

The House and Seasonal Use of Space

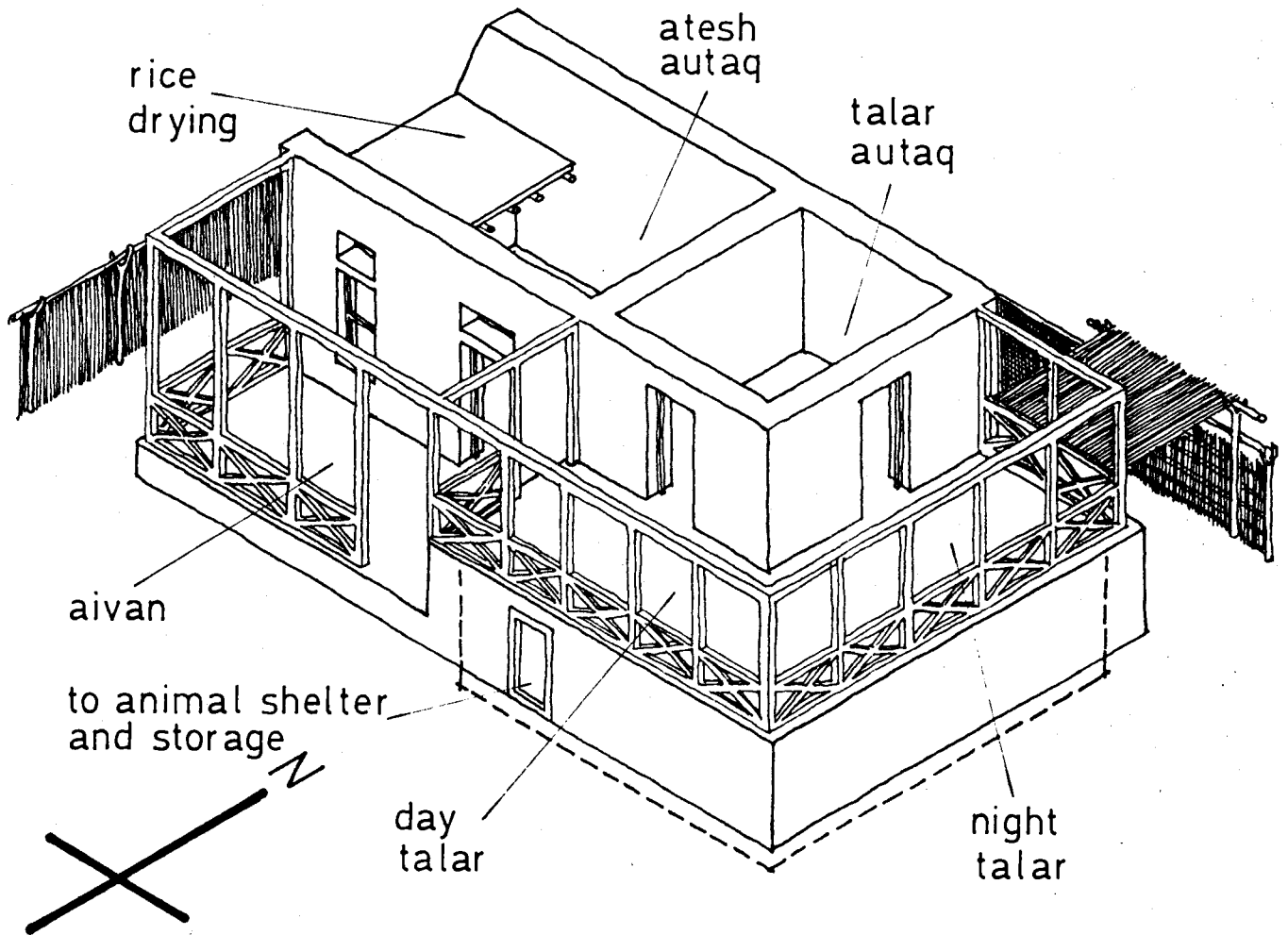
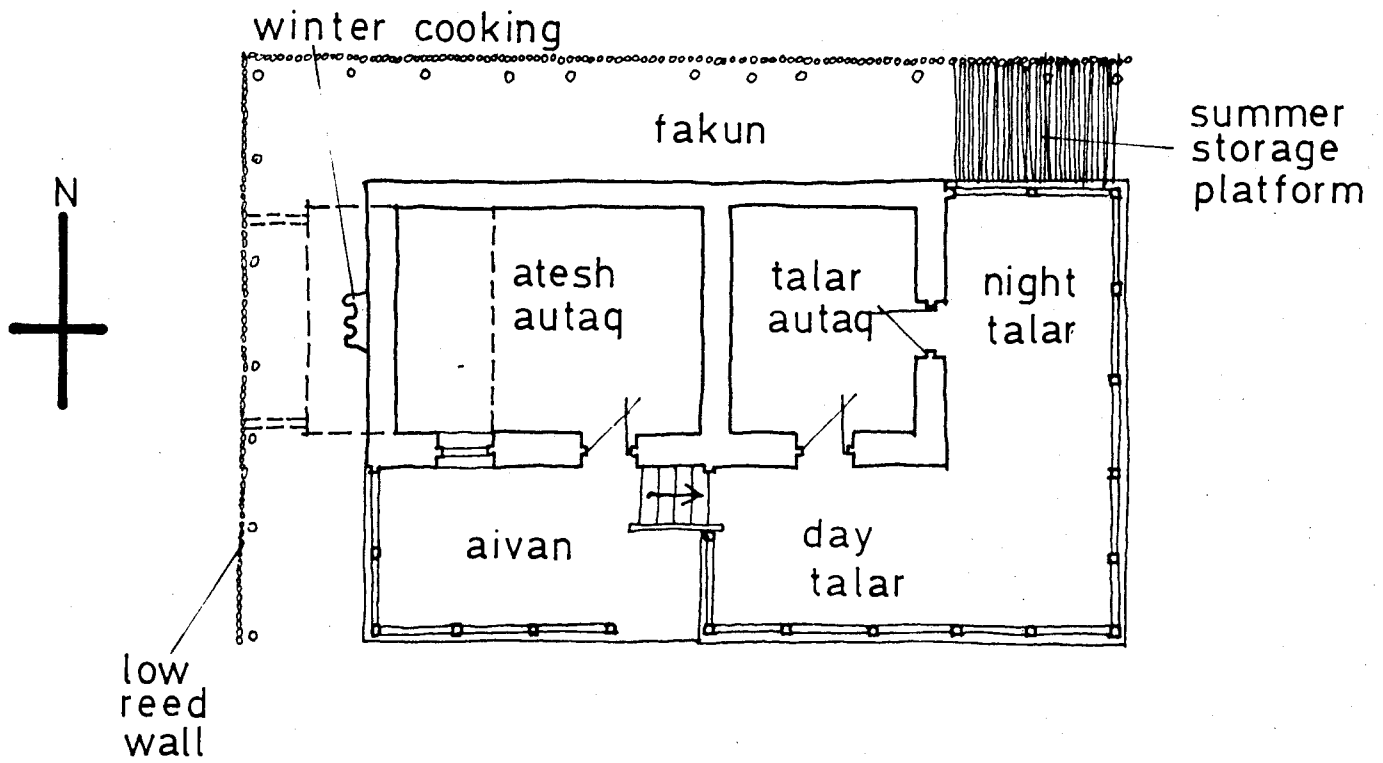
Although house forms vary from area to area over the Caspian region, one common feature is the multi-use function of most spaces. Rooms are rarely specialized and instead are usually readily adaptable to changes of use with the seasons. Upper sections of the house normally being more open are generally used in the warm summers, while enclosed lower rooms are usually reserved for winter living. C. Bromberger* likens this internal house migration to the common migration pattern of seasonal movement from the lowlands to the cooler hills in summer.

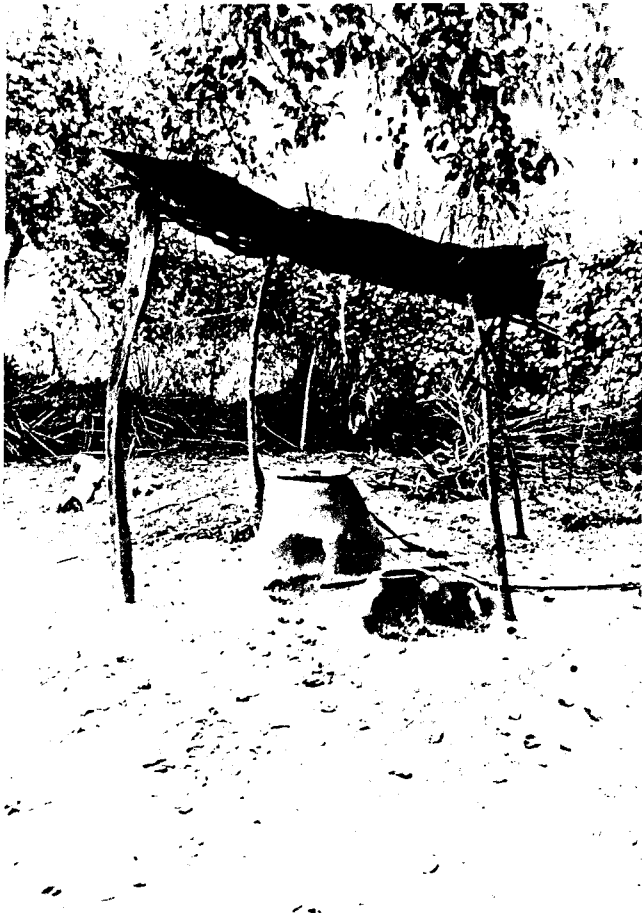
For the purposes of discussion, an example will be taken of the mezzanine house typical to Dogoor village in the Founan area. The example shown illustrates principles common to a number of houses which were surveyed in that village. As stated earlier, the mezzanine house incorporates two living levels, each with their indoor and covered outdoor components, plus a partly below ground animal shelter and storage space, and an attic under the hipped roof also used for storage.

