University of Tishk
College of Engineering
Department of Interior Design

Islamic Interior and Exterior
Sixth Lecture

Supervised by
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2018-2019

The Traditional design strategies

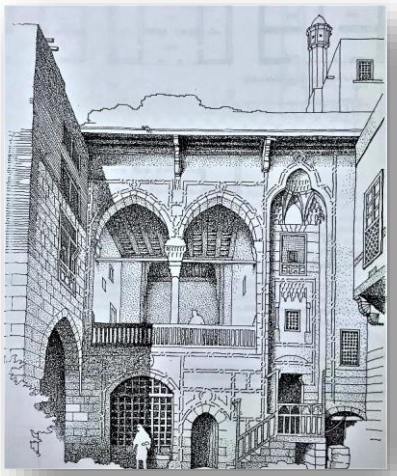
3– Designing for a severe climate

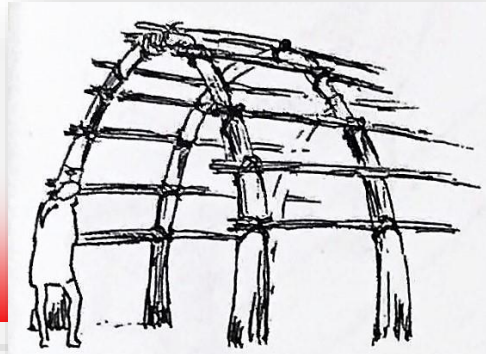
The craft of architecture is the first and oldest craft of sedentary civilization.

It is the knowledge of how to go about using houses and mansions for cover and shelter.

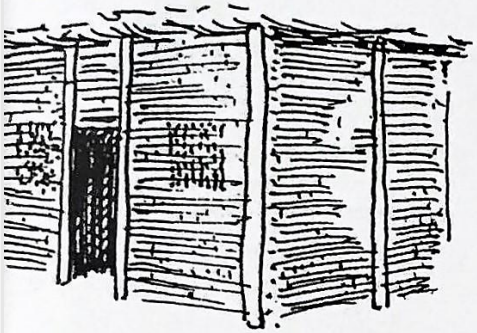
This is because man has the natural disposition to reflect upon the outcome of things.

Thus, it is unavoidable that he must reflect upon how to avert the harm arising from heat and cold by using houses which have walls and roofs to intervene between him and those things on all sides.





nstruction of a Marsh Arab's reed house



Simple *barasti* hut

sarifa [98]

The Traditional design strategies

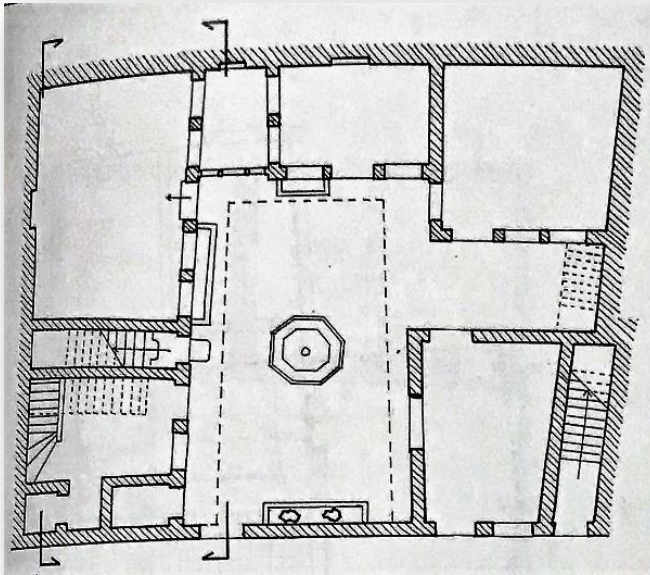
a– Orientation and horizontal nomadism

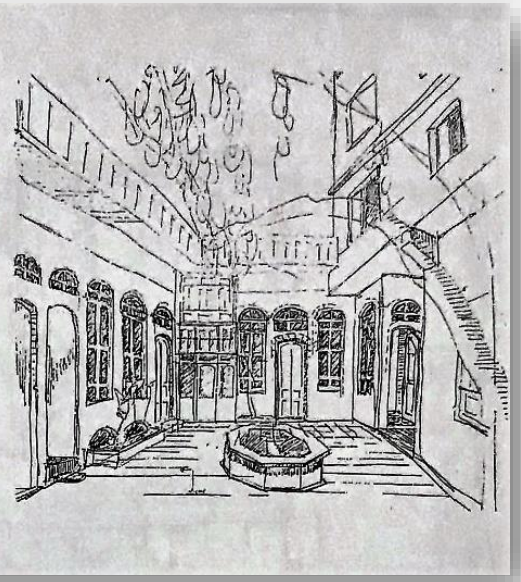
A basic response to local climate is orientation, either in reference to sun or wind.

In general the sun, being the principal source of comfort or discomfort, determines orientation.

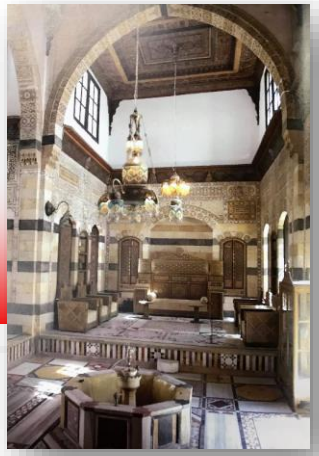
The flexibility of traditional house design allows individual orientation solution.

Its enables the inhabitants to live in those parts of the house, which are most comfortable in terms of temperature and ventilation.





