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BRICK, TIMBER, AND STONE: BUILDING MATERIALS AND THE CONSTRUCTION OF ISLAMIC ARCHITECTURAL HISTORY IN GUJARAT

...because there is no stone in the Country [of Gujarat]; seeing they are forc’d to make use of Brick and Lime, a great deal of Timber is employ’d, which must be brought from Daman by sea.1

—Jean de Thevenot

The central place of materials in architecture and the subsequent construction of architectural history is so obvious that it is easily taken for granted. The idea that architectural traditions are conditioned by the materials available for construction is axiomatic, as is the notion of hierarchies of materials, determined both by the economics of supply and demand and by cultural factors. We all recognize too that architectural history’s documentation and interpretation of architecture is largely dependent on what survives, with materials playing an essential role in patterns of survival. Differing rates of material decay, and susceptibility to different threats, determine the longevity of structures. Different forms of human intervention—decisions to repair, rebuild, abandon, or even destroy structures—have an equally fundamental effect on patterns of architectural survival, but here again materials, or more specifically culturally determined hierarchies of material value, also play a part in the making of these decisions. Structures employing expensive or rare materials may be better preserved and maintained than those built in materials perceived as having low value, though they may also be more liable to appropriation. Obviously a structure that is no longer standing, or even an entire building type with no above-ground examples, is not necessarily completely lost to architectural history; nevertheless, written and visual records are not always available, and archaeological excavation is only rarely possible, meaning that architectural history is still dominated by the “standing,” the “above ground.” Since the birth of architectural conservation as a professional sphere in the nineteenth century, this area of human intervention has had an increasing role in determining what is listed for protection, documented, and conserved, and can thus be written into architectural history. Here again, hierarchies of material value, even if mingled with other agendas, are always operative.

Awareness and understanding of materials do not simply make for a more “holistic” architectural history, one that includes and can be limited to a history of building materials and technologies. The linked notions of hierarchies of material value and patterns of survival foster an understanding of why what is there remains there and, just as important, an awareness of what is no longer there, and why. These notions enrich a variety of agendas within and beyond architectural history: at their most primary level they contribute to the decoding of meaning within architecture through the very fabric of construction and to a more critical reading of extant literature in the field; beyond this, they help integrate architectural history with facets of economic and social history as well as geography.

Historians of Western architecture have already engaged with these debates to varying degrees: there is a massive literature on building materials and their sources, circulation, and meaning in the Roman and Byzantine worlds, based in large part upon archaeological research, while various European archives have allowed for explorations, sometimes detailed, of building materials and processes during the medieval and Renaissance periods. The architectural history of the Islamic world, in contrast, seems still to be on the cusp of this area of investigation, particularly for regions beyond the so-called Central Islamic lands.

This article reexamines the Islamic religious architecture of Gujarat in western India from the perspective of building materials: their availability and circu-
Fig. 1. View of the mosque of Rani Rupavati, Mirzapur, Ahmedabad, ca. 1500, showing the facade of the prayer hall with the bases of the characteristic centrally placed paired minarets. (Author’s photograph)

Fig. 2. View of the mosque and tomb of Rani Sabrai, Ahmedabad, early sixteenth century. (Author’s photograph)

Fig. 3. View of the collapsed facade of the Alif Khan Mosque, Dholka, mid-fifteenth century. Constructed of brick, with a total height of over 115 feet. (Author’s photograph)
lution, the impact of this availability and circulation on local hierarchies of material value and patterns of survival, and the consequences of these patterns of survival for writing the architectural history of the area. More specifically, this article suggests that brick and/or timber construction actually constituted the norm in most of the region, aided by the availability of hardwoods imported from South India by sea. The article reviews the Islamic religious architecture of the region against this background and supports this review by presenting two previously unpublished seventeenth-century brick-and-timber mosques. The focus on Islamic religious architecture is largely a result of the author’s research specialization and interests but poses a model that applies across the architecture of the region, irrespective of faith or function. As is increasingly recognized, the Islamic architectures of South Asia cannot be artificially cut off from the indigenous architectural traditions within which they grew up; for the sake of focus and with the particular audience of *Muqarnas* in mind, however, discussion will focus primarily on construction for Muslim patrons.

The Islamic architecture of Gujarat is probably one of the most famous regional traditions of Muslim architecture in South Asia. Numerous mosques, mausolea, step-wells, and even palaces have survived throughout Gujarat State, and no Gujarati city has a greater concentration of Islamic architecture than Ahmedabad, the capital of the region under the Ahmad Shahi Sultans and later the Mughals. The vast majority of these surviving structures are built in stone, with profuse external decoration and finely carved mihrabs, jalis, and inscriptions (figs. 1 and 2). Visiting the numerous stone mosques and mausolea of Ahmedabad and reading the extant literature on this regional building tradition, one may all too easily assume that stone was readily available, the natural and principal building material of Gujarat. The few brick structures that do enter the current architectural history are there, I would argue, because they are simply so massive that they cannot be ignored. The Alif Khan Mosque at Dholka, dating to the second half of the fifteenth century, is a brick structure with an original facade height of over 115 feet (fig. 3); its height dominates the surrounding town even today (fig. 4). Yet as de Thevenot’s quote cited at the opening of this article shows, a far more complex array of materials was used in the region.

THE AVAILABILITY AND CIRCULATION OF BUILDING MATERIALS IN GUJARAT

Geology and geography obviously exert a primary influence on the building materials available in any one region. The modern-day state of Gujarat is geologically and geographically diverse and is consequently home to several distinct building traditions. This first section explores the parameters that influenced architecture in the region.

The heart of Gujarat is a large, flat alluvial plain, traversed by the Sabarmati and Mahi rivers, that stretches from the southern reaches of the Aravalli hills in the north down to the Gulf of Khambhat (Cambay) in the south and is bounded on the east by the early risings of the western Ghats (fig. 5). In this central plain, sand and alluvial silts make brick the only building material available in abundance, though the plain is ringed to the north and east by ranges of mountains or hills that provide outcrops of stone. The alluvial character of the central plain of Gujarat in many ways makes it a miniaturized version of the large delta of the Indus that lies to its west, and for many centuries Khambhat was indeed believed to lie on one of the mouths of the Indus. In spite of the untruth of this belief and the differences in scale, the parallels between the two areas in terms of naturally occurring building materials deserve to be remembered.

