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## Terracotta tiles in Bengal. Decorations and techniques in Mosques of the Sultanate period

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**Abstract:** *The mosques of Bengal exhibit a unique decorative style, representing diverse ornamentation on both interior and exterior facades. This diversity reflects the varied backgrounds of the artisans, culminating in what can be termed 'Bengali style' emerging from external influences and local Bengali traditions. This style spread along the ancient Bengal region during the sultanate period 944-1538; including present West Bengal and Bangladesh. This research, based on field studies and observation in Kolkata, Malda, Orissa, Bihar, Karnataka, and Madhya Pradesh, aims to identify the aesthetic features in Bengal sultanate mosques connected to a specific mode of decoration: the employment of terracotta tiles. Employing a chronological study backed by statistics, the research seeks to address questions about the terracotta tiles' properties, artistic origins, techniques used, and the impact of geographical and cultural variables on its diversity. Furthermore, an attempt is made to propose approximate dates for five mosques with uncertain dates based on their artistic style properties.*

**Key words:** Bengal, Sultanate Period, Gaur, Pandua, Saptgram, Mosques, Terracotta Decoration

### Introduction

Originally, the term “Bengal”, or “Bangla” in Sanskrit referred to the non-Aryan population in the Bengal region. In ancient Sanskrit literature, “Bangla” described only a small part of modern Bengal. During the Islamic conquests “Bengal” denoted the areas of the Ganges and Brahmaputra deltas. It was the Muslims themselves who first adopted the term “Bengal” for the entire region. Minhaj Siraj, around 1259, defined the northern and southern regions of Bengal as “bangla” or “Bengal”, while “Banga” referred to the areas east and south of contemporary Bengal.<sup>1</sup> Barny also used the term “Bengal” to delineate the eastern and southern regions of Bengal, noting

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<sup>1</sup> Jawzānī, 2013.

Sultan Balban's grant of Lakhnuti and Bengal to his eldest son Baghra Khan (1282-1333).<sup>2</sup>

The modern territory of Bengal, situated at the head of the Bay of Bengal, extends along its northern and northwest coastline on the eastern side of the Indian subcontinent. Because of geopolitical changes within Bengal sultanates, political borders, particularly in the western and northeastern regions, remained variable and unstable during the Islamic conquest until the Mughal invasion.<sup>3</sup>

Counting the exact number of mosques attributed to the sultanate periods in Bengal poses challenges due to the absence of inscriptions, the disappearance of many mosques, and limited records documenting their establishment. The earliest extant mosque in West Bengal is the Zafar Khan Mosque (*Dar Al-Khairat*) in Tribeni (1298), followed by the Adina Mosque (1370) in the first capital of the Ilyas Shahi Sultanate (1339-1410).<sup>4</sup>

The shift of the Ilyas Shahi Sultanate's capital from Hazrat Pandua to Gaur City led to the construction of several mosques [Tab. 1]. In addition to Gaur City, the Sultans constructed and rehabilitated numerous cities for economic and military purposes during the Sultanate era. Saptigram City, situated on the bank of the Saraswati River, is an example containing the Saptigram Mosque (1455).<sup>5</sup> The mosques in cities like Gaur, Hazrat Pandua, Houghly Pandua, Saptigram, and Tribeni across West Bengal showcase a distinctive artistic terracotta style and decorative motifs. It is through these motifs that we can gain a sense of the civilizational and cultural connotations of the Islamic community in Bengal during the Sultanate period.

### Research methodology

Research was based on a field study approved by the Bengal Antiquities Department of Calcutta, India, aimed at photographing and measuring sultanate mosques in Bengal. A classification chart of the motifs and techniques used in its implementation, utilizing a chronological system and qualitative statistics for each decorative motif across Bengal's sultanate mosques is used for a stylistic analysis of the monuments, in absence of foundation inscriptions.

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<sup>2</sup> al-Dīn Barnī, 1862; Until Ibn Battuta's visit to the region in 1345-1346, the term "Bengali" was still used to refer to both eastern and southern Bengal. Ibn Battuta mentioned that the Sultan of the region was named Fakhr al-din and that he was at war with Ali Shah, the ruler of the lakhnauti. This indicates that both eastern and southern Bengal was known as Bengal at that time, and that his capital was known as the laknuti (Ibn Baṭṭūta, 1987).

<sup>3</sup> Dani, 1961; Eaton, 1993.

<sup>4</sup> Banerji, 1993; Hasan, 1984; Hasan, 1988b.

<sup>5</sup> Blochmann, 1875; Sinha, 2012.

Tab. 1. List of West Bengal mosques (by Mahmoud Ahmed)

No	Name	City	Date	Suggested Sultanate
1	Gunmantpur mosque	Gaur	Undated	Ilyas shahi 1
2	Chamakati mosque	Gaur	Undated	Ilyas shahi 1
3	Lutan mosque	Gaur	Undated	Ilyas shahi 2
4	Tantipara mosque	Gaur	Undated	Ilyas shahi 2
5	Qadm al Rasul mosque	Gaur	1530	Hussain shahi
6	Chika mosque	Gaur	Undated	Hussain shahi
7	Adina mosque	Hazrat Pandua	1370	Ilyas shahi 1
8	Zafar Khan mosque	Tribini Hoghly	1299	Delhi sultanate
9	Bari Pandua mosque	Pandua Hoghly	Undated	Ilyas shahi
10	Gamaluddin mosque	Saptigrm Hoghly	1455	Ilyas shahi 2

Tab. 2. Analytical material tables (by Mahmoud Ahmed)

Table (A) the proportions of the constituent elements of the terracotta tiles, ancient temples.									
symbols	CaO	Mno <sub>2</sub>	Mgo	Tio <sub>2</sub>	Na <sub>2</sub> O	CaCO <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	Sio <sub>2</sub>
lutan			1.4	2.8	1.2	13.0	3.2	21.1	60.1
chamakati		0.4	1.0	2.1	1.8	10.0	13.6	15.0	58.6
tantipara	0.6		1.0	1.1	1.4		9.0	19.4	68.6
adina			1.1		1.4	40.3	4.8	13.4	38.9
gunmatpur	1.0		1.2	1.3	1.8		8.6	21.1	66.2
Table (B) the ratio of the equivalent of the absorption of the brick for water.									
symbols	porosity		Absorption equation			μ			
lutan	19.9		11.4			1			
chamakati	9.7		5.1			2			
tantipara	25.2		13.7			3			
adina	29.2		17.3			4			
gunmatpur	19.6		11.3			5			

Scatter plots of Lime versus magnesia	Scatter plots of (a) soda versus lime

The research employs a comparative analytical approach to discern similarities and differences in motifs; it also includes an analysis of the artistic origins of each motif and the extraction of its artistic connotations. Building samples were collected for analysis, utilizing methods such as Microwave Acid Digestion, Thermo-Gravimetric Analysis (TGA), and X-ray Diffraction (XRD). These analyses were conducted at the Archaeology Department's laboratory within the Asian Society for Archaeological Studies in Kolkata [Tab. 2], aiming to ascertain the components of materials utilized in decorating mosque walls.

