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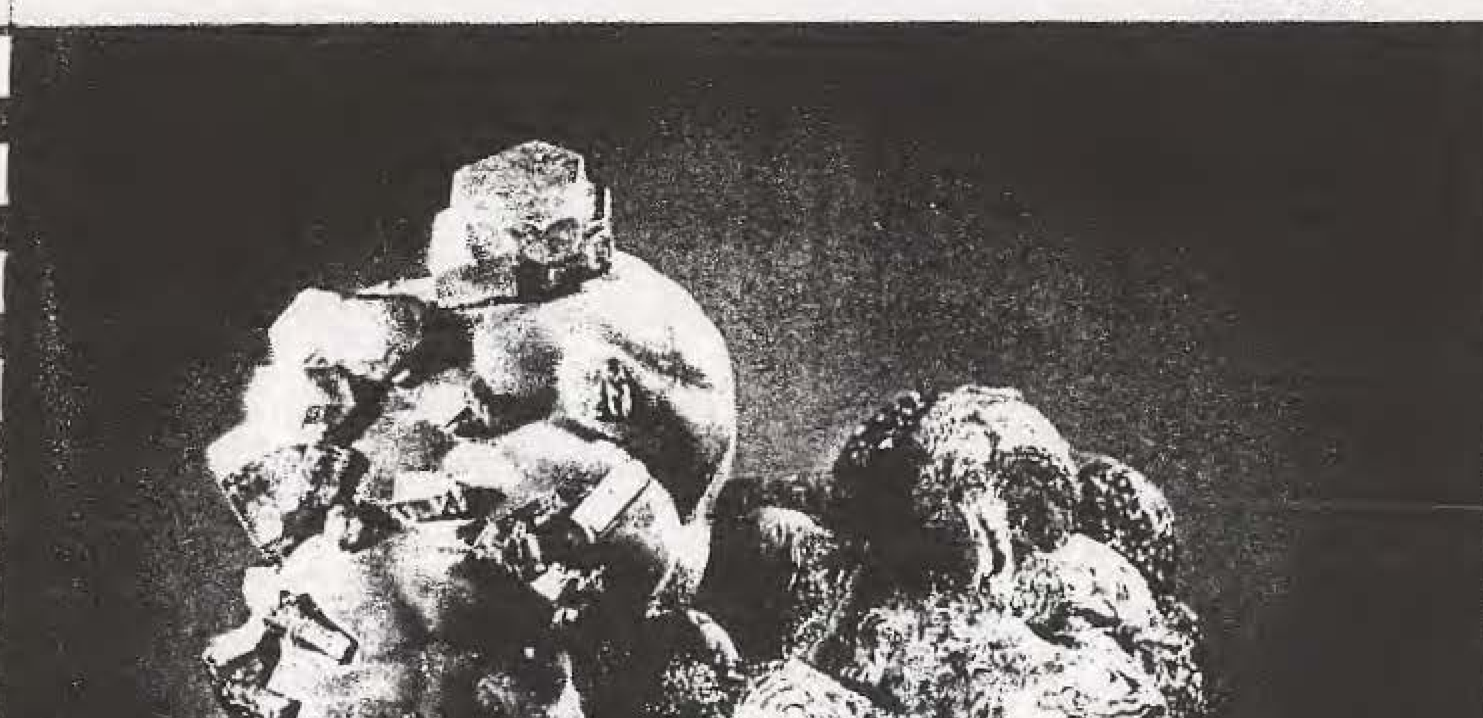

JOURNAL OF THE EGYPTIAN SOCIETY OF ENGINEERS

Contents

Genrtal Section

SPACES & HOUSING OF THE VERNACULAR URBAN ENVIRONMENT

Part 1 :First Topic of study: Pedestrian Spaces

Dr. BASHAYER KHAIRY *

ABSTRACT

The research displays examples of vernacular pedestrian spaces (streets) and housing and analyses them by E.B.S. through a broad sample (location, cross-culturally, through time). The evidence is for the purpose of learning about how people have shaped environments, how environments have affected people and what mechanisms link people and environments; this matrix is the system of settings or the cultural landscape. The paper reviews and discusses items concerning the two case studies:

EBR Environmental Behavior Relations

1) First Topic of study: Pedestrian Spaces
2) Second Topic of Study: Housing
   2.a Malqafs or Wind Catchers.
   2.b Courtyards or Atriums.

Conclusion

Until very recently, man has been able to maintain with moderate means a certain balance between bodily and sp-iritual being and the external world.

Unaware that civilization is measu-red by what one contributes to his cu-lture and assessing the value of one's own heritage,many of the architects and planners have been tempted to copy contemporary models and works of west-ern architects in Europe and North America.

What is needed is a directed instr-uctive basis for regionalist design with an urban priority.We need to for-mulate and substantiate those cons-iderations that constitute the region-alist design approach [1].

Environmental-Behavior Studies [E. B.S.]. It is thus about people, buildings, objects, streets and landscapes, the relationships among people and people, people and things, things and things, all the organizations of space,time meaning and communications about which we can find out [2].

To formulate a regionalist design approach E.B.S. should be precedent and listed as follows:

1. Do not confine yourself to high style examples.
2. Do not consider it to be a separa-te thing.
3. Do not begin with Egypt 5000 years ago, but look at it historically acr-oss time, the full time span of the built environment for e.g. origins of Architecture can be traced to the first hominid structures in "Olduvai Gorge" that go back almost 2 million years ago [3].

Hence all the evidence is for the purpose of learning about how people have shaped environments, how environments have affected people and what mechanisms link people and environments;this matrix is the system of sett-ing or the cultural landscape [4].

In the case of high style and vernacular elements, the relationships can be of two kinds.The most common is the situation where the high-style elements are embedded in the vernacular that is then the matrix.That is clearly the case with monumental buildings in all cultures, for example,religious building whether the Egyptian Mosque, a Gothic Cathedral, an Indian Temple or the major urban

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complexes, such as the Acropolis in contemporaneous Athens, the Maidan El Hosain and its surrounding elements in the urban fabric of old Cairo.

Worldwide today less than 5% of all environments is designed by architects [5].if one considers the full range of past environments that figure goes down to significantly less than 1%.

