sultanate, the first major Islamic kingdom in India, advanced Indo-Islamic architecture by blending Indian and Islamic elements. The Mughal Empire's reign marked the zenith of this style, epitomized by the Taj Mahal. Indo-Islamic architecture also influenced Rajput and Sikh styles.

During the British colonial period, European styles like Neoclassical, Gothic Revival, and Baroque became prevalent in India. The fusion of Indo-Islamic and European styles created the Indo-Saracenic style. Post-independence, modernist visions emerged among Indian architects, moving away from colonial influences. Le Corbusier, a pioneer of modern architecture, designed Chandigarh, inspiring a generation of architects. The economic reforms of 1991 further transformed India's urban architecture as the country integrated with the global economy Kamiya *et al.*, [4].

1.4 Bengali Architecture

Bengali architecture encompasses ancient urban, religious, rural vernacular, colonial, and modern urban styles. The bungalow is a notable architectural feature of Bengal. Corner towers of Bengali religious buildings influenced medieval Southeast Asian architecture. Bengali curved roofs, suitable for heavy rainfall, became a distinct feature of Indo-Islamic and Mughal architecture in North India. Due to a lack of good stone, traditional Bengali architecture often uses brick and wood, echoing local vernacular styles. Decorative terracotta plates are a striking feature. Brick's durability led to ancient buildings being stripped for materials over centuries explored by Saraswati and Niklaus [6,8].

1.5 Pavilion Architecture

Pavilion architecture is a diverse field within architecture, featuring temporary, open-air structures for exhibitions, events, public gatherings, and aesthetic exploration. These pavilions provide architects with a unique canvas for experimentation, innovation, and artistic expression.

1.5.1 Historical perspective

Pavilion architecture boasts a rich history, dating back to ancient civilizations with iconic examples like the Parthenon, Athens and the Taj Mahal in Agra. These structures, designed for religious or cultural purposes, are notable for their symbolic and aesthetic significance. The 19th century saw a revival of pavilion architecture, exemplified by the Crystal Palace in London, which highlighted innovative structural design and materials.

1.5.2 Pavilion as an architectural experiment

Pavilions provide architects with a platform to experiment with innovative design concepts, materials, and construction techniques. Recently, architects have increasingly blurred the lines between art and architecture. The Serpentine Pavilion in London, an annual commission, has consistently attracted renowned architects like Zaha Hadid and Herzog & de Meuron to explore new forms, materials, and spatial experiences.

1.5.3 Sustainability in pavilion architecture

Sustainability is now pivotal in pavilion architecture, with many designs incorporating renewable materials, energy-efficient systems, and minimal environmental impact. The Eden Project's biomes in Cornwall exemplify how pavilions can promote environmental awareness through both design and function.

1.5.4 Digital design and fabrication

Advancements in digital design and fabrication have revolutionized pavilion architecture, enabling the creation of intricate and precise structures. Projects like the Elytra Filament Pavilion at the Victoria and Albert Museum exemplify the fusion of cutting-edge digital design with traditional construction methods, pushing the boundaries of pavilion design.

1.5.5 Temporary vs. permanent pavilions

The distinction between temporary and permanent pavilions is crucial. Temporary pavilions, often linked to events and exhibitions, allow for experimental design and materials. In contrast, permanent pavilions prioritize longevity, functionality, and maintenance. The Vitra Campus in Weil am Rhein, Germany, with its iconic permanent pavilions by architects like Frank Gehry and Zaha Hadid, exemplifies the enduring integration of art, architecture, and functionality.

1.5.6 Cultural and regional influence

Pavilion architecture often embodies cultural and regional influences, incorporating local traditions, materials, and aesthetics. For example, the Kazakh Khan Shatyr Entertainment Center in Astana integrates elements of traditional Kazakh yurts, blending modern architecture with cultural heritage.

Pavilion architecture remains dynamic and evolving, embodying architectural innovation and artistic expression. As architects explore new materials, techniques, and sustainability, pavilions continue to push architectural boundaries. The rich history and diverse contemporary examples highlight pavilions as a unique and enduring typology.

1.6 Pavilion Architecture: Decoding Global Specimen

1.6.1 Barcelona pavilion

The concept of a pavilion with a plinth, roof and minimal or no walls, drawing inspiration from the iconic Barcelona Pavilion designed by Mies van der Rohe.