By contrast, Saurashtra, the central region of modern Gujarat State, is rich in building stone including granites, sandstones, limestones, and marbles, which are even found at coastal sites (figs. 5 and 6). Stone is so abundant that it is even used for domestic architecture. District gazetteers as a whole pass over the presence or exploitation of stone, and the first general survey of sources of stone in the region was made by Burgess and Cousens in 1903, as part of their survey of the architecture of northern Gujarat. They observed that at the time of writing grey sandstone was quarried in north Saurashtra, around Dhrangadra, and often used in the northern plain of Gujarat. Other sources of sandstone were around Ahmadnagar in Idar, in the east of Gujarat, while white marble came exclusively from the Aravalli range that extends between the north of the state and southern Rajasthan. The authors specifically mention that marble was still being quarried at Chandravati in northern Gujarat. The situation in Rajasthan is particularly complex, since the Aravalli hills provide outcrops, ridges, and plateaus of marble that are often not large enough to feature on most
geological maps but that may have been exploited at different periods. Finally, Kutch, the westernmost part of the state, actually belongs geologically to the Indus Delta, and there also brick is the main building material. Nevertheless, certain hilly ridges may have created micro-traditions, and it is believed that the stone structures at the site of Bhadresvar were built of stone from just such a local outcrop. 5

Stone

The absence of stone in the central plain is especially significant because it is this area that was home to most of the important towns of the preconquest and Muslim periods. Anhilawad Patan, the capital of Gujarat under the Solankis, Khaljis, and Tughluqs, is situated in the north of this plain; Asawal, the later site of Ahmedabad, lies at its very center; while Dholka and the ports of Kambhat, Bharuch, Rander, and Surat lie on its furthest southern edge (fig. 5). We are therefore not looking at building traditions of a remote and peripheral region but at the factors that dictated building traditions in Gujarat’s capital cities, major towns, and ports.

Though stone clearly was brought to the central plain of Gujarat, as the many stone temples, mosques, and tombs there testify, the distances over which it had to be carried made it an expensive building material. When the British official James Forbes saw the large volume of marble and carved stone that had survived at Kambhat, he immediately “read” it as evidence for the port’s former wealth. Forbes remarked that “from the quantity of wrought stones and scattered relics of marble at Kambhat, we may judge of its former wealth and magnificence, the charge of transporting them thither must have been immense, the mountains from whence they are hewn being very distant.” 6 Indeed, the finest white marbles found at Kambhat must have been brought there during the Solanki period from quarries in the southern Aravalli range, some two hundred kilometers away (see fig. 5).
Although documentation of the stone trade across Gujarat in the medieval period is practically non-existent, we do find occasional statements that testify to the difficulties in obtaining stone. The author ‘Ali Muhammad Khan, an official in Gujarat under the later Mughal emperors, appears to have been acutely aware of these obstacles, since his description of Ahmedabad includes information about how the kings and nobles “procured stones from distant places and built mosques.” This is corroborated by an inscription on a temple pillar which was reused in the construction of a mosque in the citadel at Ahmedabad in 1414, under the patronage of Ahmad Shah. The inscription records how an individual named Pethada contributed a jali screen to the temple of Uttaresvara at Mahisaka in the year 1308 Vikrama Samavat (henceforth abbreviated as VS) which is equivalent to 1251–52 CE. Mahisaka is to be identified with the present village of Mahisa in the Kaira district, which is some fifty kilometers from Ahmedabad. In this example, by making use of spolia the patron economized considerably on the costs of quarrying and transporting fresh stone, even though the task of dismantling the structure and transporting the stone more than fifty kilometers overland by bullock cart would itself have been costly. Earlier patrons, however, would have had to bear the full costs of quarrying and transport to the building site.
No Gujarati sources so far give information about the infrastructure needed to obtain stone, but later documents provide insight into such issues. Quite exceptionally, three *firmāns* have survived that detail arrangements for the quarrying and transport of white marble for the construction of the Taj Mahal in Agra between 1632 and 1637. The marble quarries were situated at Makrana in Rajasthan, in the territory of Raja Jai Singh of Amber, and the quarrying therefore necessitated his permission and cooperation. The correspondence makes clear that the whole production of the quarries was made over to supply the Taj, and that every stonemason in the region was employed in the quarrying, while over 230 carts were arranged on hire to transport the marble to Agra.\(^{11}\) While the Taj was undoubtedly one of the largest-scale projects of all time, these *firmāns* are useful reminders of the infrastructural and political factors involved in any acquisition of stone.

There is in fact a growing body of evidence to suggest that stone architecture may have come to the central plain of Gujarat comparatively late. The *Prabandhacintāmani*, a Jain text of the early fourteenth century, states that the Chalukyan rulers of Gujarat in the twelfth century were the first to build stone temples in Gujarat, earlier temples and buildings being of wood and brick.\(^{12}\) This statement also fits with the political history of the Gujarat area.\(^{13}\) Until the ninth century, what we now see as the “natural” area of Gujarat was in fact split between a number of competing kingdoms. Between the seventh and ninth centuries the Chalukyas of the Deccan gradually extended their control of the southern coast up from Bharuch towards the central plain, pushing against the Gur-
jara-Pratihara clans of north Gujarat, north Saurashtra, and Rajasthan, and against other stakeholders such as the Valabhi dynasty in southern Saurashtra, the Kalachuri dynasty of central India, and finally the rulers of Thaneswar in the Gangetic valley. In the mid-tenth century the Gujarat branch of the Chalukyas—generally known as the Solankis—was founded, and under Mularaja Solanki (r. 998–1053 VS/942–97 CE) extended its rule as far as Anhilawad Patan in northern Gujarat and asserted control over south Gujarat at the expense of former kinsmen, the Chalukyas of the Deccan. The main point is that for an extended period the southern coast and central plain of Gujarat were separated territorially from Saurashtra and from northern and eastern Gujarat with their sources of stone (figs. 5 and 6). There seems little doubt that these political divisions affected the circulation of building materials in the region and perhaps delayed the extensive use of stone in architecture. By contrast, natural geology and a long coastline offered alternative materials and contributed to a distinctive local architecture.

**Brick and timber**

As one would expect of an alluvial region, there is plentiful evidence for a long tradition of brick architecture in the central plain of Gujarat. The earliest brick structure is a tank at Lothal, the site of a large city of the Harappan period, about forty kilometers west of Kambhat. Brick structures spanning the first to ninth centuries have also been excavated at the early port site of Nagara, now located three kilometers inland from Kambhat. The massive brick mausolea of Darya Khan and Azam and Mu’azzam Khan in Ahmedabad and the Alif Khan Mosque at Dholka provide examples of a tradition of monumental, domed brick construction during the fifteenth and sixteenth centuries that has to date barely been explored (figs. 3 and 4). Brick manufacture continues to be a major industry in central Gujarat to this day.

The massive mausolea and mosque do not appear to be typical of brick architecture in Gujarat, however. Instead, the majority of brick architecture in western India seems to have been intimately tied to the use of timber. While brick could be used alone for the construction of tanks or foundations, Gujarat does not appear to have employed the technology of dome or vault construction until comparatively late, possibly as late as the fifteenth century, and the majority of brick structures in the region appear to have depended upon wood for their roofing and internal supports. For larger structures, a supporting timber frame maximized the capabilities of non-vaulted brick. A late but particularly complete description of this building method is provided by the mid-eighteenth-century author of the *Mīrāʾī i Ahmadi*, who states that “walls of houses are built of baked bricks. The roof is covered with teakwood and clay tiles” and that “teakwood is used for roofs and pillars of buildings.” The same technique is described a century earlier by de Thevenot in his description of the use of brick, lime, and timber for house construction at Surat (see the opening citation).