The Traditional design strategies



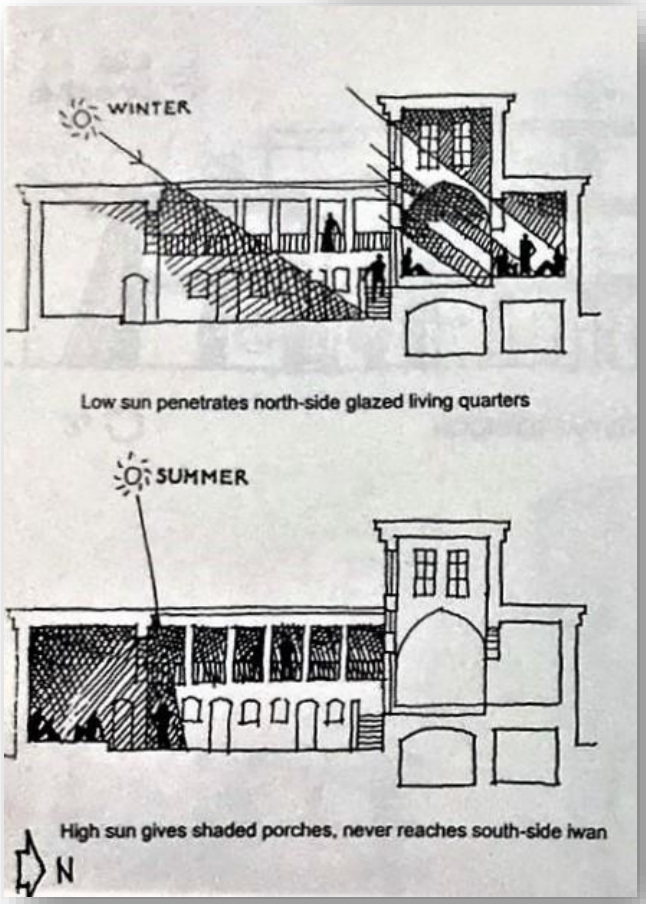
a– Orientation and horizontal nomadism

The horizontal nomadism takes advantage of different orientations of rooms and is usually seasonal.

In the cool season sunshine is welcome and we prefer south- facing rooms with low ceiling and large windows, to trap the sun.

In summer high and open north oriented rooms such as an iwan will serve best.

Very open summer rooms will be in front and winter accommodation behind the courtyard, in back.



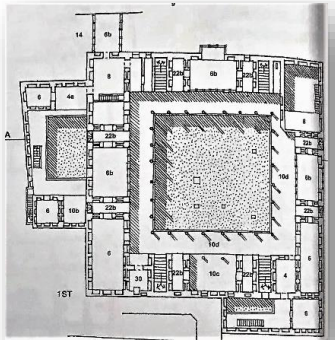
The Traditional design strategies

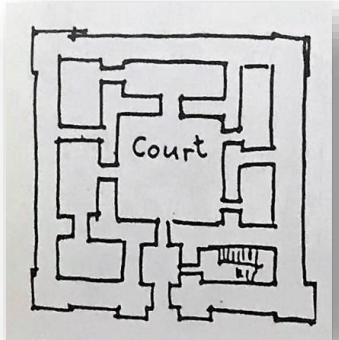
b-Massing, radiation and vertical nomadism

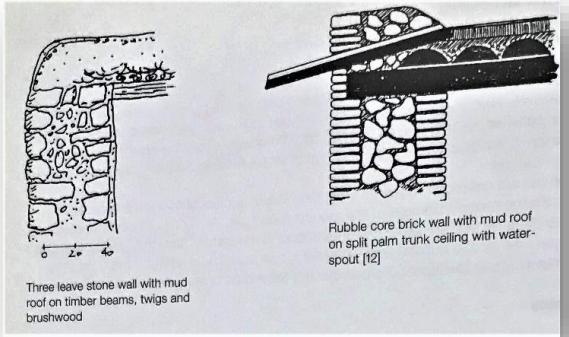
Mass- construction of exterior walls, be it of mud or stone will not only insulate against the day, but delay heat transmission and store heat for chilly mornings.

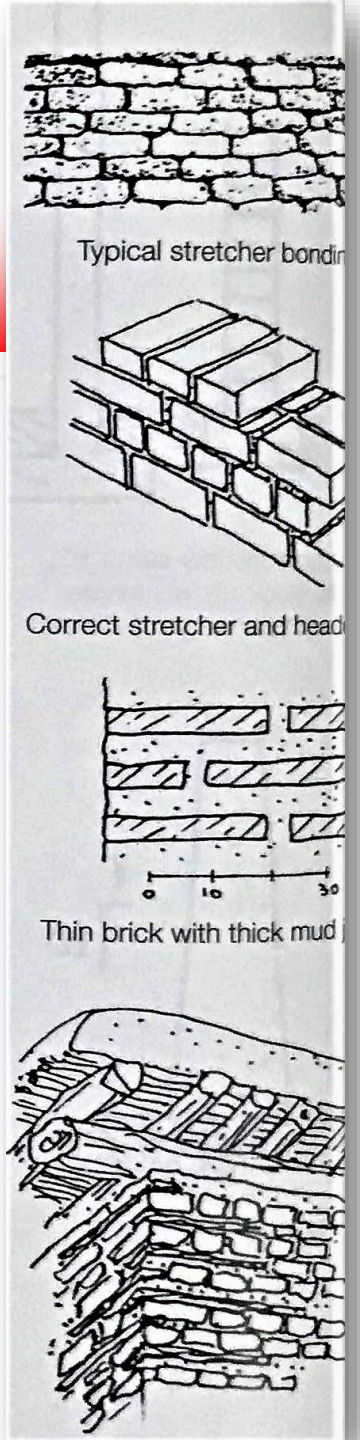
The most effective response to temperature change is vertical nomadism. In extreme climates, such as in Iraq, it is practiced on daily basis.

Nights are spent on the roof, mornings on the lower floors and excessive afternoon heat is avoided in the basement.