Fig. 4. Panoramic view of the Mies Van de Rohe's pavilion, Barcelona, Photo; Quim LlenasCover, Getty Images

The Barcelona Pavilion (Fig. 4.) Originally built in 1929 for the International Exposition in Barcelona, Spain was reconstructed later to preserve its legacy.

Plinth, roof and separated wall planes: The Barcelona Pavilion, a masterclass in simplicity and spatial elegance, stands on a travertine plinth, elevating it slightly from the ground. Instead of conventional walls, Mies employed a series of separate wall planes creating a dynamic interplay of indoor and outdoor spaces. These walls do not enclose space, rather structure it. They define areas without fully enclosing them, allowing for a fluid transition between interior and exterior. The pavilion's design emphasizes openness, blurring the boundaries between inside and outside.

Low horizontal orientation: The pavilion's profile is intentionally low and horizontal. This effect is accentuated by the flat roof that appears to float over both the interior and exterior. The low stature narrows the visitor's line of vision, directing their gaze toward carefully framed views.

Spatial effects and illusions: The pavilion's layout creates a succession of spaces that flow seamlessly into one another. Two pools of water enhance the spatial experience. Sunlight and moonlight play on the rich materials, creating shimmering effects.

Philosophy: Mies envisioned the pavilion as more than just a building; it was an inhabitable sculpture. His design emphasized spatial effects, tranquility, and a sense of escape from the bustling exposition. The Barcelona Pavilion exemplifies the modernist principle of "less is more," where simplicity and thoughtful design take center stage.

In summary, the Barcelona Pavilion stands as a testament to Mies van der Rohe's architectural vision, a harmonious blend of materials, spatial poetry, and a celebration of openness.

1.6.2 Turner Residence

Turner residence (Fig. 5) is a private house designed by Jensen Architects on 2013 at Larkspur, CA, United States.

A plinth and a pavilion nestled into the hillside; the long, solid plinth contains the private rooms of the house. Atop this plinth sits a transparent living and dining pavilion that opens completely for access to the outdoor decks, pool patio, and expansive views to Mount Tamalpais and the bay.

An elegant structural solution allows the views to be uninterrupted by perimeter sheer walls. Most of the site is left undeveloped with its forest of native oaks intact.



Fig. 5. Turner Residence by Jensen Architects

1.6.3 The Atherton Pavilions

The Atherton Pavilions (Fig. 6), designed by Feldman Architecture, are a pair of matching structures located in the verdant backyard of a northern California residence in Silicon Valley.



Fig. 6. Alaskan Yellow Cedar Slat Pavilion, Photo: designlab.gr

Architecture: The pavilions are delicately placed amidst existing redwoods and mature trees, blending seamlessly with the surrounding softscape, to create transparent and discrete boxes that harmonize with the garden.

Roof: Both pavilions have different functions. The kitchen pavilion sits next to a pool, extending the outdoor lounge area. The gym pavilion has sliding glass doors, allowing a connection to the garden.

Plinth: The buildings' concrete foundations are slightly lifted in the front and rear, creating a floating effect.

Wall: The pavilions are partly wrapped in slats made of Alaskan yellow cedar, introducing privacy into the exercise and meditation pavilion, and creating a feeling of openness in the kitchen pavilion. The gym pavilion has glass sliding doors, while the other pavilion remains open to the air.

The Atherton Pavilions exemplify a harmonious blend of architecture, natural materials, and thoughtful design within their serene garden setting.

1.7 The Pavilion Architecture: East vs West dilemma

The architectural design of pavilions varies significantly between the eastern and western hemispheres, reflecting the distinct climatic, cultural, and contextual factors that shape these structures. This section explores the contrasting approaches to pavilion architecture in tropical regions like Dhaka, Bangladesh (representing the eastern hemisphere) and temperate regions like the United States and the United Kingdom (representing the western hemisphere).

1.7.1 Eastern hemisphere (Dhaka, Bangladesh)

Climate and context: Dhaka, situated in a tropical climate, experiences high temperatures, heavy rainfall, and humidity. The pavilion architecture here prioritizes practicality and comfort.

Design features:

Roof: High roofs are essential to allow hot air to rise and dissipate, keeping the interior cool.

Plinth: Elevated plinths prevent flooding during monsoons and provide ventilation.