EBR. Environmental Behavior relations:

Environments were created as setting for behavior i.e. have ended to be designed so as to be as congruent as possible with people, their behavior and activities which lead to the extraordinary variety of environments.

a) The First Topic of the Study is pedestrian Spaces:

Such spaces exhibit certain characteristics across a set of environments. It is important to relate these characteristics to concepts and finding based on contemporary work. It is significant to find on concentrating on pre-industrial societies that more extreme variations are shown than in post-industrial societies. Also as one concentrates on pre-industrial societies and goes furthers into the past the more purely pedestrian do the settlements become. Thus they can be expected to reflect much more directly those physical characteristics related to walking than do later settlements This concerns environment behavior interaction.

Vernacular urban environments of pre-industrial societies are much more satisfying, attractive, interesting and walkable than those of any designers.

The approach to E.B.S. of pedestrian streets makes a broad sample Location, cross-culturally and through time necessary.

The figures shown represent a wide variety of pedestrian streets from many cultures and through time with the purpose of illustrating the mutual relationship of E.B.S. and settings and how they have coincided in similar environments.

Fig.1. a.b.c.d. show pedestrian streets with variation in space and short subspaces.limited length of views hence division into segments defined by horizontal .blocking or by use of angles or overlapping planes, many twists and turns within a given space and articulation of space; hence, space is made up of a sequence of spaces with high contrast among these spaces and in those sequences.

Long listed narrow streets and many culde sac. The examples are from Syria, Lybia, India, Jerusalem (Israel).

In the preindustrial period the best documented streets are Middle East Cities where donkeys and particularly camels were determinants for major streets,we find narrow streets and tight corners;these range approximately 3.5m for through streets (allowing two fully loaded camels to pass) to just 2m for residential cul-de-sac [6].

Another instructive example is spanish Latin America where most cities were designed following the laws of the Indies of July 3, 1573*. Under these laws streets were to be approximately 12m and in grid pattern.

Also streets were to be wider in cold than in hot countries.At the same time the building line was strictly regulated to prevent encroachment**.

Fig.2.a,b,c,Shows use of level changes by

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* These laws are published in full in the Hispanic-American Historical Review, Vol. 5, 1972, pp. 249-254

** Some cities in Spanish Latin America were not devloped according to the laws e.g. in Mexico, Guadalajara streets are 40mX310m, building heights 7.5mX12m high and block lengths vary between 55.5m-88.5m

- In Columbia main streets are 10.5m wide, secondary ones 7.5m, building heights between 7.5m and 16m; blocks are short

- In Ecuador streets widths are 12m, 10m and 7.5m, buildings heights between 3m and 6m and blocks between 33.5m and 70m [7] stairs to block view vertically with the use of bends and gradual curves and angles. This treatment gives a supportive setting by encouraging exploration through interest and providing different and appropriate perceptual characteristics for pedestrians.

Hence the effect of movement either vertically or horizontally may produce novelty, surprise, mystery. Examples are found in Gurnia (Crete), Appollonia (Greece), Viseu (Portugal), Gunning (Indonesia), Ouropreto (Brazil) Fig.3. a, b, c presents the examples defining the use of overhead elements in cross streets and narrow width with regular rhythms. The examples are in Tinerhir (Morocco) and Kabul (Afghanistan). Both are in hot climate countries and that explains the long narrow street 2.5m-3.6m width and approximately 57.6m length with long overhead.

Fig. 4. a, b, c, d. Show some perceptual characteristics of four sections in pedestrian streets in preindustrial, hot climate countries. The enclosing elements tend to be tall, low percentage of sky visible and relatively low width. Different treatments have been used to reach the required affect e.g.Fig.4a in Ankara (Anticoh), it has tall buildings with narrow streets. The ratio between width and height almost 1:2 and ended by the protrusion of the edge of the pitched roof. Fig.4b in Baghdad (Iraq) the street width to height ratio here also is 1:2 yet starting from the first floor the houses protrude over the street making the sky view even less. The suspended cornice on top is yet another narrowing device. Fig. 4c Udaipur (India) the height is 2.5 times the width and protrusions all the way up the height (balconies, corbels and tents) Tend to make the shy view less. Fig. 4d, Lukang (Taiwan) here the height is three times the width and ended by a protruding frame along the edge of the building.

Fig 5a, in Hong Kong (china)includes all the previous perceptual characteristics of pedestrian streets e.g., variation in widths, articulation in spaces, short subspaces, only one or two long streets and the rest are limited views of length, sequence of different spaces at area level introducing courts, plazas and culde scas, large number of overhead elements. Note that all these characteristics are planned and designed by experts yet if we examine Fig. 5b and 5c,

we will notice much similarity in the whole effect though the designs are spontaneous squatter settlements in Rio de Janeiro (Brazil) and Delhi (India) and this is evidence in itself that these characteristics are the result of expressed environmental preferences and that vernacular design because it occurs over long periods of time and through group processes becomes highly congruent with activities and perceptual selectivity.

The last figures 6 a.b.c in this case-study are examples from seville (Spain),Sao Paulo (Brazil), Rio de Janeiro (Brazil),Solo(Indonesia) show the use of a large number of elements ,fine grain of enclosing surfaces, use of a variety of materials, use of different colors,changes in light and shade, presence of projecting elements overhead e.g. roof overhanging, awnings, balconies.

Thus after analyzing the previous examples we can conclude that the sum of vernacular perceptual characteristics of pedestrian streets cross-culturally are similar and congruent to culture and behavior. These characteristics could be summarized as followed:

1. Widths for average streets range between 8 and 12m,while narrow streets are 3 to 6m and principal or main streets are often 20m. These figures are encountered in almost all the examples seen [8].
2. Width to height ratios typically ranged between 1:1-1.5 and 1:2-2.5 but went as high as 1:3.
3. The sky view was usually interrupted by over head elements. Usually under 15% of the sky area would reach the streets below.

4. Widths of the streets are rarely constant due to turns and twists and short subspaces and blocks offering fairly short lengths of views. Difference in levels and the use of stairs are yet another device resulting in short views.

