HOUSE AND FABRIC IN THE ISLAMIC MEDITERRANEAN CITY

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Introduction

Due to its enclosed form that hides and protects the internal parts, the courtyard house is identified tout court with Islamic culture. This culture has put at the centre of its philosophy the protection of the family and the separation of women from public affairs. With a few exceptions, the large majority of traditional urban Islamic fabrics adopt a type related to the enclosure. Actually, a careful examination of the walled Islamic cities would record the presence of more elementary forms of dwelling next to the large and hairy *dar*s. Those are simple one-room houses with a unique access on the main front that provides air and light to the interior. These elementary units are either the residual of rural types or abusive invasions of leftover public spaces of the city; they are in any case typological variations. They are called *alwi* at Algiers, for instance, where they rise two levels above the ground. These mono-cellular types once aggregated in series have generated the row house type in the western medieval cities. In the Islamic cities, on the contrary, they have always shown a marginal and disaggregated character.

Due to the limited space of this essay, these minimal types will be out of consideration.

Studies of the courtyard house rest on an ever-present ambiguity that tends to perpetuate the image of a generic and universal type, indifferent to the site and immutable over time. However, the work of Orientalists and Arabists, celebrating the courtyard as the heart of the *dar*, of the extended family, has muddied the waters in architectural terms. Satisfied with generic symbolic and functional virtues, they have omitted structural and typological components that are essential to the full appreciation of the courtyard house. They have failed to recognize the historical phases which mark the change of the type and its various translations in different geographical locations.

In the following passage Vittorio Gregotti underscores the tectonic importance of the courtyard as an architectural act par excellence,

"the enclosure not only establishes a specific relationship with a specific place but is the principle by which a human group states its very relationship with nature and the cosmos. In addition, the enclosure is the form of the thing; how it presents itself to the outside world; how it reveals itself."[1] Given the fact that the archetype courtyard house represents a primordial act of enclosure and construction, it is senseless to establish primogeniture for something that is as essential to mankind as the wheel. Nevertheless, it is necessary to consider that every cultural region developed shelter and enclosure along different lines, through the choice of a specific elementary cell or by addressing the typological process in a specific direction.

This chapter seeks to describe the typological processes inherent in the evolution of the Mediterranean "Islamic" courtyard house with reference to the forces intrinsic to the building plot. It will also discuss the complex problems found at the level of the aggregation of building types and the accumulation of the courtyard house into the characteristic Middle Eastern city.

The Courtyard House

In the typological history of the courtyard house there was a critical moment when in a precursor an area around a mono-cellular unit was marked off by an enclosing wall. After that, the enclosing wall became a reference point, with an aggregation of more cells around a central space. Unlike the side-by-side placement of serial cells, the enclosure simultaneously suggests the final form of the courtyard house and emphasizes its inward looking content.

Much has been written about the sacred significance of the courtyard house. For example, it has been suggested that the courtyard of an Arab house evokes the Garden of Eden.[2] Gottfried Semper[3] associated the enclosure with a southern Mediterranean agricultural society that must struggle to coax a harvest from a grudging soil and

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[1] V. Gregotti, "Editoriale," *Rassegna* 1 (December 1979): 6.

[2] J. E. Campo, *The Other Sides of Paradise: Explorations into the Religious Meanings of Domestic Space in Islam* (Columbia: University of South Carolina Press, 1991); P. Oliver, *Dwellings: The House Across the World* (Austin: University of Texas, 1987); G. T. Petherbridge, "The House and Society," in *Architecture of the Islamic World: Its History and Social Meaning*, ed. G. Michell (London, 1978), 193–204.

[3] G. Semper, *The Four Elements of Architecture and Other Writings* (Cambridge, 1988).

protect it from the elements; G. Buti used linguistics to tie it to Indo-European nomadic people. The type is, however, a generic domestic form of residence which independently evolved in various places from the Egyptian-Sumerian civilization to the Mediterranean, Asia Minor, and right up to the Indus Valley.[4] The closed and reinforced courtyard house is, thus, a product of cultural polygenesis dating to the Bronze Age, and it has endured in the Mediterranean basin in the form of the classical Roman *atrium* and Greek *pastas* house.

The kernel of the type is the concept of the organism or better, the specific balance between a serial and/or an organic attitude of putting together forms that is the genetic patrimony of every culture. A courtyard house in Jilin, China, a courtyard house in Fez and a *domus* in Italica, Spain are, however, deeply different in spite of a generic similarity. The Chinese house disposes its pavilions inside the enclosure in a scattered manner, scarcely related to the wall of the perimeter. The house in Fez lays out the elementary cells enmeshed along the border of the plot, while double symmetry controls the regularity of the patio, but without influencing the whole building. The *domus* in Italica disposes the cells around the peristyle in an organic way, ordered by a bi-axial symmetry that crosses the whole building from the entrance to the exedra. Spaces have different sizes and are hierarchically composed in a variety of ways in spite of their superficial similarity as courtyard houses.

In order to better understand the courtyard model in all of its guises it is useful to introduce the fundamental typological differences between the courtyard house and the row house. The row house always lies on a road, faces onto it, and is directly accessible to it from the outside. Its pertinent area is behind, to be covered in subsequent stages as the area is filled in. The pre-eminence of the building site and the high property value attached to its facing front determine the dimensions of the lot, the front of which is equivalent to the size of the elementary cell, usually around five metres. The courtyard, on the contrary, has a superior sense of the familial territory, so that the form coincides with borders of the same territory. The same strict relationship to the road does not apply in the courtyard type, so any side of the lot can face the street without interfering with the internal organization of the house. A first building is even conceivable in which the courtyard

[4] G. Buti, *La casa degli Indo-europei. Tradizione e archeologia* (Florence, 1962).

is in some distance from the road. The unbuilt area dominates the built area because the former must mediate between the inside and the outside of the enclosure as well as distribute the organism from within. Furthermore, the courtyard-house type lacks external openings: they appeared only recently in both East and West following a lengthy process and exclusively in urban areas. The fact that a room has only one source of light, that is, from the courtyard, limits its depth to six metres or less, depending on the size of the elementary cell used by a society. This depth can be extended by adding a ground-floor portico into the courtyard with a loggia on the upper level. The building bay can be doubled only by making an opening in the wall that faces the street, which then allows the portico to be enclosed.