Walls: Open or minimal walls facilitate cross-ventilation, allowing breezes to flow freely.

Materials: Avoiding heat-absorbing materials (such as glass) is crucial.

Purpose: Pavilions designed for Dhaka should serve as retreats from the heat and rain, emphasizing functionality over aesthetics.

1.7.2 Western hemisphere (USA and UK)

Climate and context: The western hemisphere includes temperate regions with milder climates. Pavilions here can focus on aesthetics and visual connections.

Design features:

Walls: Glass walls provide transparency, connecting indoor and outdoor spaces.

Roof: Flat or gently sloped roofs allow for unobstructed views and natural light.

Plinth: Less emphasis on plinths due to lower flood risk.

Materials: Glass and other transparent materials enhance views.

Purpose: Western pavilions prioritize aesthetics, views, and light, often serving as extensions of living spaces.

While both hemispheres appreciate pavilion architecture, their divergent approaches reflect the unique demands of their respective climates and cultural contexts. Dhaka's pavilions prioritize functionality and climate resilience, whereas western pavilions emphasize aesthetics and visual connections. Architects must adapt their designs to harmonize with local conditions, ensuring that pavilions serve their intended purpose effectively.

1.6 The Pavilion Paradigm and Ragamala Architecture



Fig. 7. Interior of an Indian hut in Oonalashka, engraving based on a drawing by John Webber (1750-1793) from an account of the last voyage of James Cook (1728-1779), undertaken between 1776 and 1779. Aleutian Islands, 18th century. (Photo by DeAgostini/Getty Images)

The deltaic pavilion: A primal machine for shelter: Pavilions dominate the delta region's architecture. The rustic Bengali hut (Fig. 8 and Fig. 9), resembling a primal pavilion, provides shelter in the hot-humid climate with its swooping canopy (chhad) shielding from intense sun and rain. Supporting elements like mud walls or bamboo posts are secondary, while permeability is crucial.

The seventeenth-century Bundi painting *Bangala Ragini* vividly depicts the deltaic pavilion. Historical art, such as the eighth-century Ashrafpur Bronze Caitya and the eleventh-century Buddhist manuscript *Ashtasahasrika Prajnaparamita*, highlights the idealization of these huts in Bengal for cosmological purposes depicted by Haque *et al.*, [3].



Fig. 8. The Bengal Hut (Photo: Md. Samiul Sabbir Islam) **Fig. 9.** The mud hut

Contrasting Arab courtyard houses and Bengali pavilion houses: Architectural typologies differ between Fathy's Arab courtyard houses and Bengali pavilion houses. A Murshidabad pata painting illustrates this contrast. Courtyard houses shield the desert with blank walls and open their central space to the sky, while pavilion houses dissolve walls, blur boundaries, and feature roofs that cast shadows. Unlike enclosed courtyard houses in arid climates, pavilions embrace the open air.

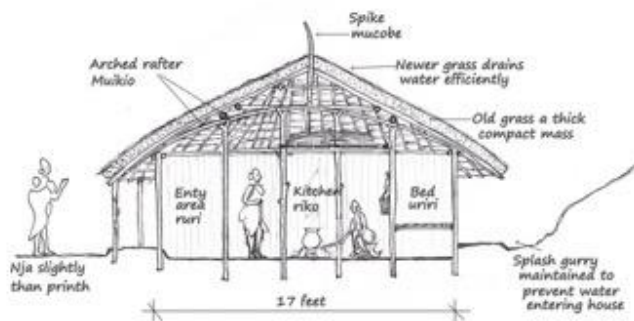


Fig. 10. Section through a traditional Kenyan hut



Fig. 11. Section through a traditional hut of Kerala, India. Photo: ©2010 Wayanad thanal.com.



Fig 12. A tribal hut at Shantiniketan, Bolpur



Fig. 13. A South Indian House

The pavilion, a centrifugal perspective: The pavilion, serving as a vantage point for sunsets and moonlight, has a centrifugal nature highlighted by King, with activity extending to verandas and compounds [10]. In contrast, courtyard houses are centripetal, focusing activity inward. Terraces and verandas naturally complement the pavilion's design.

Pavilion dwellings in the Bengal landscape: The integration of open air and architecture creates a seamless blend with nature. In the deltaic context, Bengali dwellings extend beyond roofed rooms to include orchards, gardens, and ponds. A folk proverb (Khanar Bachan), "Ducks to the East, Bamboo to the West, Banana to the North, Open to the South," encapsulates this harmony. These modest, detached structures amidst foliage and water epitomize the timeless Bengali landscape.

