

Culture and Geography: An Interactive Process in the Formation of Courtyard Houses of Kashan in Iran

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The relationship between culture and geography is long known.¹ Climate affects us physiologically and psychologically. Our spirituality, values, symbols, and our means of coping with life are linked to nature: geography and the environment. This link is more profound in Islamic societies where the interactive bond between spirituality and the production of the environment is the strongest. From the formation of the city to the basic cell of a house, Islamic culture is in constant dialogue with landscape and the artifacts that modify it. The desert landscape has had a particular influence on the shaping of Islamic spirituality and the physical environment in which it is nurtured, perhaps because of the origins of Islamic faith in the Arabian desert where the struggle in a harsh environment with marginal resources, but at the same time striking visuals, had a lasting effect on the psyche of its adherents. The traditional town of Kashan in Iran, nestled at the edge of the desert and compacted with courtyard houses, is an Islamic urban specimen where the interactive process between culture and geography, mediated through the means of materials and building technology, is visible in every feature of urban morphology.

THE DESERT GEOGRAPHY OF KASHAN

Kashan has uniquely grown at the edge of the Iranian central plateau. Here development of a sustainable form of urbanism in the fragile margins of the desert highlights the adjustments that culture and geography must make to ensure growth and survival of human habitat in an otherwise inhospitable terrain. Kashan is situated at 33°59' N. Latitude and 51°27' E. Longitude at the height of 945 m from the sea level. It is located near the Kavir salt deposits—geological remains of what was once a lake during the Ice Age. Prehistoric settlements that grew at the edges of the lake began to vanish as the lake dried up. Today, Iran's dry central plateau, with less than 4 inches of annual rainfall, occupies one-seventh of the country's

landmass, a geographic predicament with which Kashan must cohabit. Contrasting the desert, the city is bordered by the Karkas Mountains on the other side. This southeasterly range with its peak reaching the height of 3900m holds the city's important source of water.

Traditionally for its water, Kashan mainly depended on the *qanat* system, with springs and wells providing secondary sources. The *qanat* system utilizes underground water by taking advantage of the changing water table by bringing water down from the higher slopes underground to the lower plains where they become surface streams serving a villages or the city. Kashan has had extensive *qanat* systems, numbering 130 at one time, which feed the city's reservoirs. Some 40 to 50 of these are still active and in use.² The other source of water is the springs flowing down from mountain heights. Springs such as the historic Sulaimaniya that has been watering the garden of Fin and its nearby village provided an additional source. However most streams such as Hanjan, Qahrud, Lathar and Chamrud are only seasonal and of limited use. Access to irrigation water has determined the value of agricultural land, and as a result, the precious land between the city and the mountains has been sought after for orchards. Moreover, the cool mountain valleys have been popular with city residents as a retreat to escape the heat of the summer. The region also had historic dams that controlled mountain floods and stored water for irrigation. The Kurud dam built in the seventeenth century during the Saffavid period by Shah Abbas provided an important source of water to the city and its hinterland. The Kamsar dam was another Saffavid project that was active for centuries until 1958 when it was destroyed by floods.³ Most of the traditional water system has been destroyed in recent decades due to uncontrolled growth and unsustainable planning practices. The deep wells operated by the municipality, which form the major source of water for urban residents today, are an unreliable source not certain how long it will suffice the

needs of the city as underground reserves are fast depleting. With population on the rise and the scarcity of water a serious problem, many villages have in recent times been abandoned due to lack of water.

Wind is another climatic factor whose positive and negative influences over Kashan's climate and the shaping of its physical environment are well understood in traditional systems. It is no surprise that these winds are given specific folkloric names related to how they can advantageously be utilized or to be mindful of their ill effects. Those blowing in the summer from the direction of the mountains, known among the locals as *Bad-e Shamal* (North Wind), *Bad-e Sham* (Evening Wind) and *Bad-e Shahriyari* (Royal Wind), are welcome and incorporated in passive cooling systems; those blowing from the desert and bringing sand such as *Bad-e Sorkh* (Red Wind) are feared and combated by urban design features.⁴ Similar to the wind, sun can be a positive energy in winter and yet have an excruciating nuisance in the summer when the temperature rises to 45°C. Again urban form has developed vernacular devices that welcomes warming winter sun and mitigates harsh summer sun.