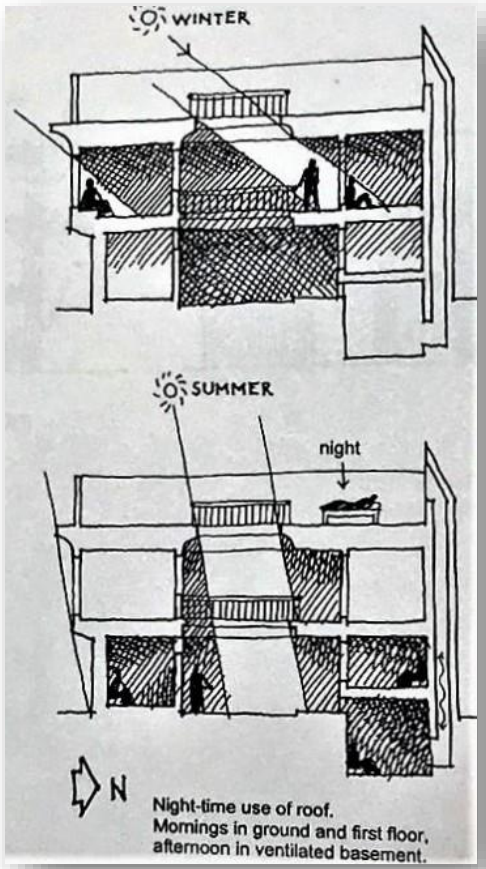


The Traditional design strategies

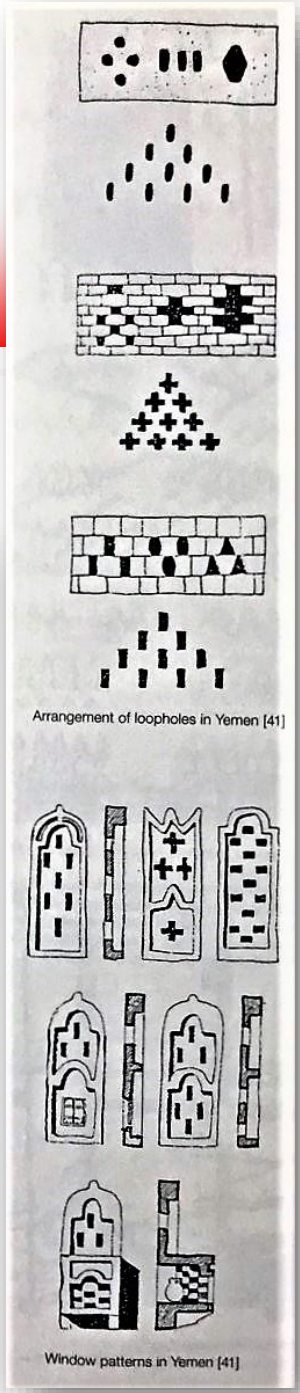
b-Massing, radiation and vertical nomadism

This strategy is based upon cool sky radiation at night and the fact that warm air rises while cool air collects in low spaces.

Even the closing and opening of windows and doors is done judiciously, either to permit or inhibit circulation of air.



Night-time use of roof.
Mornings in ground and first floor,
afternoon in ventilated basement.


Arrangement of loopholes in Yemen [41]

Window patterns in Yemen [41]

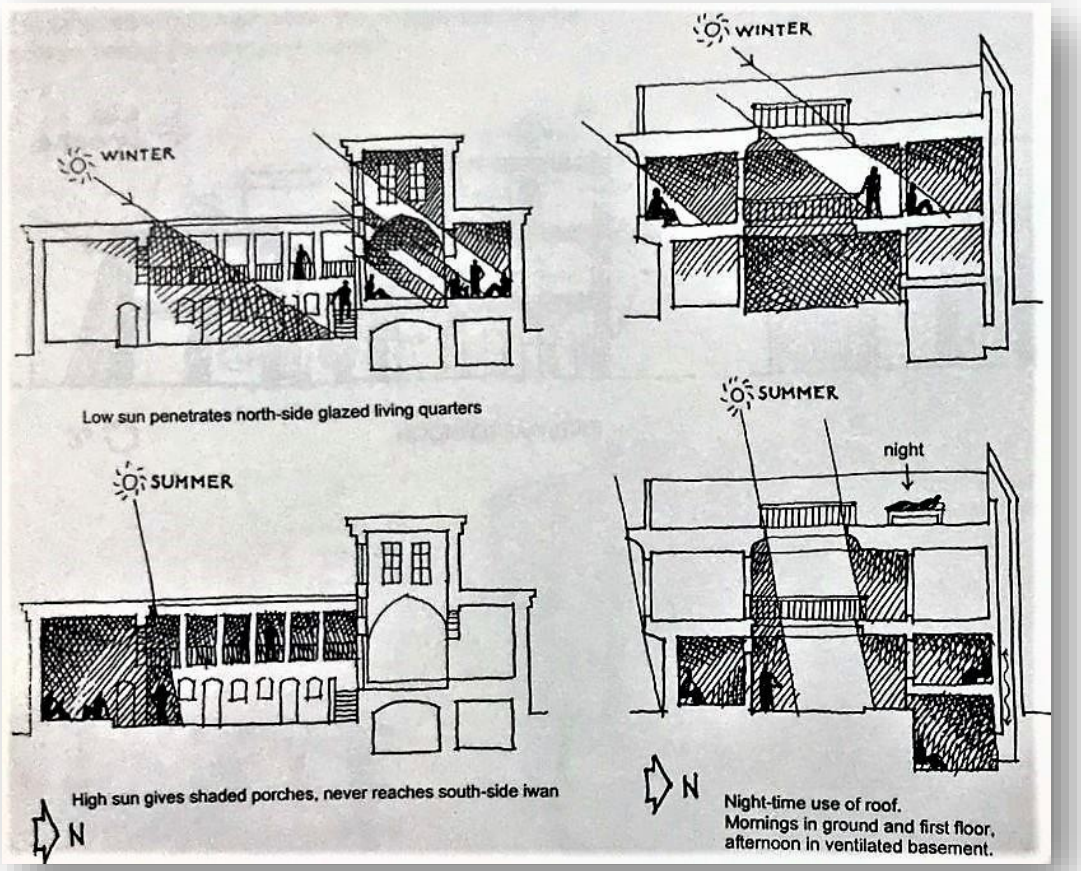
The Traditional design strategies

c-Shading.

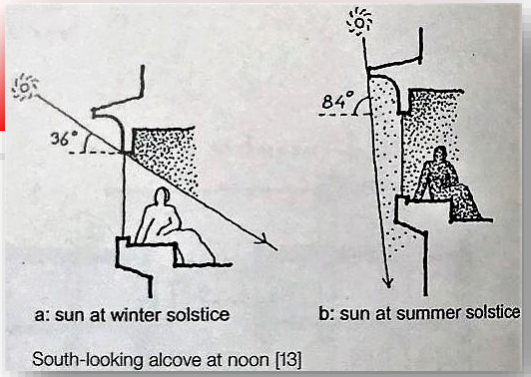
The difference of sun angles between winter and summer solstice.

Together with shorter and longer days this yearly isolation cycle is responsible for seasons.

Luckily, winter sun penetrates more deeply south- oriented rooms at a time when warmth is needed.