Brick-and-timber construction appears to be far more ephemeral than construction in stone—more easily burned down and far more simply stolen—and very few structures older than the seventeenth century have survived. Thus the history of this type of construction has mainly been traced through later domestic architecture, physical evidence such as the imitation of wooden construction in stone structures, textual references, and rare visual evidence. This important task was begun by V. S. Pramar, who gathered descriptions of the different building materials used in Gujarat going back to the first century. These references are often oblique, however, and even descriptions of structures are not always as complete as one would hope. Thus the sixteenth-century *Ā’in-i Akbar* relates that “the roofs of houses [in Gujarat] are usually of tiles and the walls of burnt brick and lime.” Though the author describes only the outward appearance of structures, it seems likely, on the model of the *Mīrāʾī i Ahmadi*, that their roofing and internal supports would have been of timber, but this is not explicitly stated. In a similar fashion the twelfth-century Arab geographer al-Idrisi limits himself to describing the exterior of houses, remarking that Bharuch was “a large handsome town, well built of brick and plaster.”

**Timber**

There is also considerable literary evidence for the existence of pure wooden construction in certain parts of Gujarat. Both Jain and Muslim sources record that the early-eleventh-century temple at Somnath Patan was built of timber. Details of the temple destroyed by Mahmud of Ghazna in 1026 are supplied by Muslim authors in the context of their accounts of his campaign in Gujarat. Ibn al-Athir in his *Kāmil fi al-tārīkh* records that “this temple of Somnath was built upon
fifty-six pillars of teak wood covered with lead," while Ibn Zafir adds that the floor was also made of planks of teak, the interstices filled with lead.\textsuperscript{21} No further details are available about the Somnath temple before Mahmud’s raid, but it appears to have been reconstructed in wood afterwards. A passage in the Prabandhacintāmani of Merutunga records a discussion between the Solanki ruler Kumarapala (r. 1200–29 VS/1144–73 CE) and the Jain scholar Hemachandra, in which the latter exhorts his sovereign to “restore the wooden temple of Somesvara, which is almost destroyed by the neighbouring sea, owing to the showers of ocean spray that fall over it.”\textsuperscript{23} This passage suggests that, for the temple to be so vulnerable to seaspray, the roof and large parts of it must have been of timber. Again, these passages fail to clarify whether the temple was built entirely of teakwood or whether it employed the mixture of timber and brick found in contemporary domestic architecture, although presumably an important temple would be a pure timber construction.

Other passages in the Prabandhacintāmani refer to yet other wooden temples in Saurashtra. Again, one may question whether these temples were constructed entirely of wood or also employed brick for walls and foundations. One passage set during the reign of Jayasimha (r. 1150–1200 VS/1094–1144 CE), recounts how in 1128 CE a governor of Saurashtra named Sajjana “devoted the proceedings of the taxes for three years to building on the holy mountain Ujjayanta [Girnar] a new stone temple to Neminatha [Girnar] and also employed brick in place of the wooden one which he took away.”\textsuperscript{24} Yet another anecdote, set during the reign of Kumarapala (r. 1144–73 CE), describes the restoration of a wooden temple at the site of Vimala Mata, or Satrunjaya, in Saurashtra. Merutunga relates how an official named Udyanana, on campaign in the region, “was afraid that the god’s wooden temple would be destroyed [by fire]... [and] conceived a desire to restore the dilapidated temple.” This was finally achieved in 1211 VS/1154–55 CE, although the text does not make clear what material was employed for the reconstruction.\textsuperscript{25}

The use of timber in Gujarat is not without its paradoxes, however, since timber, like stone, was not always a naturally occurring building material. Pramar has argued that Gujarat did not have large viable forests for the provision of structural timber such as sal (Shorea robusta) or teak (Tectona grandis), the two Indian trees that yield the best structural timber. Although several areas—such as the Gir forest in Saurashtra, the Dangs in southern Gujarat, and the hilly eastern fringes of the state—are potential sources of timber, Pramar’s research has established that these areas yielded wood poor in either quality or quantity, insufficient for a regular and reliable production.\textsuperscript{26} To make matters worse, in many periods these areas were under the control of tribal chiefs and therefore inaccessible to large-scale exploitation. By contrast, reliable supplies of structural timber were available from further down the western coast, from Konkan and Malabar.

\textbf{Transport costs: sea versus land}

As de Thevenot’s analysis of building materials in seventeenth-century Surat makes clear, the final choice of materials was conditioned not simply by availability but also by the transport costs involved in acquiring them. He writes:

> ...because there is no stone in the Country [of Gujarat]; seeing they are forc’d to make use of Brick and Lime, a great deal of Timber is employ’d, which must be brought from Daman by sea, the wood of the Country [i.e., Gujarat] which is brought [from] a great way off, being much dearer because of the Land-Carriage.\textsuperscript{27}

Daman is a port on the extreme southern border of the modern state of Gujarat, on the border with Konkan. De Thevenot’s statement explains that local timber sources (in the Gir forest in Saurashtra and in the hilly eastern fringes of Gujarat) were too expensive to exploit because of the high cost of land transport. It was cheaper to import the required timber by sea than to exploit Gujarati timber sources inland. Though de Thevenot cites Daman as the source of this timber, it was probably only a transshipment port for wood originating even further south in Konkan or Malabar. De Thevenot’s data are confirmed by his contemporary, Stavorinus, who remarked that at Surat, “most of the wood for fuel, and all that is wanted for house and ship building, is brought thither from Daman, by water-carriage.”\textsuperscript{28} This situation even continued into the nineteenth century, when numerous sources describe the shipment of timber from the Malabar and Konkan coasts to carpenters at Ahmedabad and Bhavnagar in Saurashtra.\textsuperscript{29}
some idea of the relative cost of these means can be gauged from data evolved for Europe before the invention of steam or combustion engines.

Table 1. Ratio of transport costs by sea, river, and land

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<th>Ratio</th>
<th>Sea : River : Land</th>
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<tr>
<td>Eighteenth-century UK</td>
<td>1 : 4.7 : 22.6</td>
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<tr>
<td>Roman Empire</td>
<td>1 : 4.9 : 28</td>
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<td>Roman Empire</td>
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Since Gujarat has an extensive seacoast but only one navigable river, the Narmada, water transport in Gujarat equaled sea transport. With land transport at least twenty times more expensive than sea transport—and up to sixty times more expensive in the worst scenario—it is easy to see why timber was imported to Gujarat from the Konkan and Malabar coasts rather than from local inland sources, and equally why stone was such a prestigious building material.

