The longevity of Persian urban form: Maibud from late antiquity to the fifteenth century

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Abstract. *Urban morphology has developed mainly in Europe, where a wealth of historical maps, plans and other records exist. Such documents are comparatively rare in most Iranian cities. But the history of these cities over thousands of years is embodied in their urban development. This paper explores the morphological development of the medium-sized Persian city of Maibud, giving particular attention to its street pattern. The types of street patterns are the twisting alley, the orthogonal pattern and the geometric system. Each is linked to a phase of history, and together they connect late antiquity to the early modern city. The overlapping of the first two of these types of patterns is where the Jamiʿ mosque was erected and the early Islamic hub developed. This suggests a zone of transition between the pre-Islamic and Islamic periods. These street patterns are fundamental to the process of early Islamic development of the region.*

Keywords: street patterns, plots, oasis cities, topography, history, qanats

The study of Islamic cities has been dominated by evidence from the western part of the Islamic world, and in particular by the standing remains of late antiquity and the Islamic period in *Bilad al-Sham* in greater Syria and North Africa. As well as being elegant and attractive to tourists, these remains are archaeologically significant and relatively accessible to researchers. However, the concentration of research on this area of Islamic influence has tended to obscure what has happened farther east in the Islamic world (Kennedy, 1999). Hardly any Islamic city in Iraq and or on the Iranian plateau has been surveyed chronologically through the ages. The only area where a considerable amount of archaeological excavation and research has been conducted is in central Asia: in areas of Turkmenistan and Uzbekistan, where cities have become more accessible for international research. In such a context, the study of the city of Maibud in central Iran contributes to the understanding of Islamic urbanism in general, and urbanism in Iran in particular.

Maibud

Despite having existed for over 6000 years, Maibud has never become a big city. It is the second largest city of Yazd province. It has an arid climate, an area of almost 3181 ha, and a population of 70 728 in 2006 (Figure 1). Maibud is an oasis city, and a notable example of environmental adaptation. Here people have been able to live in a harsh desert environment. Water is scarce and only provided by a *qanat* system, an ancient underground water system developed in the hot and arid climate conditions of central Iran, probably in the first half of the first millennium B.C. (Gaube, 1979, p. 6).

There are few archaeological surveys of Maibud, and where they do exist they are

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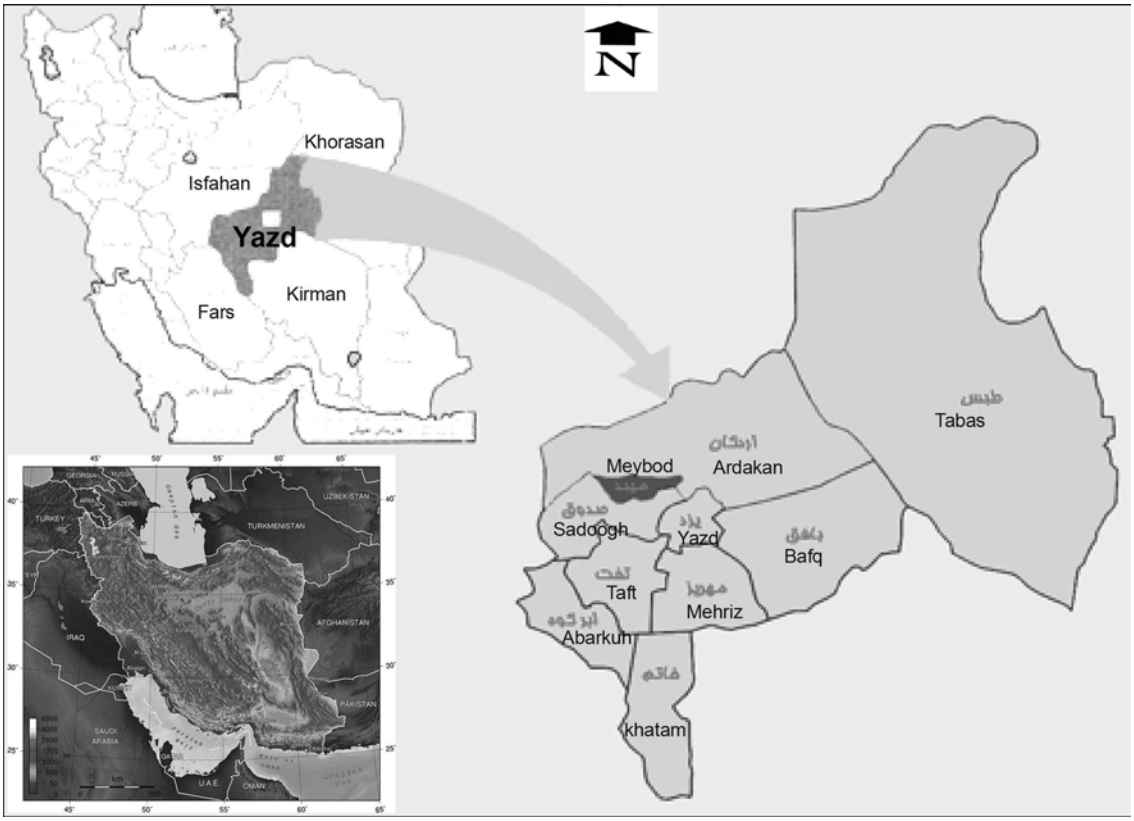


Figure 1. The location of Maibud (Meybod) within Yazd province in Iran.

concentrated on the Narin qalʿa and the Jamiʿ mosque. However, the history of the city is inscribed in its urban fabric. By careful examination of the existing urban form, it is possible to trace the processes that have shaped the city, despite the paucity of documentary records (Caniggia and Maffei, 2001; Conzen, 1981a). During the period 2000-2010, a survey of the existing structures was undertaken by the author. This was combined with the limited archaeological and written sources as the basis for interpretation of the city's physical form.

It is widely believed that buildings made with stone can survive, be reused and adapted over a long period of time, whereas mud-brick buildings quickly disappear, making it easier to demolish and rebuild (Beazley, 1977). This has been considered to be a major reason for the comparative rarity of remains of medieval earthen urban fabrics. But the major construction materials used in Maibud, essentially earth, suggest a different interpretation. Buildings constructed with mud brick are more flexible, easier to adapt, and relatively cheap to maintain. Hence there has been a tendency to adapt and add to structures rather than demolish them. The survival of houses from as early as the fourteenth century in Maibud, and their adaptability would seem to support this view. Importantly for the present study, this high survival of old buildings is combined with a high degree of survival of the ancient street systems and the persistence of property boundaries.