The talar is the outdoor covered space situated at mezzanine level, about half a floor above the ground. The talar is primarily a summer living area and is divided into daytime and night-time use areas. Activities such as eating or meeting guests normally occur in the shaded south wing of the talar, where one can maintain direct contact with the daily activities of the forecourt immediately in front of the house. Cooking and other work activities requiring ample space are carried out in the forecourt. Bedding and matting for night-time use are stored out of the way on a small platform at the back of the talar. On summer nights the eastern end of the talar is spread with woven rice stem matting and bedding for sleeping. This space is open on three sides for

* Christian Bromberger, "Documents pour l'Etude de la Repartition de Quelques Traits Culturels dans le Gilan et l'Azarbayjan Oriental" in Mardom Senasi va Farhang-e-Anne-e-Iran, 1975, p.37.

Elements of the House
surveyed in Dogoor, Gilan

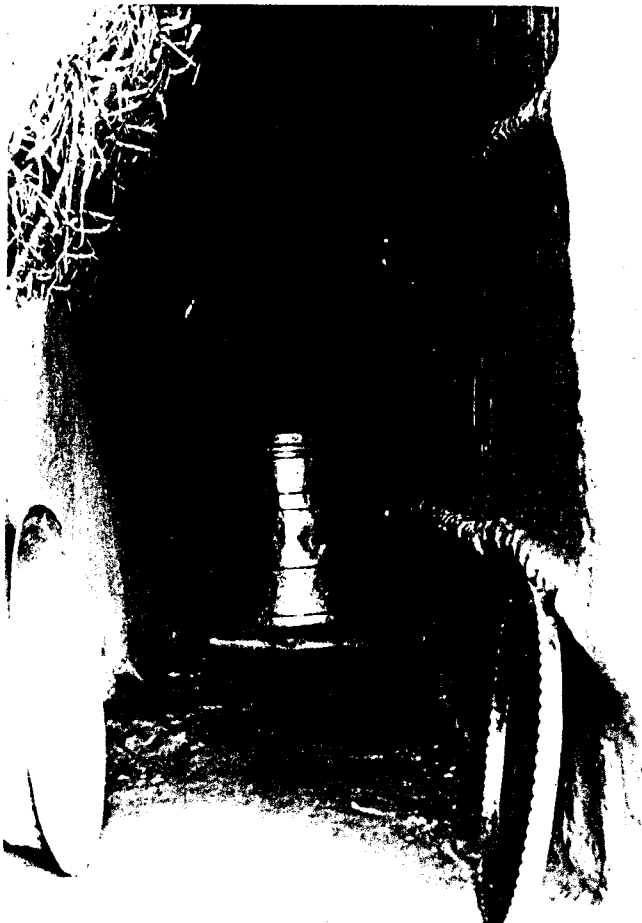




Bread oven in Kuzibagh in Sari coastal plain.



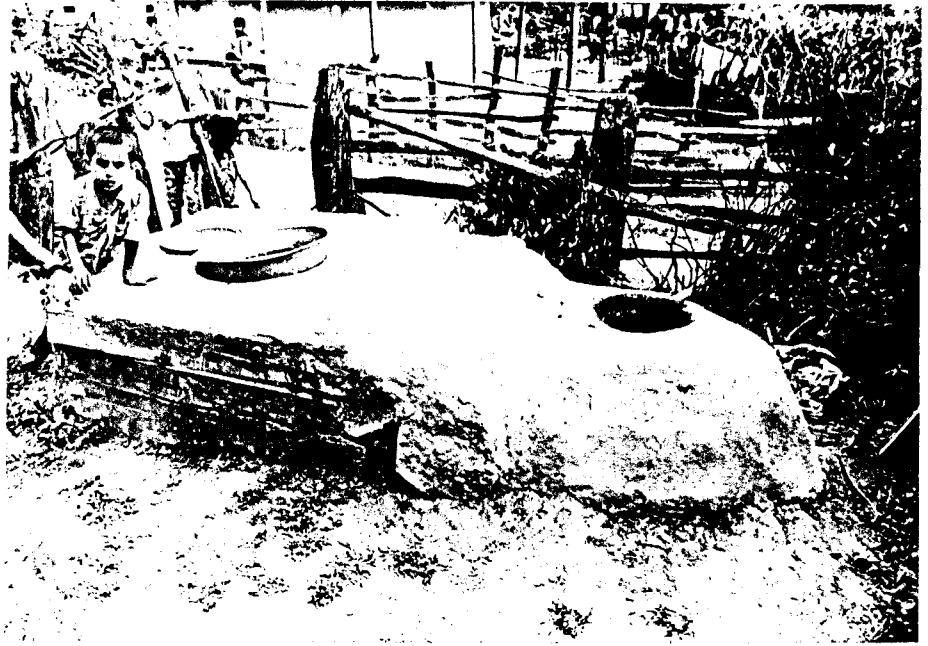
Bread oven being constructed. Clay becomes fired with use.



Storage area is created by overhanging eaves in Doroon.



Summer kitchen in open aivan.

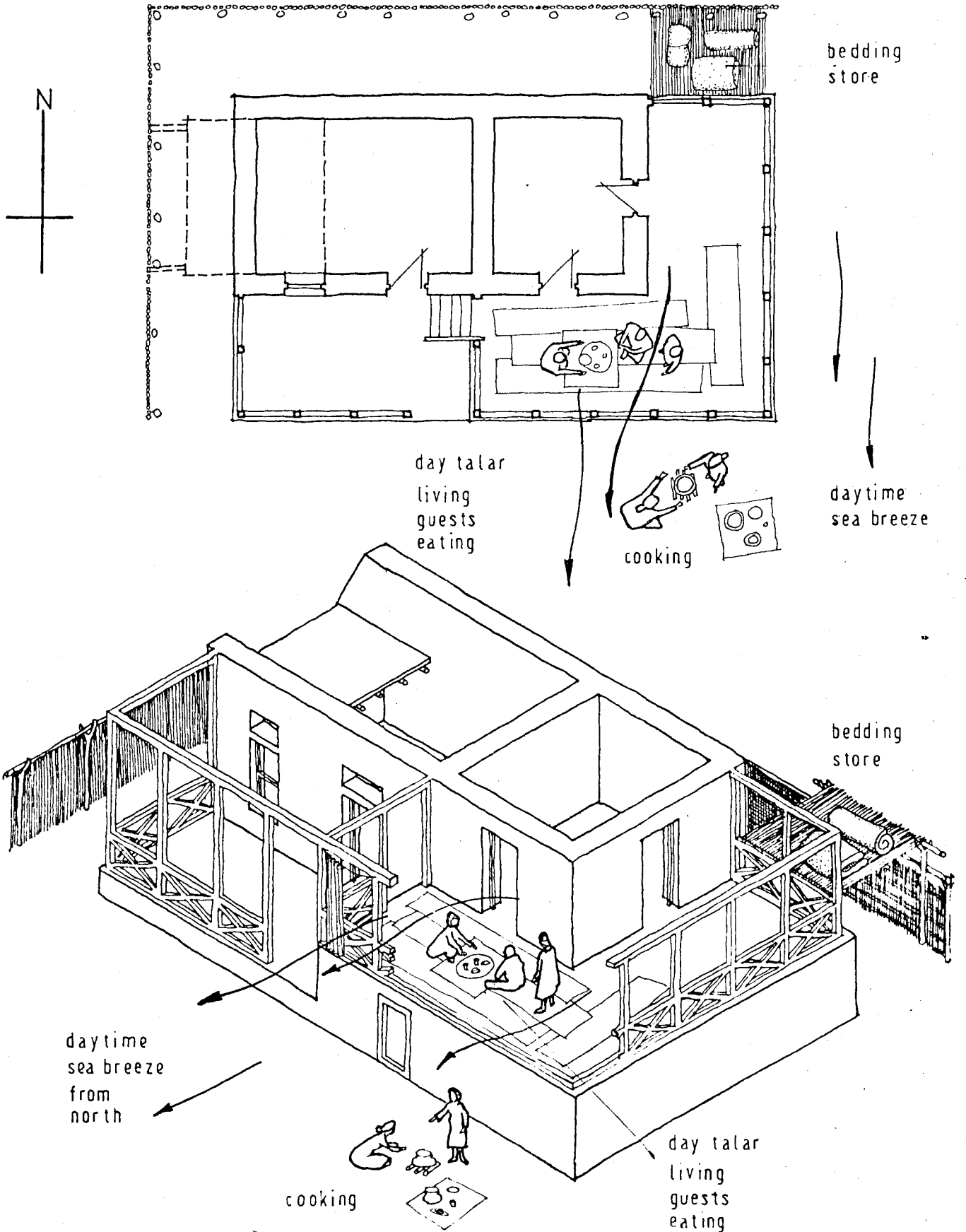


Bread oven in Chajkam, Mazandaran.