### **Colored Terracotta Tiles**

As highlighted by Gupta, the technique employed for the terracotta tiles decorations is distinctive; as all decorative motifs depicted on terracotta tiles were delineated on the ground before application to walls. The tiles were then arranged in a manner identical to their decoration plan, engraved before being painted, and finally placed in kilns. Despite Gupta's observation of engraving marks on some terracotta tiles, this claim (unaccompanied by images) lacks substantiation within the historical sources.<sup>6</sup>

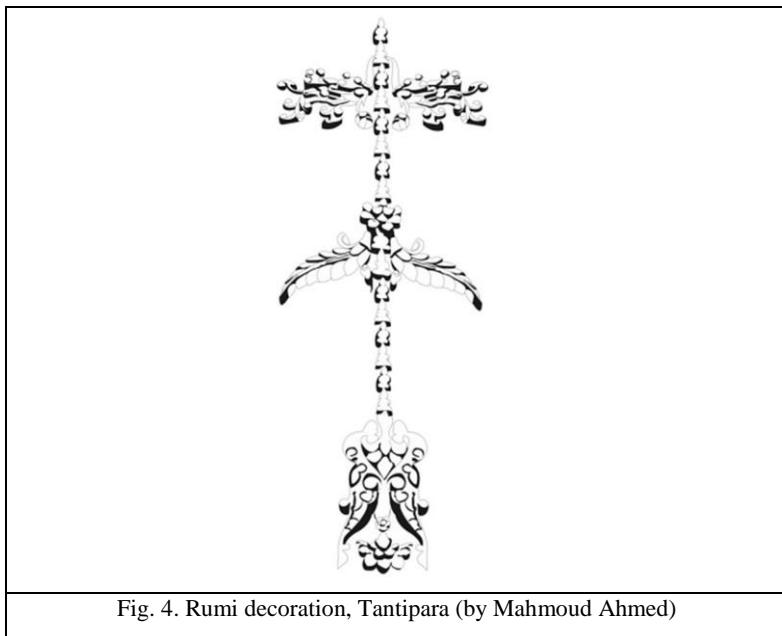
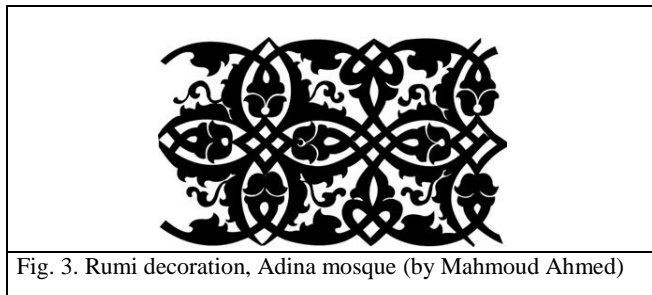
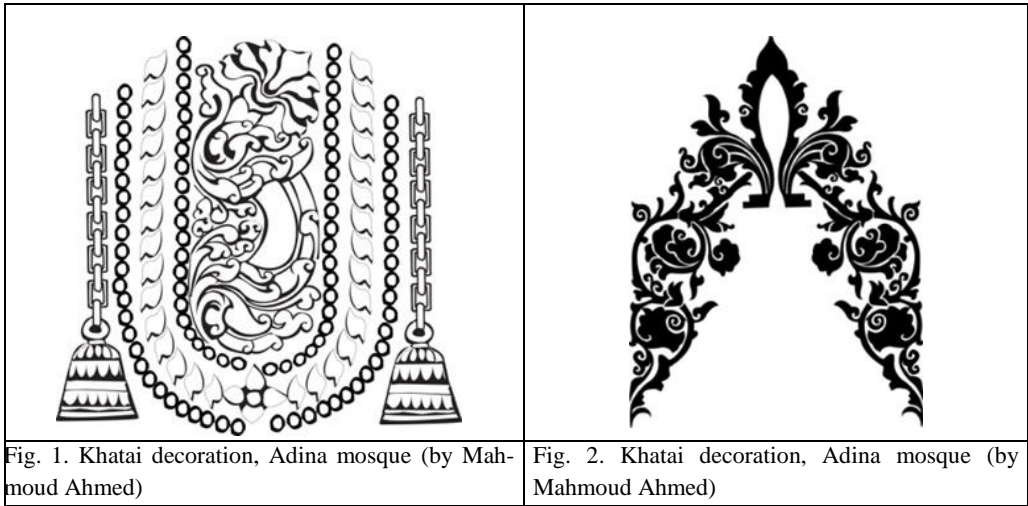
Terracotta tiles were utilized as a decorative method in some sultanate Bengali mosques, showcasing three artistic styles: blue and white glazed tiles, multi-colored glazed tiles, and monochrome glazed tiles. Additionally, unglazed terracotta tiles were found in the Adina Mosque, Chamakati Mosque (undated), and Bari Pandua Mosque (undated). These unglazed tiles consisted of single square tiles featuring decorative motifs encircled by geometric outlines, repeated in friezes across the mosque walls.