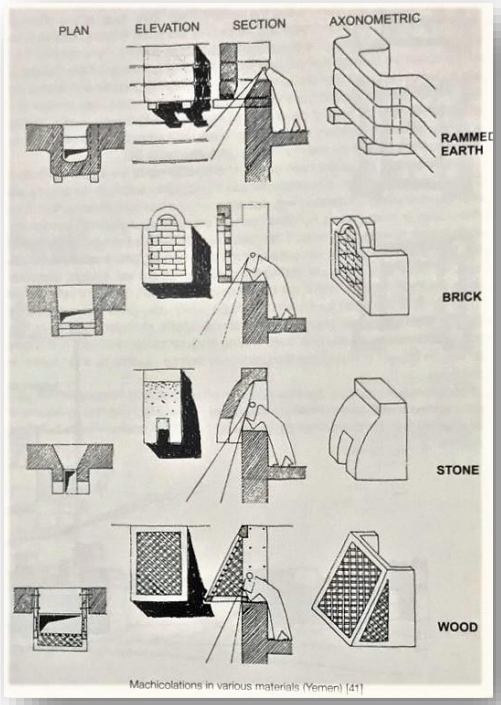
The Traditional design strategies

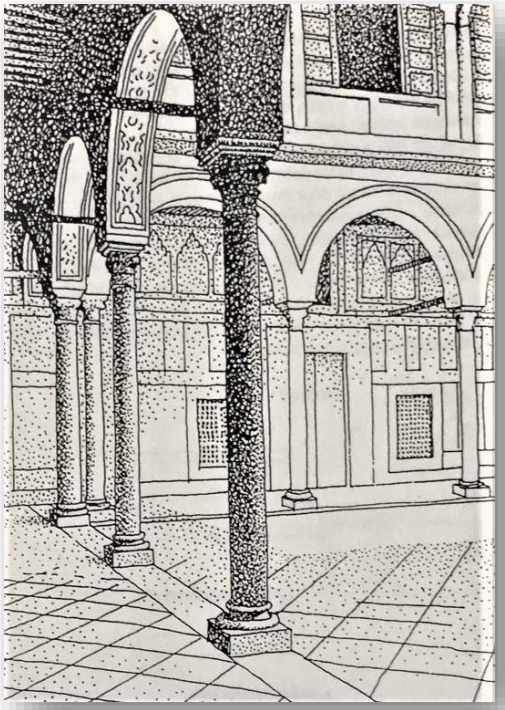


c-Shading.

Colonnaded or arcaded porches and peristyles give shade to passages and walls.

Since buildings are predominantly closed to the outside, shading elements on the facades play a minor role and visual screens act also as shades.





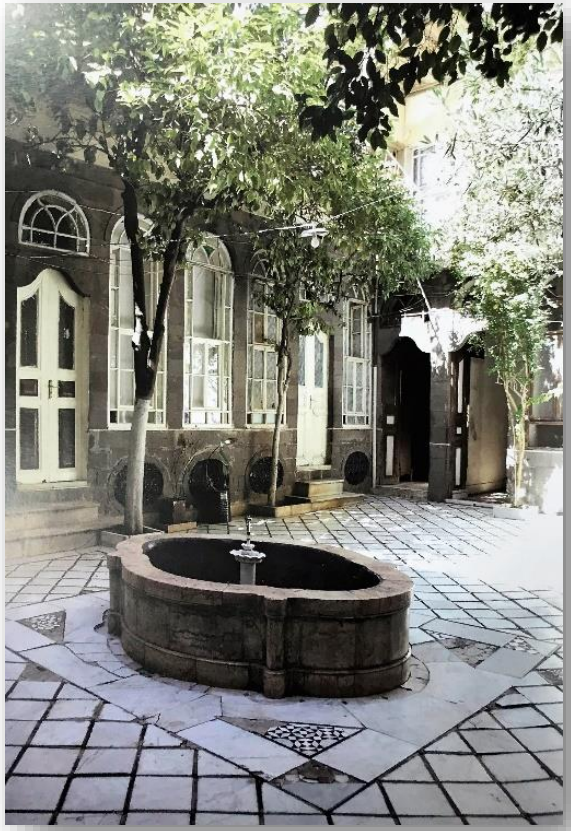
The Traditional design strategies

d-Ventilation.

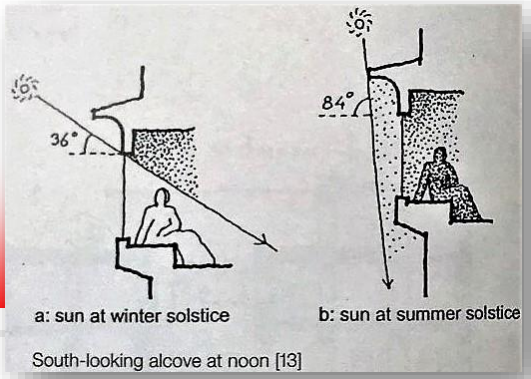
The interior courtyard is an excellent modifier of hot and dry climates, being an air well collecting dense, cool air at night.

Since protected from the morning sun, all surrounding spaces stay cool till well into the day.

Once the sun reaches the court, the air heats up and rises, creating convection currents and cross- ventilation, particularly when the surrounding spaces have secondary ventilation openings from adjacent narrow and cool alleys.



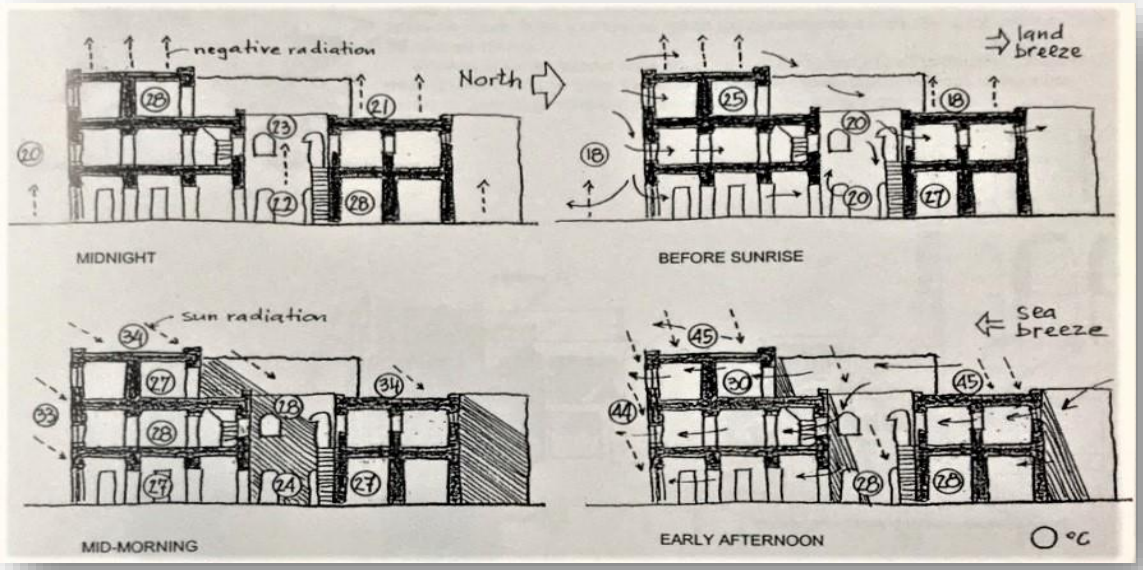
The Traditional design strategies



d-Ventilation.