Though brick-and-timber construction was less expensive than stone, it was still far from being a cheap and popular building medium. “Brick and lime,” states de Thevenot, “are very dear also; and one cannot build an ordinary house at less than five or six hundred livres for brick and twice as much for lime. […] Such houses as these are for the rich.” Tavernier confirms this hierarchy, adding that “in the whole of Surat there are only nine or ten well-built houses, and the Shahbandar, or chief of merchants, owns two or three of them.” The majority of the population at Surat lived in houses “like barns, being constructed of nothing but reeds, covered with cow-dung mixed with clay” and “covered with branches of palm trees.” In Gujarat the status quo between stone and timber appears to have been broken by the fact that timber could be imported cheaply by sea and could be combined with the brick available locally to maximize its capabilities.

One aspect of the circulation of building materials that de Thevenot and Tavernier do not mention is that of the transport of stone by sea. Although evidence for this is at present extremely scant, the availability of stone at coastal sites in Saurashtra makes movement of this type at least theoretically possible. In this connection, one passage from Merutunga’s Prabandhacintāmaṇi is highly relevant. Merutunga relates an incident that occurred during building work at the Nandisvara Temple on Mount Satrunjaya in Saurashtra in the year 1277 VS/1220–21 CE, reporting that:

Sixteen excellent pillars of Kantheliya stone were being brought by water from the mountain, and when they were being landed near Samudra-kantha one pillar sank into the mud in such a way that, though diligently searched for, it was not recovered. A pillar of a different kind of stone was substituted in its place, and the temple was fully completed according to the size designed. During the next year, owing to the change produced by the tide of the sea, that very pillar, that was lost in the mud, became visible.

The location of the mountain where the pillars were carved before transport to Satrunjaya is not certain but may correspond to the site of Kanthkot or the region called Mahi Kantha, hence Kantheliya, on the border between north Saurashtra and the Rann of Kutch (see fig. 6). Similarly, the site of Samudra-kantha where the pillars were unloaded corresponds to no known site, though the term samudra suggests a coastal site, and since they were destined for the temple at Satrunjaya it seems likely that they were landed somewhere close by. Whatever the current confusion, this passage clearly describes an incident during the early thirteenth century in which pillars were precarved and then transported by sea to the vicinity of their final destination.

The identification of the mountain and the Kantheliya stone with Kanthkot or Mahi Kantha is corroborated by what we know of Saurashtra’s geography at this period. The Imperial Gazetteer of the Bombay Presidency of 1909 makes clear that until the nineteenth century Saurashtra was separated from the mainland of Gujarat by a belt of salt lands and a long lagoon called the Nal (see also fig. 6). During the monsoon the Nal formed a connecting link between the Gulf of Khambhat and the Little Rann of Kutch and for six months of the year turned Saurashtra into an island. This phenomenon ceased only as a consequence of a violent earthquake that shook western India in 1819 and raised the Saurashtran peninsula, thus terminating the annual flooding. It is mentioned by several reliable authors, namely de Varthema, Baldaeus, and Alexander Hamilton, and is also confirmed by contemporary maps of India, such as that illustrated in Herbert’s 1665 volume, Some Yeares Travels into Divers Parts of Asia and Afrique (fig. 7). Even more than now, therefore, this part of western India was intimately linked to the sea, and pillars quarried at Kanthkot or in Mahi Kantha would have been shipped around
Fig. 7. Map of Gujarat in 1665, showing Saurashtra as an island off the coast of Gujarat. (From T. Herbert, *Some Yeares Travels into Divers Parts of Asia and Afrique*, reprinted in Susan Gole, *A Series of Early Printed Maps of India in Facsimile*, map 11b)
either the western or the eastern half of Saurashtra and unloaded at a port site close to Satrunjaya.

Although this is only an isolated notice, it seems likely that more details of this type might be found in other texts of the period. With its massive reserves of stone and its status of a near-island, Saurashtra may have been in an ideal position to supply stone to other parts of western India. A sea trade in Saurashtra stone certainly existed in the early twentieth century, since the Imperial Gazetteer of the Bombay Presidency mentions that “near Porbandar a valuable description of building stone is extracted from the hills and sent to Bombay in large quantities.” Since Porbandar and Bombay are both ports, it seems logical to infer that this trade took place by sea.41 The building stone of the region would also have been especially accessible to towns in the central plain of Gujarat such as Khambhat and perhaps even Ahmedabad. The quarries at Dhrangadra are situated on the very “coast” of the Rann of Kutch, offering direct contact by water with Khambhat and easy access to other major towns such as Dholka and Ahmedabad. In this new geographical context, Briggs’s rather dismissive comment that certain persons believed the stone employed in the construction of the Friday mosque at Ahmedabad (fig. 1) to be a “grey-wacke procured from the contiguity of the Rann of Katch” may in fact have some basis in fact.42 This said, it seems unlikely that these seaborne sources of stone radically altered the balance of materials in Gujarat. The most prized stone of the day, white marble, was available only from inland sites in southern Rajasthan, and, as our many sources show, stone was generally brought to the central plain of Gujarat by land.

Overall, our understanding of the circulation of building materials in coastal Gujarat in the seventeenth century provides a useful overview of the parameters that conditioned building traditions in Gujarat from the earliest times until the advent of rail transport and the combustion engine revolutionized the economics of transporting materials. If we are to trust the Periplus Maris Erythraei, which states that “teakwood, and beams, saplings, and logs of sisoo and ebony” were exported from Barugaza [Bharuch] to the Iranian coasts of the Persian Gulf, Gujarat appears to have been a transshipment area for South Indian timber from as early as the first century.43 It is then possible that imported timber was used to expand the possibilities of local brick in the central plain of Gujarat, and especially at coastal sites, at least from this early period. While the political unification of Gujarat under the Solankis in the tenth century would have facilitated the circulation of stone from Saurashtra and northern Gujarat down to the central plain and the coast, the patterns of survival in these regions suggest that stone remained rare and costly. Brick and timber then, rather than stone, would have constituted the principal high-status building materials in the central plain of Gujarat and along the coastal plain in the east.

**RECONSTRUCTING THE ISLAMIC ARCHITECTURE OF GUJARAT**

*Materials and patterns of survival in Gujarat*

The fact that so many stone structures survive today in Ahmedabad and other cities in Gujarat is due in part to the natural durability of stone as opposed to wood and brick, as well as to the technical complexities of making off with heavy stone blocks. However, it must also go back, to a large degree, to a more or less unspoken hierarchy of building materials in which stone was considered a more “worthy” material than either wood or brick. If it is difficult to document for the precolonial period, this bias towards stone is very evident in the work of the Archaeological Survey of India in its colonial and postcolonial forms. There is no doubt that religious architecture in stone was listed, conserved, and restored more than buildings of “lesser” materials. In case of Khambhat, for example, the stone Tughluq Friday mosque of 1325 and the port’s many marble inscription slabs were listed and published relatively thoroughly from 1885 onwards. By contrast, at least two early and important brick-and-timber mosques—the mid-seventeenth-century Masjid-i Fath and the fourteenth-to-eighteenth-century Sad-i Awwal Mosque and its minaret—were extant in the late nineteenth century but were almost completely ignored and certainly never protected. The 1961 Census of India, which assembled a great deal of data on construction in brick and timber in Gujarat, equally neglected to include mosques and certainly omitted these two examples, which cannot have been the only extant brick-and-timber structures at Khambhat in the late nineteenth century; countless loose foundation inscriptions in the port testify to the many other mosques and mausolea, very probably of brick-and-timber construction, that also existed. They are simply the two buildings that survived long enough for me to be able...
to document them during fieldwork at Khambhat in the 1990s. This bias towards stone construction has led to a very skewed perception of the character of Islamic architecture, not only at Khambhat but across Gujarat.