KASHAN'S CULTURAL HISTORY

The location of Kashan on the commercial route between Tehran, Isfahan, Yazd and Kirman in one direction, and to the port cities of the Persian Gulf in the other, has historically been an asset. As the ruins in Sialk, an archaeological site two kilometers southwest of the city attest, Kashan's history goes back to pre-Islamic times when settlements in the area existed as part of the larger civilization of eastern Iraq and Persia. Ancient pottery found on the site dates back to a period that extends from fifth to third millennium BC, a culture subsequently destroyed in eighth century BC. There must have been an active community during the Sasanian period (third to seventh centuries) up to the time of the first wave of Arab/Islamic invasions in seventh century. The invasion is reported to have met with strong resistance from local alliances including Kashan, which sent 20,000 soldiers in the war against the Arabs at Nehavand. Establishment of the existing historic town, however came a century later and is attributed to Zubaida Khatun, wife of Baghdad Caliph Haroun al-Rashid (780-803 AD). During this early period, the town is reported to have had fortifications and a bathhouse with thriving villages outside.⁵

The first time the town comes into real prominence is during the Seljuqs in the eleventh century when it became part of the province of Isfahan that had capital of the new Seljuq Empire. Seljuq culture brought a new architecture and helped build new academies (*madrassa*), mosques, a hospital, and a library; it encouraged artists and scholars, and promoted the art of calligraphy and ceramics. The town's prominent citizens found their way to becoming high-level administrators in Seljuq courts. Most of the Seljuq buildings were destroyed during the

subsequent invasion of Mongols and later earthquakes, but the Friday Mosque, the minaret of Panja Shah (1074 AD), Jalali fort, and walls of the city still bear witness to the glory of the period. Kashan during the Ilkhanid and Timurid rules in the fourteenth and fifteenth centuries, continued to be known for its role in providing ceramics and weavings for export.

With the establishment of the Saffavid dynasty and the flourishing of culture in Isfahan, Kashan received renewed vigor. It became known for its weaving industries such as silk, velvet and carpet, as well as other crafts such as ceramics. Shah Abbas rebuilt and expanded the bazaars building new shops and caravansaries. He also built grand avenues, new palaces, and gardens. The garden of Fin, 5 km outside the city, which have ever since been a popular retreat with urbanites escaping the heat of the city, was also a Saffavid undertaking.⁶ Moreover, the Saffavids supported the Shi'a sect of Islam with fervor, which has since shaped the culture of the city. Yearly mourning ceremonies for Shi'ite saints (*Emams*) known as *Qali Shoyan* (carpet washers) draw huge crowds to the religious complex of Ardhal and Fin Gardens. The city's luster in the eighteenth century faded as earthquakes and the attacks by Afghans damaged the city. Unlike the past, when the positive influences came from Isfahan (200 km to the southeast), in the eighteenth century a strategic shift occurred when the Qajars established their kingdom in Tehran, 273 km to the northwest. Fateh Ali Shah Qajar reconstructed Kashan after the earthquake of 1779 AD breeding new life to the city. Industry once again began to thrive causing expansion of the city and sponsorship of new buildings. Streets were paved; old buildings were refurbished and mosques and religious academies were built. It is during this period that the elaborate courtyard houses discussed in this paper were constructed. Kashan's proximity to Tehran made it popular both as a place of royal recreation as well as a thriving commercial center. Most of the twentieth century for Kashan was uneventful. Growth of the city fluctuated following a slow and gradual process. Its estimated population of 5,000 households in the sixteenth century increased to 6,500 in the seventeenth century. In early nineteenth century, the population figure was estimated at about 30,000 reaching 50,000 in 1908. Most of the new growth has taken place in the last thirty years outside the old town increasing from a benchmark of 48,468 in 1966 to the present level of 156,144.⁷ Recent efforts are underway in managing growth and safeguarding the heritage of the city.

OLD KASHAN: A TRADITIONAL ISLAMIC TOWN WITH COMPACTED COURTYARD HOUSES

An early nineteenth century sketch of Kashan by a European traveler shows the town as a densely built walled town, compacted by houses with its skyline punctuated by wind towers of houses and domes and minarets of public buildings.⁸ With the exception of new boulevards cutting through the fabric of town and incidental appearance of some modern



Fig. 1. View of Old Town of Kashan.