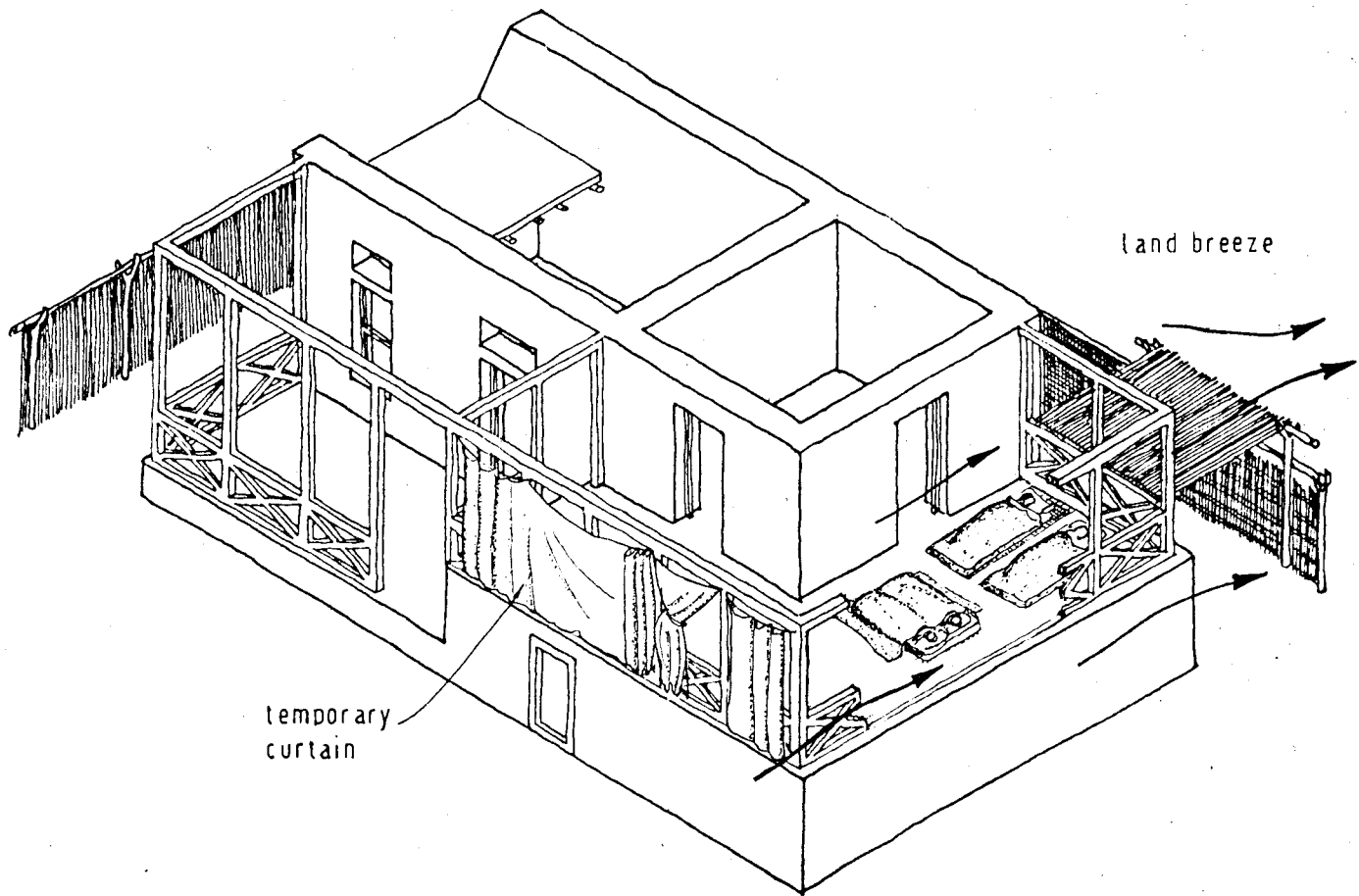
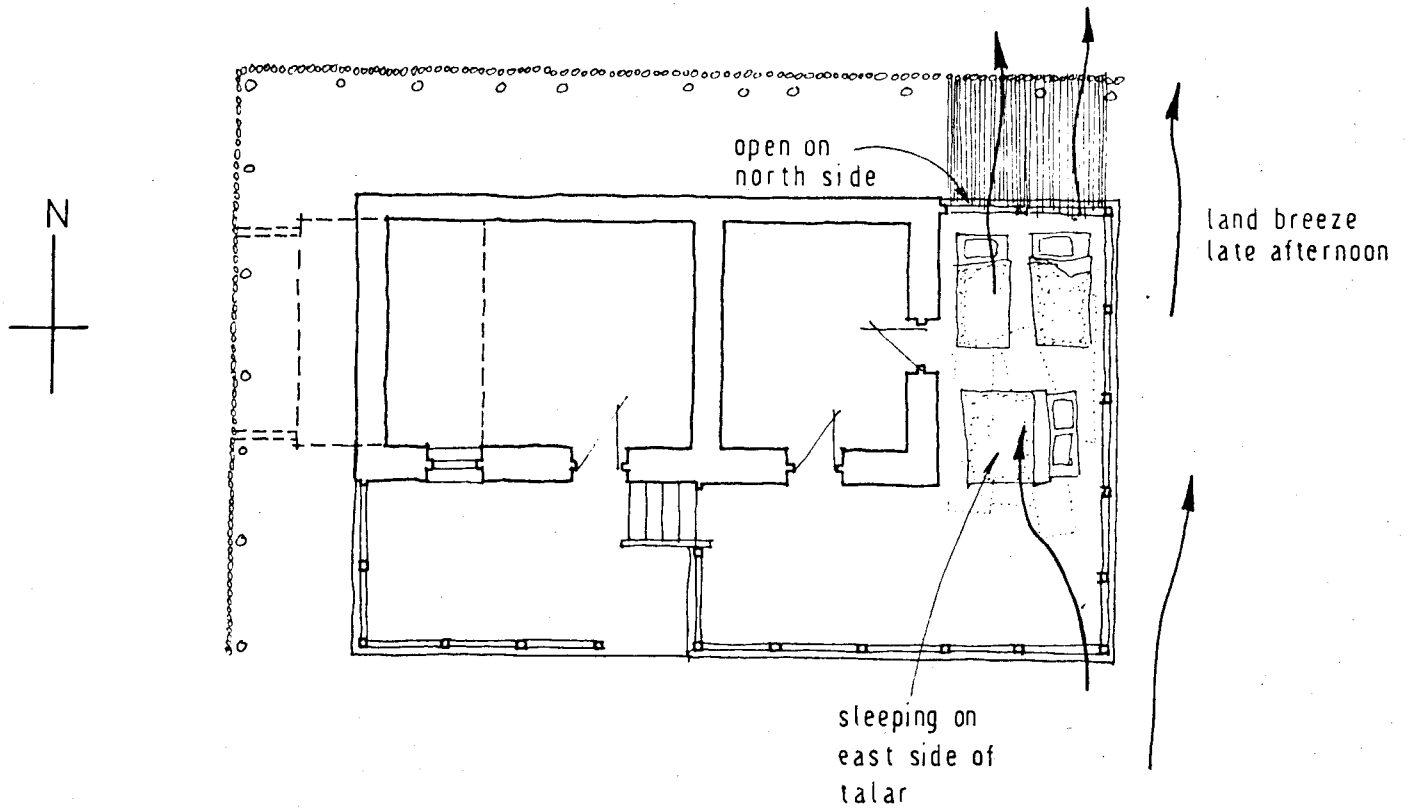


Historic kitchen area within house in Kedin.