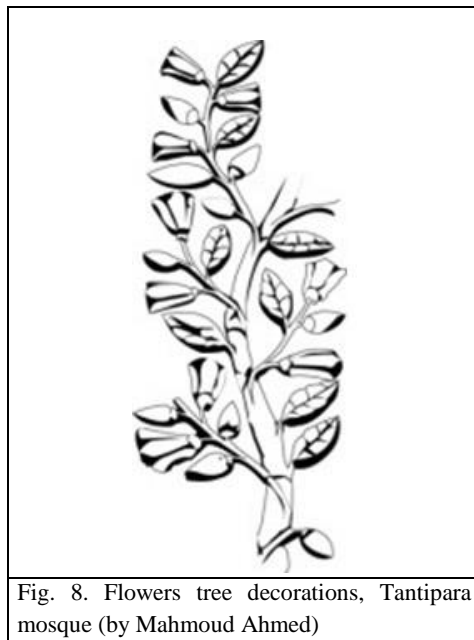
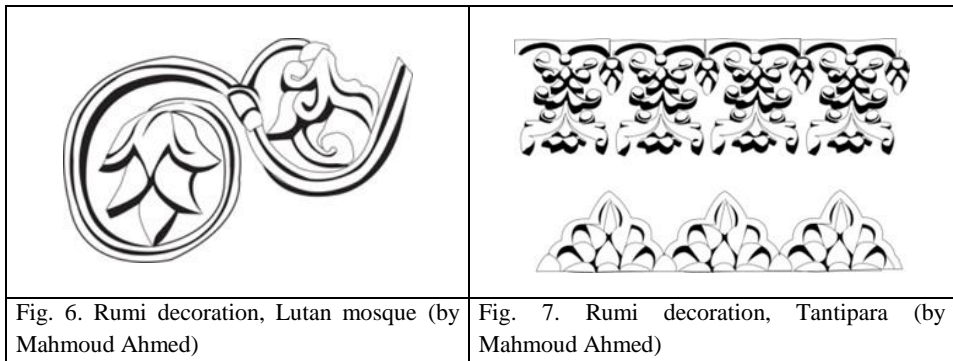
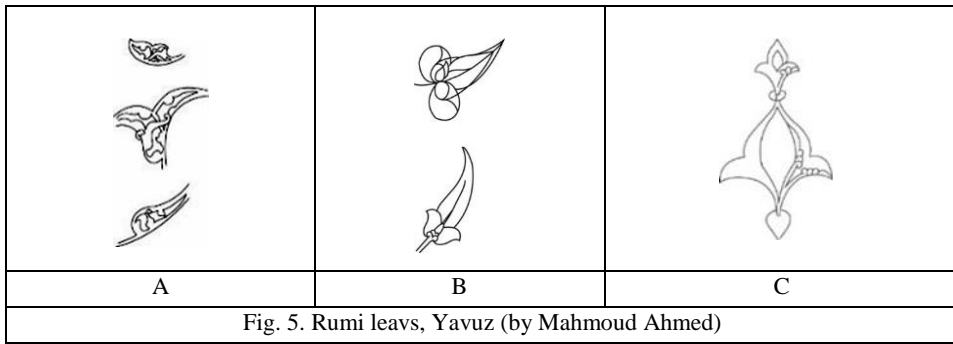
The Qadm al-Rasul Mosque [Figs. 1, 2, 6], dating back to 1530, exhibits a distinct artistic style in its wall decorations. The decorations feature a large design that differs from individual repeated motifs along single friezes. Colored glaze covers these decorations, and further examples of this decorative mode can be observed in the Lutan Mosque (undated) [Figs. 3, 4, 5, 7].

Moreover, one building, such as the Lutan Mosque (undated) and the Qadm al-Rasul Mosque [Figs. 1, 2, 6], incorporates all three types of terracotta tiles, blue and white, multi-colored, and monochrome, featuring glazed terracotta tiles, while the Chamakati Mosque [Figs. 1, 8, 9] exhibits the same style without glazing.

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<sup>6</sup> Willis, 1992; Das, 2013; Guha & Bandyopadhyay, 2017; Sen Gupta, 2020.





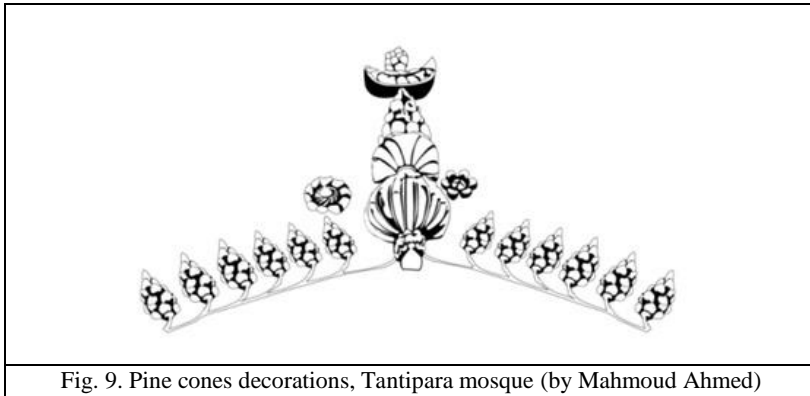


Fig. 9. Pine cones decorations, Tantipara mosque (by Mahmoud Ahmed)

Based on the similarity in decorative techniques, three mosques: Qadm al Rasul Mosque (1530), Lutan and Tantipara mosques (undated), can be attributed to the same historical period. This association is reinforced by several dated military constructions, as a similar decoration style is found in Neem Darwaja and Dakhil Darwaja, dating back to Sultan Nusrat Shah Bin Sultan Hussein Shah's period (1519-1532).<sup>7</sup>

Thus, investigating the reasons behind the presence of terracotta tiles in Bengali sultanate mosques becomes paramount to also understanding more about the history of architecture and material culture of the period. For that aim the use of terracotta tiles as a basic material in the decorations of the mosques examined in this study, both externally and as internal cladding, demands an exploration into the history of terracotta tiles and their various styles in India and other regions of the medieval Islamic world.

Terracotta tiles have been an integral part of Bengal's decorative style since ancient times. This is owing to the Ganga River Delta's abundant clay, suitable for shaping these tiles. Their existence in Bengal dates back to the Songa period (2nd century BC), with most discoveries featuring embodied forms of animals and human figures [Fig. 10].<sup>8</sup>

Sudeshna Guha identifies the terracotta tiles of Setu Temple as the oldest examples used for decorating ancient Bengali temples during the Pala dynasty (8th century).<sup>9</sup>

However, this technique seemingly vanished from Bengal for a span of three centuries (13th to 15th). The oldest post-Pala examples were found in the Midnapur

<sup>7</sup> Further information about these monuments and the history of sultan Nusrat Shah, see: Creighton, 1817; Khan, 1931; Hasan, 1984; Hasan, 1988b; Abdul, 1993.