Ventilation is most important in humid coastal situations with little drop of temperature during the night.

The higher up, the more breezes can be enjoyed: from the sea during the day, from the land during the night.



Upper floor rooms have large screened openings down to the floor equipped with inner shutters, to close the room against daytime heat.

The roof itself looks like another story, being screened to the outside.

The Traditional design strategies

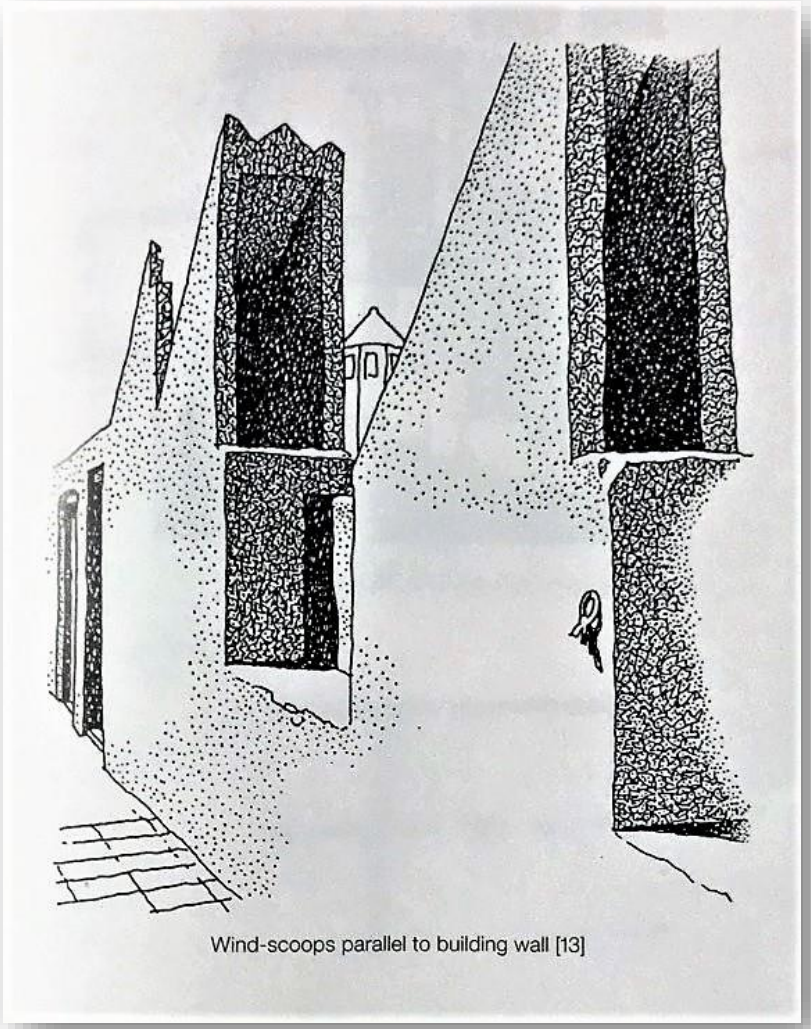
d-Ventilation.

The most remarkable ventilation devices are wind- scoops (malqaf) and wind-towers (badger).

Wind scoops are ventilation flues carried above the roof to catch cool and clear air.

They are facing the prevailing wind direction and divert air to the room below in a reversed chimney action.

Through the rooms the air passes into the courtyard, feeding the convection cycle.



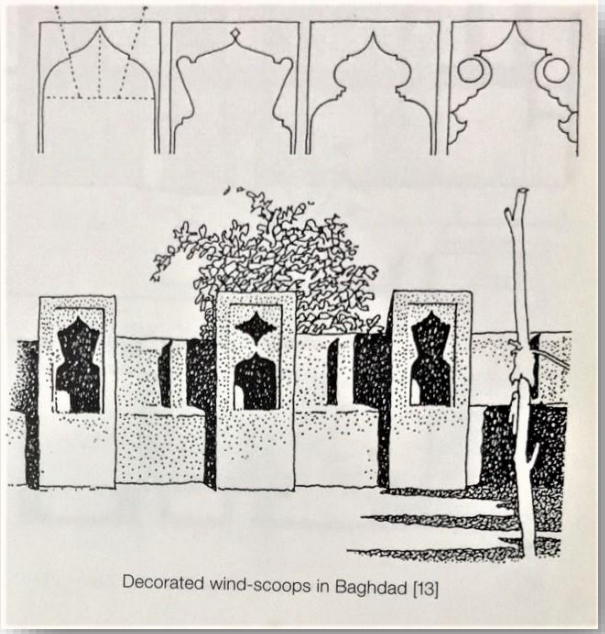
Wind-scoops parallel to building wall [13]