Brick-and-timber mosques of Gujarat

Though most of the descriptions of brick and timber structures cited so far concern domestic architecture, we could perhaps just as easily replace “house” by “mosque.” A few later sources do indeed refer to mosques of this type. A footnote in the Bombay Gazetteer of 1899 includes a description of a typical Gujarati mosque as a structure with brick walls and floors and a stone gateway.\(^{44}\) As the Gazetteer suggests, more ambitious projects or wealthier patrons probably included some stone for focal areas such as the foundation inscription, the mihrab, the minbar or, as mentioned above, the entrance gate. Although the author of the Gazetteer does not specify the manner in which such mosques were roofed, the text of the Mir'at-i Ahmadi and de Thevenot’s description, both cited earlier, suggest that these would have been of timber, even if the precise form and finish of the roof—whether flat, pitched, or marked by domes—is unclear, since to date no original roofs have been identified.

Perhaps more surprisingly, a few structures have survived. A late though not particularly fine example is the nineteenth-century wooden extension to the fourteenth-century Tanka Mosque at Dholka. The amount of covered prayer space was increased by building across the courtyard; in this area, construction is entirely in wood, with stone used only for the pillar bases and paving (fig. 8).\(^{45}\) The roof here is flat with plain, undecorated ceilings.

More interesting are two seventeenth-century brick-and-timber mosques that have recently come to light at coastal sites in Gujarat. The Masjid-i Fath at Khambhat\(^ {46}\) is almost invisible from the street, and a quick glance through the bars of the entrance gate on the north side suggests nothing more than an empty space enclosed by four brick walls. From the inside, however, traces of a fine mosque are still visible. Although no roof or pillars have survived, the qibla wall is still substantially intact (fig. 9). Built of brick with a plaster finish, it has three white marble mihrabs and a minbar, all finely carved and some still bearing traces of inlay.

Fig. 8. Interior of the Tanka Mosque, Dholka, showing the nineteenth-century wooden extension to the fourteenth-century mosque. (Photograph courtesy of Sara Searight)
Most important, the qibla wall carries three inscriptions relating to the construction of the mosque (fig. 11), which together establish that the Masjid-i Fath, or Mosque of Victory, was built in 1056 (1646–47) by a certain ‘Ali Akbar, an Iranian horse and jewel trader who in 1646 was appointed by Shah Jahan to administer the ports of Khambhat and Surat. ‘Ali Akbar’s career and patronage provide a late but fascinating example of the merchant patronage that had driven architectural activity at Khambhat for centuries and, most significantly, produced one of the earliest brick-and-timber mosques known to survive in Gujarat. While the building currently lacks any internal supports or roof, a short description in James Burgess’s Revised Lists of the Antiquarian Remains in the Bombay Presidency records that in the late nineteenth century the mosque still “[had] a marble arch and [was] sup-

Fig. 9. Qibla wall of the Masjid-i Fath, Khambhat, 1646–47. (Author’s photograph)

Fig. 10. Detail of the central mihrab and minbar, Masjid-i Fath, Khambhat. White marble, inlaid with carnelian, dated 1056 (1646–47). (Author’s photograph)
Fig. 11. Detail of inscriptions recording the foundation of the Masjid-i Fath, Khambat, by 'Ali Akbar Isfahani in 1646–47. (Author’s photograph)

Fig. 12. Reconstructed ground plan of the prayer hall, Masjid-i Fath, Khambhat. (Author’s plan)
ported on 32 wooden pillars.”

The Masjid-i Fath therefore had brick walls, wooden pillars on stone bases, and marble furnishings—the mihrabs, minbar, and foundation inscriptions. In all probability, the pillars and roof of the Masjid-i Fath were constructed with teak imported from Malabar or Konkan. Indeed, the letters of the English factory at Surat specifically mention that ’Ali Akbar was issued twelve passes for ships from Malabar to trade at Khambhat, indicating that he traded directly with this area. From Burgess’s account and the surviving stone pillar bases, the ground plan of the mosque can be reconstructed with some certainty (fig. 12).

Given the use of wooden supports it also seems likely that the mosque would have had a trabeated wooden roof, though, as mentioned earlier, the exact form of the roof remains open to debate. If mosque architecture of this type followed domestic models, then we might reconstruct a pitched roof covered by tiles as described in the earlier A’ın-i Akbarī and the slightly later Mināt-i Ahmadī. If this is the case, brick-and-timber mosques would have had a very different exterior profile from stone-built mosques, where domes are the norm (see the small open mosque to the left of the mausoleum in fig. 2). However, it may be that these brick-and-timber mosques had some form of flat roof or a system of plaster-covered wooden domes. For the moment we can only speculate.

More recently, substantial traces of a second brick-and-timber mosque, possibly some fifty years earlier than the Masjid-i Fath, have been identified at Bharuch. The mosque is the object of a separate article in course of preparation, but given the rarity and fragility of brick-and-timber structures, its presence seems worth signaling even at this early stage. The foundation inscriptions of the Qazi Mosque at Bharuch were first published in 1933–34 with the specification that they were inscribed on the wooden beams of the mosque (fig. 13).

Together they record, in Persian verse, the construction of a mosque by one Murtazz Khan Muzaffar Ghazi in 1018 (1609). Remarkably enough, the mosque has never been published but still stands today within the precincts of a private home inside the old city walls (fig. 14). The inscriptions are no longer in situ on the beams, and it is clear that the mosque has undergone substantial alterations, notably including a
reroofing, since the 1930s. However, substantial parts of the original structure do survive. Here, a pattern of survival opposite that of the Masjid-i Fath appears to have operated, with the original exterior walls being lost but fine wooden pillars, numerous stone bases, and a superb pair of carved wooden doors surviving instead (figs. 15 and 16).

Unfortunately, in Gujarat these survivals are the exception rather than the rule. The leitmotif of my fieldwork in Khambhat was to be shown a brand new mosque with, at best, only a few remains of the wooden original in the courtyard, awaiting disposal. The one area that preserved a few wooden mosques, at least as late as the mid-1990s, was Patan, in northern Gujarat, though these were rapidly being replaced by concrete structures funded from the revenues of migrant workers in the Gulf States and Saudi Arabia. The Sad-i Awwal Mosque at Khambhat illustrates this pattern of failed listing and documentation inevitably followed by enthusiastic modernization.