<sup>8</sup> The Sunga empire: a dynasty ruled the regions of Central and Eastern India (ca. 187-78 BC) and was founded by Pushyamitra Sunga after the fall of the Maurya dynasty, it was Buddhist empire (Dhavalikar, 1977; Guha & Bandyopadhyay, 2017).

<sup>9</sup> Guha & Bandyopadhyay, 2017.

region, notably the “Konnagar Bali Temple” in Karmakar Pur, Ghatal District, and the Samavaini Temple of the Karmakar Dynasty (1490).<sup>10</sup>

Gupta notes the absence of examples of brick buildings containing terracotta tile decorations during Bakhtiyar Khilji’s rule in Bengal (1202) until Shri Chaitanya’s era (the founder of the Gudiya Vaishnavism faith) in the second half of the 15th century.<sup>11</sup> This period is marked by only two examples of brick temples, one in Ghatal in Midnapore, and Gaurangpur in Bardaman.<sup>12</sup>

In summary, three crucial historical observations emerge from the discussion. First: the disappearance of terracotta technique in Bengal for three centuries, Second: the widespread adoption of Islamic architectural style in the decoration and construction of over 428 temples during the Sultanate period by Shri Chaitanya’s Bhakti sect, Finally: the distinct aesthetic separation of these temples from ancient temple architectural styles, as they exhibit clear influences from the Islamic architecture of Bengal.<sup>13</sup>

Equally, there are clear differences in the decorative style of terracotta tiles between ancient Bengali temples and sultanate mosques. First, a notable reduction in terracotta tile size during Muslim invasions, contrasting with larger sizes before these invasions. Then, variations in the general design of terracotta tiles are noted. The ancient temples feature individual elements repeated along friezes, unlike the Sultanate mosques’ style, which places various designs on multiple tiles. Moreover, within the mosques of the Sultanate there seems to be a significant introduction of colored glaze, not present in Pre-Islamic Bengal.

These differences suggest potential influences outside of Bengal, possibly tied to Iranian artistic endeavors. This is especially considering the first appearance of glazed tiles in Multan during the Tughluqid period.<sup>14</sup>

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<sup>10</sup> Haque, 1980; Chakrabarti, 2016; Sen Gupta, 2020.

<sup>11</sup> Rosen, 1988.

<sup>12</sup> Sen Gupta, 2020.

<sup>13</sup> Yaqub Ali, 1990; Furthermore, it is one of the oldest instances of terracotta tiles that have been linked to the Buddhist Gokul Med or Lakhaingarir temple in Bangladesh, which is situated outside the Mahasthangarh Fort and dates to the 6th or 7th century. A second site, thought to date from the second Gupta dynasty, was found amidst the Buddhist temple's remains. A few ceramic tiles that date back to the 7th/8th century. The 10th century was marked by changes in architectural style; scholars explained this phenomenon as the religious situation of Bengali society changed at the end of the 9th century, as evidenced by the architectural and decoration style that was characterized by Hindu influences from Orissa temples, whose wall decorations differed from the style of terracotta tiles. Examples of Orissan style in Bengal can be observed in the temple of Sat Deuel. The terracotta technique was also found during the 8th and 9th centuries in the Buddhist temple of Baharpur as well as Mainamati. Another decorative style known as Chaitya and Javaksa was present in Bardhaman, which dates to the 4th to 11th century (Spooner, 1912; Sen Gupta, 2020).

<sup>14</sup> Rukn Alam mausoleum, dated to the Tughluqid period (14th century) [Pl. 14], Zain al-Din’s mother mauslem in Sarinjar, Kashmir (15th century). However, Havel (1913) acknowledges that terracotta art is a local Indian art, challenging the idea of external influence on its re-emergence in Bengal; see also Hillenbrand, 1992.



Terracotta tiles have been part of the Islamic architectural repertoire from the 10th century.<sup>15</sup> Historical sources describe such buildings in Iran, with references from Al-Masoudi in the 10th century, mentioning the green dome built by al-Hajaj in Wasit, Iraq, and Ibn Rasta describing the Jami' Mosque in Baghdad in 1497. The latter mentioned the mosque's walls were adorned with various colored tiles made in terracotta.<sup>16</sup> While the mentioned buildings have disappeared, the oldest remaining example of glazed terracotta tiles in Iran dates back to the Seljuk period, seen in the minaret of the Damghan Mosque (1058), characterized by turquoise colors. This technique also spread widely in Central Asia, particularly among the Karakhanids and the Khwarezm Shah, as well as in Khorasan during the Ghurid era, employed within monuments such as the Jam Minaret and the entrance to the Jami Mosque in Herat in the 12th century.<sup>17</sup>

Kamal Al-Hajj highlighted additional examples of terracotta glazed tiles in Iran dating to the 12th century, including the minaret of the Sin Mosque in Isfahan (1131), the Heydaria Mosque in Qazvin (1167), and the Gulpaykan Astan Mosque in Isfahan, dating to the Seljuk period. These examples, along with others, demonstrate shared decoration techniques between Iran and Central Asia.<sup>18</sup>

The transmission of this technique to India might have occurred through the migrations of craftsmen, especially considering that the early conquerors originally came from the wider Central Asian region. However, the limited areas of the early Indo-Islamic sultanate, with absence of rivers and clay, hindered the development of this technique in central India during the early Sultanates.<sup>19</sup>

The development of the decorative style using terracotta coincided with the expansions to Kashmir during the Shahmiri Sultanate and to Bengal during the Ilyas Shahi Sultanate (the 2nd half of the 15th century). The Tughlaq sultans' interest in consolidating political relations with Iran and the Abbasid state was paramount to the use of terracotta tiles during this period. Terracotta techniques appeared within the Tughluq monuments, as witnessed with the Rukn Alam mausoleum in Multan, Pakistan, in 1320, featuring blue-white glazed terracotta tiles.<sup>20</sup>

The Deccan region provides distinctive examples of terracotta glazed tiles, such as the tomb of Sultan Ala al-Din Bahman Shah (1436-1458) at Bidar for instance, which is decorated with polychrome tiles and a style that is reminiscent of Persian or Central Asian workmanship.<sup>21</sup> The *madrassa* of the Persian vizier, Mahmud Gawan, at Bidar (1472), is a building of Timurid proportions and form, one would think more at home

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<sup>15</sup> Glazed terracotta tiles have a lengthy history dating back to the Middle East and ancient Egypt, for more examples (Hayes, 1937; Guaitoli & Rambaldi, 2002; Aloiz, Douglas & Nagel, 2016).