5. Strong light and shade contrasts to be seen quite typically due to difference in street widths and over head elements.

6. The enclosing elements themselves are very complex, with different textures, balconies, projecting windows, and other elements, complex skylines, over head elements.

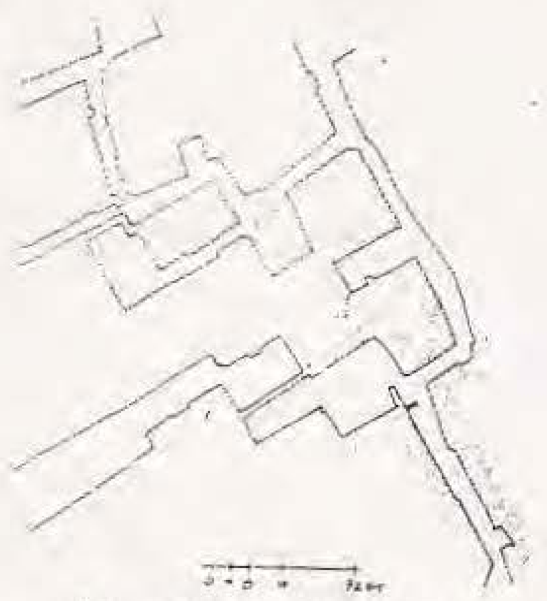

Fig. 1a (9) Hama (Syria) (Period J6, 3rd millennium B.C.E.)

Fig. 1b [10] Misratah (Libya) (medieval-still in existence)

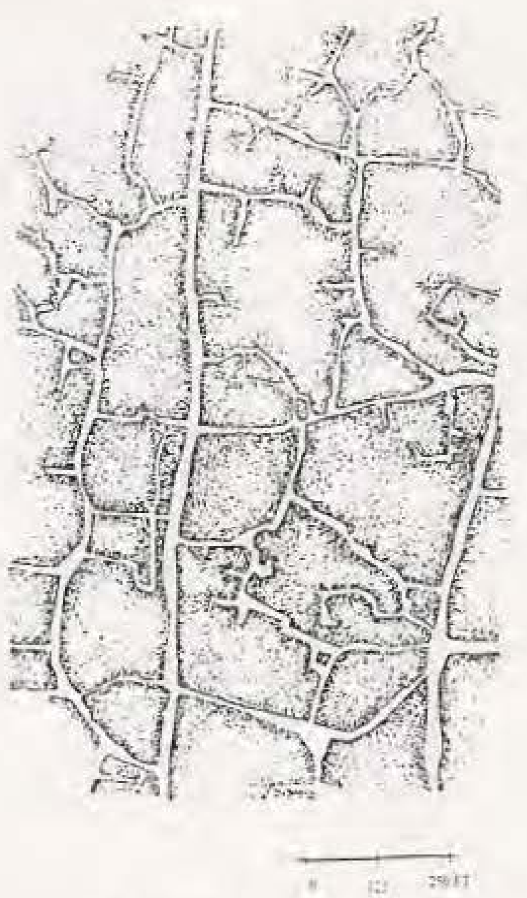

Fig. 1c Midnapur (india) (still in existence)

Fig. 1d Jerusalem (Israel) (old city - Armenian quarter) (still in existence)

Fig. 2a [11] Gurnia (crete) (minoan, ca. 18th-16th cen. B.C.E.).

Fig. 2c [13] Viseu (Portugal) (still in existence).

Fig. 2b [12] Appollonia (Greece) (still in existence)

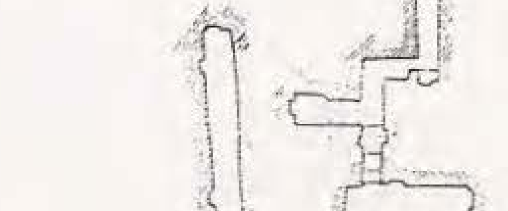

Fig. 3a [14] Tinerhir (Morocco) (still in existence)

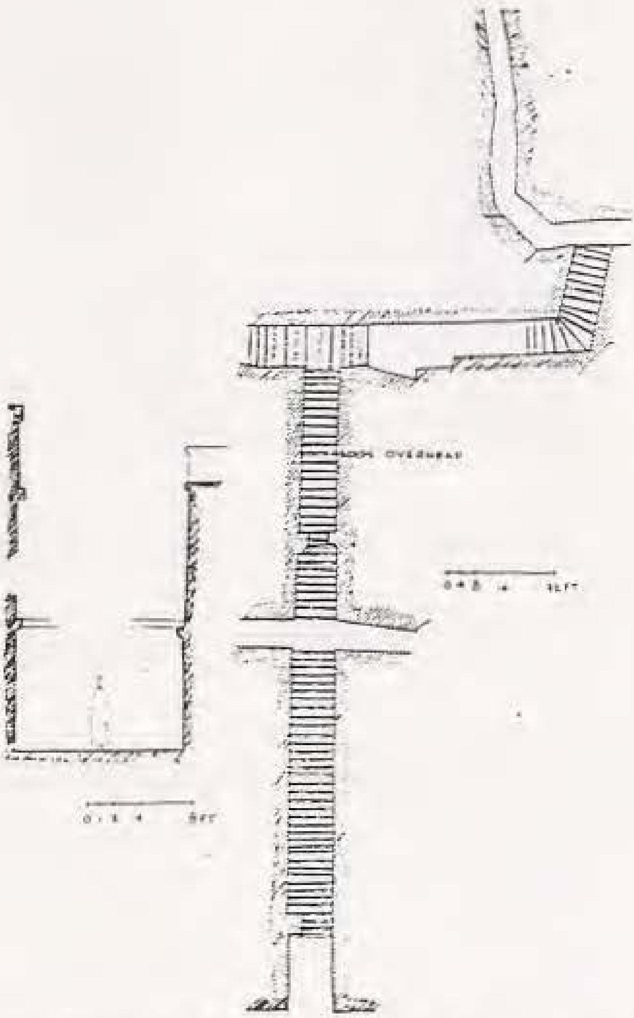

Fig. 3c2. Diest (Belgium) (Beguinage).

Fig. 3b [15] Kabul (Afghanistan) (still in existence).