Diverse manifestations of the pavilion idea: Pavilions vary in form, from simple bamboo-woven huts on stilts or thatch huts on earth platforms (Fig. 10 and Fig. 11) to complex brick or stone structures. Not all solid masses fit the pavilion concept. For example, the brick-earth stupa with a symbolic Buddhist chhatri at its peak merges the pavilion idea with masonry, creating a unique interplay of form and openings.

Deltaic pavilion, a continuum of form and landscape: The pavilion, from simple clusters to deltaic city-forms, is vital in complex organization. Clusters form by grouping pavilion units around interior spaces. In the Bengal delta, isolated buildings blend with paddy fields, gardens, orchards, and

water features. Unlike labyrinthine cities, deltaic urbanism, termed the “city of figure-nature,” blurs urban and rural lines. The pavilion, with its parasol roof, permeable walls, and verandas, embodies this unique spatiality portrayed by Ameen [1].

1.7 From Bangladar to Bungalows

Sultanate rule and the deltaic pavilion in Bengal: From the fourteenth to sixteenth centuries, Sultanate rule in Bengal significantly reinterpreted the deltaic pavilion concept in mosque designs. This architectural shift highlights the tension between universalist Islam and local territorial ideals.

Adina masjid: A monumental failure in deltaic architecture: The Adina Masjid, constructed in Pandua around 1375, illustrates the difficulty of implementing large, interiorized courtyards in the deltaic environment. Modelled after the Great Mosque in Damascus, Adina aimed to replicate its high vaulted space and spacious courtyard. However, this vision was impractical due to the delta’s waterlogged conditions, which were unsuitable for massive congregations and interiorized courtyards.

Sultanate architecture in Bengal, the Bangla roof: During the Sultanate period in Bengal, architecture underwent significant changes.

Territorial context: Architecture evolved within the Bengal delta’s unique context. The regional style embraced brick and terracotta, resulting in detached cubic structures. Courtyards were abandoned in favor of practicality.

Bangla roof influence: Architects drew inspiration from common huts and contemporary temples. They adapted the curved roof of the Bangla hut (originally bamboo and thatch) into masonry structures. Even without the swooping chhatri (dome), a softly curving cornice echoed the hut’s essence.

Distinct temple genre: The combination of a centralized cubic form and the multiplication of the Bangla roof led to a distinct temple genre.

Later, the Mughals and Rajputs continued their fascination with the Bangla roof, incorporating it as Bangladar in their architectural repertoire.

Evolution of the deltaic pavilion, bungalows and modern architecture: Over time, the deltaic pavilion remained influential. In colonial Bengal, the bungalow emerged by monumentalizing rural huts but later adopted neoclassical styles driven by imperialist agendas. Modern architecture reimagined the bungalow, shedding colonial associations. Tropical principles justified its design in hot-humid zones, while modernist themes introduced abstract, asymmetrical configurations. The bungalow transformed from a cuboid shape to a lyrical composition of planes, echoing lessons from Frank Lloyd Wright’s architecture.

1.8 Traditional Bengali Village Houses

Traditional Bengal homes, symbols of simplicity and community: Beyond physical structures, the concept of home encompasses memories, cultural nuances, and belonging. Bengal’s traditional homes reveal a rich tapestry of architectural forms reflecting history, climate, and social bonds. Notable among these are the Palm Leaf Hut, Gerostho Bari, and Mud House, embodying simplicity and resilience within the community.

1.8.1 The palm leaf hut (nal hut): Harmony with nature

The Palm Leaf Hut (Fig. 14) (locally known as “Nal Hut”) embodies resourcefulness and natural harmony. Its meticulously crafted palm leaf roof provides shelter from tropical sun and monsoon rains. These huts are scattered across the Sundarbans region, including Patuakhali, Bagerhat, Khulna, and Satkhira. Despite urbanization, frontier communities cherish this architectural heritage, finding contentment within these compact spaces.