<sup>16</sup> O'Kane, 2019.

<sup>17</sup> Scerrato, 1962; Hillenbrand, 1979; Akhund & Askari, 2011; Hamzavi, 2019.

<sup>18</sup> Hāg Sayīd Ġādī, 1996.

<sup>19</sup> Raza, 2008; Burton-Page, 2008.

<sup>20</sup> Hillenbrand, 1992.

<sup>21</sup> Yazdani, G, 1947; Maninder Singh, 2015.

in Central Asia than in the Deccan.<sup>22</sup> In short, in tracing the history of unglazed colored terracotta or even glazed terracotta, it could be suggested that this feature was transmitted to India from Iran and central Asia. If it did, it was filtered through Multan, Uttar Pradesh, and the Deccan when it finally arrived in Bengali lands.<sup>23</sup>

The rainy nature of the Bengal region, along with the use of terracotta in constructing and decorating the Sultanate mosques, due to the scarcity of quarries and the availability of another building material, raises questions about the procedures architects followed to secure terracotta tiles under these natural circumstances.<sup>24</sup> Dany emphasizes the disappearance of the majority of brick temples in the three centuries before the Sultanate, suggesting a lack of craftsmanship among builders in Bengal during the Sultanate period.<sup>25</sup> However, this is not proven, and the reasons for the demolition of these temples remain unclear. Either the disappearance was justified by the climatic circumstances, or by the changing of their construction style, where increasingly, stone and not brick was the preferred mode, especially under the Senas.<sup>26</sup> Perhaps the conversion of the population from Hindu to Buddhist which took place in Bengal, during the Gandhara and Gupta Buddhist empires, and ending with the Sena Dynasty, played a part in the changing of the main construction materials.<sup>27</sup>

Perween Hasan's classification of terracotta clay into two types, terracotta clay without lime powder and terracotta clay mixed with varying amounts of lime and lead powder, provides an answer to these inquiries.<sup>28</sup>

Adding lime to terracotta clay not only provides more solidity but also imparts lightness. While some scholars emphasize the Iranian origins of this technique, chemical analyses of ancient Indian terracotta tiles don't always indicate the use of lead and lime. However, historical records, such as the Mahendravar inscription from the 7th century, highlight the tradition of using terracotta clay mixed with minerals and lime, further developed during the Gupta dynasty [Figs. 10-11].<sup>29</sup>

Singh asserts that terracotta clay mixed with lime and lead was used in a group of brick temples in Uttar Pradesh and Bihar, citing examples like the Bhitari Temple in

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<sup>22</sup> Brown, 1959.

<sup>23</sup> The earliest and most original models have been found in Bauduin; a number of glazed terracotta models discovered in the Eid prayer hall known as the Shamsi Eid prayer hall (1202). Then, in Delhi, similar style emerged in Ghiyas al-Din Balban's burial dome (13th century), featured a blue-glazed terracotta mold frieze. It is located in the Eid prayer hall of Rabri, near Agra, and its upper part was decorated with a frieze of epigraphic inscriptions, with a frieze of floral decorations above it, all in the style of glazed terracotta (1296-1316) under Sultan Ala al-Din Khilji (Nizami, 1961; Rahman, 1988; Burton-Page, 2008; Maninder Singh, 2015).

<sup>24</sup> Blochmann, 1875; Abdul, 1993; Hussain, 2003.

<sup>25</sup> Dani, 1961; Eaton, 1993.

<sup>26</sup> This is a personal observation that has not been found in any study of the architecture in Bengal.

<sup>27</sup> About the gupta terracotta style, see Desai, 1978; Willis, 1992; Lee, 2009; Karabi, 2009; Das, 2013.

<sup>28</sup> Hasan, 1988a; 1988b.

<sup>29</sup> Dhamija, 1975; Aloiz, Douglas & Nagel, 2016.

Ghazipur. Additionally, in the Gupta era, terracotta clay mixed with limestone powder and sand, known as kankar clay, was employed.<sup>30</sup>

From the discussion above, it emerges that the differences in measurements between the terracotta tiles in the sultanate Bengali mosques and the ancient temple tiles, coupled with their similarities to Iranian examples, could suggest potential Iranian influences on the former. On the other hand, the idea of mixing minerals and lime powders into terracotta clay for increased hardness and cohesion may not have been influenced externally; it appears to have been a chemical treatment used in ancient Bengali temples.

To adapt to the challenging climatic conditions of West Bengal, architects developed terracotta clay known as “Lokhori” and “Surkhi”.<sup>31</sup> Chemical analyses, using methods like Microwave Acid Digestion and Thermo-Gravimetric Analysis, show that the terracotta tiles were carefully processed to match environmental circumstances, considering factors like rainfall, surrounding vegetation and farmlands.<sup>32</sup>

Chemical analysis revealed the presence of titanium oxide and the mineral Wollastonite in Lutan Mosque and Chamakati Mosque. These components, resistant to fires and temperatures, contribute to crack resistance and increase the solidity of the terracotta tiles. All samples contained approximately 60% silica, confirming specific chemical treatments applied to the clay [Tab. 2].

In the case of the Gunmatpur Mosque in Gaur city, the large quantities of calcium carbonate oxide (CaCO<sub>3</sub>) in its terracotta tiles suggest they were not well-fired. The presence of CaCO<sub>3</sub> in samples from the Hussein Shahi dynasty era, along with other minerals, indicates firing at temperatures of more than 850 degrees, confirmed by the color variations and the glazed finish on most tiles [Tab. 2A].