Guy Petherbridge offers an overall explanation for the dispersal of the courtyard-house type by distinguishing two varieties: "The interior courtyard house, where the house encloses a courtyard, characteristic of urban areas; and the exterior courtyard house, where the courtyard borders the house, providing a protected area contiguous with the dwelling units but not enclosed by them."[5] Andre Bazzana finds that this distinction holds for the Iberian Peninsula; he calls the first "block-like" and the second "attached." According to Bazzana the difference between the two is a result of a difference in economies: the exterior courtyard was used by semi-nomads; the interior courtyard, patterned after the ksar of the Sahara, was originally inhabited by sedentary farmers.[6] Such a schematic analysis is doubtful since it is conducted at an insufficiently low level of typological specificity. Petherbridge's contrast between the two models assumes a stereotyped dichotomy between urban mercantile and rural society which does not allow for a plethora of intermediate positions. The contrast is artificial and is less the result of an Orientalist mentality than of the mind set of geographers, who focus on territory, and historians, such as Torres Balbas, who concentrate on exceptions, such as the opulent and lavishly decorated homes of merchants and city officials.

Furthermore, if we look closely at local typological processes in the Maghreb and Andalusia, we not only discover the inappropriateness of

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[5] G. Petherbridge, "The House and Society," 176.

[6] A. Bazzana, *Maisons d'al-Andalus. Habitat medievale et structures du peuplement dans l'Espagne orientale* (Madrid, 1992), 169. For a more general discussion, see C. Flores, *Arquitectura espagnola popular*, 5 vols. (Madrid, 1973).

the closed and open models of the courtyard house as an explanation, but also that the Arab-Islamic city, whose fabric gives the impression of being frozen in time between the thirteenth and eighteenth centuries, is not monotypological at all. On the contrary, it is based on a wealth of variants which in no way jeopardize the fundamentals of the courtyard type. Misconceptions like Bazzana's result from the fact that the idea of an elementary courtyard lingers in the cultural memory long after its physical demise, and is replicated and reused in the same area even after a substantial lapse of time.

General Nomenclature and Typological Process

The approach here is to begin the analysis of typological processes with the study of the rural version of the courtyard house. The limited changes it undergoes allows for a clearer reading of the matrix type and early diachronic phases. Generally, there are two types of rural buildings in the same enclosure: the residence and the annexes which include stables and a shed for tools and farming equipment. Annexes are usually located on the side opposite the house. When the residential part of a structure in an enclosure is located on the side in front of the entrance, they either line up parallel to the entrance or on the perpendicular side. In North African Arab-Islamic urban houses, traces of these annexes coincide with the kitchen or *metbah*, the pantry area or *bayt el-hazim*, and the bathroom, and are grouped together on the side opposite the main *bayt*.[7] The dimensions of the enclosure are in no way restricted by the built area: such interdependence is a feature mainly of urban planning. In the Mediterranean, one finds it in both the ancient Greek *pastas* house, whose frontage varies between 9 and 18 metres[8] and the Roman *domus*, whose frontage measures between 12 and 18 metres.[9]

Two key factors determine in the first phase the whole growth of the house: orientation and access. The building unit is oriented to take the greatest advantage of direct sun, which in the Mediterranean

[7] J. Revault, *Palais et demeures de Tunis XVIII^e et XIX^e siecles* (Paris, 1971).

[8] More precisely, 9 m and 18 m facades are found at Priene in two different quarters; 15 m at Olinto and Kassope; 18 m at Dura Europos, and even 21 m at Abdera. The oversized facade of the last example can be explained by the fact that the courtyards there line up with the predominant side parallel to the route onto which the entrances open. W. Hoepfner and E. L. Schwandner, *Haus und Stadt im Klassichen Griechland* (Munich, 1994).

[9] On Roman metrology, see A. Martini, *Manuale di metrologia* (Turin, 1883).

basin corresponds to a south–southwestern exposure. Because choice of orientation relates more to production needs than to the building itself, this rule is rigid in rural areas but not so strictly adhered to in towns, although it is still prevalent in the majority of the town houses as well. Given the prevalence of a southern orientation, the built part within the enclosure is either parallel or perpendicular to the road. There are then only three possible access variants for the courtyard house. In the first case, when the building is parallel and adjacent to the route, entry is through the building unit, where in order not to limit the distributive possibilities of the building, it is pushed to a far end. In the other two cases, the building is either opposite or perpendicular to the road, and the entry lies in the centre of the free side.

The first figures demonstrate situations that produce different diachronic variations, their relative processes, and the most interesting transitions in these processes. These transitions, in turn, are capable of generating parallel processes of synchronic variants which, for reasons of space, are not represented in the various diagrams.

In the A 1–2–3 series the elementary courtyard is gradually transformed as more and more of its area is covered, so that activities that once took place outdoors begin to take place indoors. This is achieved through the addition of rooms on the opposite side of the initial cell; these new rooms are then consolidated with a portico, after which the two parts are unified by a covered passage, and the process ends by forming an enveloping courtyard around the centre. Because the example in this series is single family, mezzanines and other possible vertical additions typical of different processes are not included, although it is common to reserve at least one cell with an independent external entry for newlywed couples or house guests.[10]

In this first series, the house has a rather low level of specialization. The plot size even in an urban area is large enough to allow division of function on a single level. Further hierarchies occur when an addition is made on the upper level or by acquiring adjacent courtyards to form a larger building unit. This choice will not be an arbitrary one, but determined by cultural, political, and economic factors. An important step in the process of making a house more complex and specialized occurs when functions other than residential ones are introduced. This

[10] A non-commercial use derived from the *taberna* process is found in the Maghreb in the annex to the *dar* called an *ali* in Tunisia and in Algeria and a *masriya* in Morocco.

can take place whenever a residential area comes into contact with a strongly commercial outlying area. The B 1–2–3 series describes this development, which we shall refer to as a *taberna* process (from the Latin *taberna*, meaning shop), a term first used by the Muratori school to refer to the commercialization of residential property. The appeal of commerce leads to the transformation of the front part of the courtyard house into shops, which is achieved simply by creating a new and direct access from the outside to the existing cells of the house. The *taberna* develops independently to the point that it becomes a row house on the edge of the road, where it behaves like an independent elementary cell: it is doubled in height by introducing a staircase and is elongated on the sides to form the embryo of a row-type tissue, which recalls the evolution of the mono-cellular unit as in the diagram on figure. Where possible, the facade is doubled at the expense of the public road by adding a front portico.