The ancient city of Maibud consists of three principal parts: Narin qalʿa (the citadel); *Sharistan* (the walled city, including a bazaar and the Jamiʿ mosque); and *Birunih* or outskirts (several quarters scattered throughout the oasis and surrounded by gardens). In addition to the great age of Maibud, its significance for morphological research reflects its strategic location on a network of roads, and the fact that it was the home of the Muzaffarid dynasty between 1314 and 1393, and the major

centre over a long period of the ceramic and textile industries.

Owing to its environmental characteristics and natural resources, Maibud has been a fairly stable settlement. There are ancient remains, such as prehistoric sherds and metal-work dating back to 3000 to 4000 B.C., Iron Age slags, Sasanian architectural remains (from the period between the third and seventh centuries A.D.) in Narin qalʿa, and the Jamiʿ mosque dating back to the early centuries of Islam. There was also extensive urban development in the middle Islamic period (Esfanjary, 2007, p. 19).

The city grew steadily in the early Islamic period and the zenith of its influence was in the fourteenth century when the concentration of power under the Muzaffarid family turned Maibud briefly into a capital city. The Muzaffarids policed the road network and gained power in Yazd, following the decline of Ilkhanid (Miller, 1990, p. 197). The Muzaffarid period was characterized by an extraordinary building boom created largely by local patrons, particularly the Muzaffarid, Nezami and Dadai families (Holod, 1972, p. 73). This prosperity continued until the end of the fifteenth century, when the city's political and economic power declined gradually. Today, it is a dynamic modern city and, despite the changes and modernization that have occurred, the spatial organization of the earlier phases of development is still evident, representing an ancient form of Iranian town planning system. For this reason, and the significance of its urban fabric, the entire city was added to the Iranian National Heritage List in 2001. It is currently on the national tentative list of sites for consideration for proposals to UNESCO for designation as World Heritage Sites.

The first master plan of Maibud, the so-called *Tarh-i Hadi* (1986), imposed a modern grid system slicing through the historical town plan. This master plan attempted to connect the ancient parts of the city in a new way, providing vehicular access to all ancient quarters and encircling them with broad modern streets. However, based on a combination of fieldwork and an aerial photograph of 1956 the street systems that existed before these changes were made can be reconstructed.

Neighbouring settlements were firmly linked to and functionally integrated with Maibud prior to the insertion of the modern street system (Figure 2). Survey of the existing form of Maibud reveals three distinct street systems of the pre-modern period: the twisting alley, the orthogonal pattern and the geometric system, each linked to a period of history. The principal focus here will be on the first and second types of street systems associated with the development of Maibud between late antiquity and the fifteenth century. The third pattern was a new town plan, a geometric system with wide and tree-shaded streets, equipped with surface *qanats* in the middle of the streets and developed on the urban fringes of Maibud in the nineteenth century.

Twisting alleys

The detailed map of the traditional street network of the *Sharistan* (walled city) displays two different patterns (Figure 3). The first pattern, which is associated with Mahalla Bala – meaning high or upper quarter – is characterized by a maze of narrow, twisting passageways, occasionally covered by arches or vaults. Two key aspects of this town plan: the congestion of the street network and its twisting character will be given especial attention.

Within the city wall, the high density of the street pattern of Mahalla Bala is very evident. This includes the area beyond the southern parts of the Jamiʿ mosque and the western parts of Narin qalʿa. Here the street blocks are much smaller than elsewhere. Each plot of land, whether large or small, requires at least one access point to the street system. The smaller the size of the plots, the greater is the density of the street network. An examination of the existing structure in the walled city suggests that in Mahalla Bala the initial plot size was smaller than in the Mahalla Paʾin and Kuchuk quarters. Whether the smaller plots are a result of the process of plot subdivision or whether