The Sad-i Awwal Mosque is one of a number of mahalla, or small neighborhood mosques, at Khambhat. As its name suggests—sad-i awwal means “first hundred” or the first century of the Hijra—it is believed to be one of the first mosques founded at Khambhat. Though a date in the first century AH seems highly unlikely, the mosque does preserve a number of important old inscriptions and marble carvings going back at least to the fourteenth century.

I in fact first visited the mosque in 1998 as part of a survey of inscription slabs at the port; unfortunately, I arrived after the most recent of many renovations, this one quite drastic. The prayer hall of the mosque had been completely rebuilt and was now a simple concrete box without internal supports (figs. 17 and 18). However, the fine marble pillar bases built into the floor (fig. 18) and the piles of old timber stacked in the courtyard for disposal suggested that it had formerly had a timber roof supported on timber columns placed on marble bases. The timber was too damaged to establish any firm date, but the pillar bases and inscriptions still preserved in the mosque provide enough information to reconstruct a possible history of the structure before its renovation.

The earliest foundation inscription (fig. 19) records the reconstruction of a fallen mosque in 827 (1423) by Sultan Ahmad Shah of Gujarat.52 Generally at Khambhat it is extremely difficult to prove that an inscrip-
tion slab is in situ, since loose slabs were often moved between structures for safekeeping, and the inscriptions are rarely detailed enough to identify a mosque in a particular locality, let alone location. However, in this case, the date of the inscription and the name of the patron can be inferred from the elaborate stellate pillar bases that have been preserved in the floor of the mosque (fig. 20, a and b). These finely carved white marble bases recall similar stellate bases and pillars placed at the openings of the prayer hall screen in the 1414 Bhadra Mosque and the 1424 Friday mosque at Ahmedabad (fig. 21), both erected under the patronage of Ahmad Shah, and in the mosque of his successor, Qutb al-Din Shah, built at Ahmedabad in 1449.53 While it is impossible to prove absolutely, the cluster of stellate pillar bases in mosques built under royal patronage at Ahmedabad and the presence of similar bases alongside a foundation inscription of Ahmad Shah at Kambhat suggest that the two groups of material may be associated, and that the foundation inscription and pillar bases in the Sad-i Awwal are survivals of an early stage of the mosque. Although the Sad-i Awwal Mosque does not go back to the first century of the Hijra, it was at least rebuilt in the early fifteenth century under royal patronage and had a fine marble inscription along with elaborate pillar bases. The absence of any other stone remains in the vicinity of the mosque and the fact that the mosque was never listed or protected suggest that these bases supported a wooden superstructure. A second foundation inscription in the mosque specifically names the Sad-i Awwal Mosque and states that it was rebuilt again in 1186 (1772–73).54 The timber stacked in the courtyard may well have come from this later, eighteenth-century reconstruction.

The evidence from the Sad-i Awwal Mosque is not as solid as that provided by the Masjid-i Fath but nevertheless suggests the existence of brick-and-timber mosques at Kambhat at least as far back as the fifteenth century. More important perhaps, its inscriptions seem to confirm that such mosques generally deteriorated more rapidly than their stone counterparts and tended to be almost entirely rebuilt, rather than restored, when this happened. Since the nineteenth century, unlike stone structures, they have also tended to be ignored in listings of monuments and so were never recorded, let alone protected or sensitively preserved. The story of the Sad-i Awwal Mosque has unfortunately grown even sadder: on my last visit, in early 2004, the pillar bases had been removed from the prayer hall, where they obviously impeded prayer, and were stacked in the courtyard for disposal.

The enthusiastic renovation of the mosque had also extended to its earliest part, the brick staircase minaret on its southeastern corner. In this discussion of brick-and-timber mosque architecture, I have paid little attention to ancillary structures such as minarets. The east wall of the mosque courtyard carries an open flight of stairs that leads up to a small domed chattri, or small, open kiosk, at the southeast corner of the

Fig. 15. Wooden pillar from the Qazi Mosque at Bharuch, probably early seventeenth century. (Author’s photograph)
building, above a former entrance to the mosque. As seen in 1998 and documented in previous photographs by the American Institute of Indian Studies, the *chattri* is built of brick covered with plaster and carries a band of turquoise tiles around the base of its dome (fig. 22). The four walls of the *chattri* are chamfered at the corners to lead into the octagonal zone of transition and then up to the circular dome. The whole has a prismatic or faceted effect quite different from the angular stone *chattris* seen atop other mosques in the region. The southern side of the *chattri*, that directly above the gateway, has a small balcony supported on brackets. Many surfaces preserve traces of decoration: the dome is lobed and sits on a band of blind arches each decorated with a turquoise-glazed ceramic inset in the shape of a lamp; its octagonal base carries a row of bud-shaped merlons; and, finally, the exterior face of the balcony is decorated with the traditional Gujarati frieze of mango leaves.

The *chattri* has no inscriptions and there are no structures with which to compare it directly; nevertheless, various details suggest a date in the four-
Fig. 17. Exterior of the recently rebuilt Sad-i Awwal Mosque, Khambhat, showing remaining pillar bases, possibly remnants of an earlier wooden or brick-and-timber mosque. (Author’s photograph, taken in 1999)

Fig. 18. Interior view of the recently rebuilt Sad-i Awwal Mosque, Khambhat, showing remaining pillar bases built into the new floor, possibly remnants of an earlier wooden or brick-and-timber mosque. (Author’s photograph, taken in 1999)
Fig. 19. Foundation inscription in the Sad-i Awwal Mosque, Khambhat, recording the reconstruction of a fallen mosque by Sultan Ahmad Shah in 1423. (Author’s photograph)

Fig. 20, a and b. Marble pillar bases of different shapes, possibly early fifteenth century, Sad-i Awwal Mosque, Khambhat. (Author’s photograph, taken in 1999)
teenth or fifteenth century. The crown of merlons is too generic for comparison, but similar turquoise-glazed tiles, square this time, are built into the exterior wall of the Begumpur, or Jahanpanah, Mosque built around 1343 in Delhi. The closest local parallels are with the decoration of turquoise tiles on two fifteenth-century mosques, the Shams Khan and the Ek Minar ki Masjid, at Nagaur in Rajasthan. Since both mosques display heavy Gujarati influence in their ground plans and minarets, their decoration may also

Fig. 21. Detail of one of the stellate pillars within the prayer hall of the 1427 Friday mosque at Ahmedabad. (Author’s photograph)
reflect contemporary Gujarati fashions largely lost in the region.

Unfortunately, during the latest phase of renovation of the Sad-i Awwal Mosque, which saw the pillar bases dug up from the prayer hall, the entire chattri has been covered with what can only be described as bathroom tiles (fig. 23), completely obliterating any trace of the original turquoise tiling (though I continue to hope that these may simply lie under the modern surface).