This process determined the formation of bi-cellular rows that, once codified, became the basis in medieval Europe for all the expansions in extra-moenia villages. The phenomenon occurred at Ostia Antica, Rome's trade centre, and was identified and described in detail by Alessandro Giannini.[11] Further additions occur as public space is occupied, a universal and elementary anthropic behaviour.

This phenomenon was widespread in the Middle Ages, especially in those Arab cities where the classical foundations—the forum and agora—had been swallowed up, leaving a bare minimum of road. In the linear suq of Islamic cities a strip of tiny shops provides the background for a residential tissue of patio houses. In the case of spontaneous first settlement, if the tissue cannot accommodate bi-cellular shops on the street front, it will allow demolition and substitution inside the house, ultimately resulting in a change in use.[12]

This process of progressively filling in a courtyard, which we might call the "insula process," coincides with the transition into multi-family residences of the earlier *domus*.[13] The C 1–2–3 series describes this process: it begins at a side of the courtyard with a row of cells that

[11] A. Giannini, "Ostia," *Quaderno dell'Istituto di Elementi di Architettura e Rilievo dei Monumenti* 4: 36 ff.

[12] Alexandre Lezine notes that in a Tunisian block on rue de Tamis, three courtyard houses were transformed in this way after the seventeenth century (A. Lezine, *Deux villes d'Ifriqiya*, 160).

[13] Some classical archaeologists call any tall building an insula in order to distinguish it from the *domus*; others use the term to mean a block.

doubles in height served by a balcony. The stairwell is strategically located in the portico of the original cell; by doubling the row on the side opposite, a single stairwell can efficiently serve another balcony.[14] In another version, the stairs are provided for every single unit. If the open courtyard is eventually fully utilized, then it is reduced to a linear passageway. However, if the process begins on the side opposite courtyard C1 and C2, the tendency is to maintain a small square enclosure. The two processes do not take place independently of one another. On the contrary, commercialization of residential space (the *taberna* process) and the apartment-block phenomenon (the insula process) often occurred concurrently.

The insula process was triggered by two opposing tendencies. In a period of political or economic crisis, social upheaval causes a decrease in specialization; as the rich move out, their houses are occupied and subdivided by poor families. In a period of rapid economic growth, the city attracts new inhabitants, leading to land pressures and the need for major housing stock, which must be created by occupying the interior of existing houses. It should be made clear that building increment is a normal phenomenon that a society is able to control under normal conditions, but moments of heavy social imbalance could generate pathological phenomena like wild encroachment or speculative phenomena like demolition and substitution of the courtyard house with denser apartment houses.[15]

In the Arab or Ottoman pre-industrial city the insula process occurred mainly in the limited cases of great metropolises, such as Cairo during the Ottoman period, because it was connected to proletarization, which is much less frequent in a medina of merchants and artisans, because it leaves light marks in the fabric.[16] The deep changes that occurred in Muslim society in the second half of the last century have mined the roots of the patriarchal structure of the family and therefore constitute

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[14] The balcony in a courtyard that has undergone the insula process gives the maximum result insofar as it allows a single staircase to provide access to many residences.

[15] On typological substitutions and their corresponding social features in old Cairo, see L. Christians, O. Greger, and F. Steinberg, *Architektur und Stadtgestalt in Kairo* (Berlin, 1987), especially the section on the Husayniyya quarter, 84 ff.

[16] A question that arises is that of family structure. The *dar*, especially in old cities, was associated with the extended family—a structure closer to the Latin idea of gens than to the modern nuclear family. The growth of a family generates new units, often producing building complexes. It is not unusual to find that over time an extended family grew so numerous as to generate its own neighbourhood.

the main reason for the survival of the mono-familial courtyard house. The process of subdivision has assumed an exponential progression and no medina is exempted.

Series D1, in which a whole module doubles, and D2, in which there is an increase of half a module, describe the fusion of two neighbouring units. The process is subject to any of five basic outcomes. First, an unhierarchized aggregation of heterogeneous courtyards; second, a simple joining of two plots by eliminating the dividing wall and making no further modifications; third, an unhierarchized aggregation of homogeneous courtyards; fourth, a union of two pre-existing organisms; and, finally, fifth, a closing of the courtyard on all four sides.

This overall process happens differently in cities in the Maghreb where the expansion of a house is achieved through the serial addition of another autonomous organism. For instance, a very large house may have three courtyards, but they would never be re-hierarchized as they were in the Italian Renaissance case of serial courtyard buildings being turned into a palace. Instead, the resolution of the whole is achieved by making an opening in one of the walls of the acquired unit which, if it is smaller, becomes a service unit, or by adding an elevated passage (*sabat*).

The E1, E2, E3, E4 series describes processes relating to the subdivision of a lot. Each new portion, if uniform in size, will behave like an autonomous type, taking into consideration the presence of a corridor that must serve the innermost dwelling without being disruptive.

The purpose of those first four figures is to reconstruct the principle phenomena tied to the typological processes of the courtyard house. The diagrams are not intended to serve as a universal model and are therefore subject to adjustment. It should be kept in mind that every building culture behaves differently and privileges its own itineraries within the universal scheme. For instance, the elementary cell may vary in shape and size with the aggregation of cells depending on the level of organicity of the culture.[17]

[17] A more organic area will tend to organize along a central or dividing axis; the corner cell can be part of a larger rectangular cell (as in the Maghreb) or part of a unitary composition (as in Pompeii).

The Courtyard House: Structural Organization

The Islamic house displays structural complexity in the organization of the building. The composition of the building can be analysed through examples taken from the same cultural area. The "bourgeois" houses of Fez of the seventeenth–eighteenth centuries and their typological variants are the point of arrival of a long experimental route of the typological, technological, and functional components that are the result of a profound artisanal know-how. With reference to construction these houses are built of wood and masonry materials utilized in a fashion which simultaneously exploits structural and thermal properties.

For the purposes of organizational analysis it is necessary to leave out the accessory spaces that are unessential to our discourse, like minor partitions of rooms, encroachments that may close the courtyard, rooms acquired outside of the original plot, and hangings *tahal* or suspended passages *sabat*. For a detailed description of all domestic parts the reader should consult the exhaustive work of Jacques Revault.[18] The typical courtyard house at Fez is a two storey building with a patio closed on four sides with a double porch or external gallery. It is constituted of modular rooms called *bayt* or *byt* of elongated rectangular form and arranged along the edges of the plot. Secondary rooms like the kitchen, toilet facilities, and pantry are in the corners, sometimes served by a corridor. The stair is located in the corner opposite the entrance. In more wealthy dwellings the vertical arrangement is doubled: a stair leads to the quarters of the guests, another to the harem and the terrace. The arrangement of the *bayt*s at the ground floor is replicated at the upper floor, where the spaces are served through an external balcony or through the rooms in succession.