Fig. 14. Palm Leaf Hut (Photo: © 2020 Bproperty.com)

1.8.2 The gerostho bari: Communal living and generational stories

The gerostho bari (or “Elderly’s House”) intertwines familial bonds and communal life. These houses, with tin roofs and bamboo fences, resonate with generational tales. Lively yards host children’s play and elders’ animated conversations, alongside fishponds and grain stores. Shared meals from communal bowls and the warmth of the “Kachari Ghor” (living room) define the Gerostho Bari’s essence.

1.8.3 The mud house: Cool abode and community bonds

The quintessential mud house offers nostalgic refuge from the heat. Constructed with locally available materials, its mud walls provide excellent insulation. The mud floor bears imprint of daily life as, housewives drying hair, children’s playful footsteps. These houses foster community, where shared meals and spaces create lasting memories. Traditional Bengali village houses embody heritage, resilience, and life’s retreat and flow, a fusion of simplicity and enduring connections.

1.9 Asmani's Hut: A Reflection on Primitive Shelter and Resilience

Asmani, a young girl in Rasulpur, embodies rural struggles and dreams. Her modest Palm Leaf Hut, like a “primitive hut,” emerges from raw materials, branches forming columns, topped by a protective canopy of leaves. This elemental design, devoid of ornamentation, harks back to architecture's core principles. Asmani's shelter, nestled in nature, reflects resourcefulness and enduring purpose. In this unassuming dwelling, we witness the timeless dance between humanity and its surroundings, depicted by Pulse [5].

1.10 The Faculty of Fine Arts Building: A Synthesis of Modernism and Vernacular Craftsmanship



Fig. 15. Fine Arts Institute, Dhaka

The Faculty of Fine Arts building (Fig. 15 and Fig. 16), completed between 1953 and 1955, represents a pivotal moment in Bangladesh's architectural history. Designed by Muzharul Islam, this structure embodies a harmonious blend of international modernist principles and indigenous craftsmanship. Its significance extends beyond its functional purpose, it serves as a beacon of architectural innovation and cultural identity.

1.10.1 Modernism and regional identity

Muzharul Islam emerged as a pioneer of regional modernism in South Asia during the mid-20th century. His architectural vision sought to transcend global modernist trends while remaining deeply rooted in the local context. The Faculty of Fine Arts building exemplifies this delicate balance, reflecting both functionalism and cultural specificity.

1.10.2 The Bengal renaissance influence

The architectural evolution in Bangladesh draws inspiration from the broader “Bengal Renaissance.” This movement, spanning the late 18th to early 20th centuries, redefined ideas of liberalism and modernity. British colonial rule left its mark on Bangladeshi architecture, with neo-classical and neo-gothic styles dominating public buildings.

1.10.3 Pavilion architectural design



Fig. 16. Fine Arts Institute, Dhaka

The building’s initial appearance may seem international in style, but upon closer examination, it reveals intricate detailing rooted in local craftsmanship. The use of white volumes on pilotis (raised columns) creates a sense of lightness and openness. The pavilion-like design emphasizes spatial continuity and interaction with the surrounding landscape.

1.10.4 Verandahs and shading strategies

Muzharul Islam’s genius lies in his climate-responsive approach. Large continuous verandahs envelop the inner walls and windows of classrooms and studios. These verandahs serve dual purposes: shading from the tropical sun and fostering cross-ventilation. Traditional woodwork, meticulously crafted, adorns these verandahs, connecting the building to its cultural heritage.

1.10.5 Legacy and influence: Architectural pedagogy:

The Faculty of Fine Arts building not only accommodates art students but also serves as an educational tool. Its design principles, simplicity, functionality, and sensitivity to climate, became foundational for subsequent generations of architects.

1.10.6 Enduring relevance

Despite decades of use, the building remains resilient and relevant. Art students continue to find inspiration within its walls, where light and shadow dance across verandahs and studios.

The Faculty of Fine Arts building stands as a testament to Muzharul Islam's vision, a fusion of global modernism and local wisdom. Its pavilion architecture, with its verandahs and traditional craftsmanship, invites us to appreciate the interplay between form, function, and cultural identity. As the first modern building in Bangladesh, it remains an enduring symbol of architectural excellence and a bridge between past and present.

1.10 The Khanqah for Fakir Bari: A Place of Cult and Retreat



Fig. 17. A Khanqah for a Fakir (Architect: Lutfullahil Majid Reaz and Team)

1.10.1 Architectural intervention: a Khanqah for spiritual retreat

The architectural project titled “A Khanqah for a Fakir,” (Fig. 17) conceived by Architect Lutfullahil Majid Reaz and his team, materialized in the serene locale of Datter Bazar, Gafargaon, Mymensingh, in 2019. This distinctive creation embodies a thoughtful synthesis of spiritual sanctity and harmonious integration with the natural environment.