The Traditional design strategi

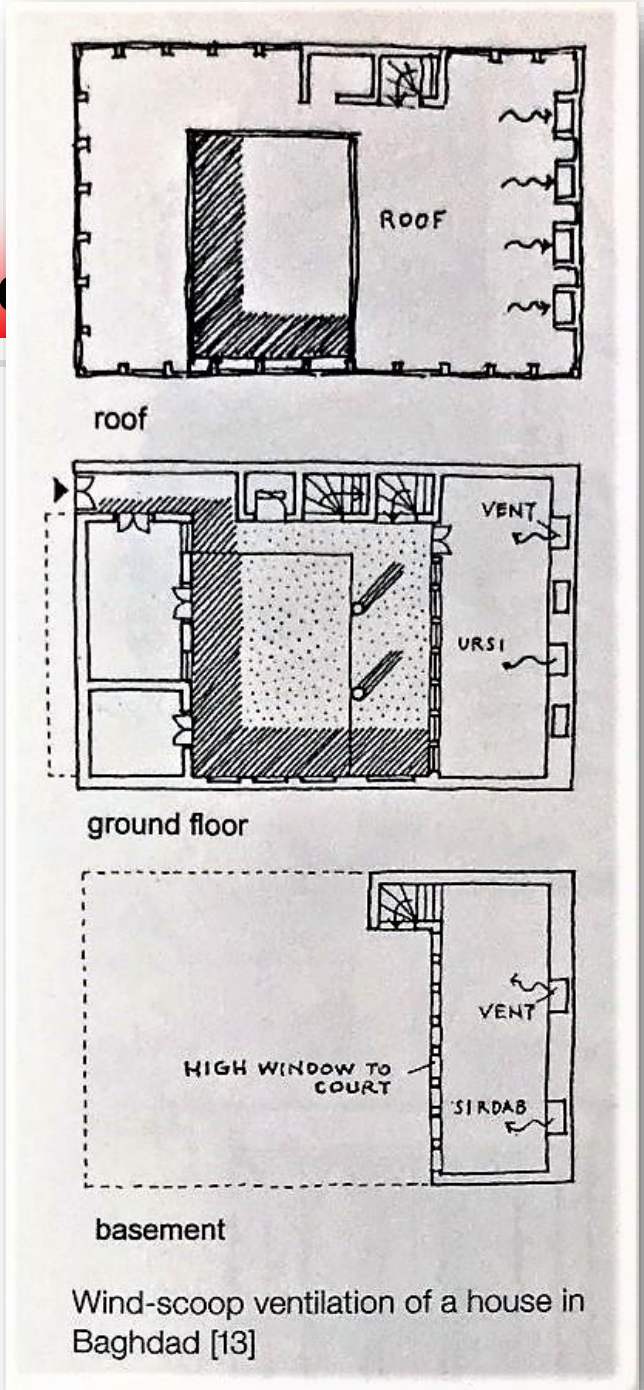
d-Ventilation.

In Baghdad, different floors receive independent wind scoops which are decorated when they open to the roof terrace.

When the prevailing wind is parallel to the wall they have tall, narrow intakes.



Decorated wind-scoops in Baghdad [13]



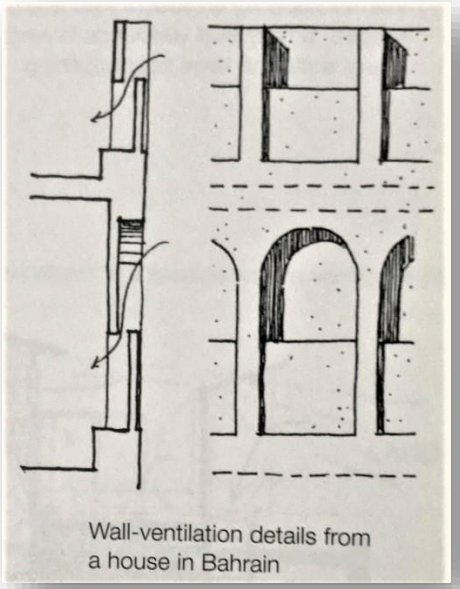
Wind-scoop ventilation of a house in Baghdad [13]

The Traditional design strategies

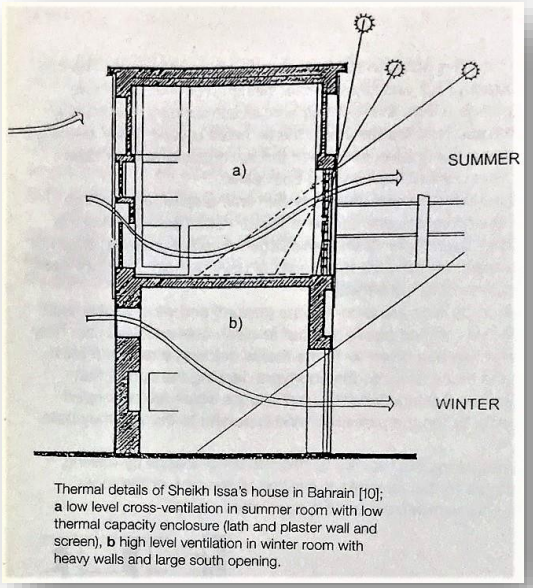
d-Ventilation.

In the Gulf, whole parapet walls along the roof are turned into wind scoops by making them double- walled, to direct the air to the screened lower part of the roof, or the room below.

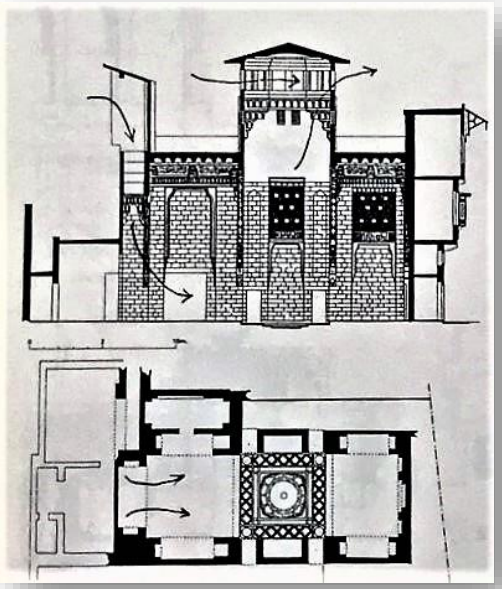
In the Cairo, large wind catchers ventilate principal living rooms or qaas.



Wall-ventilation details from a house in Bahrain



Thermal details of Sheikh Issa's house in Bahrain [10]; **a** low level cross-ventilation in summer room with low thermal capacity enclosure (lath and plaster wall and screen), **b** high level ventilation in winter room with heavy walls and large south opening.