The terrace, usually reserved for women and children, is closed by a high wall along the perimeter of the house, while a short parapet protects people from the void of the patio.

In the mutual collaboration of the rooms, the plan of each *bayt* deforms itself in trapezoid forms in order to absorb the external irregularities of the urban fabric, but it maintains the walls at 90 degrees along the courtyard in order to preserve the geometric regularity of

[18] A detailed description of the domestic architecture of Fez can be found in the exhaustive work of Jacques Revault: J. Revault, L. Golvin, and A. Amahan, *Palais et demeures de Fes*: 1. *Epoques merinide et saadienne (XIV^e–XVII^e siecles)* (Paris, 1985).

the central courtyard or patio. The footprint of the patio tends to be rectangular or square and contains one or two axes of symmetry, marked by the position of the doors of the *bayt* facing themselves in the centre of the side of the courtyard. Sometimes a small fountain at the centre reinforces the virtual intersection of the two axes. The patio's symmetry does not involve the whole building (differently from the Roman *domus* or the Renaissance palace): the doors facing the courtyard are in asymmetrical relation to the single *bayt*.

The relation of the house to the urban fabric is accommodated through the adaptation of the peripheral cells. The patio or *Wast ad dar*, on the contrary, with its elementary stereometry, its arrangement of the openings controlled by symmetry, is the centre of the composition and gives the essential light and air to the house. Moreover, the transition from the well of the patio to the sky, the special treatment of the overhanging attic with green painted tiles and the wood decoration bestow to the patio the value of an autonomous sub-organism with its own rules of arrangement and construction.[19]

In the courtyard house types of Fez a system of structures closed and heterogeneous is the elementary cell *bayt*, a tri-dimensional module of 220 cm of max width (equivalent to a *kama* or a double arm of 165 cm plus a *dra* or cubit of 55 cm), whose length extends itself up to 7–8 metres. According to some scholars, the width is determined by the ancient use of palm wood beams. Functionally, the *bayt* has the highest flexibility and autonomy: it contains either the master bed or the living room couches and is separated from the patio by a monumental door. It can be easily transformed into an independent dwelling unit for a nucleus of the extended family.

The gallery on pillars or columns is an open structure that architecturally enriches the houses of the wealthier families like at the Abu Helal house. The inferior order sits on posts of masonry that define a porch of minimal width that filters air and light to the more internal spaces. A dense decorative pattern of stucco covers the surface, reducing its weight and making it vibrant under the sun. The upper balcony has the same function as the patio and porch of arranging the routes, avoiding the passage in succession in the rooms. Rarely, the gallery runs

[19] The archetype for the *skifa* is found in the so-called Door of the Spirits in the Chinese house; a wall recessed with respect to the external wall and perpendicular to the access axis of the courtyard. In addition to this example, the distributive element is also apparently found in Semitic regions.

along the entire perimeter of the patio, more frequently it is a loggia in front of the main entrance.

The structural members are aggregates of elements that contribute to the formation of a system. The timber structure is constructed as a frame i.e. an open discontinuous structure that works with interlapsed supports; the masonry structure is closed and continuous and it stands as a permanent element. The system of mixed structures in the Fez houses reached a high level of integration that required the alternate presence of the mason and the carpenter on the site. The foundations of the houses are in continuous masonry made of bricks and stone laid in mortar. Three sides of the house are normally shared with the neighbouring houses, the fourth, the façade, has no relevant openings but the main entrance. The unitarian treatment of the surface of the facade with a plaster of lime and sand reinforces the sense of continuity of the masonry involucres. In the interior the wall is permeable to light via small high level openings and the façade is articulated by balconies. Normally, the door is realized with an arch, more rarely all the wall is cut away revealing the ceiling.

Of all the combinations of elements the ceiling received particular attention because it was the most visible manifestation of the building tradition in different cultural arenas. Conceptually the ceiling is the projection of the roof on a horizontal plan, therefore in the cultures that use gable roofs the ridge purlin will be transformed into a master beam.[20]

Timber horizontal structures in Fez have different levels of complexity. The simple ceiling of a *bayt* is made with joists *ga'iza* ranged with a span of 15–20 cm and enchased at both extremes. On this structure sit floorboards of 1 cm thickness on which is spread a bed of mortar.

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[20] The ceilings in Essaouira are very different from those in Fez. The beams are of thuja rather than rare wood, and are no bigger than 3.2 m. They support a secondary structure covered with a layer of tassuit branches. The floor is made by covering a layer of dry leaves with and a mixture of mortar and earth. The typological specificity of each area is confirmed by the fact that seemingly similar ceilings are in fact realized according to quite opposite concepts. The Neapolitan ceiling is described by Caniggia as follows: "In Naples… a tradition of structures vaulted in light stone (pumice, lapillus) results in an apparently wooden ceiling being constructed with small barely stripped beams… a ceiling which in and of itself does not support… it could do so statically if isolated. In reality it is not so much the wood frame that provides support as the mass of lapillus mixed with mortar that thickly covers it (up to a metre in places). The wood frame acts as a disposable mold for what is laid upon it: it is the authentic structure insofar as it forms a sort of natural vault resulting from the settling of the casting material when the lens is separated from it" (G. Caniggia and G. L. Maffei, *Composizione architettonica e tipologia edilizia. Il progetto nell'edilizia di base* [Venice, 1985], 160).

Above sits a stratum of rubble materials (50 cm for the ceiling and 30 cm for the roof) on which are fixed the ceramics or the waterproof mantle. This type of structure guarantees the uniform distribution of weights on both main bearing walls, but can span only 220 cm in width. To increase the span of the ceilings brackets was a common feature.

Galleries built on pilasters required a more complex structure of the ceiling in order to create a passage of 60–120 cm in width. In this case the joists are laid on a continuous beam that goes along the perimeter of the courtyard. The latter usually sits on two overlapping beams supported by the columns and cantilevered towards the centre to reduce the span. The beams are coupled with elements of the same section and assembled in the form of a box. The timber structure is faced with a cedar-wood strip with floral motifs *turiq* or cufic lettering *qufi* to improve its appearance.