There seems little doubt that the chattri was intended to function as a place for the call to prayer. Contemporary parallels in stone are known in Gujarat, but the Sad-i Awwal is the only brick example so far documented. The Friday mosque at Bharuch (1321) is an open hypostyle mosque of relatively modest proportions: it seems clear that the call to prayer was given from the roof, reached by means of an open flight of stairs in the north boundary wall. The Ravali Mosque, at Mangrol in Saurashtra (1386–87), is also a simple, open hypostyle mosque, and here again the staircase is built into the south wall. In contrast to Bharuch,
the stairway of the Sad-i Awwal leads up directly to a small, square chattri, or pavilion for the shelter of the muezzin. In terms of architectural genealogy, the chattri follows clearly in the line of so-called staircase minarets or mi’dhanas (literally “place for the calling of the adhān,” rather than that of tower minarets. The roofs of mosques were frequently used for the call to prayer, and in certain cases this use was formalized by the construction of a staircase leading up to the roof, sometimes with a small pavilion or structure at roof level to protect the muezzin from the elements. The earliest surviving physical example of the type is
and Kambaya, all large port sites along the Gujarati coast. The reign of Harun al-Rashid (r. 786–809) also mentions the presence of “Friday mosques at Famhal, Sindan, Saimur, and Khambhat,” all large port sites along India’s western seaboard. Short but specific references to mosques clearly indicate that an Islamic religious architecture already existed in these areas; thus al-Mas‘udi (d. 956) writes that in the kingdom of the Balhara (the Arabic rendering of Chalukya) “Islam is honored and protected and the Muslims dispose [themselves] of monumental mosques and Friday mosques, frequented for the five prayers.” A slightly later source, Ibn Hawqal’s Kitâb sūrat al-arḍ (finished in 976) also mentions the presence of “Friday mosques at Famhal, Sindan, Saimur, and Kambaya,” all large port sites along the Gujarati and Konkani coasts. As we have seen, at this period even the local Chalukya rulers may have built more frequently in brick and timber than in stone. Thus, although we have no descriptions or traces of these early mosques, it seems highly probable that they would have followed the dominant local building traditions of brick-and-timber or timber construction, with brick staircase minarets. The only real chance of definitive proof lies in the archaeological excavation of early Islamic quarters, and specifically mosque sites, something that the religious tensions and politics of Gujarat render almost impossible any time in the near future.

Nevertheless, the above discussion clarifies important aspects of the Islamic architecture and epigraphy of Gujarat. Contrary to generally held assumptions that the Islamic architecture of Gujarat is a stone architecture, it appears that of the three building materials available in Gujarat—brick, timber, and stone—stone was the most costly and least easy to obtain, and consequently that brick and timber, used singly or in combination, were the primary means of construction. Although timber was also an expensive raw material and was not available locally, it could be imported cheaply by sea and could be combined with the brick available locally to maximize its capabilities. Particularly at a site such as Kambhat, situated on the furthest southern edge of the central alluvial plain, using a mixture of timber and brick was the most natural method of construction and never appears to have been seriously rivaled by the use of stone. The large numbers of inscriptions on stone and architectural carvings in marble from Kambhat demonstrate that small quantities of stone were used for especially important areas of buildings, such as foundation inscriptions and mihrabs, and for other inscriptions that were required to survive as enduring records, such as grave memorials.

Significantly, this pattern of material use and circulation brings the architecture of coastal Gujarat firmly into the ambit of Islamic architecture around the Persian Gulf and along the coasts of the Arabian Peninsula. Though common materials by no means dictate common stylistic or technical traditions, this shared basis suggests a closer examination of architectural traditions around the western Indian Ocean. The presence of staircase minarets in western India at least as early as the fourteenth century illustrates the close ties between the Islamic architecture of Gujarat and the building traditions of the Islamic heartlands.

The relative fragility of brick and timber compared to stone construction explains why so few Islamic buildings of this type have survived, since it is considerably more difficult to destroy a stone structure than one built in brick and timber. Burn or take away the timbers, make off with the bricks, and the only durable remains of a structure such as the Masjid-i Fath or the Sad-i Awwal Mosque will be the areas of carved stone—that is, its architectural carvings and foundation inscriptions. This is exactly the pattern of Islamic survivals at Kambhat, where we have a mass of detached foundation inscriptions and mihrabs, the earliest foundation inscription dating as far back as 1218, but few standing structures of any age. The only two complete Islamic structures at Kambhat are both stone constructions: the Friday mosque of 1325 and the adjacent tomb complex of `Umar al-Kazaruni (d. 1333). Otherwise the port has preserved a few solitary stone gateways and a brick staircase minaret, all of the four-
teenth century, which now are attached to modern concrete mosques or simply stand alone.

Excluding Ahmedabad, the exception to the rule, other towns in Gujarat present a pattern similar to that of Khambhat, with only a handful of monumental stone structures. Stone-built mosques survive at Bharuch (1321), at Dholka (the Mosque of Hilal Malik [1333], the Tanka Mosque [1361], and the current Jami' Mosque dating to the fourteenth century), and at Kapadwanj (1370–71). A further two mosques, one at Mandal and the other at Baroda, are undated but can probably be dated on stylistic grounds to the fourteenth or early fifteenth century. Survivals are slightly better in Saurashtra, in the western part of Gujarat State, and even to some extent in Kutch, where adequate supplies of local stone appear to have made stone construction far more common. The site of Bhadresvar in Kutch has preserved three stone-built mosques in addition to the so-called Shrine of Ibrahim, all dating to the mid-to-late twelfth century. In Saurashtra, a late-thirteenth century mosque, the Mosque of al-Iraji, has survived at Junagadh, also the site of a fifteenth-century mosque; another early mosque, so far unpublished, survives at Vanthali. The ports of Saurashtra also preserve a significant number of mosques and mausolea built in stone from the fourteenth century onwards. Somnath Patan has a Jami' Mosque dated 732 (1331) and the Maipuri Mosque of possibly fourteenth-century date; only recently, Mehrdad Shokoohy has mentioned the existence of two more unpublished early mosques there. Three stone mosques survive in Mangrol alone: the Rahmat Mosque of 1382–83, the Jami' Mosque probably dated 785 (1383–84), and the Ravali Mosque of 1386–87. Mehrdad Shokoohy has also recently identified a medieval-period stone mosque on the island of Diu. All locations also preserve masses of stone foundation inscriptions detached from the buildings to which they once belonged. Although Saurashtra and Kutch preserve Islamic structures in greater quantity and from a far earlier period than do the eastern coast and central plain of Gujarat, the numbers still do not compare to Ahmedabad’s wealth of stone architecture.