Summer Day time Use of Space



Summer Evening / Night Use of Space



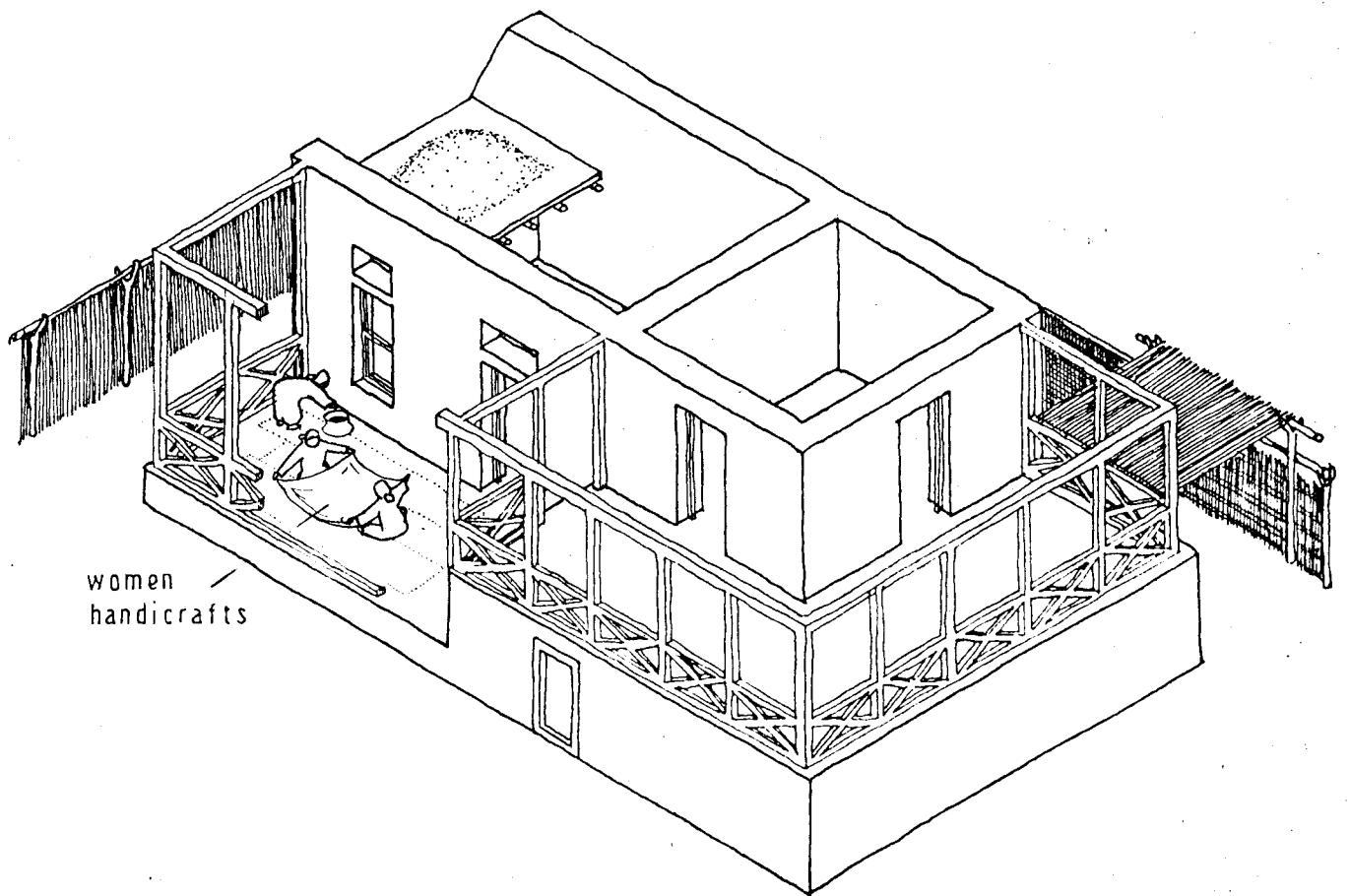
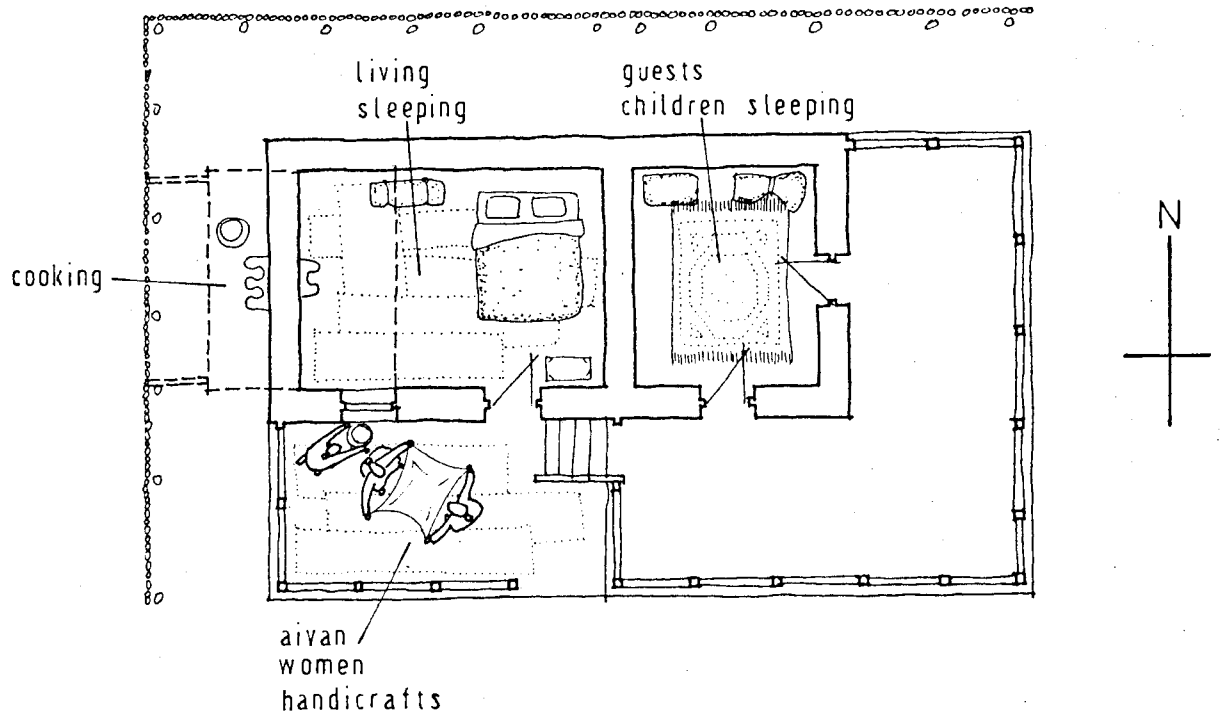
cooling air movement. A temporary curtain is often hung around the mezzanine level talar. This curtain has a multiple function of providing visual privacy to the family as well as shade on the eastern side from the early morning sun and occasional shelter from unwanted winds. In other areas of the Caspian the function of the talar is replaced by a structure separate from the main house. In the Talesh region an independent platform, or "kutam", serves as a summer living and sleeping space. Similarly, in Mazandaran the "nepar" is a two storey structure enclosed on the ground floor with an open but roofed upper floor which has a similar function to the talar.

The aivan, which is a ground floor, covered but unwallled space, is used primarily in the spring and autumn as an area for women's handicrafts, such as mat weaving. During these seasons the sun angle is such that the south facing aivan receives solar radiation for most of the day, making it a warm space protected from wind and rain.

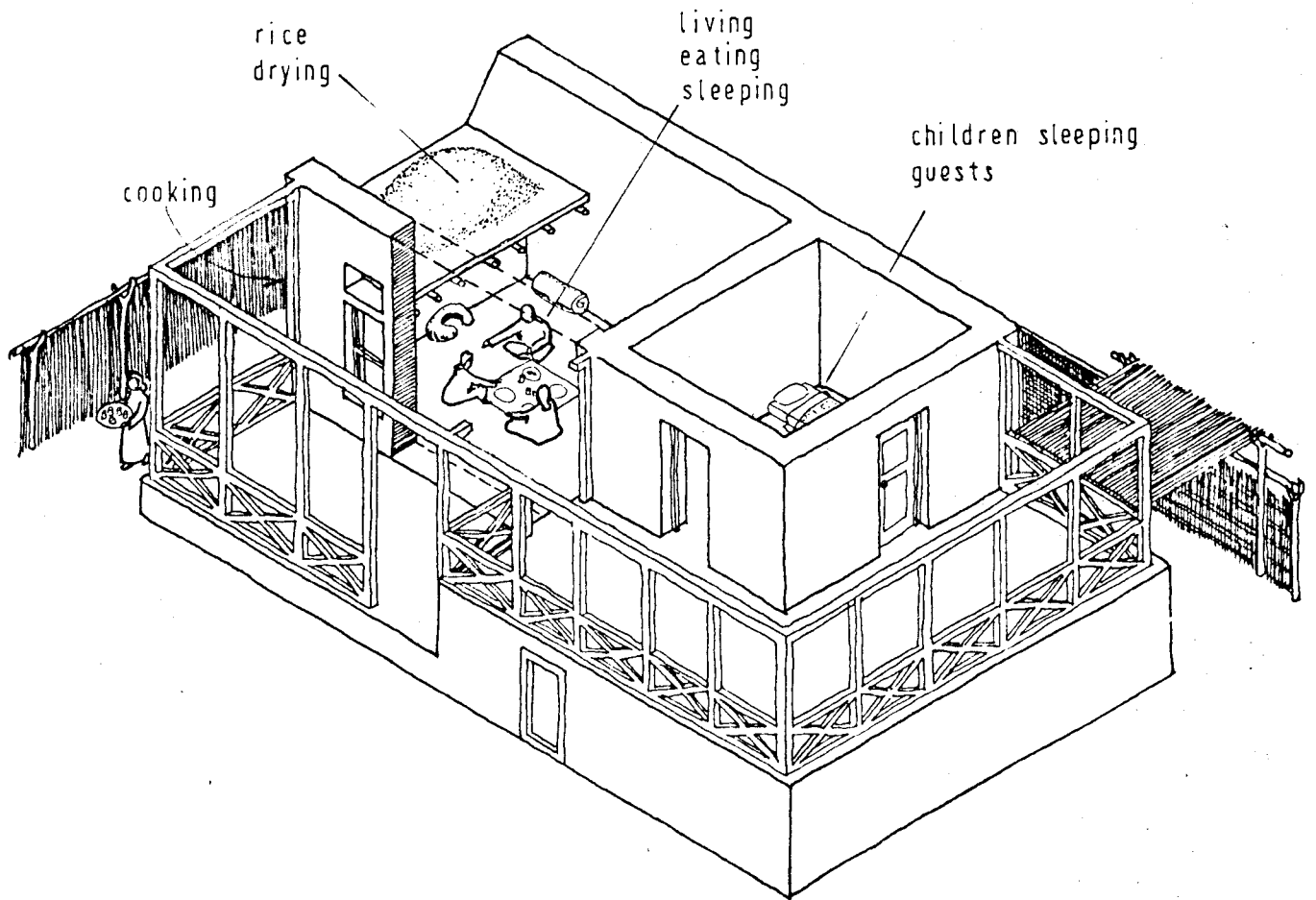
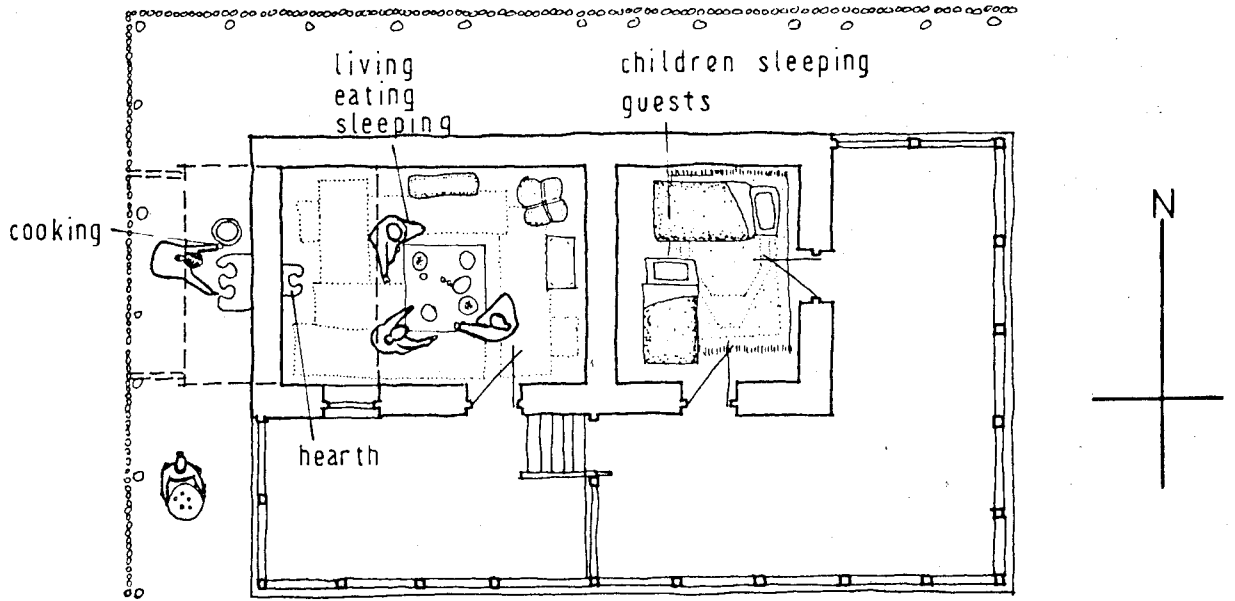
In the winter most of the domestic activities are concentrated in a single room on the ground floor, the atesh autaq. This room incorporates a rice storage and drying platform at one end of the room, which extends out over the passage, or "fakun", to meet the roof slope on the west side of the house. A hearth located here not only heats the room in the cold months but helps dry the stored rice. The hearth does not have a chimney and so smoke is left to escape through the thatched roof. Winter cooking over a wood fire usually occurs in the passageway on the west side of the house. In one house studied the cooking fire was located under the projection of the rice storing platform. In this case excess heat from cooking would assist the rice drying process.