In an alternative system the carpentry of the *halqa* touches the highest constructive level with a stratum of several overlapped beams and brackets. The stratum of joists then supports the parapet and the crown of tiles. Through repetition of supports, the first system has no theoretical limits of width, save those codified by the type of wood employed and in Fez is about 18 metres. The second system is restricted to courtyards no larger than 5 metres.

In spite of the fact that the contrast between the light colour of the masonry and the dark of the cedar timber produces tones of great visual effect, the attractive appearance of the traditional courtyard house should not hide the strict functionality of the structural methods employed. The sequence of masonry—timber—masonry is a defining feature of the house type.

Regarding the masonry construction, the method of building usually gives priority to decorative bricks laid with various types of textures: double header course, oblique, herringbone, or toothcomb-type, and built with courses of stones and wood to produce facade patterns. The three main textures: horizontal, oblique, and herringbone could appear in the same wall with alternate sequence. Externally the wall is covered with plaster, internally with stucco, ceramics, or plaster.[21]

The timber structures are composed of components always readable as separate entities by the tectonic deconstruction of the junctions. The

[21] Some of the different patterns found in bricklaying include curtain, cross, oblique, herringbone, double herringbone, and stone and wood inlays. "Schema directeur d'urbanisme de la ville de Fes," dossier technique IV, 2, in *Les techniques traditionnelles de l'architecture et du decor à Fes* (Paris, 1980).

openings within the arch are closed with a rectangular door of 350 cm hight which rotates on cylindrical pivots inserted in a hole in the floor and in the wooden frame *rtej*.

Is The Courtyard House A Universal Archetype?

The discussion so far has been of typological processes in more or less synchronic terms. The next question is whether or not the courtyard house is a universal archetype. A number of scholars have observed that while the courtyard house is the leading type in many regions, such as Padania (the Po Valley), the Maghreb, and the rest of the Middle East, it is not uniformly dispersed throughout the Mediterranean and North Africa. While it is reasonable to assume that the territories of the Roman Empire were influenced by the *domus* up to at least the fifth century, no trace of it can be found in parts of central Italy (including Rome), southern Italy (excluding the Naples area), and Provence. Climate is not the underlying reason for the courtyard house—for instance, Milan and Aleppo share the same building type but not climate.[22]

Perhaps the reason for the dispersed presence of the courtyard house lies in the continuity of Byzantine culture; in areas that had been abandoned by the empire, the revival of building was based on a relatively retrogressive type almost consistent with the elementary cell. Within the Islamic world the courtyard type, inherited from Byzantium also responded effectively to the essential Muslim requirements of secluding and protecting women. This explains the easy transition from earlier Yemenite models to the courtyard type by the Umayyads when they reached the shores of the Mediterranean.

In Europe the transformation of the *domus* led directly to the codification of the row-house type, while in pre-colonial Arab Islam this happened only sporadically. Thus in the Maghreb the insula type was reproduced imprecisely, and it was also always strongly resisted in North Africa whenever the core of the house, the *wast ad-dar*, was threatened by population pressure. Even when faced with a population density of 500 inhabitants per hectare, the house responds by growing in height

[22] Theorists of sustainable technology claim that the courtyard is capable of thermoregulation. G. Scudo, "Climatic Design in the Arab Courtyard House," in "Technology: From Tradition to Innovation," ed. A. Petruccioli, special issue of *Environmental Design: Journal of the Islamic Environmental Design Research Centre* 1–2 (1988): 82–91.

and subdividing in an effort to preserve the integrity of the courtyard.[23] Although the courtyard itself lost its "cosmic" value (as Hassan Fathy called it) long ago in the transition from single-family to multi-family dwelling, it continues to represent in the mind of society an idea of unity that goes beyond its distributive function. The status of the row-house type provides the additional proof for Islamic resistance to the insula development in the Mediterranean. In the Islamic city, the row house was generally considered a lower-class house, while in medieval Europe it was the house of the urban middle class. The row house type nevertheless has a local history along the Arab Mediterranean coast, as the excavation of small bi-cellular row houses at Fustat attests, and is found in the form of the small cells built on top of shop fronts and lying in a protective screen on the border of a residential neighbourhood. Even today the row or terraced house is seen as alien in the region as the modern detached villa of western countries.

A type cannot be stretched beyond the limits of spatial and cultural geography. The metamorphosis of the courtyard house has, therefore, limits which are social rather than spatial. Recent surveying of some densely populated medinas of North African urban centres (such as Casablanca, where more than 1,000 residents were squeezed into a single hectare) has revealed that the subdivision of courtyard space is common. The tendency is to divide up the courtyard into thin access strips that can be covered when necessary. It has been speculated that, as these are the seeds of future row or apartment houses, the changes will bring with them subsequent modification in the Islamic idea of the house and the city itself.[24]

The Mediterranean lineage of the courtyard house

In order to navigate in the archipelago of the typological processes involved in the evolution of the courtyard house, it is useful to deepen the concept of cultural area. A residential type is an expression of a culture, anchored in a territory where a society has built its identity. To

[23] In Algiers a metal screen is ingeniously placed over the courtyard to act as both a surface to be walked on and a covering in case of rain. This creates two insulae, one on top of the other, while still keeping the courtyard as a global space inside the house.

[24] See figure 52, a survey of an Essaouira house on the rue de la Mellah by M. Accorsi and A. Petruccioli. See also M. Cote, *L'Algerie ou l'espace retourné* (Algiers, 1993).

say that the residential type does not travel is a partial truth that cannot hide the osmosis and the interactions between cultures. The linguistic disciplines demonstrate that the more the frontiers are impenetrable, the more arduous are contacts and hence design transitions. Relationships are never linear but hierarchically ordered: in a region there are sub-areas economically and socially dominant, like the county town in the plains. It may happen that the "bourgeois" families of the latter form their building types based upon the models in the main city. The concept is relative, since it is enough to enlarge the scale from the region to a larger geographical area. Inevitably, the county towns will be cultural debtors of the superior area—the State capital. If in the eighteenth century the plateau of Medea, the piedmont of Blida, and the coast of Tipasa were dependent from Algiers, the regional capitals of Algiers, Damascus, Tripoli, and Baghdad were vigilant of the fashions of Istanbul, the capital of the Ottoman Empire. First discourses on the Mediterranean typological processes confirm a division between the Levant and the areas west of the Mare Nostrum. In Southern Spain and Maghreb prevails the patio house, well represented by the houses of Fez we have just analyzed. What makes them recognizable in the same family is the *taddart*, the elementary cell that is permanent in time and space all over the West Mediterranean. Recent ethno-archaeological studies such as E. Laoust's work on central Morocco[25] have allowed us to isolate the *taddart*, a long narrow cell that is fairly consistent from tribe to tribe. It could be argued that the *taddart* is the elementary type that in the Maghreb becomes a component of spatial structure, the *bayt-* on a par with the Eastern-imported T-shaped room—of both rural and urban homes. As the dwelling of transients, the *taddart* is nothing more than the stone version of a tent, placed along the perimeter of a courtyard, just as nomads would place their tents around the *douar* leaving room in the middle for their animals.