Fig. 3c1. Stockholm (Sweden) (old Town)

Fig. 3c3. Cordes (France)

Fig. 3c4. Nice (France) (old city).

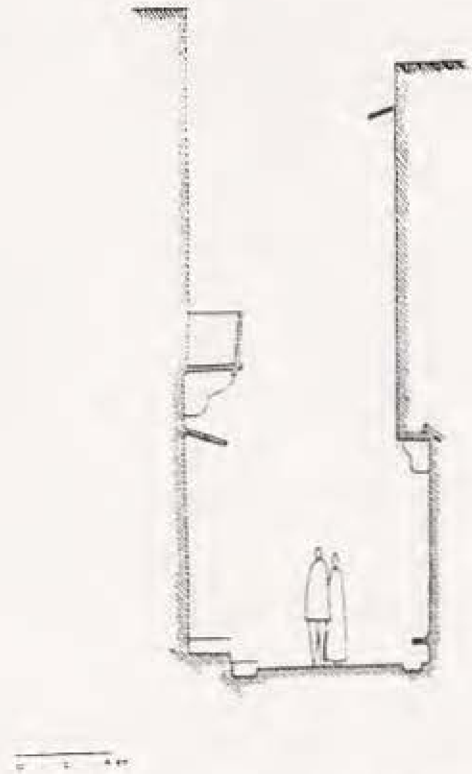

Fig. 4c [18] Udaipur (India) (still in existence - founded in 1559 C.E.).

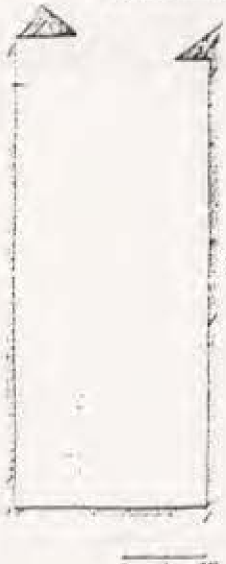

Fig. 4a [16] Antakya (Antioch) (Turkey) (still in existence).

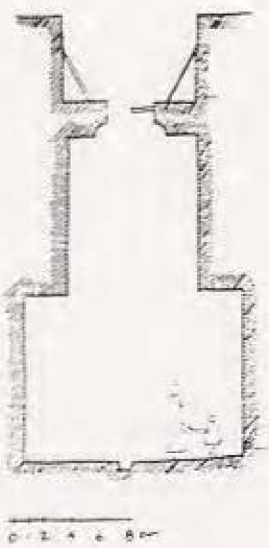

Fig. 4b [17] Baghdad (Iraq) (still in existence).

Fig. 4d [19] Lukang (Taiwan) (17th-18th cen. C.E., still in existence):(residential lane).

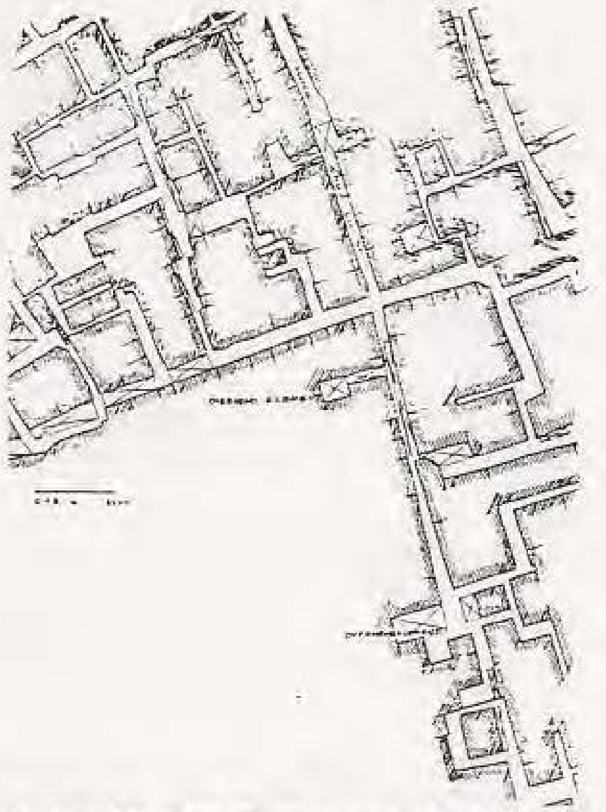

Fig. 5a [20] Hong Kong (china) (Kowloon area) (19th-20th cen. C.E.; still in existence).

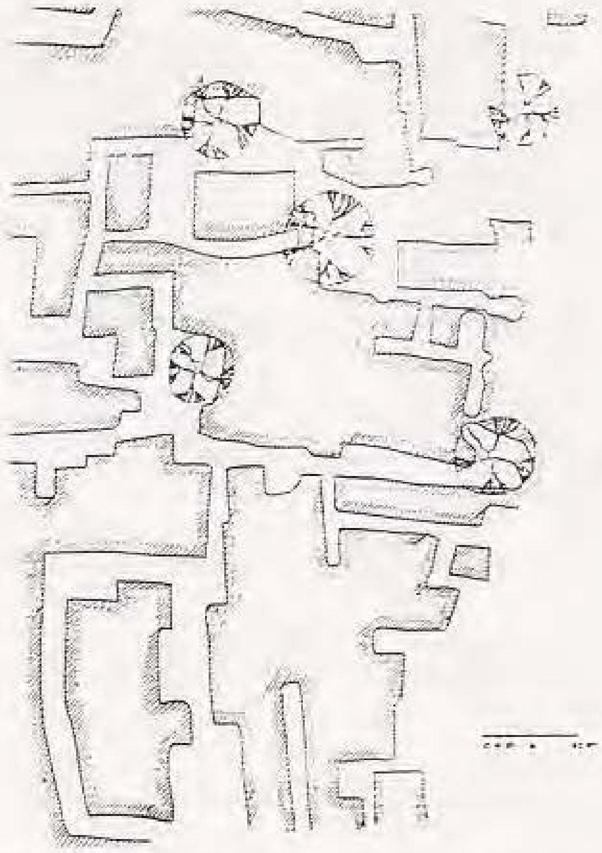

Fig. 5c [22] Delhi (india) (Rouse Ave. squatter settlement) (contemporary)