The mezzanine level room, though often used as an extra

Spring and Fall Use of Space



Winter - Use of Space



sleeping space for children, was in many cases a formal place to receive guests during cooler seasons when the talar was not employed.

The semi-basement rooms under the talar are used during the cold seasons as animal shelters. Animals are usually kept during the summer in light frame sheds within the garden compound.

The pattern of use of space is variable, depending on house type and the local environment. The pattern is simplified in the one room peasant's house where movement can only be from the interior to the aivan to the outside court. Space use becomes correspondingly more complex in houses incorporating several rooms and as many as three different levels. Specialization of the seasonal use of space is less apparent in the drier areas to the south, though in many areas where flat roofs are found, roof tops are employed for sleeping in the summer.*

* C.Bromberger, op.cit.

Internal Micro-Climate of the House

A series of tests were carried out over a five day period from 21:10:78 until 26:10:78 to evaluate the individual house's internal response to ambient climatic and micro-climatic conditions. A single house in Dogoor, Gilan, was chosen which it was felt would best typify the local mezzanine house form. Portable meteorological equipment was installed in the various different spaces of the house to continuously monitor the internal environment. The location of the test sites is indicated in the accompanying drawing, and measurements taken from the apparatus are listed in the chart for purposes of comparison.

It can be seen from the above mentioned chart that the thermal environment of the internal spaces of the house are moderated and show much less temperature fluctuation than external spaces. While ambient temperatures vary from 14°C . at night to 28.2°C . during the early afternoon, internal temperatures remain relatively more constant with variations of little over 6C° .

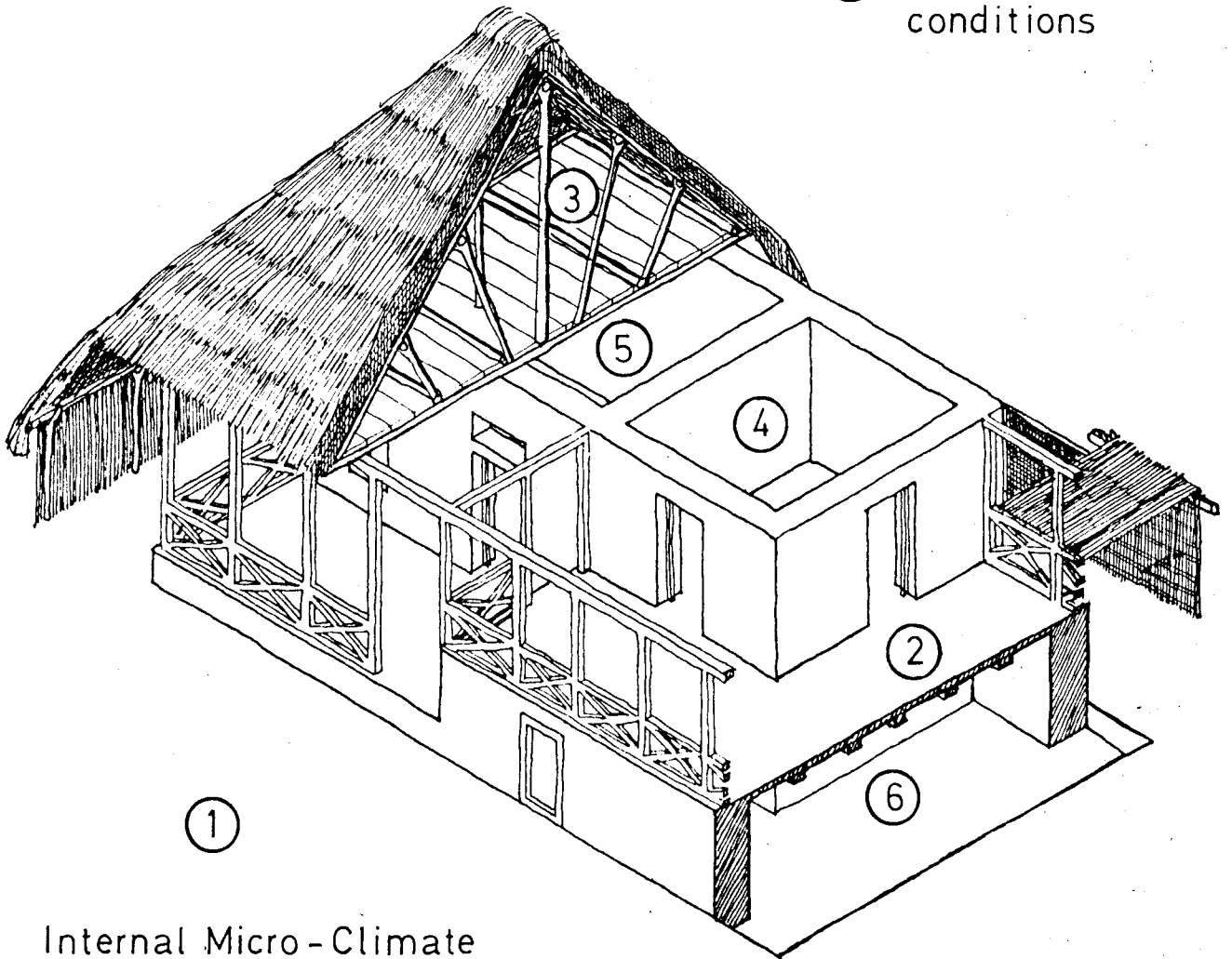
Equally, humidities of internal spaces are moderated by the house. Measurements indicate the external relative humidity to have been 90% at the time of testing, while internal relative humidities within the living spaces of the house varied between 78% to 86%. Relative humidity plays a major role in thermal comfort, especially during warm periods when a lower percentage of relative humidity means that the body can cool itself more readily by losing heat through evaporation to the surrounding air.

The moderating effect of the house on its own internal environment is largely due to the design of spaces, the construction techniques and materials employed.



plan

① outside ambient conditions



Internal Micro-Climate
of the House

location of test apparatus

Micro-Climature of the House
surveyed in Dogoor, Gilan

Table of Measurements

Test Location	Temperature Range °C			at 16:00 hours 26.10.78		
	Maximum	Minimum	Difference	Temperature		% Relative Humidity
				Wet Bulb	Dry Bulb	
1. Outside	28.2	14.0	14.2	17.5	18.7	90.
2. Talar	28.2	14.5	13.7	18.0	19.5	86.
3. Attic	28.5	17.3	11.2	17.5	19.2	84.5
4. Upper Floor	25.2	19.0	6.2	18.2	20.7	78.
5. Ground Floor	24.0	17.7	6.3	17.8	19.2	86.
6. Basement	24.0	18.0	6.0	18.0	19.2	88.

The house surveyed, being of the mezzanine type, has two distinct internal living space levels: the ground floor and the mezzanine located half a floor above. Similarly, there are two covered outdoor spaces: the ground floor aivan and the mezzanine level talar. Two more spaces, the attic under the roof pitch and the basement below the mezzanine level and slightly below ground level, are used principally for storage.

Thick packed mud walls (minimum of 50 cm. thick) are employed for enclosing internal spaces. Walls supporting the mezzanine tend to be thicker (over 60 cm.) due to the extra load of the talar. The thermal capacity of mud walls is excellent. They act to retard the flow of heat and tend to even out peaks of temperature which may occur externally. The thatch employed in roofing is noted to be a good heat insulator and can be seen to reduce temperature differentials from the 14.20° noted outside to the 11.20° measured in the attic storing space. These insulation properties, combined with extra waste heat rising from the living spaces, make the attic a usable frost-free storage space in the winter months.

Basement walls, partly submerged underground and being particularly thick, have the greatest thermal mass. It can be seen from the chart therefore, that of all the spaces within the house the basement has the most stable temperatures. The basement space can be used for an animal shelter and for storage without the need for supplementary heating.