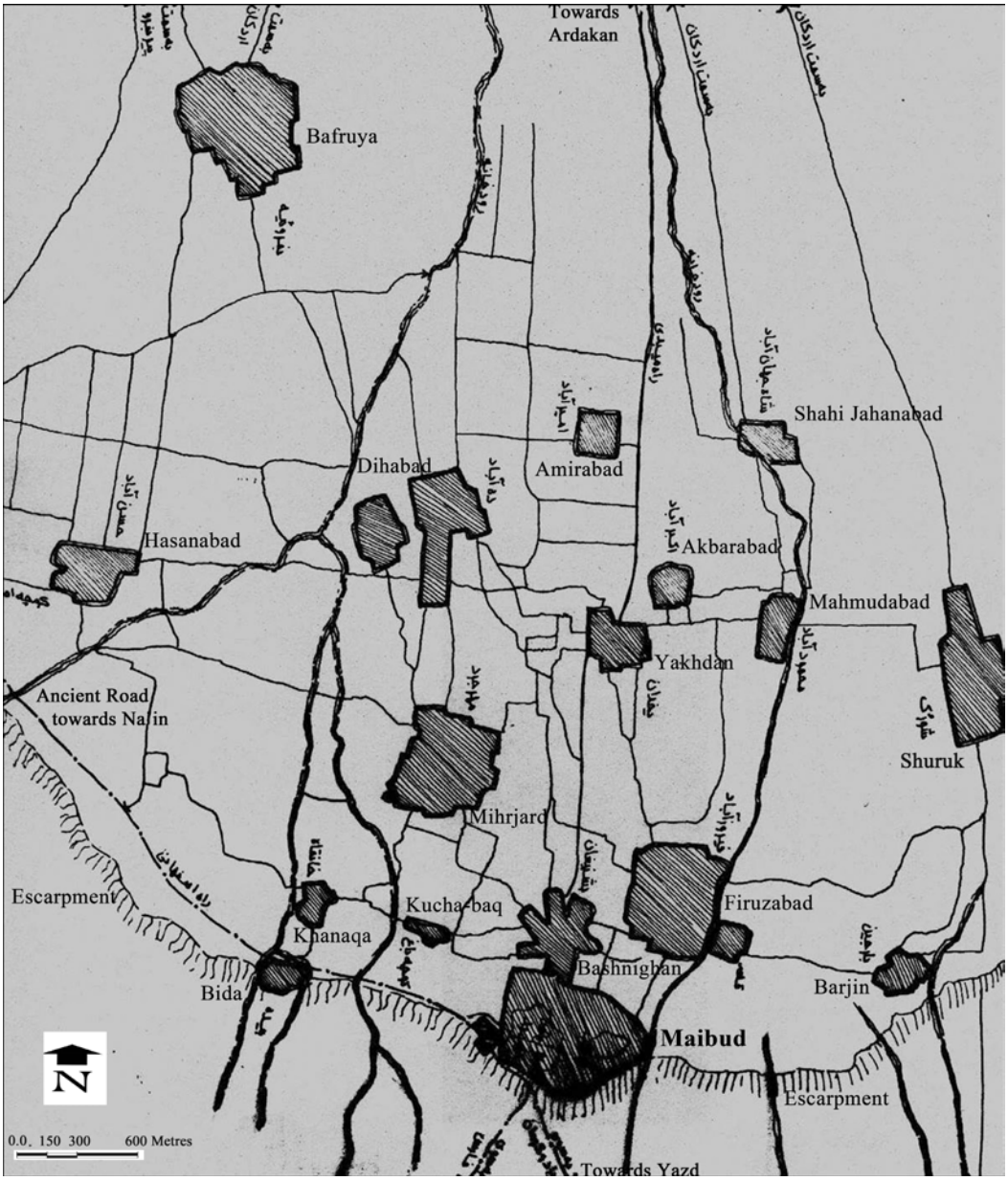


Figure 2. Maibud in relation to the traditional settlements scattered throughout the oasis (based on an aerial photograph of 1956 and fieldwork. Source: Esfanjary, 2007).

they were initially particularly small requires investigation. Unlike in Europe, there is a lack of historical town plans to aid the relevant research. In medieval British towns, for example, there is sound evidence that the burgage, an extended narrow rectangular plot, is a key feature of the plot pattern (see, for example, Conzen, 1981a; Slater, 1980; Tait, 2010). In Iranian cities no comparable regularity has been recognized.

Different explanations are possible in the case of Mahalla Bala: first, because of the topography and lack of surface water this area may never have been used for farming, which normally demanded larger land holdings; and secondly, the fourteenth-century Muzaffarid house type that was prevalent in Maibud is consistent with this plot pattern. These houses

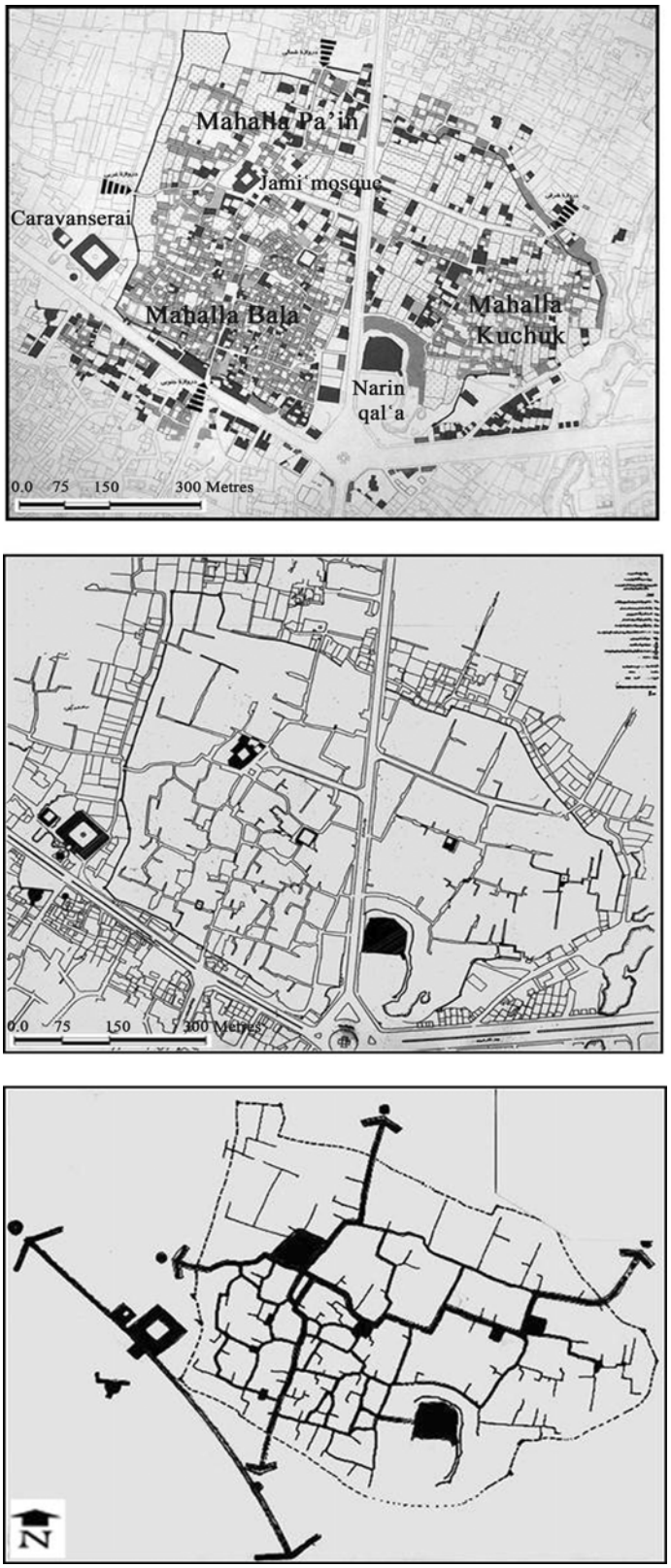


Figure 3. The walled city of Maibud (top), the present street system (middle) and the traditional street system (below), based on the ordnance map and author's field survey of 2001.