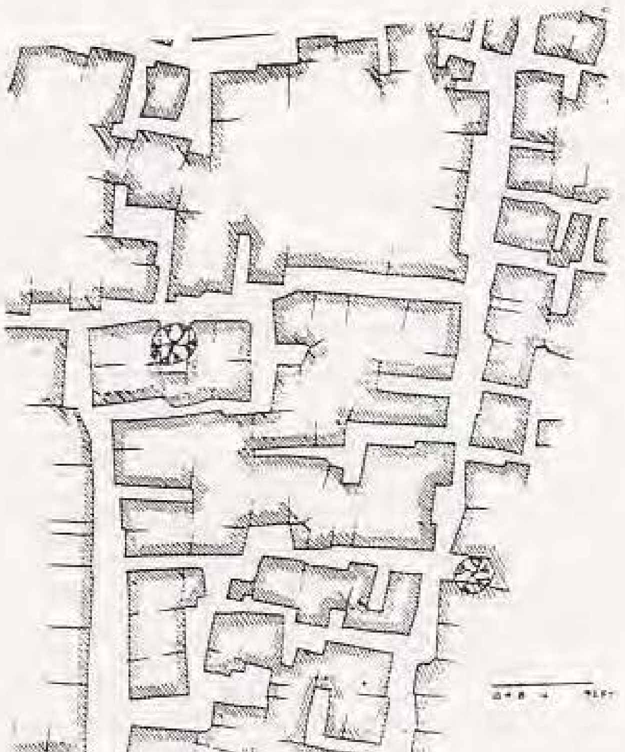

Fig. 5b [21] 6Rio de Janeiro (Brazil) (Favela Mare-squatter settlement) (Contemporary)

Fig. 6a Seville (spain) (shopping street)

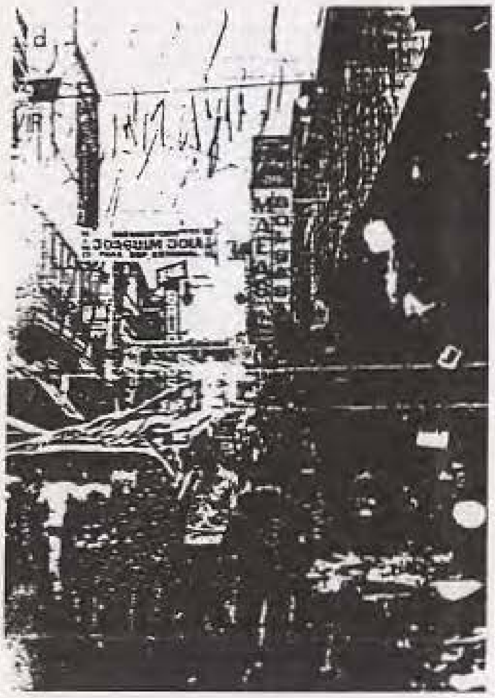

Fig. 6b Sac Paulo (Brazil) (downtown pedestrian precinct).

Fig. 6c Solo (Indonesia)


No. 3 1993
VOL. 32
ENGINEERING
ART OF ETERNITY
OF THE EGYPTIAN SOCIETY OF ENGINEERS

SPACES & HOUSING OF THE VERNACULAR URBAN ENVIRONMENT

Part 2: Second Topic of study: Housing

By
Dr. BASHAYER KHAIRY(*)

ABSTRACT

The research displays examples of vernacular pedestrian spaces (streets) and housing and analyses them by E.B.S. through a broad sample (location, cross-culturally, through time). The evidence is for the purpose of learning about how people have shaped environments, how environments have affected people and what mechanisms link people and environments; this matrix is the system of settings or the cultural landscape. The paper reviews and discusses items concerning the two case studies:

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2.a Malqafs or Wind Catchers.

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- Conclusion

b) The Second Topic of the Study is housing:

Housing is conceptualized as a system of settings within which certain systems of activities take place. To design for people one must consider the culture of the people, their traditions, customs, behavior and to design the building enclosure to suit the environment i.e. E.B.S. The building enclosure should be supportive of user's wants, needs and activities (instrumental and latent); to help guide behavior and coaction, to remind people of social rules and situations by acting as a mnemonic [23]and to suggest new possibilities by acting as a catalyst [24].

Most important of all, the design philosophy can be developed by adopting and learning from the traditional design methodology in the context of the changing standards of living and modern technology without interfering with the social patterns of contemporary societies [25].

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The design of shelter must respond to its environment. In hot climates the sun is the major source of heat and its position must be determined for all hours of day. Meteorological records show that in Egypt, Cairo the optimum orientation of the building block with regard to sun factor is the East-West and the cool wind in Cairo blows from the North-West and that the correct solution would be to orient the residential block from North-East to South-West [26], Fig. 7.

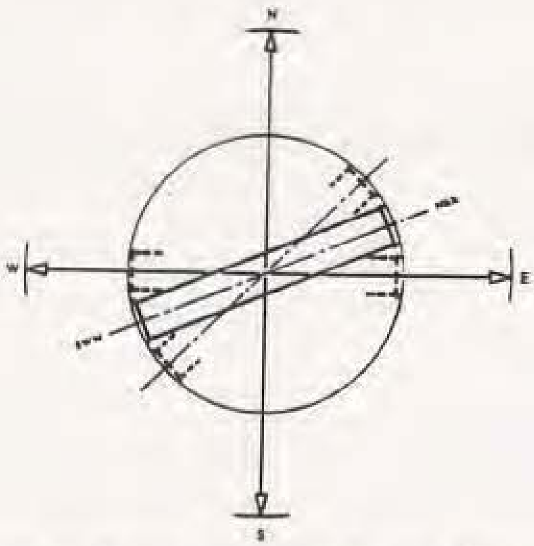


Fig. 7a Optimal orientation of a row of houses with regard to both sun and wind

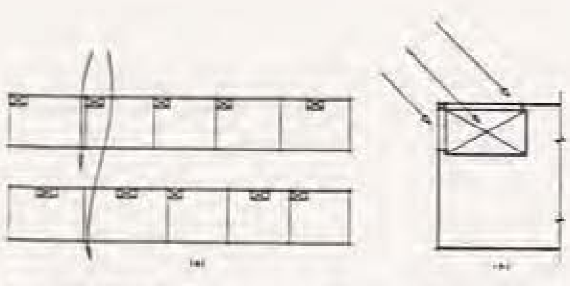


Fig. 7b Plan for two rows of houses showing the malgaf or wind catch of each arranged to bring wind to the dwelling (a), and details of a malqaf(b).