buildings, a contemporary view of Kashan's skyline still show the old urban character of densely built ochre-colored buildings. This compactness exemplifies the essence of the Islamic town where courtyard houses are integrated with neighborhood (*mahala*) centers, the grand Mosque (*masjid-e jame*), commercial core of the city (*bazaar*), and various other urban and community elements such as the neighborhood mosques (*masjid*), shrines (*ziarat*), cisterns (*abanbar*), even the streets (*jada*) and alleys (*kucha*) – all of which make an interconnected fabric that nurtures life of the community. Within this dense urban fabric woven from attached buildings and narrow winding streets, all buildings, excluding the bathhouses (*garmaha*), an exceptional building type, are designed with courtyard spaces. Masonry, whether baked or unbaked brick, is used throughout including the construction of walls, roof domes and vaults. Such widespread use of masonry materials is logical in the light of scarcity of trees in the desert climate and the careful use of precious wood in mostly ornamental elements of buildings. But the evolution of urban form goes beyond practical considerations becoming a time-honored indigenous response that assimilates the imperatives of culture with the demands of the physical environment. Indeed urban architectural strategies neutralize ill effects of the environment and incorporate its energies through the design of building elements; but the design of high walls facing the streets, or

enclosed spaces of the courtyards, or use of parapets at rooftops, or incorporation of wind towers, go beyond sound physical design at the same time reinforcing tenets of culture bringing a sense of community and privacy, and support spiritual values of the individual.

In this context, the courtyard houses are a particular achievement of this urban evolution. The winged layout of the house has allowed integration of cultural needs and environmental comfort by not only allowing differentiation of functions between the different uses and living sections – formal living spaces, private sleeping chambers, service areas and servant quarters – but also environmental considerations such as creating warm sunny sides (*aftabru*) for winter use, and cool shaded sides (*sayaru*) for summer use. A cool basement (*sardab*) to escape into from the outside heat is a common design feature. As a result, life rotates seasonally between the different wings of the house and daily between the different levels. South-facing rooms are lower in height and invite winter sun for use during the cold season. The north-facing rooms, which have tall ceilings and are open to air circulation are consequently cool and used in the summers. During the extreme heat in the summer, life further moves up and down the different levels during the course of a day as temperature fluctuates. In the morning, when men are off to work, the middle living



Fig. 2. Residential street with wind tower in the background.

room/reception hall (*talar*) is mostly used by women. In the afternoon when heat of the day builds and men return for lunch and siesta, the cool basement (*sardab*) turns into the main family space. In the evening when the outside weather cools off, the family may assemble and eventually sleep on the roof. Other popular spaces for outdoor sleeping may be a terrace in the yard, or *mahtabi* (moon terrace), an outdoor space enclosed by walls on three sides but open to the sky. A basement may also be featured with a breeze vent from the wind tower that brings down the cool air and draws up and out the hot air thus further reducing the temperature. Another feature can be the cool water of the *qanat* passing through the basement for adding moisture and coolness. A room popularly referred to *hauz khana* may also be built with a pool of water for tempering the air. At the end a combination of these built features can reduce the interior temperature enormously by as much as 20°C. Even in a typical situation when a measurement was taken in Boroujerdi-ha House described later, a test showed the outside temperature to be 36°C while the temperature at the basement had a reading of 24°C.⁹ The yard with landscaping and a pool is often cooler than the street outside.

The average residents in Kashan live in a modest house with a small courtyard without elaborate functional differentiation.

Large ones, however, may have multiple of yards for different functions and different members of an extended family. In these instances the reception room may have exposure to two yards with additional light and ventilation. They may also have a separate servant quarter with yard or separate yard with stables. However most houses have two yards, an outer one (*biruni*) for guests and public activities and an inner one (*andaruni*) for the activities of the secluded family. Some houses have sunken courtyards (*goudal baghcha*) allowing deeper basements and more levels. Entry sequence to the house and the yard is an elaborate succession of architectural spaces and form. The courtyards have formal and orderly layout often cut out of the chaotic irregularity of the residential mass. The flow of spaces between the outside (the courtyard) and the inside (the reception hall) and between different levels creates a dynamic spatial concept experienced throughout the house. This dynamic character is enhanced by the form and harmonious treatment of surface ornamentation. With the bright sun prevalent throughout the year, soft interiors with subdued lighting penetrating through the intricate geometry of domes and vaults, is valued. Use of color glass for bringing in polychromatic light to the space adds to the drama. Color windows resembling a sunbow (named *khursheidi*) form special details in luxury houses. The courtyard houses discussed in this paper are the elaborate mansions from the Qajar period, which were built, in the eighteenth and nineteenth centuries. These aristocratic residences are located in the southeastern section of the town, which a century ago was a high-income neighborhood of the city.