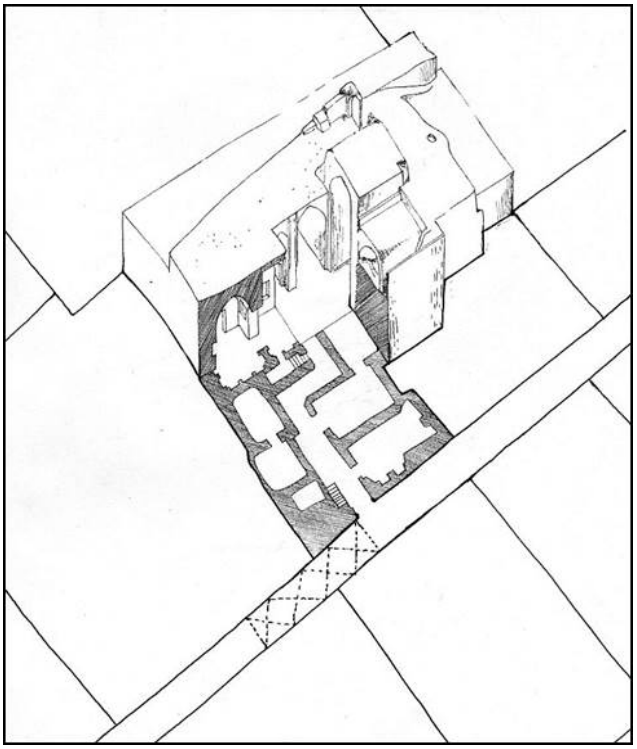


Figure 4. A typical fourteenth-century house in Maibud (reproduced from Zakerameli and Esfanjary, 2007).

contained a very small – just under 15 m^2 – courtyard at the centre, surrounded by small rooms, and a lofty north-facing *iwan* (a U-shaped semi-open portico) (Figure 4). Average plot sizes of five of these types of middle Islamic houses in Maibud were recorded and these ranged from 240 to 390 m^2 (Zakerameli and Esfanjary, 2007, p. 165). In their original configuration, major rooms were arranged to benefit from the light provided by the small courtyard. Areas reserved for secondary functions were located at the corners of the courtyard and at the rear of the building. These houses are consistent with the pattern of small plots.

It is believed that the earlier – pre-thirteenth century – houses in this region had a similar courtyard format but were probably much smaller (Esfanjary, 2014, p. 146). Archaeological evidence from the city of Merv (situated in present day Turkmenistan) supports these findings, since a Sasanian residential quarter with a narrow and irregular street system bordered by small courtyard houses has been uncovered in that city (Herrmann *et al*., 1996; Kennedy, 2008). Ctesiphon is another example of a settlement where 'the alignment of the houses along the streets was anything but regular, even when the main roads were concerned' (Invernizzi, 1976, p. 167).

The early Islamic settlement uncovered by archaeologists in tenth-century Nishapur shows a similar pattern of small plots within a twisting alley system (Wilkinson, 1986, p. 219). The smallness of the houses and the limited availability of land within the fortification would seem to account for the small size of the plots. This relationship is also observable in other towns and cities, including the historical core of Yazd (Nogh-san-muhammadi, 2001, p. 77) and Kharanaq qalʿa, a village near Yazd. In this light it would seem that the small plots and later subdivisions on a hill site are the main reasons for the high density of the street pattern in

Maibud.

In the case of the irregularity and twisting nature of the street network, which is widely acknowledged as a major feature of Islamic cities (English, 1973; Gaube, 1979), there are various explanations. According to English, 'the religious focus in urban organization tended to decrease political and civic interest in the city'. He also notes that Islamic law was vague about encroachments on the public thoroughfare (English, 1966, p. 42). Other factors included protection and security, the lack of wheeled vehicles (Bulliet, 1975), and the lack of a basis in Islamic law for imposing a regular street system (Planhol, 1959). It is worthy of note that in Mediterranean cities, for example Aleppo, Sauvaget noted how Hellenistic regularity was transformed into irregularity during the Islamic period (Annalinda, 2009; Raymond, 2008).

A survey of Mahalla Bala in the walled city and of outlying areas, such as Bida and Barjin, shows that all these pre-Islamic areas with a winding street pattern are located on a particular topography. There was an absence of surface water, gardens and green landscape within these settlements. These were areas in which a Sasanian origin has been proposed (Puya, 1993, p. 6). Here, the structure of the buildings and more importantly the street plan are constrained by the topography. In areas such as Mahalla Bala, within the walled city, the street system tends to be more complicated as a result of the complex topography, whereas in Bida, with its virtually flat hilltop, the streets tend to be less winding. Accordingly, it would seem that the character of the twisting alley system is to some extent a reflection of the complexity and diversity of the topography of the site.

Architecturally, the challenge of adapting construction to difficult topography is reflected in the buildings: sometimes the base and walls or an entire building – as in the mosque in Bida – is carved into the hillside, locally known as *bumkand*. The interaction of topography and architecture is thus another characteristic of those parts of the city that have a twisting alley system (Figure 5).

Maibud is not unique in having this type of street pattern. Other towns and cities in this region, including Yazd and Na'in, have a similar form: a compact layout, with buildings sometimes superimposed on one another in a network of twisting alleys, located on very uneven topography. Later development in Maibud took place down the hill, conforming to the direction of the slope and the position of the *qanats*. The names of the various parts of the walled city of Maibud are instructive: the names Mahalla Bala (upper quarter) and Mahalla Pa'in (lower quarter) are indicative of their topographical relationship. Hence the use of the term *Sakhtar-i Mahalla Bala* (upper quarter structure) to describe the twisting street plan.

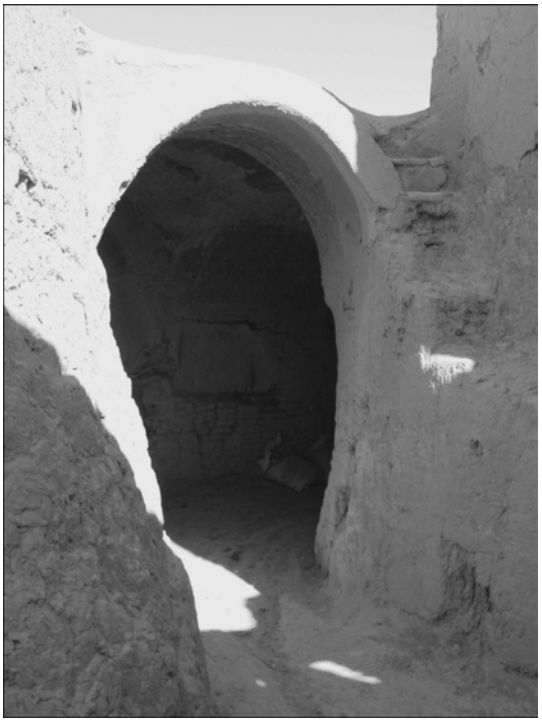


Figure 5. Part of the main alleyway in Bida quarter: some parts of this alleyway and buildings, including a section of the vault, are below ground level.