Sutabha Sinha mentions that the Antiquities Department analyzed the soil behind the Durbar Hall in the city palace of Gaur, which resulted in the discovery of very large quantities of quartz powder, as well as quartz blocks stuck to glazed tiles, which would imply that this site was indeed where the terracotta tiles factory was situated.<sup>33</sup>

Furthermore, due to the large amounts of rain, chemical analysis using the IRA technique shows that the water absorption equation, which is between 0.25 and 1.5 kg/m<sup>2</sup>/min, produces a good, strong clay material that is compatible and adheres strongly to the mortar, and the IRA percentage for the samples was 11.2%.

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<sup>30</sup> Das, 2013; Maninder Singh, 2015; Lal, 1953.

<sup>31</sup> Lal, 1953.

<sup>32</sup> Samples of terracotta tiles were collected from Lutan mosque, chakati mosque, Tanti para mosque, Adina mosque and gunmat Pur mosque, analysis show that the clay includes large amounts of quartz siO<sub>2</sub>, aluminum oxide Al<sub>2</sub>O<sub>3</sub>, iron oxide fe<sub>2</sub>o<sub>3</sub>, magnesium oxide mgo and titanium oxide tio<sub>2</sub> and in the sample of the gunmatpur contains large amounts of calcium carbonate CaCO<sub>3</sub>, and its presence refers that these tiles did not burn well, as this element divided into cao and co<sub>2</sub> at temperatures of more than 840 degrees, it is also justified by the color of the molds agaric reddish yellow.

<sup>33</sup> Sinha, 2012.

This percentage indicates that the clay is not impacted negatively by the abundance of seasonal rainwater to which the buildings are exposed [Tab. 2B].

All of the techniques outlined above gave artisans and craftsmen the possibility to produce numerous decorations with multiple motifs. These are all studied in the following section of the paper.

### **Floral and vegetal motifs** *Modified floral and vegetal leaves*

This motif consists of leaves and flowers combined with branches. It is unclear which real plants the decorations are derived from. The motif is normally formed by a continuous contact between branches and leaves, consisting of one or two identical vegetal or floral motifs. The method of chronological study aims to classify the decorations in a chart that identifies the roots and sources of influence.

The division of decoration styles under study fits into two basic types. First: the style of decoration of modified vegetal and floral leaves with Chinese influences [Fig. 2] which scholars identified it as “khatai motifs”, and second: the simple modified leaf decoration (shape) which consists of a bulbous, round shape with a comma-like circle attached to the pointed end [Fig. 3].<sup>34</sup>

The monuments under study also feature simple foliage decoration composed of a single leaf segment or several segments arranged in a bulbous shape, resembling the lotus flower and palmettes. These are strongly abstracted patterns, with spiral ends and circles, with no resemblance to anything in the natural world.<sup>35</sup>

### *Chinese khatai*

Statistics are applied to motifs in the sultanate mosques to identify the chronological evolution of the floral and vegetal motifs, which have been affected by the Chinese influences (khatai), as found in the early examples of the wall decorations of the sultanate mosques. This motif is found in stone as well as in tiles.<sup>36</sup>

In the Zafar Khan Mosque and the Adina Mosque [Figs. 1-2], these motifs consisted of an irregular shape, extending in an undulating form, and ending with spiral shapes.

Several scholars mentioned that it is one of the unique forms of Chinese floral decoration.<sup>37</sup> Al-Banna highlighted the role of the Iranian influences in Asia and India

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<sup>34</sup> Yavuz, 2008: 13.

<sup>35</sup> Yavuz, 2008; Ḥalifāh, 2001; ‘Abd al-‘Azīz, 2014.

<sup>36</sup> The execution of motifs with Chinese influences, limited in Islamic arts by plant and animal motifs (‘Abd al-‘Azīz, 2005).

<sup>37</sup> Ḥasan, 1941; Lane, 1957.

in spreading Chinese motifs. However, this theory might lead to some fallacies as the presence of khatai motifs on Indian monuments is found before the 14th century.<sup>38</sup>

As Buddhist art in India dates back to the 3rd century, we are faced with numerous examples of engraved khatai decorations as found in the sultanate mosques, one such example is found on the statue of Buddha preserved in the Kolkata Museum, which is contoured by a frame of khatai decorations. In addition to that, the Dhamekh Stupa at Sarnath, also features khatai motifs.<sup>39</sup>

This conclusively demonstrates that decorations under investigation can be considered among the local motifs in the Bengal sultanate mosques, based on the pre Islamic examples, such as those found in Buddhist Gandhara Dynasty and the Bengali Pala Dynasty.

### *Simple modified vegetal and floral leafs*

The style of this motif consists of bulbous, round leaves, forming an individual repeated leaf or two identical leaves. Researchers identified this as “Rumi motif” [Fig. 5].<sup>40</sup> The motif’s Statistics classification shows that it was a limited abstraction of several plants and floral motifs, such as palmette semi-leaves, spear leaves, lotus, bulbous leaves, and round leaves. Examples can be observed in the Adina Mosque [Fig. 3], Chamakati mosque, Tantipara mosque and Qadm al rasul Mosque. According to these examples this motif can be divided into two styles, Individual Rumi leafs, and Composite Rumi leaves. The first was produced at the beginning of the Bengal Sultanate period and found in Chamakati and Adina Mosques. After that, in the Tantipara [Figs. 4, 7], Qadm al Rasul, and Lutan Mosques [Fig. 6] show a clear improvement of the technique as the motif becomes more complex.

### **Roots of the Rumi Motif**

Yavas’s account provides insights and information regarding the early examples of Rumi decorations represented through ornamental motifs of birds’ wings and dragon figures, found in Uyghur designs from the 8th and 9th centuries. Similar motifs appear in later Islamic periods and are used by various dynastic powers, such as The Seljuk, the Ghaznavids, the Qarakhanids, the Uyghurs, and the Juk Turks in Asia.<sup>41</sup>

The early examples noted by Shukria kardash and yavaz of Rumi’s decoration may explain the transitional path of Rumi’s decoration into the Indian artistic style in general and the Bengali style in sultanate period in particular. This is noted by the presence

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<sup>38</sup> Aşlanpa, 1987; al-Banna, 2011.