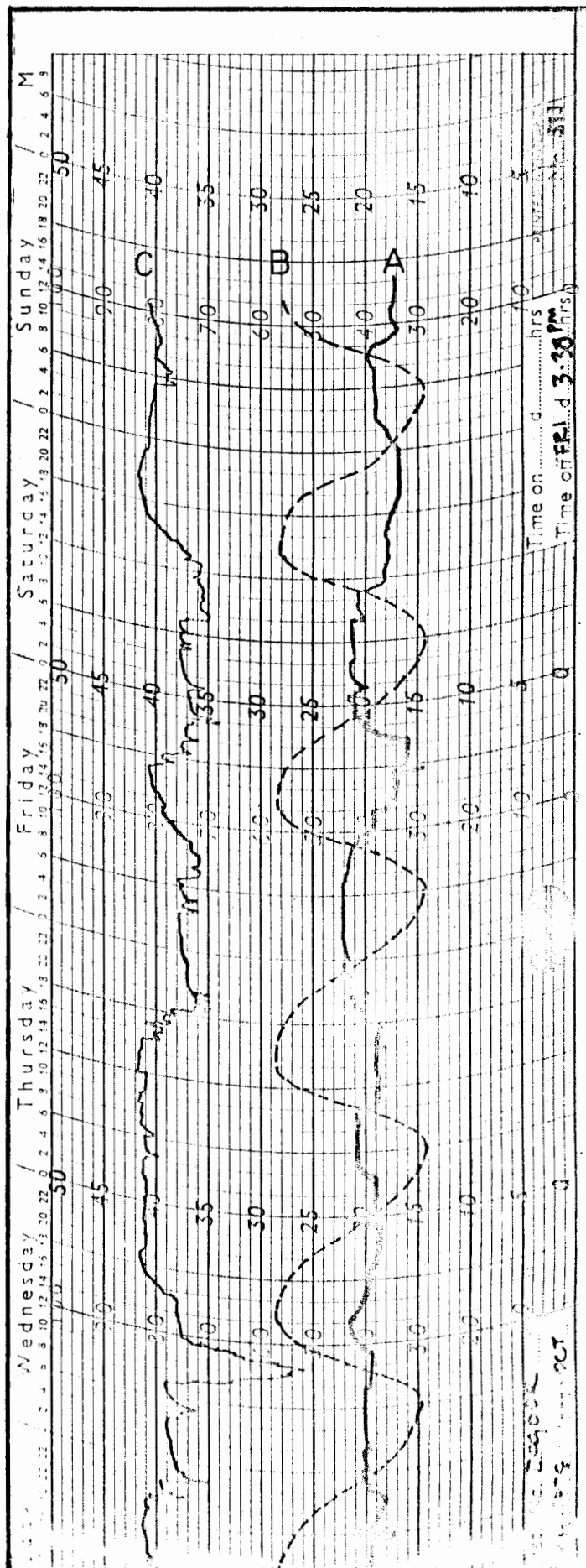
Further detailed measurements were made of the mezzanine level indoor living space (4), employing continuous recording equipment for temperature and relative humidity (using a thermo-hygrograph). Upon the graph of continuous indoor temperature is superimposed the estimated outdoor ambient temperatures. From the resulting graph it is interesting

Micro-Climature of the House

Thermo-Hygrograph Chart

for five day period
ending 16:00 hrs. 26.10.78
survey in Dogoor, Gilan

- A Internal Room Temperature
note that due to machine
error 3°C. must be added
to graphed temperatures.
- B External or Ambient Temp-
eratures
these temperatures are
estimated and superimposed
on the original chart, for
comparison purposes.
- C Relative Humidity
note that due to machine
error 3 hours must be
added to graphed relative
humidities.



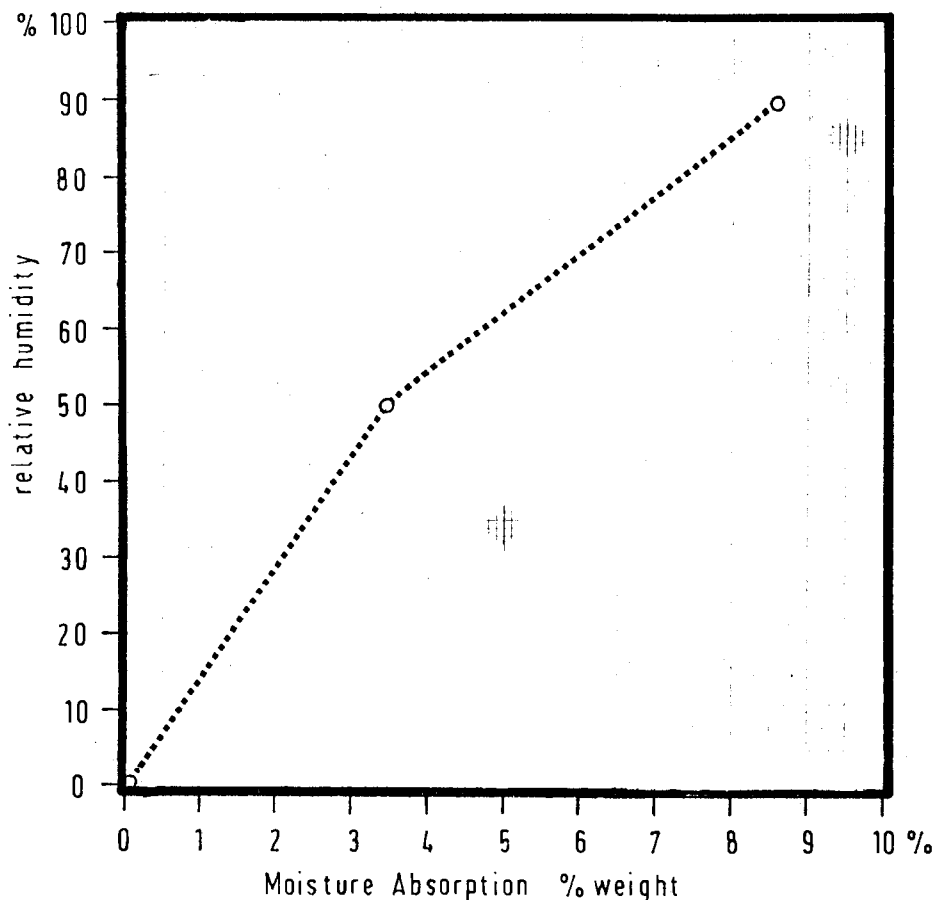
to note that the two lines showing the indoor and outdoor temperatures are out of phase, i.e., in the afternoons when the outdoor temperatures are highest (about 28.5°C.), the internal temperatures have reached their lowest at about 18°C. Similarly, in the early mornings before dawn when the outdoor temperatures have dropped to 14°C., the indoor temperatures have risen to almost 21°C. Indoor temperatures therefore not only tend to moderate temperatures, i.e. eliminate peaks of hot and cold, but provide their respective heating and cooling capacities when they are most needed. This is due primarily to the excellent thermal properties of mud walls and their tendency to delay and control the flow of heat. The "time lag" or the time that peak outdoor heat takes to pass from outdoors through the 50 to 60 cm. of mud wall to the interior of the room, appears from the chart to be between 10 to 14 hours. During the autumn period of experimentation, this time lag maintained "thermal comfort conditions" for the inhabitants without the need for extra heating. Even in the coldest months the thermal properties of mud walls will greatly reduce heating requirements.

The use of mud walls for controlling temperatures of internal environments is maximized in areas where daily temperature ranges are great. This normally occurs in drier regions, further inland from the Caspian coast. This may partly account for the increasing use of heavy mud construction as one moves from the coastal plain towards the foothills and mountain regions.

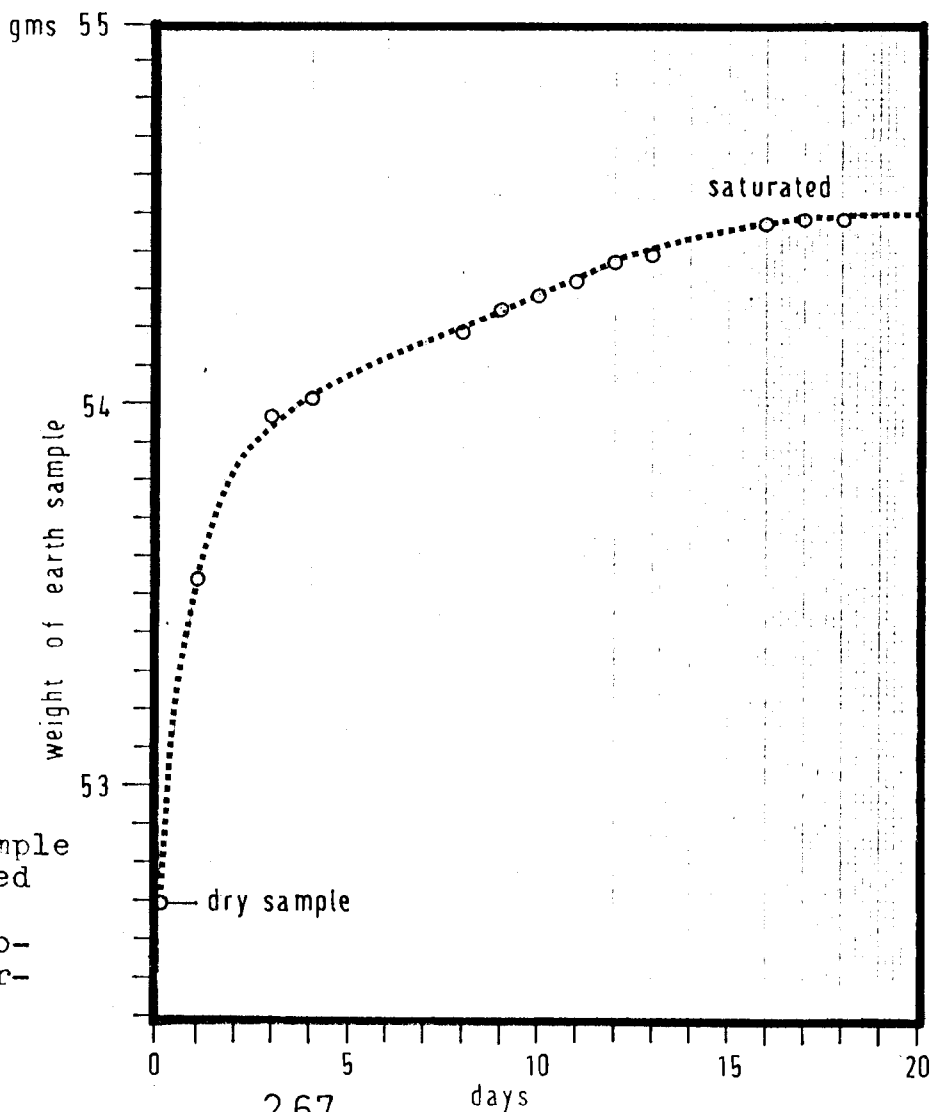
As already noted, relative humidities, or the amount of water vapour in the air, is less (+78%) in the interior of the house than outside (90%). The building materials - particularly the mud walls - are responsible for this phenomena. Tests were carried out by the authors on samples of Caspian soil using laboratory equipment to determine the hygroscopic (moisture absorption) properties of mud walls.