Orthogonal network

The street pattern developed in Mahalla Pa'in has changed from a system of twisting alleys and narrow culs-de-sac to a more linear form.

The urban landscape changed gradually from a dense, compact one to a lower density, greener one. As Kennedy observed, 'continuity of site did not mean continuity of urban topography' (Kennedy, 2008, p. 104). Inside the walled city the border between Mahalla Bala and Mahalla Pa'in is where the Kharzar Qanat comes to the surface and water could be used for both consumption and irrigation. Accordingly, all plots in these lower parts have access to running water.

The orthogonal pattern can be found widely in different historical periods. A pattern of this type exists in both extensions to areas established in the early Islamic period, such as within the *Sharistan* at Mahalla Pa'in, in parts of the Firuzabad quarter, and in newly established outskirts, such as Khanaqa, Badrabad and Bafruya, which were developed in the fourteenth and fifteenth centuries. The concentration of Muzaffarid power in the fourteenth century was reflected in major developments characterized by this type of street pattern.

Not all middle Islamic quarters in the region have the same type of street pattern, but most do display an orthogonal pattern. An exception is in the vicinity of Mahalla Tavus in Abarku, where a residential quarter was developed some time after the end of the fifteenth century on a small hill site to the north of the city. Although by this time an orthogonal street pattern was the norm in the outskirts, this neighbourhood in Abarku is characterized by a winding and twisting alley system, reflecting the influence of topography.

Morphologically, it was a major change from the ancient features of *Sakhtar-i Mahalla Bala* to the more recent character of what might be called *Sakhtar-i Mahalla Pa'in.* Mahalla Pa'in has surface *qanat* water, locally known as *ab-i ravan* (running water), which made possible abundant green open spaces and large garden-houses amongst orchards. This provided the basis for a major contrast between the spatial organization and townscape of Mahalla Bala and Mahalla Pa'in, with a major impact on the way people lived. Residents were released from the labour-intensive burden of carrying water from a particular underground *qanat*, using instead a surface *qanat*, accessible to every plot.

The main orientation of streets is non-cardinal with a 10-20 degree displacement towards the south-west, but it does not correspond to the direction of Mecca in the region. Thus the orientation of streets does not follow precisely the required religious direction. In addition, many of the roads predate the Islamic era. There are a few middle Islamic areas, such as Bafruya, which was developed in the fifteenth century. Here because of the orientation error the mosque itself is not precisely oriented towards Mecca. However, since the streets have the same orientation as the mosque, it might be argued that the orientation of Islamic cities was based on religious principles (Bonine, 1989; Hakim 1986).

In Maibud, land and water are distinguished with regard to ownership. Lambton points out that 'it often happens that the same person owns both the water and the land which it irrigates' but 'anyone who brings new land into cultivation has to buy water from someone who has water surplus' (Lambton, 1953, p. 220). Bonine remarks that 'many of the Yazd villages are, and were, owned by small landowners (*khurda malik*) who owned shares in the village, or more precisely, shares of the *qanat* water' (Bonine, 1980a, p. 164). Owing to the scarcity of water, each farmer was assigned a quantity of water and this gave rise to small allotments of land in and around the city.

The interdependence of street systems and watercourses is a key feature of the *Sakhtar-i Mahalla Pa'in.* Janibollahi highlighted the link between *qanats* and alleyways in Maibud, pointing out that the width of street networks and the size of agricultural fields depended on the quantity of water available. When residential areas were developed on agricultural lands, the former points of water access to the fields became the entrances of houses (Janibullahi, 1995). This association between *qanat* and street has been examined in different cities. Bonine argues that 'the example of Mihriz reveals the significant relationship between streets, water and walled

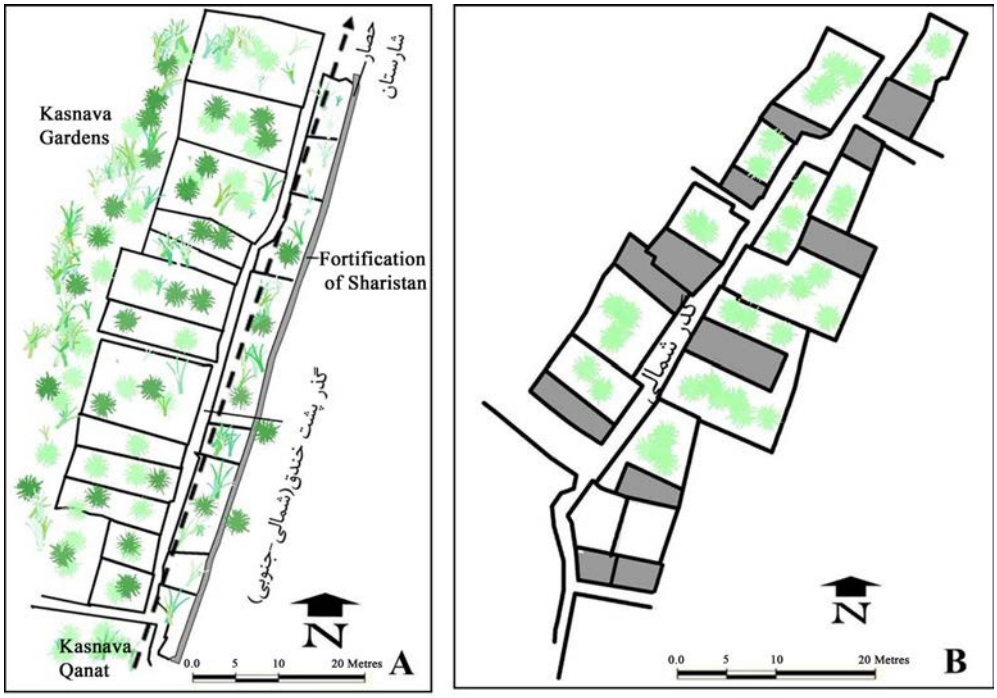


Figure 6. Orientation of streets and plots in and around the *Sharistan*. A: Kasnava Gardens, located just behind the western fortification of the *Sharistan* (the alignment of the fortification is parallel with the main division of the street and *qanats*). B: Orientation of the main street, plots and buildings in Kuchuk.

fields; all are orientated in the same direction … wider streets are associated with the main channels and smaller lanes follow the secondary *jubs* (narrow streams)' (Bonine, 1979, p. 218; English, 1966, p. 49).