<sup>39</sup> Yaqub Ali, 1990; Banerji, 1993; Bagchi, 1993; Karabi, 2009.

<sup>40</sup> Alsan, 2005; Yavuz, 2008; see also Ḥalīfah, 2001; ‘Abd al-‘Azīz, 2014.

<sup>41</sup> Yavuz, 2008.

of Rumi motifs in the ancient monuments of Ghaznah and Ghor city during the 11th and 12th centuries, the Ghaznavids and Ghurids were responsible for the conquest of India and the initial formation of the early Islamic sultanates.

The Qutb al-Din Mosque in Delhi represents one of the earliest examples of Rumi motifs in India in its facade and Qutb Minar minaret (1193), gate of the Alauddin Khilji Mosque (1296) [Figs. 12-13], and the burial dome of Iltutmish (1235). From these examples the motif was transmitted through Turkish rulers under the Delhi sultanate, who assumed the rule of Bengal in the early periods of the Islamic era.

### **Ornamental shrubs “small ornamental trees”**

The decoration of shrubs was one of the distinctive local artistic motifs of Indian art, due to its connection to a number of Indian myths of deities, whether Hindu or Buddhist, such as the Asoka tree or some shrubs associated with Buddha’s life story. However, the comparison of the engraved shrubs represented in the sultanate Bengali mosques reflects a significant difference from the local Indian style of trees. The majority of vegetation found in the mosques is very different and is normally composed by grapevine, pomegranate, rose, and pine trees, engraved among single repeated patterns, or a part of overall decorative floral scene [Figs. 8-9].<sup>42</sup>

The tree decoration has been depicted on the walls of the sultanate mosques and is generally noted with different shapes, and naturalistic features. The examples under study can be categorized into two types, representing two different time periods. During the first period motifs are repeated as single elements, such as: Walnut Palm bushes, as found in the upper and lower friezes of the western facade of Adina Mosque, as well as repeated in the same design with a variety in the types of shrubs; pomegranate bushes, grapes, palms, lush bushes appearing for example in the Lutan and chamakati mosque. During the second period development in the implementation of shrubs and fruits motifs within a general decorative design becomes noticeable. It consists of branches intertwined with other geometric motifs, examples, in the Lutan and Tantipara mosques [Figs. 8-9], and the Qadm al rasul mosque.

The tree motif spread clearly thanks to Iranian influences. Scholars mentioned that the tree symbolized eternal life in the ancient Iranian myths, as it appears numerous times in Sasanian buildings, and metal objects, However, Tantawi mentions that its use is limited to civil buildings and objects, without extending to religious and funerary buildings. It is only during the Iranian Seljuk period that the first appearance of tree decorations on the walls of funerary buildings is witnessed in the eastern tower of Kharqan tomb (1067), and the interior qibla wall of the Bayzed jama Mosque (1453).<sup>43</sup>

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<sup>42</sup> Gupta, 1968; Abd al-Nāṣir, 2006; Bautze-Picron, 2010; Mohammadi & Marasy, 2015; Kamyar & Shad Ghazvini, 2016; Ahmed Emam, 2017.

<sup>43</sup> Ṭantāwī, 2010.

Palm trees, especially those executed in repeated units along horizontal friezes, appeared as a decoration motif among the sultanate mosques of Bengal, this motif doesn't represent the local Indian type of palm, which is the walnut palm. Pomegranate trees and fruits also are depicted several times, this might be due to its sacredness and mention in the Torah, the Bible, the Holy Qur'an.<sup>44</sup>

The first example in Central Asia of this type of decoration dates from the Uyghur period (7th and 8th centuries).<sup>45</sup> The Turks were acquainted with pomegranate since ancient times, and Onal emphasize that the Uyghurs used it due to its relation to religious beliefs.<sup>46</sup>

Finally, is it clear to deduce that the presence of tree motifs in decorative ensembles of Bengal mosques was not part of the local artistic style of ancient Bengali temples, either found in the Buddhist Gandhara dynasty, the Pala dynasty or the Sena dynasty, hence the decoration of shrubs "small trees" and fruits may be considered as a Turkic influence transmitted through the arrival of the sultans from their homeland. This also would explain the absence of these decorations from the early mosques such as the Zafar Khan Mosque, the Gunmatpur mosque and the Adina mosque, as their decoration displays a distinctive local flavor devoid of motifs found later.

### **Flowers motifs**

Flowers have reflected artisans' love and interest in nature since ancient times. The tendency in Islamic arts was to visualize blooming flowers, as the Umayyad and Abbasid periods demonstrate. This is shown by several types of flowers, such as flowers with multi lobes or petals "four, five or six petals". Later some advanced styles of flowers motifs in Islamic art were characterized by blooming flowers with superimposed leaves, its leaves arranged in concentric rings.<sup>47</sup>

There are also floral motifs in local Indian arts, as Karapisaha mentioned, which represent good fortune and fertility in Hindu beliefs. This was also found in the Sanskrit text Rig Veda: the Hindu gods Agni and Lakshmi were born from a lotus flower.<sup>48</sup>

Flowers found in mosques in Bengal are of two types. Examples of this typology can be found in the Adina, Chamakati, and Lutan mosques, in which each flower occupies a single tile and is surrounded by geometric outlines. It is worth noting that this

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<sup>44</sup> Abd al-Nāşir, 2006.

<sup>45</sup> Çađıltütüncügil, 2013.

<sup>46</sup> Ünal, 1982.

<sup>47</sup> Abd al-Nāşir, 2006.

<sup>48</sup> Various terms featured the flowers along the the ancient Indian artistic books by, as Pushkara, bondarika, Padma or Kamla, padmalana and padmagala were mentioned in "arsa sastra", Spreading other types of flowers as ornamental motifs employed by Indian society traditions, such as the Mosella flower motif, a flower with pointed Lance leaves, and sandal flower, it is used in the manufacture of colored oils used by clerics in various rituals; see also Karabi, 2009; Maninder Singh, 2015; Brij Bhushan, 2015.

feature was present in ancient Bengali Hindu temples. The second type consists of flower motifs accompanied by various plants found in the Tantipara, saptagram and Qadm al-rasul mosques.