On the other side, the fact that the Western Muslim areas have abandoned the quadratic 5 × 5 metres cell has cut them off the continuity of the Roman world. Houses in Venice, Lebanon, Turkey, and Cairo, will be used to trace typological processes because their evolution, taking up the thread of the discourses of centrality and tripartition of the rooms, can be reconstructed reasonably well from the beginning using

[25] E. Laoust, *L'habitation chez les transhumants du Maroc central* (Paris, 1955). See also R. Riche, "La maison de l'Aures," *Cahiers des arts et techniques d'Afrique du nord* 5: 30–36.

archaeological evidence. Aside from its historic relationship with the eastern Mediterranean, Venice is a key area because it offers a clear reading of typologies and urban morphology. The work of Saverio Muratori, Paolo Maretto, and Gianfranco Caniggia[26] brings an unparalleled wealth of information to the subject, from a systematic survey of the city's tissues and buildings to a refined theoretical analysis of the data.

The Venetian Courtyard House

A peculiarity germane to the layout of a Venetian house is that it tended to remain unchanged over time due to the special building techniques required by its unique foundations. The high cost of a foundation on wooden piles discouraged variations that involved moving the supporting walls. This and the natural resistance of property lines are the reasons why the so-called Byzantine layout has remained almost intact in spite of stylistic trends over time.[27] The first building type in Venice, the elementary *domus*, is identified in a room set against the northern wall of the enclosure and joined to a distributive element, the portico (*portego*). Planimetric location favoured this solution over two others, for these were houses belonging to fishermen, and the courtyards served as a transit point between water along one side of the plot and street along the other. The concern to connect the two sides of the plot determined the character and the peculiar typological solution in the Venetian house.

The type was at its most developed when a second story and a *squero* (a service space used to store and repair boats) were added on, and the front of the building was closed up. At this point, the *portego* lost its original function and was transformed into the *sala veneta*, open at either end: it then served a distributive function rather than providing light. The placement of street access was symptomatic and can still be read today in either the zone of the *portego* or the courtyard, which was later covered by successive building bays that were often open loggias. The original bay, however, always remained solid and can be easily recognized even from the outside elevation. This would explain

[26] S. Muratori, *Per una operante storia urbana di Venezia* (Rome, 1959); P. Maretto, *La casa veneziana nella storia della città dalle origini all'ottocento* (Venice, 1986); G. Caniggia, "La casa e la città nei primi secoli," in P. Maretto, *La casa veneziana*, 3–53.

[27] P. Maretto, *L'edilizia gotica veneziana* (Rome, 1961).

the recurring asymmetry of many Venetian facades such as those in Campo Nazario Sauro, Lista di Spagna, and the San Stae area.

An early development in the insula process established the mercantile type, a combination house-warehouse with a front loggia; its systematic occurrence led to the important development of the street-courtyard type. When considered an independent type, its use is evident in all of the city's major planned projects: the Rialto, the Cannaregio waterfront area, and the working-class housing financed by the Republic in the fifteenth and sixteenth century. This type is an extremely functional combination consisting of a street segment running from the water to the main overland route flanked on both sides by row houses. Once codified, it was used in all Venetian-influenced Mediterranean settlements, including Dubrovnik. The similarities between this tripartite layout with a central crossing hall and both the Venetian plan and the Byzantine *triklinium* are striking.

The Lebanese Courtyard House

F. Ragette conducted important parallel research on the Lebanese house (28) in the 1960s that allows us to reconstruct a typological process in that area. This work is important for its breadth—it covers numerous mid-nineteenth-century examples, the layouts of which betray an archaic substratum. In Lebanon, an elementary type with a vaulted square or elongated plan can be identified in many rural examples. Changes in the type are generated either by doubling the width or height. The first case can lead to a serial aggregation of up to five cells, with the addition of an optional front gallery.[28] The crucial point is where, even in rural houses, the intermediate cell became specialized and gave rise to the *iwan*, locally known as *liwan*. This is a room closed on three sides, and located either on the main level or on an upper story. It is an architectural element known throughout the Middle East and is possibly of Persian origin.[29] The *iwan* played a central role in the formation of the Lebanese courtyard house because access to the house did not depend on it. Instead an external or side staircase fulfilled that function,

[28] F. Ragette, *Architecture in Lebanon*, 25–27.

[29] H. De Beyle, *L'habitation byzantine* (Paris, 1903); A. Deroko, "Quelques reflections sur l'aspect de la maison byzantine," in *Actes du Congres International d'Etudes Byzantines*, 1955 (Istanbul, 1955), 124–125.

allowing the *iwan*[30] to become the ordering element for the whole house.

There are two basic categories of *liwan* and cell combination: the first involves the association of elementary groups around the *liwan* arranged as a courtyard. As the point of departure for the geometrical axis, the liwan establishes hierarchy and scale: some variants have one, two, or three *liwan*s, or two *liwan*s and a portico. This category includes the Mamluk house in Aleppo studied by J. C. David, in which the iwan reaches monumental proportions.[31]

The second type involves the extension and modification of the *iwan* into a crossing hall. The *iwan* protrudes from the facade supported by a series of cantilevered and embedded arches. The room can be reached from either the front through a gallery or from the side by a corridor. This pattern of access results in two important variants—a T- or cross plan—both of which were common in the late nineteenth century. The front access creates a main room and *liwan* separated by a series of arches, up to twenty metres long in large residences. Side access allows the two free sides to accommodate the *liwan* and a loggia or bow window. The similarity with the Ottoman sofa house is noteworthy, but it is not the goal here to discover a comprehensive system of relations[32] or to answer the age-old question of the origins of the Turkish house. However, by referring to Sadat Eldem's research,[33] we can reach a limited conclusion with regard to the Ottoman Turkish house of what he calls the sofa type.