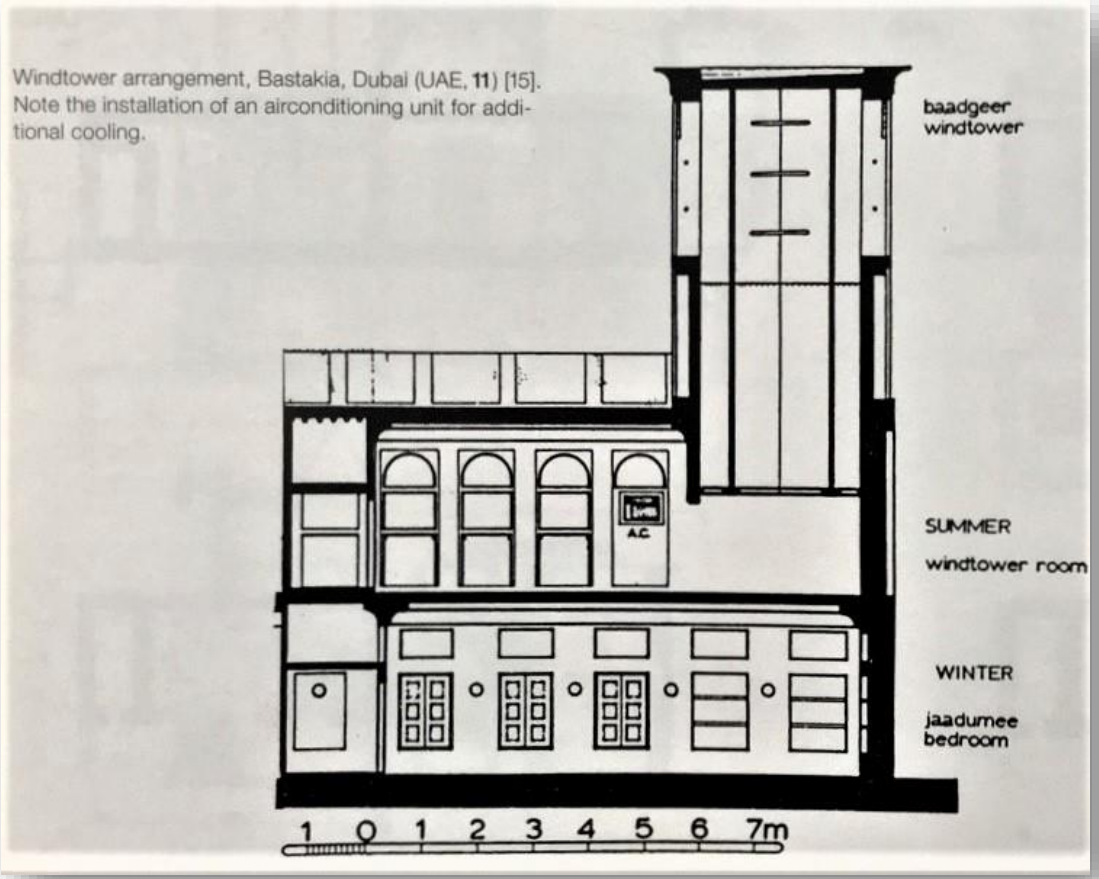


The Traditional design strategies

d-Ventilation.

Multi direction wind towers are the trademark of gulf architecture.

Introduced from southern Iran, they range from simple wood framed canvas screens to monumental towers.



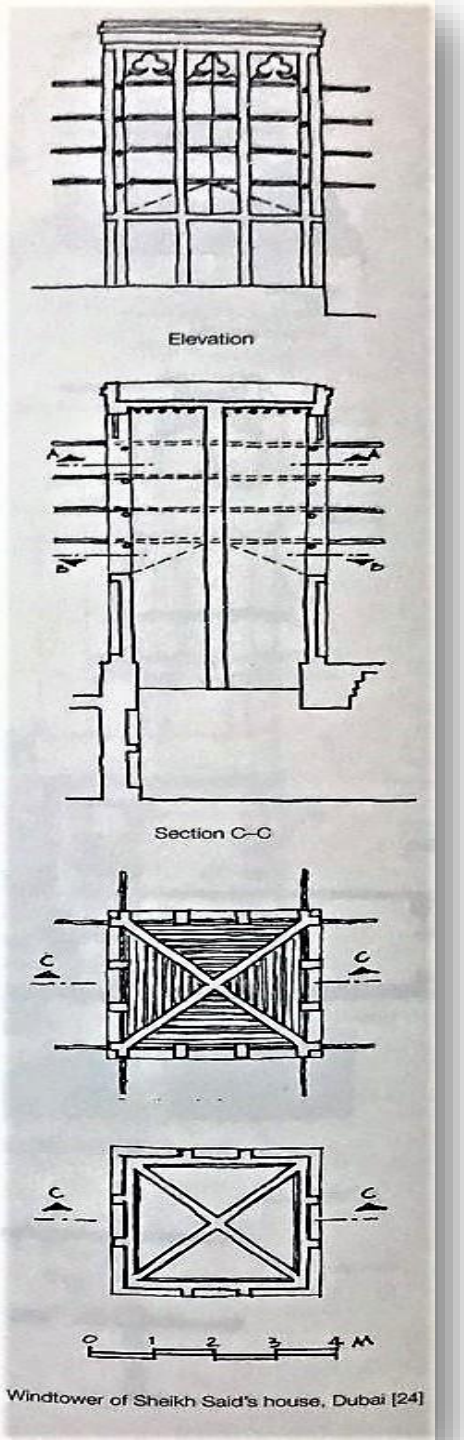
The Traditional design strategies

d-Ventilation.

Their X plan catches the breeze from any direction and funnels it to the room below, while also sucking it out from the leeward side, which increases the ventilation pull.

The effect is better than modern ceiling fans, since fresh air is brought in all the time.

Being seen from afar, wind towers are often decorated.



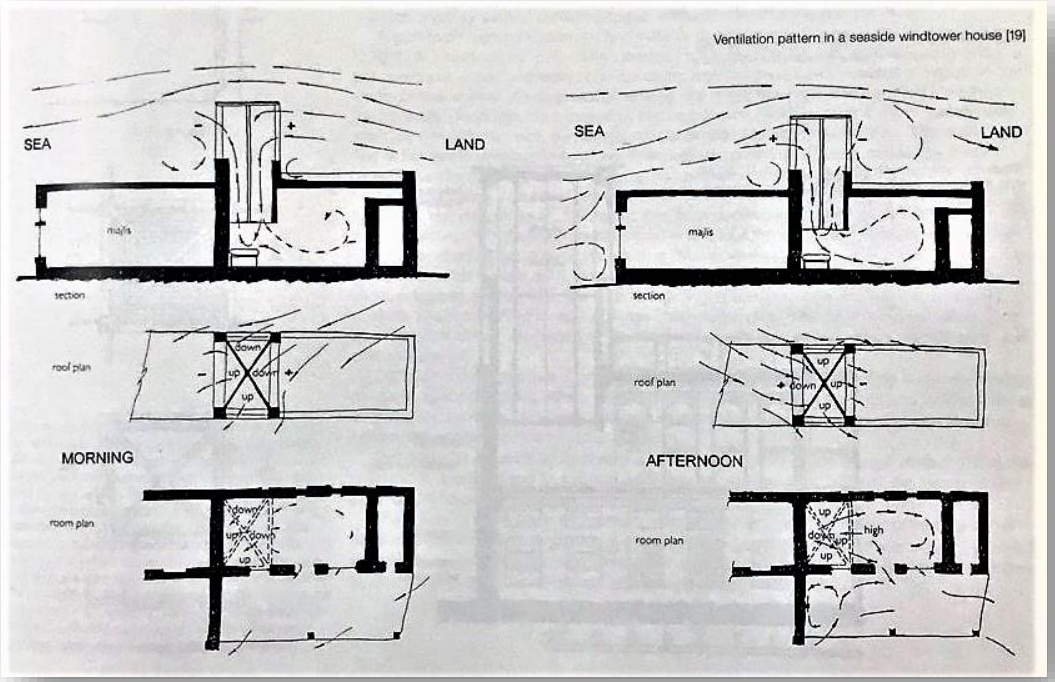
Windtower of Sheikh Said's house, Dubai [24]