The architect's vision diverged from the pursuit of iconic structures; instead, they embraced the rural context, aiming to design a simple, traditional village house that would seamlessly coexist with the surrounding landscape and neighboring villagers' homes. The Khanqah, as a place of cult and retreat, emerges as a testament to this ethos, emphasizing humility, tranquility, and reverence.

Contextual sensitivity: The design team meticulously considered the rural context, ensuring that the Khanqah would not overpower its natural surroundings.

Minimalistic approach: Rather than imposing grandeur, the architecture embraces simplicity, echoing the vernacular architecture of traditional village dwellings.

Spiritual purpose: The Khanqah serves as a sacred space for prayer, contemplation, and spiritual gatherings.

Harmony with nature: By harmonizing with the landscape, the Khanqah fosters a sense of connection to the earth and the divine.

This architectural endeavor exemplifies a delicate balance between cultural reverence, architectural restraint, and the timeless pursuit of spiritual solace.

1.10.2 Architectural synthesis: The Khanqah as a symbolic landmark

The Khanqah, meticulously designed with intricate details, embodies the essence of Islamic architecture. The brick-crafted arch, adorned with metal accents, harmoniously merges with the brick jali walls, a delicate lattice of perforated brickwork. The inclusion of Islamic pattern calligraphy in the brickwork further enriches the design, creating a splendid semblance.

Notably, the Khanqah transcends mere architectural significance. It has evolved into a revered landmark and holy structure for the local villagers. Fondly referred to as "Fakir Bari," this architectural marvel seamlessly weaves together spirituality, cultural heritage, and the craftsmanship of the community. Its enduring impact resonates beyond physical form, touching the hearts of those who seek solace within its walls (Fig 18).



Fig. 18. Fakir Bari, the Arched Doorway inviting the outdoor inside, Photo: Maruf Raihan
1.10.3 Architectural intervention amidst natural constraints

The project site, situated at road level in the eastern direction, faces unique challenges due to its proximity to paddy fields that transform into shallow water basins during the rainy seasons. To navigate this intricate context, the design team strategically preserved the site edges by introducing lush plantations (Fig. 19). The built area spans 360 square meters and accommodates distinct programmatic zones: a residential dwelling, a public prayer space for followers, and an elevated grave dedicated to the master. Notably, the design grappled with the task of establishing a communal function area within the confines of a conservative Muslim family context. The synthesis of architectural form and cultural sensitivity underscores the project's significance.



Fig. 19. The Khanqah, a landmark for the villagers renowned as Fakir Bari. (Photo Mahbub Ikbal)

1.10.4 An exemplary pavilion architecture: Integrating roof, plinth, and jali walls



Fig. 20. Fakir Bari, exemplary pavilion architecture for current time

This architectural marvel represents a unique fusion of design elements, combining a meticulously crafted roof, a raised plinth, and intricately detailed jali brick walls. The pavilion's entrance, marked by an elegant brick archway, seamlessly connects the interior to the surrounding landscape, a verdant greenway and a tranquil waterbody. Notably, this thoughtful design serves both functional and climatic purposes. By shielding the space from monsoon rains and intense summer heat, while allowing for optimal ventilation, the pavilion provides an ideal environment for contemplation and spiritual

gatherings. Its harmonious integration with nature exemplifies architectural excellence. This pavilion architecture could be declared as a perfect instance for current time in context of Dhaka's climate.

3. Verdicts

The settings of Ragamala paintings and Bangla Ragamala or Ragachitra paintings, portrays several consistent fundamental architectural features. The landscape background, lush green, trees and waterbodies create a serene natural environment. The open veranda provides a transitional space, establishing a seamless connection with the surrounding landscape. These paintings frequently showcase elevated high plinth structures. These structures are often supported by columns only, deficit walls, accenting an open and airy architecture. These elements collectively render the distinctive aesthetic and spatial qualities of the Ragamala and Ragachitra paintings.