In contrast to the pattern of plots in Mahalla Bala, in Mahalla Paʾin and Kuchuk the plots are mainly elongated in shape, laid out in a south-west to north-east orientation. This orientation follows the slope of the land and the *qanat* streams. It is influenced by climatic conditions and does not accord precisely with the religious direction of Mecca. The pattern of large rectangular plots is clearly observable in the garden areas both within and outside the walled city. However, in the built-up areas this pattern has undergone a process of change, notably the subdivision of plots. The smallest plots tend to be in the earliest areas in which building took place.

The optimal geographical orientation of buildings in this region with regard to minimizing the effect of harsh climatic conditions is south-west to north-east and is known as *run-i rasta* (Bonine 1980b; Pirniya, 2006). When constructing buildings in a garden plot, adherence to this orientation was crucial. In Mahalla Paʾin, the slope of the land and the direction of the main streets and buildings follow the same orientation, namely south-west to north-east. In the garden areas the plots are also oriented in a roughly east-west direction to maximize access to the streets and watercourses (Figure 6).

In the nineteenth-century Salar house in Maibud, three east-west narrow plots were merged to form a larger plot realigned to accord with the common orientation, so as to accommodate a mansion house (Esfanjary, 2003). In another example the seventeenth-century Shah Abbasi caravanserai was built in a garden area of Kasnava, retaining the original east-west narrow plots. This large building was constructed on the religious axis, in replication of the orientation of Maibud's Jamiʿ mosque and oriented precisely towards

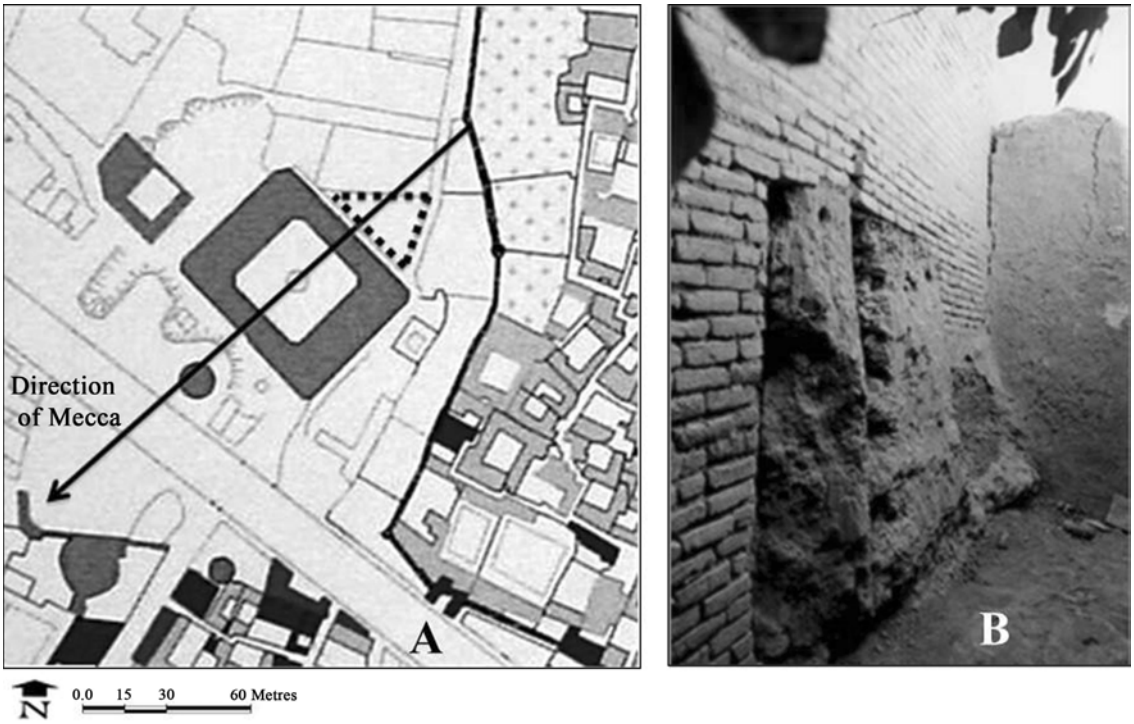
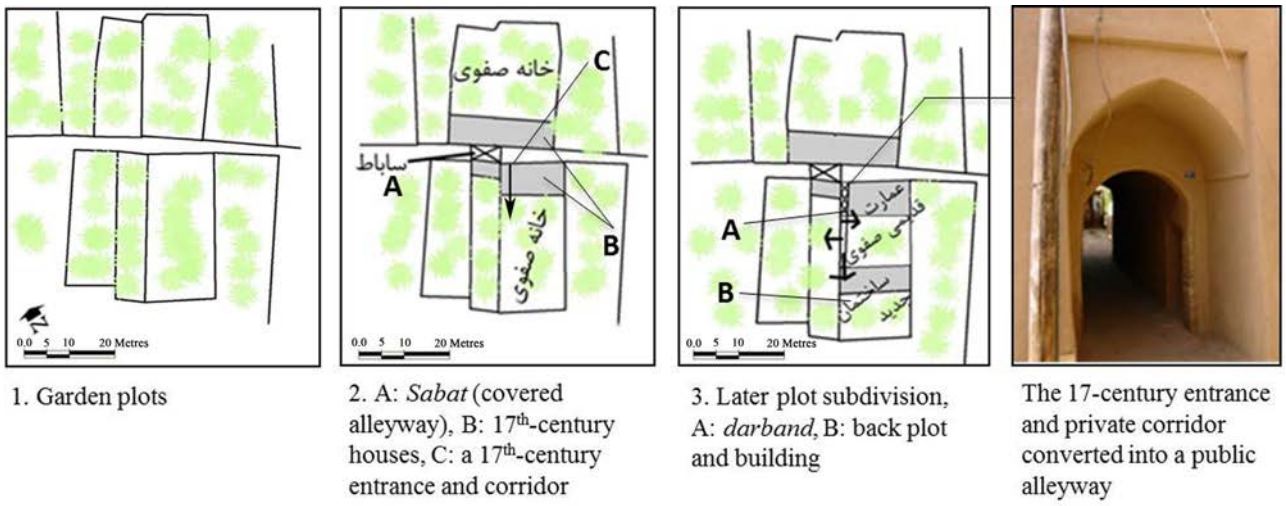