TABATABA'I HOUSE

This house is one of Kashan's elaborate aristocratic mansions built in 1774 during the Qajar period. It is an example of a house with multiple courtyards forming different functional zones around which interrelated spaces are clustered. The central house has a large courtyard around which the main functions of the house are organized. The other courtyards hold subsidiary functions, or in the case of the two southern ones, serve as light wells for the otherwise dead corner spaces. The two northern courtyards serve as almost independent units. This allows some of the in-between spaces to have double exposure towards two courtyards. The series of rooms in the west wing, in particular, enjoy this double exposure. In the southwest corner of the complex, a stable with its own independent entry from the back alley is located.

The main courtyard is entered through a series of spaces from the northeast corner of the site and has the two main north and south sections as well as the east and west wings with subsidiary rooms. The south section (facing north and shaded called *sayaru*) constitutes the formal section of the house having two octagonal atriums and ceremonial spaces. Here the central space has a high ceiling flanked by smaller chambers at two levels with interiors profusely decorated. This space has a front

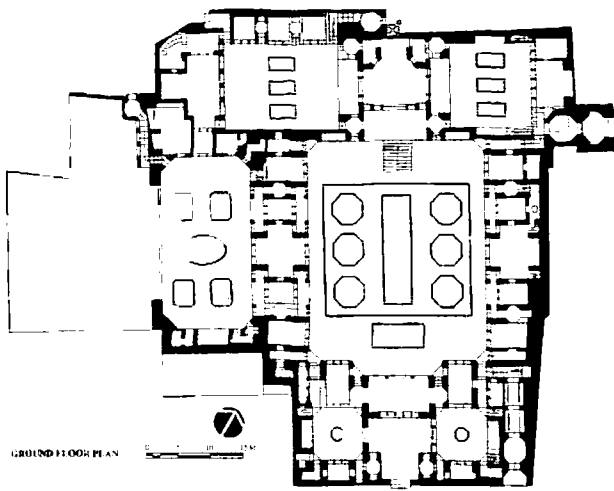


Fig. 3. Tabataba'i House.



Fig. 4. Tabataba'i House: view from the courtyard.

open gallery overlooking the yard. The octagonal courtyards allow double exposure for the spaces of this part. A stream flows through the basement of this part into the yard feeding the pools. The northern section (facing south called *afabri*) is lower in height and more enclosed having the winter rooms. This part has the main basement space of the house (*sardab*) also served by the wind tower (*badgir*) located at this end of the house. The formal reception hall (*talar*) in this part is connected to the second courtyard and is fronted by a *mahtabi* terrace. All main formal spaces of the house are accessed from small hallways referred to as *kafshkan* (shoe vestibule), a space where shoes are taken off before entering the main space.

Overall this elaborate mansion occupies a space of nearly 70 m by 70 m at three levels with independent and differentiated parts. It has all the traditional elements of a Kashani house where response to climate and cultural issues are skillfully integrated into the design, which is carried through creatively from concept to ornamentation to the last detail.

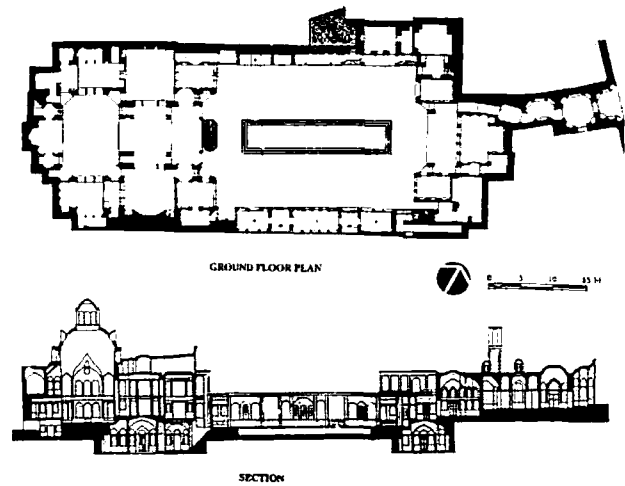


Fig. 5. Boroujerdi-ha House.