The Turkish Courtyard House

The Turkish house differs from other Middle Eastern houses in one important and determining way: the elementary cell or *oda* is consistently the ordering element and is formally and functionally autonomous. It

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[30] There is considerable debate over whether the *iwan* is the product of an autonomous evolutionary process—a local interpretation of a pre-Islamic idea familiar throughout the Orient—or simply an imported model. A Persian term, *iwan* (*liwan* in Arabic), describes a space—dependent or independent—closed on three sides by walls and completely open on the fourth. It is usually vaulted. The form can be applied to a platform or an entire building. For a detailed discussion of the monumental *iwan*, s.v. "Iwan" in the *Encyclopaedia of Islam*, 2nd ed.

[31] J.-Cl. David. "Syrie: systèmes de distribution des espaces dans la maison traditionnelle d'Alep," *Les cahiers de la recherche architecturale* 20–21 (pages 38 and following).

[32] M. M. Cerasi, *La città del Levante* (Milan, 1986), 176 ff.

[33] S. H. Eldem, *Turkish House: Ottoman Period*, vol. 1 (Istanbul, 1984).

establishes an extremely articulated planimetry in buildings which breaks up the envelope of the house by playing freely with the spaces. The sofa, a product of the predetermined disposition of the *oda*, is always expressed by a strong topological or geometric centrality and reinforced by symmetrical references. Given this, Eldem identifies the essence of the sofa type in its multifunctional mechanism and introduces an evolving classification. He begins with a *hayat* matrix type, and then follows with an exterior sofa type with the idea that an *iwan* can be placed between two *odas* to form a T-shaped sofa. Next a *kosk* (kiosk) is built opposite the sofa, with the latter becoming interiorized over time, and in the final phase there is both an interior and a central sofa. In these variants, Eldem argues that the courtyard continues to play a crucial role in house planning.[34]

The similarities between the tripartite layout with a central crossing hall of the mature Lebanese house, of the Venetian *portego*, and the Turkish sofa house are striking. Excluding important cultural migrations in one direction or the other, it is reasonable to say that the three parallel typological processes have been elaborated autonomously from a common fundamental type, the Byzantine *domus*.

The Egyptian Courtyard House

Cairo provides another important case study, for the complexity of its urban structures results from the long stratification of the tissues and the specialization of the types. With the exception of some aristocratic houses and grand residential complexes the fabric of the city has been totally replaced. Although a reconstruction of the processes will inevitably be incomplete and in need of adjustment, the history of the Egyptian courtyard house can be traced back using the archaeological and documentary evidence of the suq. The relatively recent excavations at Fustat[35] led by Scanlon reveal a wide array of types that incorpo-

[34] Ibid., 26–31, for the planimetric drawings, in part reproduced in figure 68. Eldem vehemently rejects the idea of a marked Byzantine influence, arguing that no trace of the Byzantine house exists in Istanbul. Nevertheless the similarity with the Byzantine type called triklinium is striking.

[35] G. T. Scanlon, "Fustat Expedition: Preliminary Report 1965," *Journal of the American Research Center in Egypt* 5 (1966): 83–112 and 10 (1973): 11–25.

rate earlier discoveries made by Gabriel.[36] Gabriel offers the following description of ninth-century courtyard houses that appear to be based on a model from Samarra in Iraq.

Most early houses are based on a composition of two perpendicular axes radiating from a central courtyard. A portico with three recesses lines one side of the courtyard: on the other three sides lie several *iwan*s of varying depths; at times they constitute real rooms but in general are simply modest recesses or even flat niches. The triple-bay portico that leads to the main living quarters is usually oriented east; it never faces due south or north.[37]

Little evidence exists to help us shed light on the transition from the early courtyard houses of Fustat to the Mamluk *qaʿa*: no archaeological remains of Fatimid-era houses exist, with the exception of the schematic plan Pauty published of the four-iwan courtyard of the Sayyidat al-Mulk palace. Although the proportions are grander, the same elements are present: a composition on two axes; portico and salon on one side; open *iwan* on the other three.

A relief on the reception hall of the Ayyubid palace (dated ca. 1240) on Rawda Island provides the plan of house of two T-shaped rooms joined to a courtyard. The dimensions of the room are relatively close to those of Fustat courtyards, and correspond to the *durqaʿa* of fourteenth-century Mamluk houses. The *qaʿa* of the palace at Dardir described by Creswell[38] as a closed rectangular hall illuminated from above by a cupola on the central axis could be interpreted as a later phase in which the courtyard was covered. The hypothesis is plausible and analogous to similar processes: for example, the derivation of the 3–6–3 m religious structure from the covering of the atrium of the *domus*, once thought to be an imitation of the model for the 6–12–6 proto-Christian basilica, the first to be codified.[39]

In the reconstruction of the *maqʿad*, we do not consider the north-facing upper-story loggia as an independent type because it is incapable of formal autonomy from the Mamluk *dar* with which it combines

[36] A. B. Bey and A. Gabriel, *Les fouilles d'al Foustat et les origines de la maison arabe en Egypte* (Paris, 1921).

[37] Ibid., 276–279.

[38] K. A. C. Creswell, *The Muslim Architecture of Egypt*, 2 vols. (Oxford, 1959), 2: 208.

[39] That Santa Maria in Antiqua (located in the Roman Forum) is directly derived from a *domus* is evident when comparing the planimetry of the church with that of the so-called Surgeon's House in Pompeii. Similar analogies exist throughout the Mediterranean culture area, particularly in Syria.

to make up a system. A combination of two *qaʿas* and a *maqʿad* can be found on the uppermost story of the Manzil Zaynab Hatun, an affluent *dar* from the reign of Qaytbay (1468–96).[40] The structure has two entrances: they lead to two separate apartments of unequal size which face the same courtyard. If the reading of the plan is correct, this example represents an important stage in the rise of the bourgeois house. The annexes were intended as rental property.[41] As the *durqaʿa* becomes more important to family life, the courtyard's importance decreases. Eventually it becomes little more than a passageway, along which various activities took place and different forms were imposed. During the Ottoman period, in particular, the dar was reduced to an informal composition of volumes centred on a void.[42]

The fact that there is a *qaʿa* in every building confirms that the courtyard type was the leading model in the typological processes of Cairo. It is especially distinctive in a certain type of collective residence known in Cairo as a *rabʿ*. There were two types of collective residence in Ottoman Cairo: the *hawsh* and the *rabʿ*.[43]

The first was a large enclosure, sometimes as large as an entire block, given over to the poor where they can put up some sort of shelter. More a shantytown than anything else, the building tissue was easily reabsorbed in more recent times and reapportioned without leaving

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[40] J. Revault, "L'architecture domestique du Caire a l'epoque mamelouke XIII–XVI siecles," in *Palais et maisons du Caire*, 1. *L'epoque mamelouke*, ed. J. C. Garcin, B. Maury, J. Revault, and M. Zakariya (Paris, 1982), 108–109.