The Indian subcontinent settings showcase similar architectural features. The open courtyard serves as a central space for social activities. The lush green landscape provides a verdant and serene environment bonding with nature. Vast streams serve practical and aesthetic purposes, as irrigation and architectural reflection. The open veranda offers shaded transitional spaces smudging the edges between indoor and outdoor. Plinth-like spaces with roofs sustained by pillars, nonetheless without enclosing walls, create open and airy structures facilitating ventilation and interaction with nature. These elements simultaneously define a distinct architectural style of the Indian subcontinent.

Bengali architecture, especially in traditional Bangla huts, features distinctive elements like verandas with extended roofs for shaded transitional spaces. These designs enhance aesthetics and protect from the scorching sun and heavy rain, ensuring comfortable outdoor living. The Chou-Chala and Do-Chala roofs, with their sloping designs, effectively direct rainwater away and offer ample shade protecting from the sun, ensuring comfort. These functional elements distinguish a persistent Bengali architecture style.

Certain pavilion architectures exhibit similar architectural characteristics. The extended roof provides ample shade and protection from the sun and rain. The open verandah offers an airy transitional space connecting the interior with the exterior. High plinths elevate the structure providing stability or flexibility. These structures, usually surrounded by columns, have minimal or no walls, encourages open interaction with the environment. The surrounding landscape is typically lush and green, often including water bodies, enhancing the serene and picturesque setting. These elements associatively define a distinctive appeal of pavilion architecture.

During the mentioned historical periods, these architectural features were specifically designed to provide effective shelter from the substantial rain and intense sun, addressing the climatic conditions of tropical regions such as the Indian subcontinent, particularly Bengal. The structures were thoughtfully constructed to allow cool breezes to flow through, offering relief from the scorching summer heat. They were designed to protect inhabitants from water during heavy rains and floods, ensuring safety and comfort in such challenging weather conditions. These architectural components were not only functional but also demonstrated a deep understanding of and adaptation to the local climate.

The author collectively designates these distinctive architectural features as Ragamala architecture, architecture of melodic garlands. These architectural pieces remain highly effective in contemporary times, particularly in tropical regions like Dhaka City, Bangladesh. The essential ingredients required for such architecture include a high plinth, which offers protection from floods and heavy rains, ensuring the structure remains elevated and safe. A well-designed roof is crucial, providing shade from the scorching sun and shelter from heavy rain, thereby enhancing the comfort of the inhabitants. Pillars or columns are necessary to uphold the roof, creating a sturdy and open structure that facilitates airflow. The surrounding landscape should be thoughtfully designed, incorporating lush greenery and water features. This not only allows cool breezes to flow through, offering refreshing air, but also promotes mental relaxation and satisfies an innate connection to nature, known as biophilia. These elements

collectively contribute to a harmonious and sustainable living environment, well-suited to the climatic conditions of Dhaka City.

4. Conclusions

This research concludes with the notion of designing buildings in deltaic Bengal, Bangladesh, tropical Dhaka, with an approach of Extended roof providing shade, higher plinth protection from water, and almost no wall or bare minimum walls providing the basic needs and more opening and open terraces and verandas towards vast green and water-based landscape could be the climatic answer of our indigenous essence. This research culminates quoting the declaration, of Gautama Siddhartha during his arrival at the critical destination called nirvana, and attainment the qualities of a super-ascetic, “The roof rafters are shattered,” and “the roof is destroyed”, “Architect, you shall not build your house again,”, portrayed by Ashraf [9]. The metaphor narrates the plotting of the ascetic body, and evident the deeply imbricated magnitude of architecture in ascetic dialogue and practices. The image of a building troubles the ascetic vision. This research is not declaring, “Architect, you shall not build your house again,” like Buddhist Metaphor, this research is implying, Architect, you shall build, only break the walls of your house, almost.

In case of eliminating the conventional building wall, to be in the plein air, is not so suitable as suggested in the elemental condition of the rural hut or the idealization in Bangala Ragini. More durable enclosures are necessitated by practical needs, economic status, or new urban conditions. While bamboo screens establish a degree of balance between the need for permeability and the necessity of enclosure, the paradox is heightened with a mud, brick, or concrete walls: how to make the wall both solid and porous explored by Ashraf [2].

The findings of this research can plausibly serve as a universal design principle for building construction in tropical regions, alike Dhaka. Future studies could explore innovative materials that offer viable alternatives to typical building walls, ensuring adequate shelter and security while maximizing open space.

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