Hygroscopic Properties of Earth Construction

Effect of Atmospheric Humidity on Moisture Content of Earth



Rate of Moisture Absorption in Atmosphere of 50% to 55% R.H.



note: the earth sample tested is classified as clay-silt, and contains a high proportion of fine particles.

Soil samples were first oven dried to evaporate all water, and then weighed after prolonged contact with different atmospheric conditions. From these experiments the amount of water vapour absorbed by mud walls in different atmospheres can be established, as well as the rate of water vapour absorption over time can be determined.

In the high humidity of the Caspian therefore, earth construction is able to absorb a considerable amount of moisture vapour from the air, i.e. at 90% humidity moisture content of the sample tested is between 8% and 9%. Hygroscopicity depends greatly on the nature of the earth used in the particular construction. It can be assumed that the greater the proportion of fine particles, the higher the absorption of water vapour.

Regional Service Centres

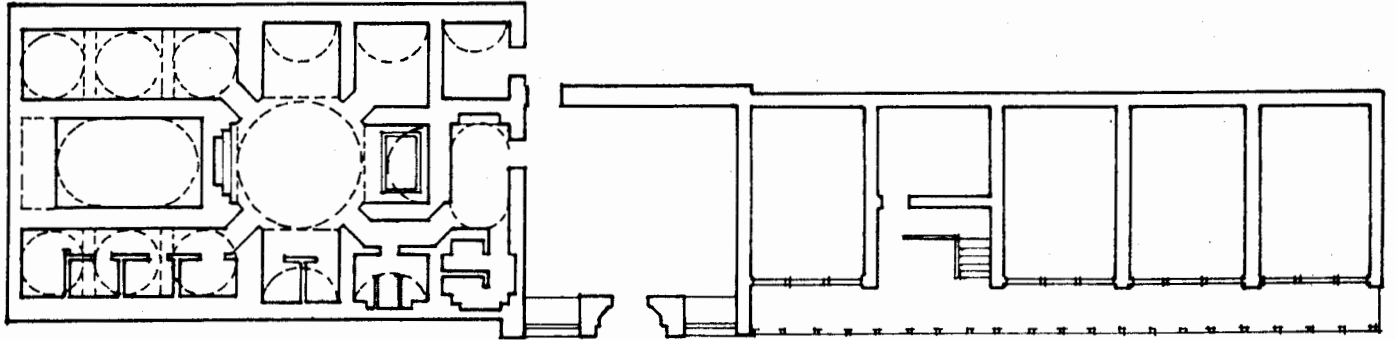
Semi-urban settlements exist within rural areas of the Caspian region. These intermediate centres each serve a number of villages and a relatively large agricultural hinterland. Such settlements can not be strictly considered urban since they are an integral part of the rural fabric and serve an essentially rural function. Such centres do not usually have a large residential population, but they do have a large number of service facilities and buildings.

These settlements are primarily trading towns, where once or twice a week open air markets are held. Essential consumer goods are bought by local villagers and agricultural products and livestock are sold. Merchants, tradesmen and farmers bring their goods to the market where they set up an outdoor stall or simply spread a blanket on the ground and display their wares. A smaller number of permanent shops form the core of the service town. In Gilan these buildings are normally laid out around an open square within which the informal commerce takes place. Among the built structures the tea shops play an important social as well as economic role. It is here that business transactions are discussed and sales of livestock or agricultural commodities are traditionally conducted.

A guest house in many service settlements provides temporary accommodation to merchants who may come to do business on market days, or may provide occasional accommodation to villagers from more remote parts of the region. The service centre may accommodate other community facilities such as mosques or schools. More recently, government secondary schools and offices intended to serve a whole region have been often situated within these traditional settlements.