The Traditional design strategies

d-Ventilation.

If the ambient air has less than 60% relative humidity, the cooling action can be improved by the evaporation effect of wet canvas, or earthenware jugs and fountains being placed in the path of the air.

During winter the wind tower is either closed at the bottom or the room served by it is not used.



Islamic Buildings & Environment

Elements of climatic treatment in buildings

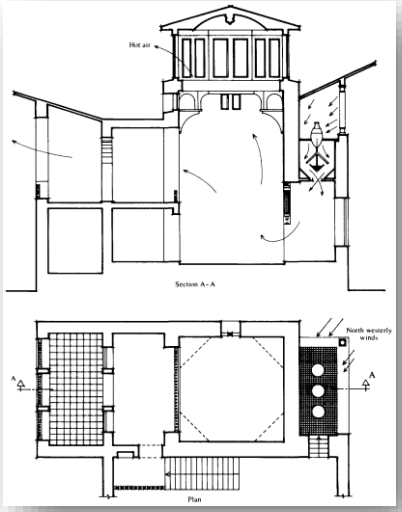
1 - The quality of building materials used.
[Temperature regulation for the day and night].

2 - The inner courtyard.
[Natural ventilation, encouraging air movement].

3 – Iwan and Altakhtbosh.
[protected from external interference].

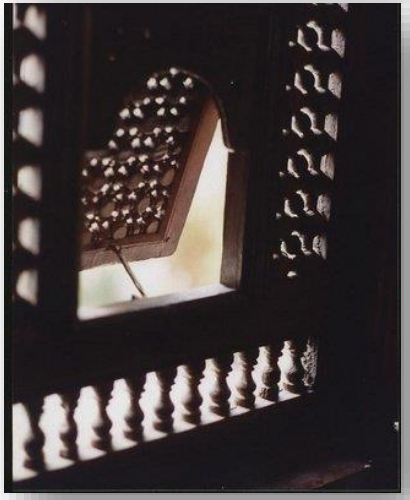
Islamic Buildings & Environment

Elements of climatic treatment in buildings



4 - Air catchers and wind scoops.

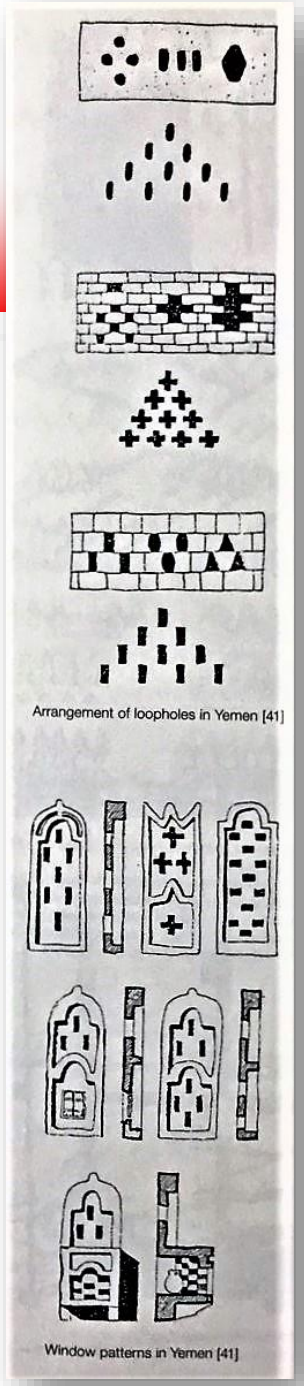
[Natural ventilation, encouraging air movement].



5 - The windows and vents.

Tools of natural light (oriels- screens and narrow openings) :-

- **to treat glare,**
- **to control passage of light and humidity,**
- **to achieve privacy between inside and outside.**



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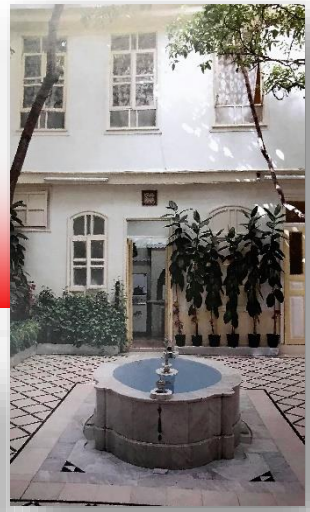
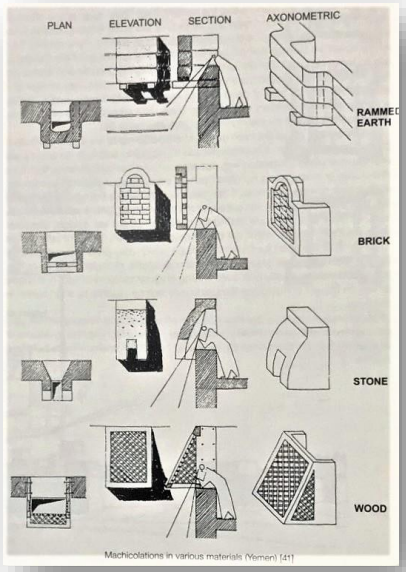


Elements of climatic treatment in buildings

7 – Using natural elements.

[Water (Fountains, water well) – Plant(fruit trees, shade trees, shrubs, and flowers basins].



8 - The noise treatments.

[Closing the house from the outside, narrow openings].