Figure 7. A: Realignment of originally east-west plots to orientate the Shah Abasi caravanserai towards Mecca, resulting in a triangular plot in the north. B: The mud wall of the previous garden can be seen cutting obliquely through the foundation of the seventeenth-century caravanserai.

Mecca. The result of this adaptation of the plot pattern was a triangular garden plot that remains today on the eastern flank of the caravanserai. The presence of a mud wall related to the original garden plot is still evident beneath the north-western wall, confirming this reorientation (Figure 7).

As a general rule those plots with a roughly east-west orientation were more susceptible to alterations. The south-west to north-east plots had an effective climatic orientation for building purposes. The most common positioning of houses in the seventeenth century was for them to be placed adjacent to the main street, with the rest of the land being utilized as garden and orchards. The result was a garden-house. The demand for housing resulted in some of these garden-houses being subdivided. Greater change is evident in larger towns and cities. In a town the size of Maibud, many of these plots are not yet fully filled in. A common practice was to divide the plot into halves or thirds, depending on its length. Some were located between two streets, and in these cases plots were divided into two with each half having a separate access from one street. Back and side lanes were developed for these back plots. To provide access an internal private lane was created. This is known locally as a *darband*, a semi-private blind alley with a gate that can be secured at night. In practice, most of these *darbands* initially had a communal gate and later became integrated into the street network.

Thus the corridors, once part of private internal spaces, became public alleyways (Figure 8). Hence property boundaries had a significant effect on the street patterns. The main streets in this orthogonal system are much older than the back lanes and culs-de-sac.



1. Garden plots

2. A: *Sabat* (covered alleyway), B: 17th-century houses, C: a 17th-century entrance and corridor

3. Later plot subdivision, A: *darband*, B: back plot and building

The 17-century entrance and private corridor converted into a public alleyway

Figure 8. The processes of building and plot subdivision in Kuchuk, resulting in the creation of a semi-public alleyway, known as a *darband*.

The zone of transition

There remains the matter of the area in which these two street patterns meet. Since the city is a living organism, and dynamic processes of growth, stagnation and decline are at work, there is unlikely to be a sharp border, but rather a zone of transition between the first and the second street patterns. An intermediate area occurs where the Jamiʿ mosque is located, and this raises an important question about the placement of the Jamiʿ mosque in the early Islamic period.

The study of the existing structures of the walled city of Maibud reveals no evidence of pre-Islamic structures in Mahalla Paʾin and Kuchuk. Some Arab geographers of the early Islamic period, including Istakhri and Ibn Hauqal in the tenth century, confirmed that Maibud was a substantial regional city, and had a Jamiʿ mosque (Ibn Hauqal, 1987; Istakhri, 1969). Archaeological surveys have revealed that the origin of the Jamiʿ mosque at Maibud dates back to the early Islamic period (probably the tenth century). This was a small hypostyle mosque that was transformed into a larger domed mosque in the twelfth century (Nikzad, 2007). However, the middle Islamic historian, Katib mentioned that the Sasanian king, Shah Qubad built a fire temple called Haftazar in the Maibud district (Katib, 2007, p. 38). So far neither architectural nor archaeological evidence belonging to the pre-Islamic era has been found in or around the Jamiʿ mosque. Puya (1993) believes that the village of Haftadur, about 2 miles away from today's Aqda, might be the location of this fire temple. This is not surprising since most of the fire temples of late antiquity in Iran were located in rural areas and quite far from populated urban centres (Kennedy, 2006).

A survey of the fortifications of the *Sharistan* shows that the southern wall is older than the northern and western parts: the quality of construction, materials and the size of mud bricks display substantial differences. In the southern parts, bordering Mahalla Bala, the wall has a major foundation, more than 3 m thick, whereas the northern and western walls have a thinner structure. There is no evidence of major repair works, and the use of middle Islamic (fourteenth and fifteenth centuries) types of mud brick is widely evident. Therefore, the northern parts are of more recent construction, suggesting that a major city extension occurred at this time. This accords with the expansion of the city and redevelopment of the city wall and ditch in the regions of the Muzaffarids (1314-93) that is reported in middle Islamic local histories. There are two local histories, namely the *Tarikh-i Yazd*, which was written by Jaʿfari

Figure 9. Existing deep garden plots on the fringe of the Bala quarter. The photograph shows part of one of these gardens.

(1960) in the fifteenth century, and the *Tarikh-i Jadid-i Yazd*, probably written by Katib (2007) sometime after 1458 (Miller, 1989). Both authors were native Yazdi historians and they provide detailed accounts of public structures in Yazd, and occasional references to the development of Maibud can also be found.

Examination of the geographical features of this intermediate zone is informative. Topographically this is a transitional area between the elevated Mahalla Bala and the flatter area of Mahalla Paʾin. It is evident that the belt of surviving green garden plots surrounding Mahalla Bala, together with the remains of an ancient ditch and city wall are part of a 'fringe belt' (for discussion of fringe belts in other areas, see Conzen, 2009; Conzen, 1981a, 1981b; Whitehand and Morton 2003). The garden plots can be found in the northern, western and eastern flanks of Mahalla Bala, defining an older boundary of this part of the city (Figure 9). The topography of the site, the building types, the construction techniques and material of the city wall, as well as the location of the Jamiʿ mosque, all support the idea of the extension of Mahalla Bala on its northern fringe sometime in the early Islamic period.