2.a. Malqafs (wind Catchers)

The innovation of Malqafs or Wind Catchers has long been a feature of vernacular Architecture dating back to ancient Egyptians in the houses of Tal-Al Amarna represented by wall paintings in the tombs of Thebes. One example is shown in Fig. 8, In the pharaonic house of Neb Amun depicted on his tomb dated from the nineteenth Dynasty (1300 B.C.). Later, Qa'a of Muhib Ad-Din Ash-Shafi. Al Muwaqqi known as Othaman Kathuda in Cairo dated from the fourteenth century. A. D. Fig. 9. The same concept was applied in the modern design of the workshop at the University of Science and Technology in Kumasi, Ghana. Fig. 10.

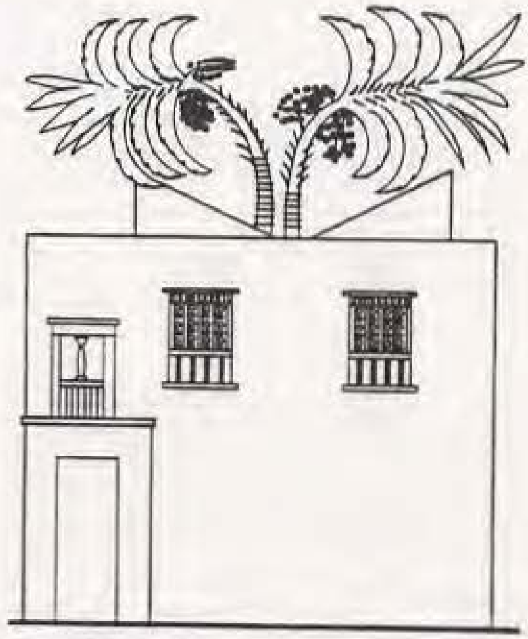


Fig. 8 Malqaf of the Pharaonic house of Neb-Amun, from a painting on his tomb, Nineteenth Dynasty (c. 1300 BC.)

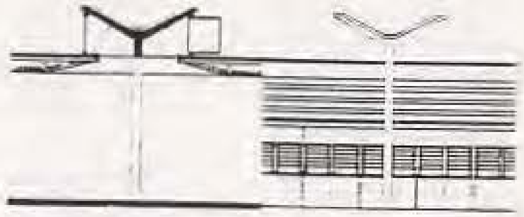
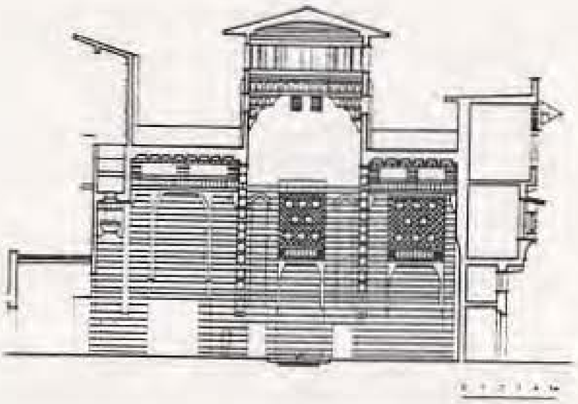


Fig. 10 Workshop at the University of Science and Technology, Kumasi, Ghana, showing how Y-beams route airflow through the work area.

In Southern Pakistan, Wind Catchers, consisting of three planes and a post, can be seen over most of the roofs [27]. Fig. 11. Similarly large numbers of wind towers could be seen in the horizon of Bahrain Fig. 12, and could also be seen in the skyline of Hyderbad Sind, Pakistan. Fig. 13.



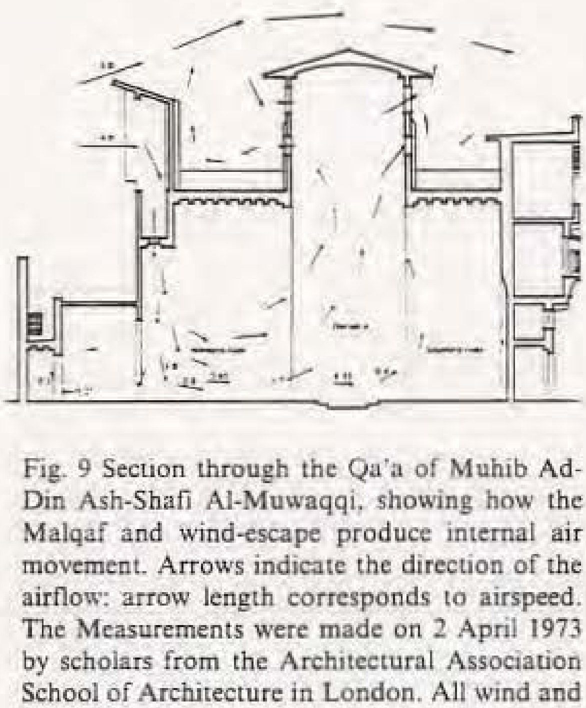


Fig. 9 Section through the Qa'a of Muhib Ad-Din Ash-Shafi Al-Muwaqqi, showing how the Malqaf and wind-escape produce internal air movement. Arrows indicate the direction of the airflow: arrow length corresponds to airspeed. The Measurements were made on 2 April 1973 by scholars from the Architectural Association School of Architecture in London. All wind and airspeeds are given in meters per second

Fig 11 Southern Pakistan, wind catchers can be seen over roofs.