Awareness of the geological and physical parameters that conditioned building traditions in the plain of Gujarat corrects our often skewed view of Islamic architecture in the region. It is too easy to visit Ahmedabad and take its many stone mausolea and mosques for granted. But they do not constitute the “norm” of Islamic architecture in Gujarat; quite the opposite, their material testifies to the amazing wealth of the Ahmad Shahis and their passion for architecture. When the author of the A’in-i Akbari praised Ahmedabad for its thousand stone mosques, he was probably marveling as much at their material as at their number. Similarly, we should take with us some of this awe when we visit and judge the stone architecture outside Ahmedabad. Just as the ready availability of images has now robbed us of the ability to feel their power, so too the internationalization of the stone industry has deprived us of an understanding of the power of stone in architecture. The other architectural traditions touched on here need to find their place in the broader picture of Islamic architecture in Gujarat, but for this research to take place they also need immediate documentation and conservation.

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NOTES


3. Unfortunately, there have been no studies of quarries and sources of stone in western India. The following discussion has been based on modern geological handbooks, tangential references in other publications, and the study of surviving buildings. One of the best sources is Burgess and Cousens, Architectural Antiquities of Northern Gujarat, 28–29. The appendix on building material in H. D. Sankalia, The Archaeology of Gujarat (Including Kathiawar) (Bombay, 1941) still relies on these basic data for its short paragraph: see 81. See also Imperial Gazetteer of India, Provincial Series: Bombay Presidency, 2 vols. (Calcutta, 1909, repr. New Delhi, 1985), vol. 2, 356.


5. Mehrdad Shokoohy suggests that the stone used for the mosques and other structures, as well as for the Jain temples there, was taken from a nearby outcrop: Shokoohy, Bhdesvar.


8. The Vikrama Samvat, or Vikrama Era, came into common use in Gujarat during the Solanki period, i.e., from the mid-twelfth century onwards, and has been the regional system ever since; it starts in roughly 56–58 BCE. For this and other systems, see B. K. Shelat, Chronological Systems of Gujarat: From Early Times up to 1304 AD (Ahmedabad, 1987), 5–10.


12. V. S. Pramar, Haveli: Wooden Houses and Mansions of Gujarat (Ahmedabad, 1989), 37, citing the Prabandhacint¸ma¨i.

13. For a detailed history of the Chaaluksya of Gujarat, see A. K. Majumdar, Chaaluksya of Gujarat: A Survey of the History and Culture of Gujarat from the Middle of the Tenth to the End of the Thirteenth Century, Bharatiya Vidya Studies 4 (Bombay, 1956), still the most comprehensive history of this dynasty. For the rise of Muslim power in the region, see S. C. Misra’s aptly named The Rise of Muslim Power in Gujarat: A History of Gujarat from 1298 to 1442 (Bombay, 1963, 2nd ed. New Delhi, 1982).

14. S. Roa, Lothal and the Indus Civilization (Bombay, 1973); there are various references to brick throughout Roa’s text, but no specific discussion of construction materials.


16. Their presence in the canonical accounts of Gujarati Islamic architecture seems to be explained by the fact that they are simply too big to be ignored. For the mausolea in Ahmedabad, see Burgess, Muhammadan Architecture of Ahmedabad, vol. 1, 58–59 and vol. 2, 78. For the Alif Khan Mosque at Dholka, see Burgess, Muhammadan Architecture of Bharuch, Cambay, 34–36 and plates.

17. Khán, Mir}¸t-i Ahmadº, 12.

18. Pramar’s study, Haveli, is essentially concerned with the surviving half-timbered houses of the seventeenth to the twentieth century and is a sociological study of the organization and structure of the house. But the author also provides valuable documentation of the history of such half-timbered constructions in the region, working back from the present day.


24. For the translated English passage, see Merutunga, Prabandhacint¸ma¨i, 95–96; for the original Sanskrit, see idem, Prabandhacint¸ma¨i, ed. Jinaejy Muni (Santiniketan, 1939), 64–65. An inscription from Gírnar dated 1119 CE confirms Sajjana’s appointment to the region; see Imperial Gazetteer of the Bombay Presidency, 26 vols. (Bombay, 1882–96), vol. 1, 127. This anecdote is repeated in other Jain sources of the period.

25. Merutunga, Prabandhacint¸ma¨i, 134–35. Udayana’s career is well documented in contemporary Jain sources; for a summary, see V. K. Jain, Trade and Traders in Western India: AD 1000–1300 (New Delhi, 1990), 236–37.
27. de Thevenot, _Indian Travels_, 22.
30. R. Duncan-Jones, _The Economy of the Roman Empire: Quantitative Studies_, rev. ed. (Cambridge, Eng., 1982) and J. Kunow, _Negoziator et Vercuta: Händler und Transport im freien Germanien_ (Marburg, 1980) both translate the relative prices of sea, river, and land transport into ratios, taking extensive data from the eighteenth-century United Kingdom as the initial guide and converting this to a Roman equivalent on the basis of anecdotal evidence.
33. de Thevenot, _Voyages_, 22.
35. Ibid.
36. de Thevenot, _Indian Travels_, 22.
37. Merutunga, _Prabandhacitamani_, 159.
39. Ibid., 346.
40. For example, a map of Cambay by Petrus Bertius from the _Caert Thesoro_ of 1612 shows Khambhat situated on one of the branches of the Indus; another map of India from T. Herbert’s _Some Yeares Travels into Divers Parts of Asia and Afrique_ of 1655 shows Saurashtra as an island off the coast of Gujarat. These maps are reprinted in Susan Gole, _The Economy of the Roman Empire_: Quantitative Studies, rev. ed. (Cambridge, Eng., 1982) and J. Kunow, _Negoziator et Vercuta: Händler und Transport im freien Germanien_ (Marburg, 1980) both translate the relative prices of sea, river, and land transport into ratios, taking extensive data from the eighteenth-century United Kingdom as the initial guide and converting this to a Roman equivalent on the basis of anecdotal evidence.
41. _Imperial Gazetteer of India: Provincial Series, Bombay Presidency_, vol. 2, 349 and n. 1; 356. While visiting Chorwad, further down the coast of Saurashtra, in 1996, I was also able to observe clear signs of stone quarrying along the shore, although we have no documentation at present to confirm that this was not simply for local use.
42. H. G. Briggs, _The Cities of Gujarat: Their Topography and History Illustrated in a Journal of a Recent Tour; with Accompanying Documents_ (Bhambur, 1849), 292.
45. Burgess, _Muhammadan Architecture of Bharoch, Cambay_, 32–34 and pl. 36. This wooden section does not appear to be much more than a hundred years old, since Burgess referred to it in 1896 as “a modern wooden erection.” The main body of the Tanka Mosque is stone built and dated by inscription to 762 (1361).
47. James Burgess, _Revised Lists of the Antiquarian Remains in the Bombay Presidency_, Archaeological Survey of India New Imperial Series 16 (Bombay, 1897), 96, entry 3.
50. Ibid., inscription no. 3422, 32–33 and pl. 19(b); inscription no. 3421, 33 and pl. 19(c). The language and epigraphic style of these inscriptions correspond perfectly to the date given in the chronogram.
52. Burgess, _Muhammadan Architecture of Ahmedabad_, vol. 1, pls. 32–33, 52, and 54.
56. Ibid., 32.