The Jamiʿ mosque was located in the ancient fringe belt where little or no building had previously taken place. It eventually became the heart of the Islamic town, gradually absorbing this part of the ancient fringe belt. Thus the Jamiʿ mosque, and indeed the entire northern stretch of the fringe belt, is a marker of the transitional zone between the pre-Islamic and Islamic eras.

Based on street patterns, and archaeological and textual evidence, Figure 10 shows the phases of development in the walled city from the pre-Islamic period to the fifteenth century, and synthesizes the argument of this paper. The ancient nucleus had been concentrated inside the old *qalʿa* until an early settlement, known as Mahalla Bala today, was developed outside its fortification. In the early Islamic period, the Jamiʿ mosque was built and Mahalla Paʾin was extended from Mahalla Bala. The Muzaffarid expansion included Kuchuk, and the re-fortification of the *Shari-*

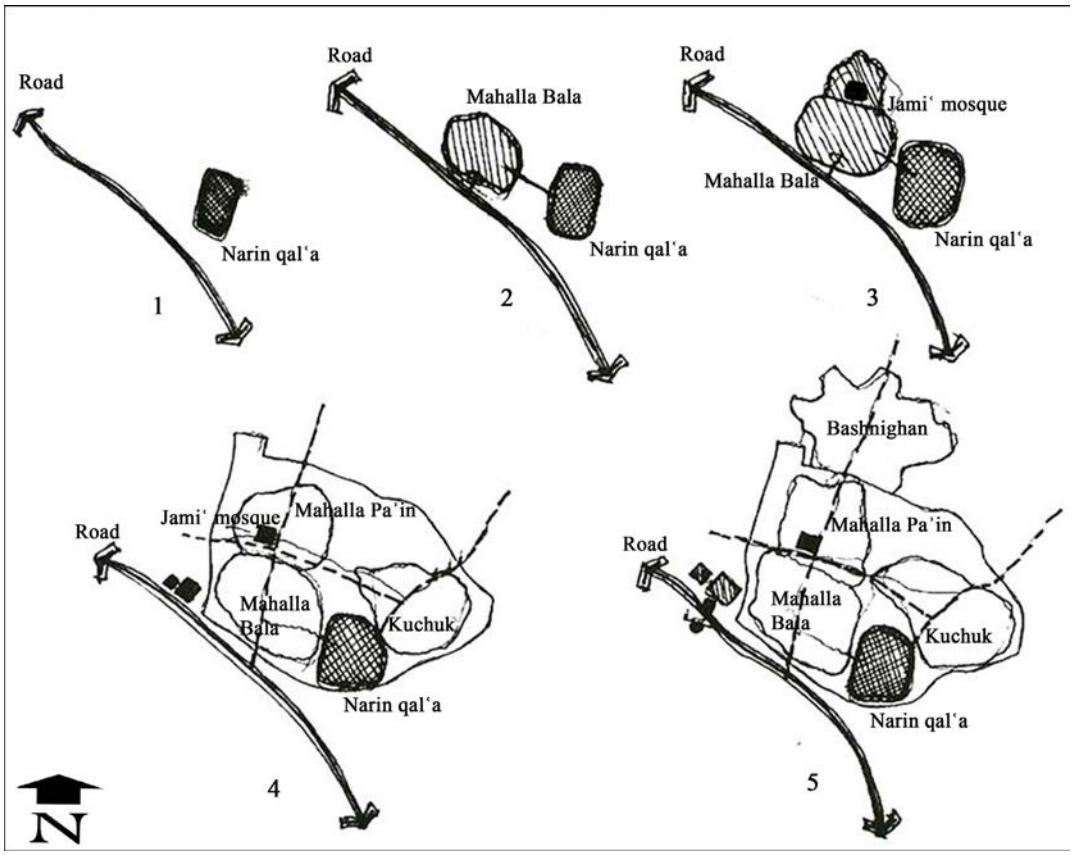


Figure 10. Morphological development of the *Sharistan* from the pre-Islamic period to the fifteenth century. 1: The early nucleus inside the fortifications of *qal'a*. 2: An early settlement outside the *qal'a*. 3: Development of the Jami' mosque and Mahalla Pa'in. 4: The Muzaffarid extension of Kuchuk and re-fortification of the *Sharistan*. 5: Addition of Bashnighan outside the wall of the *Sharistan*.

stan occurred in the fourteenth century.

This investigation of Maibud has shown that a rather limited part of the city was developed in the pre-Islamic era: namely the citadel and Mahalla Bala within the walled city. There were also several early settlements in the outskirts, including Bida and Barjin. But gradual expansion took place in the Islamic period, particularly when the Muzaffarid family ruled the region. This contrasts with an earlier hypothesis that the entire *Sharistan* developed in the Sasanian period. Most of the expansion of the *Sharistan* and increases in its density occurred in the Islamic period. And this seems to accord with the pattern of development more widely in the Yazd region.

Conclusion

An examination of the town plan of the city of Maibud has shed light on the traditional street systems. It has provided insights into the topography and the way in which water was harnessed, both of which affected the settlement pattern and the way people lived. The longevity of the street system has been emphasized. The area with the oldest street pattern, Mahalla Bala, developed on an elevated site with no surface *qanats*, and was characterized by a compact urban form and a winding street network, termed *Sakhtar-i Mahalla Bala*. A second pattern, created later in Mahalla Pa'in, has an orthogonal street system, developed in the gardens and orchards

at the northern fringe of Mahalla Bala and reliant on surface *qanats*.

New light has been shed on early Islamic urbanism in the oases and arid regions of Iran. It has been shown that the early Islamic mosque in Maibud was built on the fringe of Mahalla Bala, which was older than the rest of the walled city. There is also evidence, both morphological and from literary sources in Isfahan, that the Jamiʿ mosque, built in the gardens on the fringe of the ancient quarter of Yahudiyya, eventually became the heart of the Islamic town (Gaube, 1979). In Jay, the twin nucleus of ancient Isfahan, the Jamiʿ mosque was also located at the edge of the fortified city, near the Shahristan Bridge. In Bukhara too the early Islamic mosque is in the liminal area between the citadel and the *Sharistan*. Other examples include Yazd, where as a result of later development the ancient fringe has been absorbed into the built environment and in some places its precise identification requires more investigation. It is becoming evident that this pattern of development is characteristic of the early Islamic period in sizeable parts of the central Iranian plateau.

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