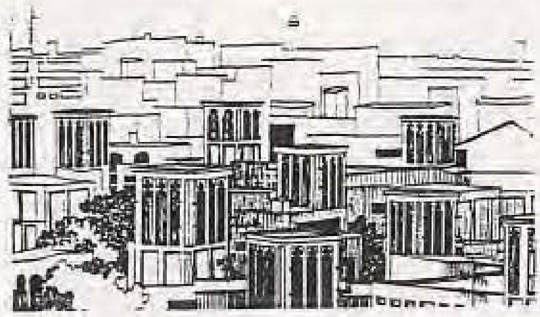


Fig. 12 Wind Towers in Bahrain.

Fig. 13 Badgirs or wind traps of Hyderabad, Sind, Pakistan

Sometimes long narrow rooms in the East-West axis rise to the height of the wind catchers and are used as ventilating devices. All wind catchers have a metal grate to prevent entry into the house from the roof. Fig. 14.

Fig. 14 Long narrow rooms in the EW Axis, all wind catchers have a metal grate to prevent entry into the house.

2.b. Courtyards or Atriums

Introverted atrium houses are found everywhere in the tropic regions of the world. The atrium which forms the core of the house not only acts as a climatic moderator but generates a unique private life style of cultural as well as spatial significance by the use of out door space within the house.

Historically, several examples of atrium Architecture are known to us in Iran, Iraq, saudi Arabia, Morocco, Tunis, Egypt, Jordan, Yemen and most other Arab countries. Most famous among such developments is Matmata Village in Southern Tunis where people live in underground courtyard houses [28]. Fig. 15.

Fig. 15 Matmata village - Tunisia.

In traditional desert architecture the external walls are usually plain, Fig. 16, the rooms all look inward on the courtyard where generally the occupants tend to spend their social life. Sometimes the walls are moulded with incised patterns that do not pass through the whole wall for reasons of privacy and generally the men are responsible for raising walls and roofs, the women are responsible for finishing the interior surfaces. In Gujarat state, India, interiors are delicately embossed with mud tracery. Using no molds the women work the mud by hand into a wide variety of forms then add to the design by visual motifs of bedding, carpets and wall hangings [29] Fig. 17. Though most buildings are simple storey they suggest monumentality by the high walls made to incorporate the roof terrace above affording maximum privacy. Some external walls acquire motifs for climatical reasons for example the "missing brick "or" stepped recession" [30] Fig. 18.

Fig 16 In traditional desert architecture, the wall is usually undecorated. But there are impressive exceptions. Local traditions include painted and incised patterns, low and high relief, applied and free-standing columns, and virtuoso arcades, they open inwards on an internal court.

Fig. 17 Traditional desert Architecture. The internal court a common open area.

Fig. 17 a Arabesques appear in many courtyards in qualata. They are believed to be a symbol of fertility.

Even the parapets and railings are sculptured and decoratively moulded and are the general characteristics in the environment. Fig. 19. In the house of the Muslim leader in Mali, pointers towards the sky high in the relief over the door way stand in row above the whole facade expressing the importance of the occupant [31]. Fig. 20.

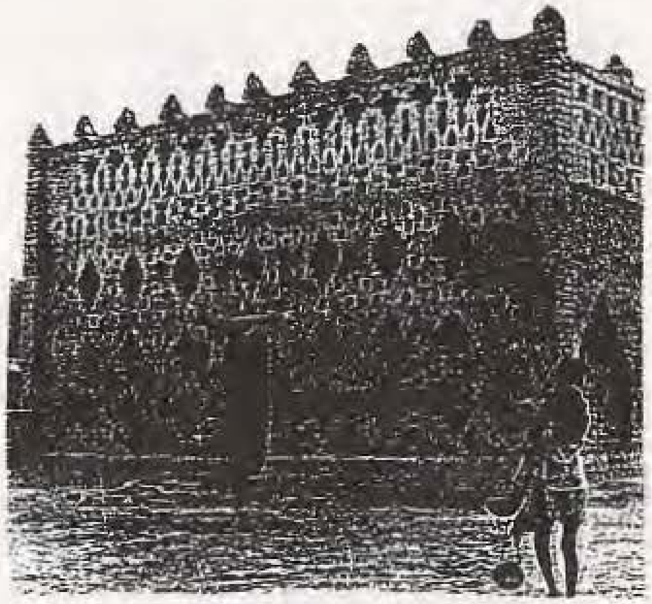


Fig. 18 The building is single storey. It appears monumental in proportion to the human being and that is the impression it gives for privacy reasons to cover the roof terrace.

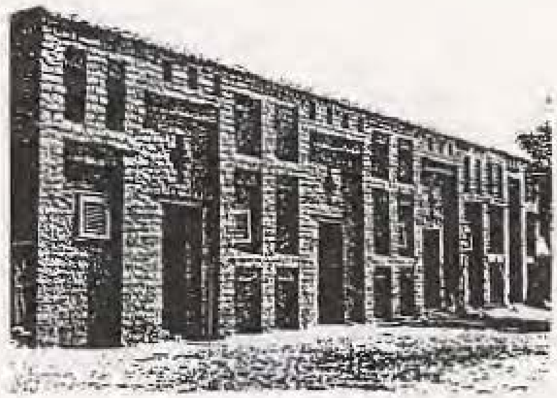


Fig. 18a Protruding and Recessing bricks are designed in Attractive motifs to give as much shades as possible in the Mali House Architecture.

Fig. 19 Sculpturesque Mud Parapets in Aziv, Saudi Arabia. On roof tops and terraces the railings and parapets are often moulded to create sculpturesque forms. Edges of the parapets are rounded and finishing points of roofs and terraces are decoratively moulded.

Fig. 20 The House of muslim leader in Mali. Pointers towards the sky in the relief over the doorway.

The internal courtyard is a common element in the urban pattern of almost all the hot climate countries and examples are abundant; for example in another part of the town plan of Tunis, near Dar Lajimi showing that all the houses have internal courts and that is a common element in the Tunis urban network. Fig. 21.