BOROUJERDI-HA HOUSE

Located in the southeast section of town near the Tabataba'i house. This mansion has a simple oblong plan with the main section of the mansion occupying a large portion of the southern end of the yard. Here the tall, two-story elaborate reception hall (*talar*) is the celebrated central space flanked by chambers on both sides at two levels. The *talar* includes the special alcove at the head of the room known as *shah-neshin* (king's place) earmarked for distinguished guests as the name suggests. A portico (*aiwan*) in front provides the transition to the courtyard and the pool to which the spaces are overlooking. The interiors are lavishly decorated with gypsum-work colorfully painted. The *shah-neshin* is richly decorated with mural paintings depicting Qajar kings. High clerestory windows bring diffused light to the interior. The lower level of this part partially extends below the back street from which the upper level has a back entrance. In addition to the top two stories, this part of the house has a sub-basement floor with living and auxiliary spaces. This part of the house also has two wind towers that bring down cool air to the basement. The lower level of the house also has a connection to the back street as a secondary entrance to the house. The exterior façade is covered with stucco ornamentation and like the interior paintings show a likely European baroque influence.

The northern, winter part of the house is low, one story in height and unassuming in character. This part has its own basement living room and its own wind tower. Main entry to the house is from this side through a series of spaces making a gradual transition from the public to the private domains. The main living space, the *talar*, on this side is also decorated with painted stucco and fronted by a terrace, which serves as a sun deck in the winter, but becomes an evening terrace, *mahtabi*, in



Fig. 6. Boroujerdi-ha House: view from the courtyard with wind tower in the background.

the cool summer evenings. On the east side of the courtyard, there are a series of secondary rooms. The house in the past had an internal courtyard house, *andaruni*, attached to the northeast corner. This part still exists, but is sectioned off completely as a separate unit under a different ownership.

The Boroujerdi-ha house is another fine example of a Kashani courtyard mansion, which despite its opulence, shows the basic harmonious relationships between environment and culture enhanced by appropriate use of materials and technology. A nineteenth century Kashani merchant by the name of Seyyed Ja'far Natanzi commissioned the house. Since his business was mostly trade with Boroujerd, the house gradually acquired the same name. But the elaborately detailed construction took 150 masons seventeen years, between 1875-1892, to complete the project.¹⁹

ABBASIAN HOUSING COMPLEX

This large mansion occupies an area of almost 50 by 60 meters and is designed with two large full-height courtyards and several secondary smaller courtyards and light wells occurring at various levels. Altogether, there are four levels, three above and one below ground. It is a complex design creating subsections and a great variety of spaces including summer and winter sections. Entrance to the complex is from the west through an octagonal space and a series of secondary spaces, which eventually leads to the two major northern and southern houses. Another entrance is located at the northeastern corner. There are also smaller unit in the northwest and southwest organized around an upper-story smaller courtyard. The main courtyards are widened at the upper levels through setbacks giving them a sense of spaciousness. Half spaces and mezzanines are incorporated in the spatial concept of the house. This house also has most of the elements of the Kashani house

geared to climate and culture. The reception halls are decorated with color gypsum work. Some of the domes are also decorated with mirror work. Color glass is used on the windows of spaces.

CONCLUSION

Large urban environments in Iran, such as Tehran, Mashhad, Isfahan and Tabriz are going through drastic changes: experiencing congestion, air pollution and environmental degradation at a massive scale as a result of natural population increase, migration from the rural areas and deficient planning policies. Smaller cities such as Kashan are not immune from this assault either. In Kashan, environmental ills such as depletion of underground water and breakdown of healthy linkages between geography and culture as a result of unsound practices have reached critical proportions. New subdivisions with inefficient land-use practices have been unraveling the urban fabric that the traditional approaches had harmoniously created. The courtyard building type lies at the core of this environmentally friendly approach. Its achievement of a compact efficient design that appropriately responds to the geographic and climatic conditions and addresses the cultural needs is exemplary. If these cities are going to maintain a healthy sustainable design, planning strategies for modernization need to incorporate the indigenous means that have reconciled environmental predicaments with cultural values.

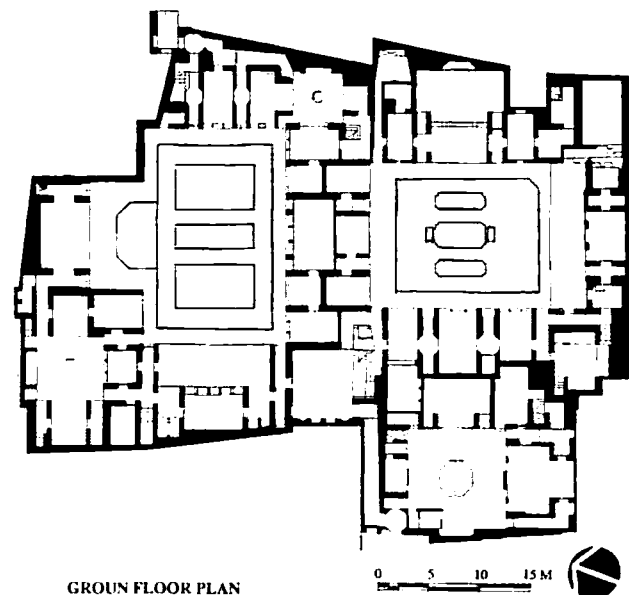


Fig. 7. Abbasian House.