[41] Both Andre Raymond and Nelly Hanna discuss the important consequences this has for the urban whole. N. Hanna, "La maison Waqf Radwan au Caire," *L'habitat traditionnel* 1: 61–77.

[42] D. Behrens-Abouseif, "Alternatives to Cadaster Maps for the Study of Islamic Cities," in "Urban Morphogenesis, Maps and Cadastral Plans," ed. A. Petruccioli, a special volume of *Environmental Design: Journal of the Islamic Environmental Design Research Centre* 1–2 (1993): 92–95; and idem, "Notes sur la function de la cour dans la maison moyenne du Caire ottoman," *L'habitat traditionnel* 2: 411–418.

[43] In *Grandes villes arabes*, 323–326, Raymond describes the *hawsh* and its presence throughout the Ottoman Empire. According to Clerget (op. cit., 1: 312) each *hawsh* in Cairo was village-like and housed thirty or forty families. There were many *hawsh* in the city and suburbs of Aleppo according to the traveller A. Russell, who describes them as "a wide space surrounded by a certain number of low, mediocre dwellings of two or three rooms each. The common area is haphazardly paved, with the exception of the space in front of each house…There are no fountains but there are numerous wells" (A. Russell, *The Natural History of Aleppo*, vol. 2 (London, 1794), 36.

any obvious traces.[44] The second type was closer to the modern version of a middle-class residential apartment complex. It was formally structured and consisted of a series of apartments derived from the *qaʿa*, distributed around a courtyard in duplexes or sometimes triplexes. Each apartment included a portion of the terrace, the only external outlet for the residence. Often a *rabʿ* was next door to a *wakala* caravanserai, in which case the ground floor and mezzanine of the complex were used for storage and business transactions and the upper stories were purely residential. The apartments opened onto the landings of a series of stairways that led to the outside. In this way the autonomy of both areas was maintained. This layout is legible on the outside of the building through the surface punctured with windows and *mashrabiyyas*; it rested on a solid rustic stone base with a full-height monumental entrance cut into it.

Despite differences in nomenclature, the ritual and sequences of use of the traditional *qaʿa* were largely the same, whether located in palaces or more modest houses. The meeting of Ottoman culture and local customs at the time of Muhammad Ali, however, produced a new type, the *fasha*.[45] A combination of a central hall and grand staircase, it was used in large buildings and condominiums. The distributive hierarchy of the building began with a large courtyard from which a number of different stairways led to various *fasha*. These in turn acted as internal covered courtyards, onto which the individual apartments open, and in which the common service areas were located.

The layout of the apartment was similar to that of the *rabʿ*: an elongated living room was divided into a vestibule, reminiscent of the *durqaʿa*, and an *iwan* with a projecting balcony. The niches of the *qaʿa* were large enough to function as secondary rooms.

Perhaps the most important lesson of the typological process in Cairo is that it elaborates the parallels in the progressive specialization and hierarchy of the urban tissue and the complex growth and changes in the courtyard house. In the modern history of Cairo, the

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[44] Jean Claude David located what is probably of series of Ottoman-period *hawsh* in the Qarleq quarter of northeastern Aleppo; J.-Cl. David, "La formation du tissu de la ville arabo-islamique: apporte de l'etude des plans cadastraux d'Alep," in "Urban Morphogenesis," 138–155.

[45] Olivier Blin, "Le Caire XIX–XX^{e} siecles. De la fasaha a la sala comme modeles," *Les cahiers de la recherche architecturale* 20–21 (1987): 96 ff.

passage from the first Fatimid settlement to the Mamluk city and then the Ottoman metropolis is mirrored by the changes in the courtyard house. Adaptation based on variations of the courtyard house in the *qaʿa* (a more compact residential type subject to insertion either in a house, or a palace, or a *rabʿ*, or even a modern condominium), joined to make Cairo a special place.

Conclusion

As a synthesis it might be useful to begin by emphasizing that the terms "serial and organic" represent the premise behind any rigorous reading of the built environment. Every civilization has as part of its own cultural expression a different way of putting together objects or components of a set, which ranges from a maximum of casual seriality to a maximum of organicity. For this reason, whilst an archetypal form like the courtyard house, the product of polygenesis, is different in plan in the Maghreb and in the Roman atrium house, that should not disguise the universal nature of the type.

The domestic cell, the initial matrix in the evolution of the courtyard house, exists as a largely standard dimensional element irrespective of cultural origins. The basic cell can evolve through successive duplications to form a row house, apartment house or courtyard dwelling. The courtyard house, however, requires attention because it is the residential type which responds simultaneously to cosmic, cultural and climatic forces. As such it is the main residential type of the Arab region, although it enjoyed a form of parallel evolution beyond the Middle East. Of particular significance are the two processes of commercial specialization (the *taberna* process) and subdivision and fragmentation (*insula* process), which are at the root of any phenomenon of metabolization into the dynamic cities of the Arab world.

With regard to different cultures, the similarity in the courtyard houses of Syria, Lebanon, Turkey, and Venice, does not represent, as some suppose, a phenomenon of cultural osmosis, but the sharing of a common taproot in the Levant. Hence these houses share in the basic genetic type or *substratum* of the *domus*. On the other hand, courtyard houses of Cairo display different characteristics where the *qaʿa* slowly evolves into the vestibule of the modern apartment. In the case of Algiers, an alien European culture violently combines with a local one to produce a radical change in favour of imported building types (the

apartment) and aggregations (blocks) based on open streets as against closed courts.

From both Cairo and Algiers we can learn the important lesson that it is not the basic domestic cell that produces the courtyard house but how the cell is put together. The resolution of the public realm (street) and the private realm (cell) in designs which exploit both plan and section to produce shelter and privacy is the essence of the courtyard house.

(All surveys and drawings by the author)