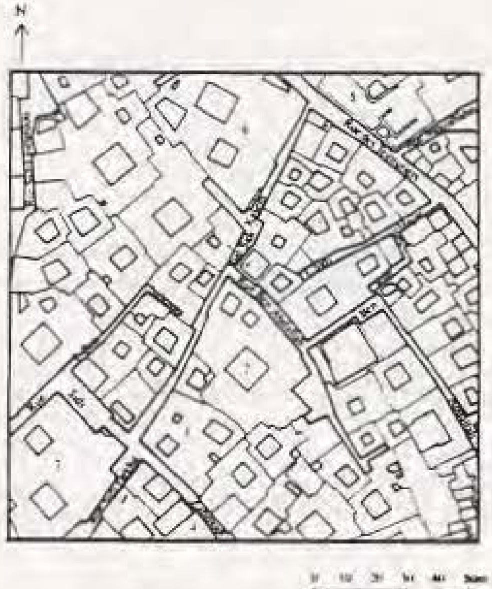


Fig. 21 Part of the town of Tunis, near Dar Lajimi, showing courtyards.

Another example is part of the town plan of Marakesh. Here also, like Tunis the courtyard is a main feature in the urban environment of Marakesh together with the winding narrow streets, short subspaces and different sequences of spaces[***] fig. 22. Even in the subterranean dwellings (M'Zira) on the Sahara border, which are underground houses, have small circular courtyards, a covered entry, and one or two long narrow rooms fig. 23.

In hot humid climates a very interesting treatment has been made in the external walls. The houses which are constructed only of mud walls need constant maintenance as they are easily affected by the rain. To protect the mud walls from rain slates are inserted in the mud walls so that the rain does not fall on the wall [33] fig. 24. This treatment

*** In Morocco one finds interesting villages in the valleys as well as on the hilltops which are monolithic structures containing all types of buildings under one roof. (32)

affords some beautiful and decorative effects in the walls and facades of the tropic urban pattern and need very skilful workers to produce the desired general elevation.

Fig 22 Part of the town plan of Marrakesh, showing the abundance of courtyards.

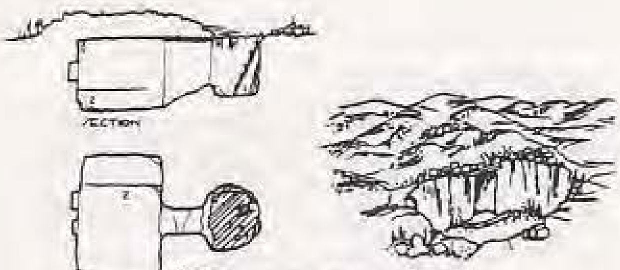


Fig 23 Subterranean dwelling in M'Zira.

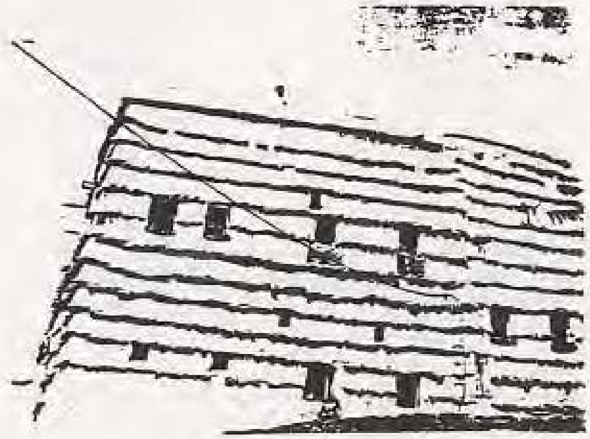


Fig. 24 Mud and Slate House in Asir; it drizzles or rains most of the year around. Houses which are constructed only of mud walls need constant maintenance as the external surface of the mud wall is easily affected by rain. To protect the mud walls from rain, slates are inserted in the mud walls as shown in the photographs so that the rain does not fall on the wall. This type of mud and slate house is beautiful and requires elaborate building skills. Generally this type of house is built by prosperous farmers who are not satisfied by ordinary mud-tower house. Such houses are about three to five stories high and similar to the mud-tower houses of the Asir mountains. They require hardly any mud surfacing and the external maintenance is minimal.

The last example to be displayed is one used among many traditional devices, though very primitive, using evaporation to cool, used from Northern India through Western Afghanistan and also in West Africa. A suitable local bush is woven into a loose thick mat or packed into a frame, placed outside a door and repeatedly drenched with water [34] fig. 25.

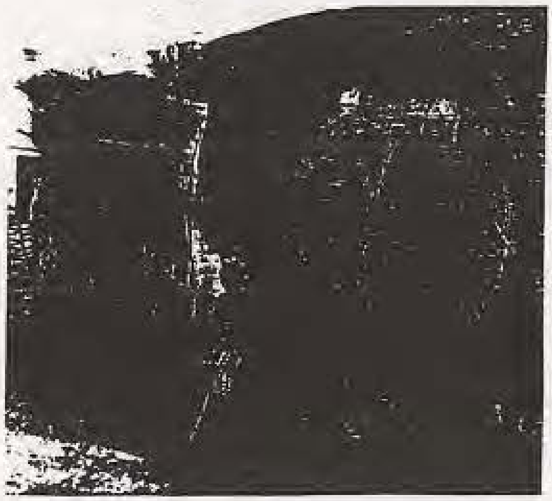


Fig. 25 Evaporative Cooling: A traditional form of air conditioning consists of packing a local plant into a frame, placing it outside a window and repeatedly drenching it with water. Since evaporation absorbs heat a breeze evaporating the water can cool a room by as much as 150 c.

Conclusion

we can conclude that the process of adapting a traditional form for contemporary use requires inventive transformations. The approach calls for a critical, inventive and creative transformation of the traditional built forms, streets and spaces, devices, aesthetics and images derived from the past to suit contemporary conditions and requirements. Regionalist design can also develop through an indirect link with the endemic qualities of the place. These are the general principles which can be identified through the analysis of the cultural tradition and architectural heritage of the place. The regionalist approach should seek to look beneath the surface to uncover the basics that can be transformed for contemporary use.

The analyses should penetrate to the originating principles to enable the designer to transform them into forms that are suitable for the changing order of the present. The rural vernacular of a place offers numerous lessons in ways of dealing with climate and then can be translated into quite different functions with modern technologies. The traditional forms of construction, materials and craftsmanship of the artisans provide further scopes for adaptive use in the contemporary urban matrix [35].

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