Fig. 8. Abbasian House: façade detail from the courtyard.

NOTES

- ¹ As early as 1935 in his treatise *Climate and Culture*, Japanese philosopher Watsuji Tetsuro, discusses convincingly the effects that climate has on people's character, belief systems and the cultural products they produce. He discusses such effects on various climatic region of the world such as monsoon, desert and meadow.
- ² Hossein Farrokhyar, *A Paradise on the Edge of Kavir* (Tehran, Negin Qom Press, 1995): 14
- ³ J. Calmard, "Kashan", E. van Donzel, et al eds. *Encyclopaedia of Islam* (Leiden, E. J. Brill): 694-95
- ⁴ Hossein Farrokhyar, op cit: 12
- ⁵ Hossein Farrokhyar, op cit: 16
- ⁶ Hossein Farrokhyar, op cit
- ⁷ Gita Shenasi, *Face of Iran* (Tehran, Peikan Press, 1997)
- ⁸ Hossein Farrokhyar, op cit: 197
- ⁹ Vahid Ghobadian, *Climatic Analysis of Traditional Iranian Buildings* (Tehran, Tehran University Press, 1994)
- ¹⁰ Kambiz Haji-Qassemi, Ed. *Mansions of Kashan* (Tehran, Mohammad Printing House, 1996): 124

REFERENCES

- Field research on this paper was carried by the author in Kashan in the summer of 2001. Drawings are based on sources from Iranian Cultural Heritage Organization. The following books have provided the general background for the subject.
- Beazley, Elizabeth and Halverson, Michael. *Living with the Desert*. England: Aris and Phillips, 1982.
- Boozarjomelri, Abdolreza. *Causes of Spatial Use in Chahar-fasl houses of Persian Desert*. Ph.D. Dissertation, Philadelphia: University of Pennsylvania, 1980.
- Bonine, Michael. *Aridity and Structure: Adaptation of Indigenous Housing in Central Iran*. Clark, Michael and Paylore, Patricia, Eds. *Desert Housing*. Phoenix: University of Arizona, 1980.
- Calmard, J. "Kashan", in Donzel, E. van, et al, eds. *Encyclopaedia of Islam*. Leiden: E. J. Brill, 1978
- Costello, V.F. (ed.). *Kashan: A City and Region in Iran*. London & New York: John C. Dewdney, 1976.
- Elton, Daniel L. *The History of Iran*. Westport & London: Greenwood Press, 2001.
- English, Paul. *City and Village in Iran*. Madison: University of Wisconsin Press, 1966.
- Farrokhyar, Hossein. *A Paradise on the Edge of Kavir: The Architecture of the Garden*. Iran: Negin Qom Press, 1995
- Gaube, Heinz. *Iranian Cities*. New York: New York University Press, 1979.
- Ghaffari, Ali. *Zawarh: The Symbol of Kavir Myth*. Tehran: Cultural Research Bureau, 2000.
- Ghobadian, Vahid. *Climatic Analysis of Traditional Iranian Buildings*. Tehran: Tehran University Publications, 1994.
- Gita Shenasi. *Face of Iran*. Tehran: Peikan Press, 1997.
- Habibi, Seyed Mohsen. *De la cite' a la ville: Analyse historique de la coception urbaine et son aspect physique*. Tehran: Tehran University Publications, 1998.
- Haji-Qassemi, Kambiz. *Mansions of Kashan*. Tehran: Mohammad Printing House, 1996.
- Khairabadi, Masoud. *Iranian Cities: Formation and Development*. Syracuse: Syracuse University Press, 2000.
- Sultanzade, Hussein. *Urban Spaces in the Historical Texture of Iran*. Tehran: Cultural Research Bureau and Municipality of Tehran, 1994.
- _____. *Entry Spaces in the Traditional Architecture of Iran*. Tehran: Cultural Research Bureau and Municipality of Tehran, 1994.
- _____. "Cities" in Yarshater, Ehsan (ed.). *Encyclopaedia Iranica*, pp 603-631.
- Tetsuro, Watsuji. *Climate and Culture*. Greenwood press, NewYork, 1961.