Moreover, in the Sultanate mosques other flower motifs found in ancient monuments were introduced. These include the water wheel flower, found in the Elklakhi mosque in Hazrat Pandaua city, and in the Chamakati mosque. Indian scholars referred to it as “Jankel or Gankyil flower”.<sup>49</sup> Maninder sing specifies its association with a religious symbol of the Buddha, symbolizing infinity.<sup>50</sup>

### **Geometric decorations**

The geometric motifs employed in the terracotta tiles decorations, which are found in both ancient temples and sultanate mosques, showcase two artistic styles. These are geometric units outlining single plant motifs and geometric units intertwined with other decoration motifs such as inscriptions and plant motifs. Triangles and circles units were repeatedly used in horizontal and vertical friezes in the decoration of the walls of the sultanate mosques, with Indian scholars noting that it had been a local staple of decorative motifs and that it was used to represent some Indian gods [Figs. 14-15].<sup>51</sup>

### ***Ratna motif***

This is an unusual geometric motif found within the sultanate Bengali mosques, limited to the area of the Qibla wall of certain mosques. For example, in a frame surrounding the Qibla niche of the Bari Pandua mosque in Hooghly, in the Adina [Fig. 16], and in the Chamakati mosque [Fig. 17].

This is an entirely local motif; it resembles the Latin letter “W”, “M”, or “E”, and forms the word “Ratna” in Hindi, which refers to Infinity in Buddhist beliefs. The appearance of this motif in local Indian art shows evidence of a connection to the Buddhist design of “DHARMA CHAKRA”, as a symbol of Buddha worship, also known as a symbol of wisdom.<sup>52</sup>

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<sup>49</sup> Literal translation in the ancient sanskrit language is “Ananda Cakra” (the wheel of happiness), see Bautze-Picron, 1995.

<sup>50</sup> Coomaraswamy, 1935; Nazinuddin, 1954; Bautze, 1999, pl. 26; Bautze-Picron, 1995; Lee, 2009; Kalantari, 2017.

<sup>51</sup> Coomaraswamy, 1935; Casey, 1985; Bautze-Picron, 1986; 1995; Alamgir, 2012.

<sup>52</sup> Lee, 2009.





Fig. 10. terracotta tiles decorations motifs, Bharpur (by Mahmoud Ahmed)



Fig. 11. Terracotta tiles, Bharpur (by Mahmoud Ahmed)



Fig. 12. Rumi decoration, Alaudin Khilji Darwaza, Delhi (by Mahmoud Ahmed)



Fig. 13. Rumi decoration, Iltutmish, Delhi (by Mahmoud Ahmed)



Fig. 14. Stucco decoration, Chamakati mosque (by Mahmoud Ahmed)



Fig. 15. Decoration unites, Chamakati mosque (by Mahmoud Ahmed)



Fig. 16. Ratna Decoration, Adina mosque (by Mahmoud Ahmed)



Fig. 17. Ratna Decoration, Chamakati mosque (by Mahmoud Ahmed)

## *Chessboard motif*

This motif consists of adjacent squares resembling a grid layout. Emam mentioned this was the embodiment of the Vastu Purush Mandala system in the local decoration style, and sutiba sinha highlighted its prominent role in the temple wall decoration. This decoration is also found in the early sultanate mosques, as a motif of local influence. Its observation showed that it can be categorized into two styles, as repeated motifs placed on horizontal friezes, and motifs circled in a rectangular units.<sup>53</sup>

Vastu sastra mentioned two terms of the chessboard decoration; Upapitha mandala resembles adjacent squares of the same size, forming a repetition of a design consisting of 25 squares divided into five vertical and five horizontal rows. Vibhoti Chakrabarti points out that it is the unique style of Vastu Purush Mandala, Paramashyaka mandala, in which the outline design displays a cross shape.<sup>54</sup>

However, sultanate mosques of the 16th century developed the motif in a different from its origins featuring intersecting lines with ornamental lines.

## **Conclusions**

- Based on stylistic similarities of decorations, the Adina and Chamakati Mosques may be attributed to the same period as the Eklaki mausoleum construction, between 1370-1474. The Lutan Mosque and Tantipara Mosque may be attributed to the 2nd quarter of the 16th century, based on their artistic similarity to the Qadm al-Rasul Mosque, which dates to 1535.
- Differences in measurements between the terracotta tiles in the sultanate Bengali mosques and the ancient temple tiles, coupled with the former's similarities to Iranian examples, suggest potential Iranian influences.
- The Lutan and the Qadm al Rasul Mosques, display all three types of terracotta tiles: blue and white, multi-colored, and monochrome glazed terracotta tiles, while the Chamakati Mosque exhibits the same style without glazing.
- The idea of mixing minerals and lime powders into terracotta clay for increased hardness and cohesion appears to have been a chemical treatment used in ancient Bengali temples, hence a locally-developed technique.
- The transmission of the glazing and coloring of terracotta tiles to India might have occurred through craftsmen migrations, especially considering that the earliest conquerors belonged to Central Asia. However, the limited areas of the early Indo-Islamic sultanates, characterized by the absence of rivers and clay nature, hindered the development of this technique in central India during the early Sultanates.

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<sup>53</sup> Ahmed Emam, 2017.

<sup>54</sup> Bhattacharyya, 1963; Chakrabarti, 1999.

- Chemical analyses, using Microwave Acid Digestion and Thermo-Gravimetric Analysis, show that the terracotta tiles were carefully processed to match environmental circumstances, considering factors like rainfall and surrounding vegetation
- The khatai motifs' presence among the decorations under investigation can be considered among the local motifs appearing in Bengal sultanate mosques. This observation is based on pre-Islamic examples, found in the Buddhist Gandhara Dynasty and the Bengali Pala Dynasty.
- The Rumi motif found in Bengal mosques was transmitted through Turkic rulers under the Delhi sultanate, who assumed the rule of Bengal in the early periods of the Islamic era
- The style of shrubs in the early mosques in the Zafar Khan, Gunmatpur and the Adina mosques, seems to be of local derivation. While the shrubs found in mosques of the 15th century appear to have developed from early Islamic prototypes found in Central Asia
- Finally sultanate mosques of the 16th century witnessed a significant development of chessboard motif, which vastly differed from the version of the same motif found in ancient Bengal temples.

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