Another important facility often found in these service

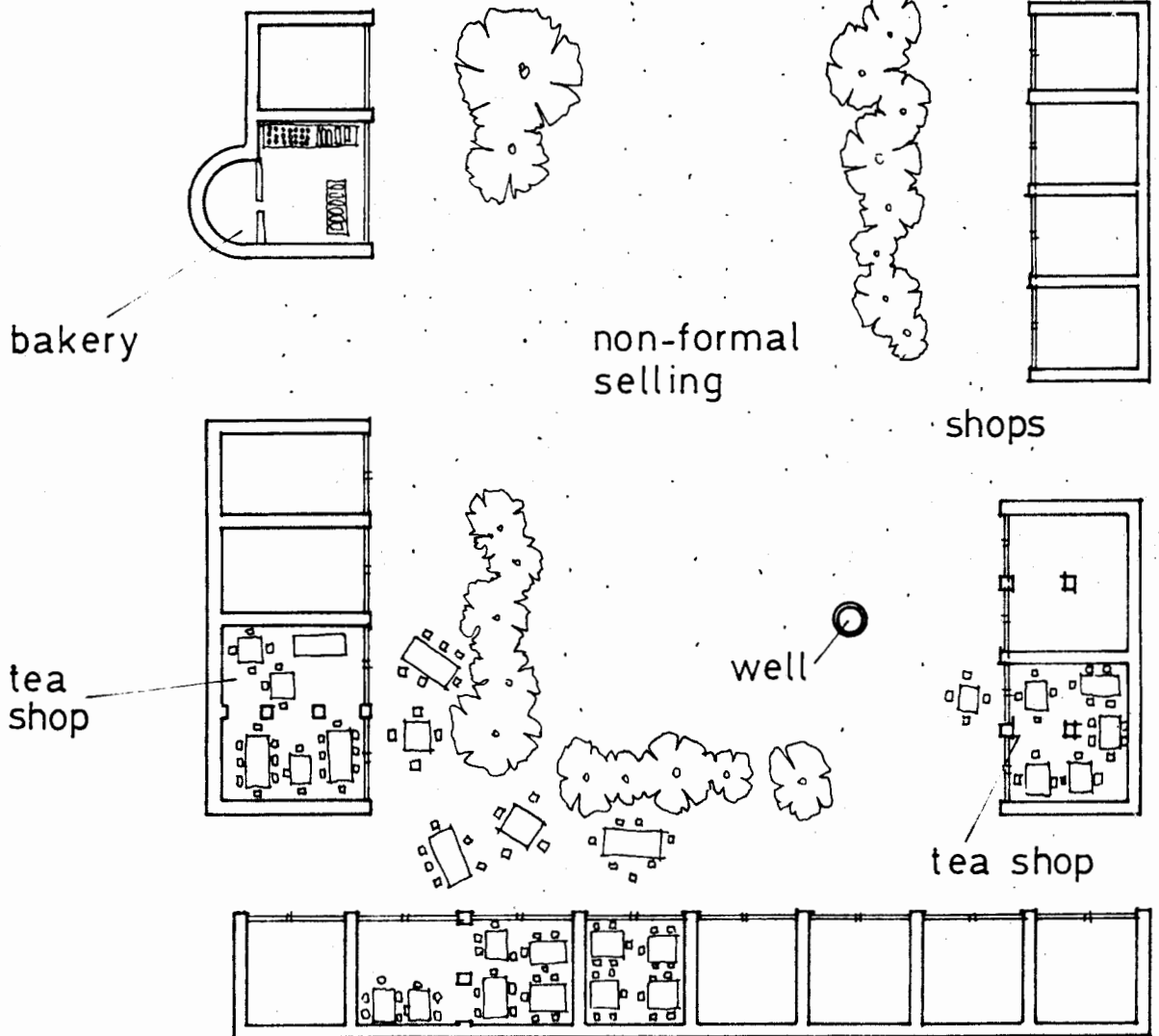
Ali-Abad , Gilan
market square



hamaam

mosque

guest house



bakery

non-formal
selling

shops

tea shop

well

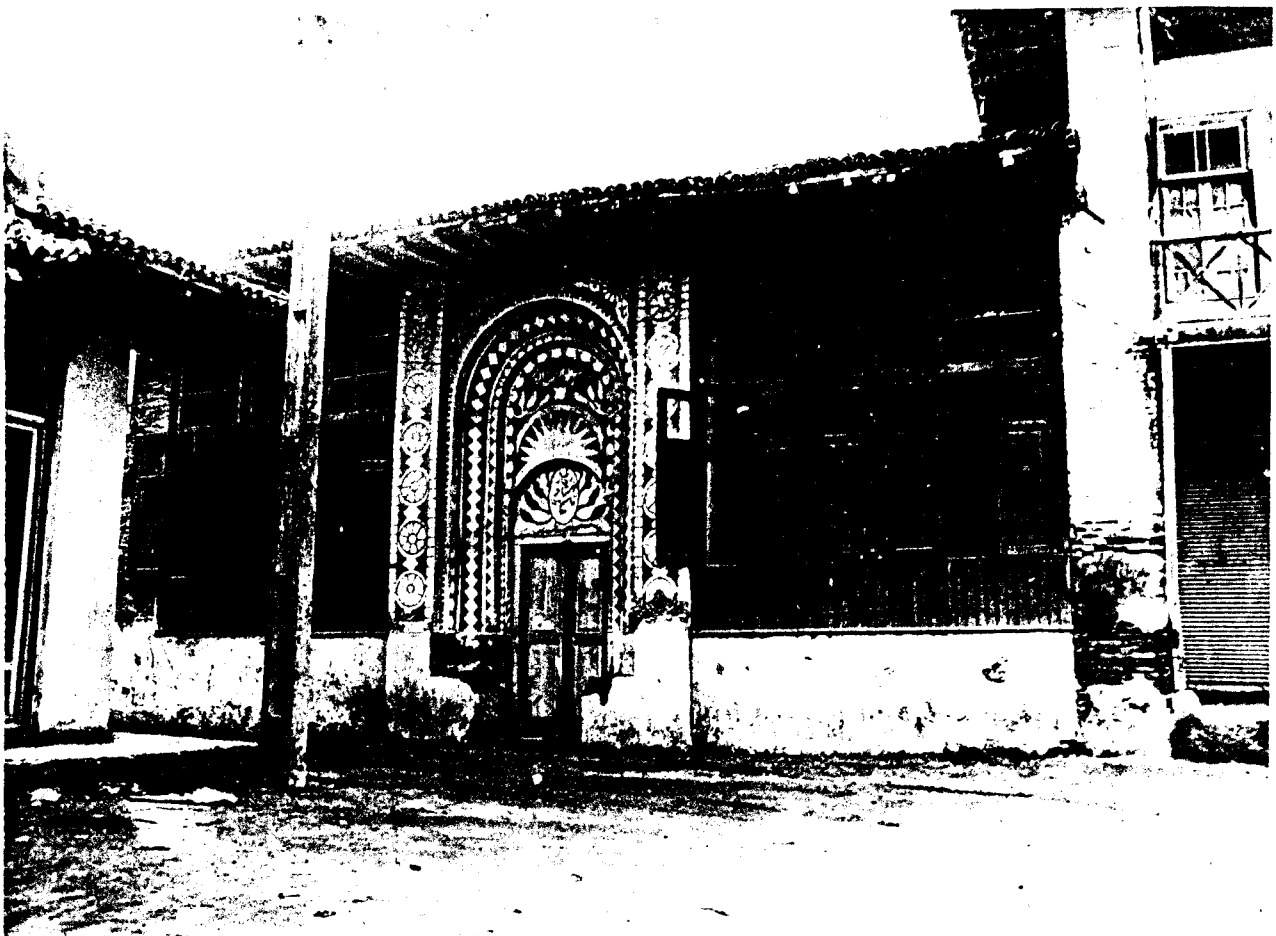
tea shop

tea shops

shops



Gorgan open square, a common settlement form in Caspian urban areas and rural market centres.

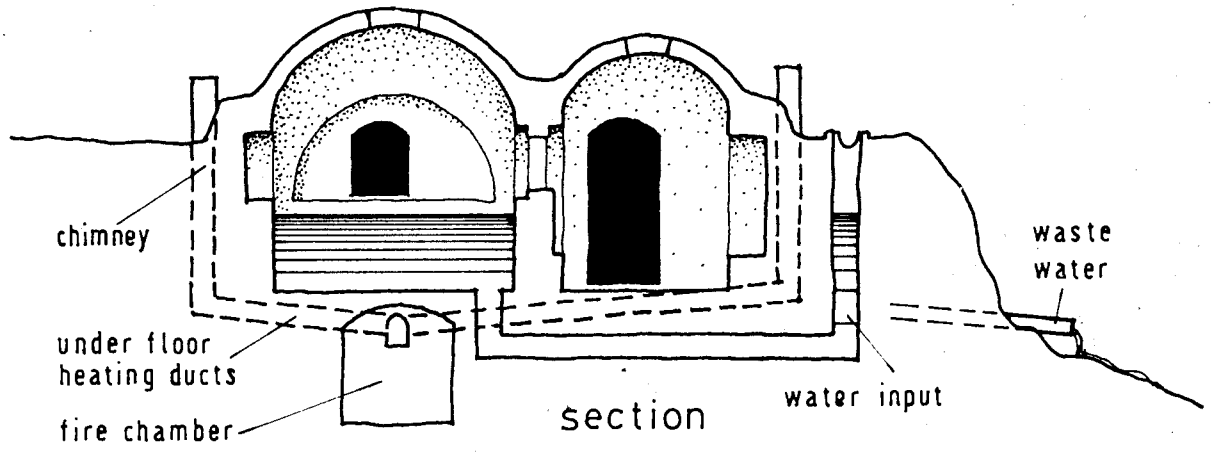


Decorated doorway leading to hammam entrance in Ali Abad market square.

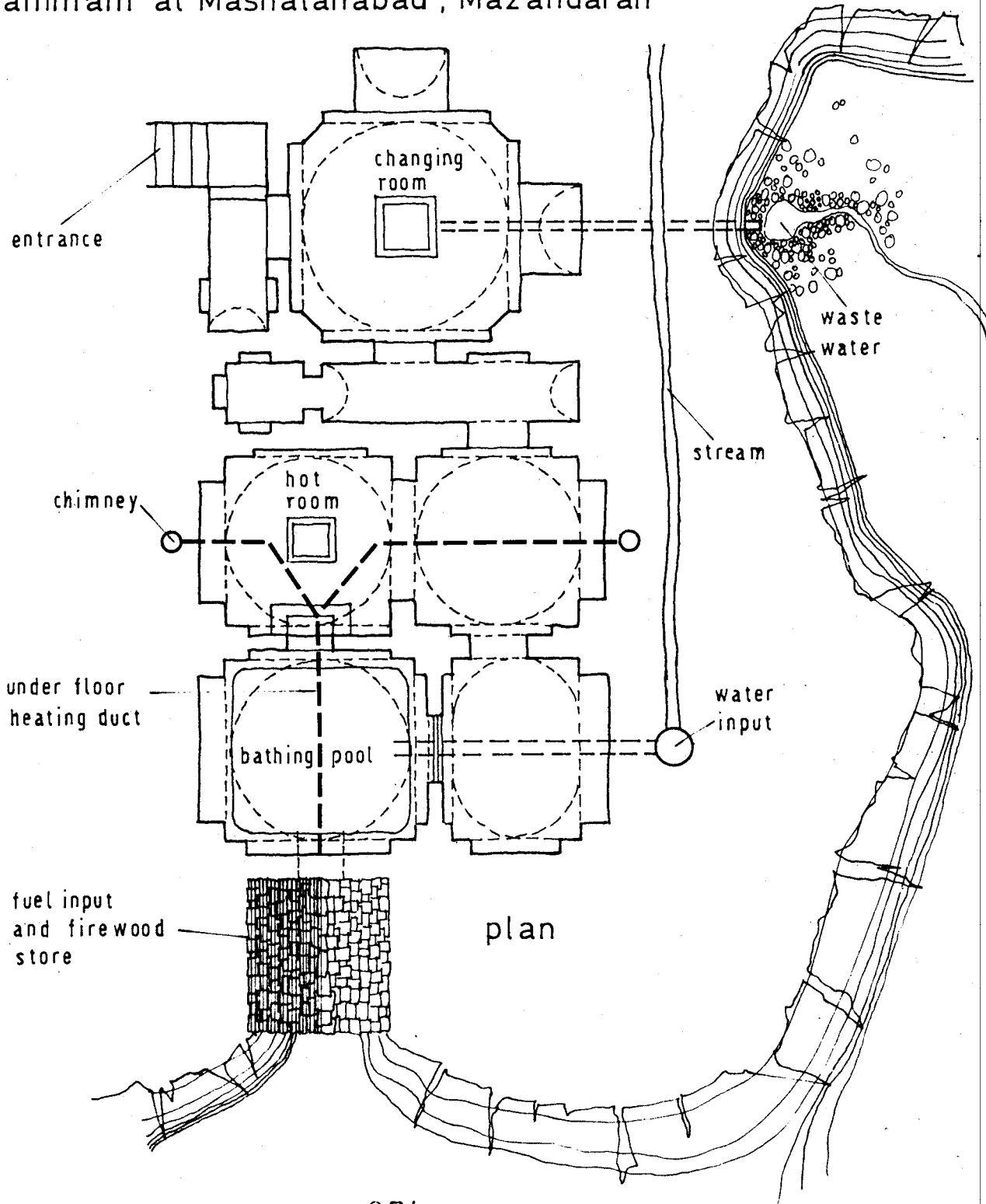
centres is the hammam, or public bath. The bath plays an important social role for both men and women, being one of the primary meeting places in the region. The hammam also plays an essential public health role in promoting basic hygiene. The hammam is normally used on alternate days by men and women except in major centres, where separate facilities for women and for men are situated in the same building. Hammams are usually built partly underground in order to conserve heat within and to reduce expensive thick wall building, which would otherwise be necessary for the predominantly vault and dome structure. Hammams were traditionally situated where the water source could feed the hammam's bathing pool by gravity. More recent hammams employ pumps and water storage towers, or some other system which can provide pressure to shower units, the latter being considered more hygienic than the traditional common bathing pool. Many hammams, particularly in rural areas of the Caspian, are fired with local timber. This can be an inexpensive source of fuel when wood which is unsuitable for construction or carpentry is employed.

Larger market centres, especially if they were situated at important points on inter-regional trade routes, grew into full urban settlements. Old quarters of many Caspian towns show characteristics of the original "service centre" pattern with open squares bordered by shops, cafes and community buildings. For this reason it can be assumed that the settlement pattern associated with the "regional service centre" is the generative form for indigenous urban settlement patterns of the Caspian.

More recent developments, largely in road planning, have affected the traditional service settlement form. The indigenous pattern is basically an inward looking square (example, Ali Abad) but the linear nature of the road has threatened it. In many cases new roads were apparently planned to cut

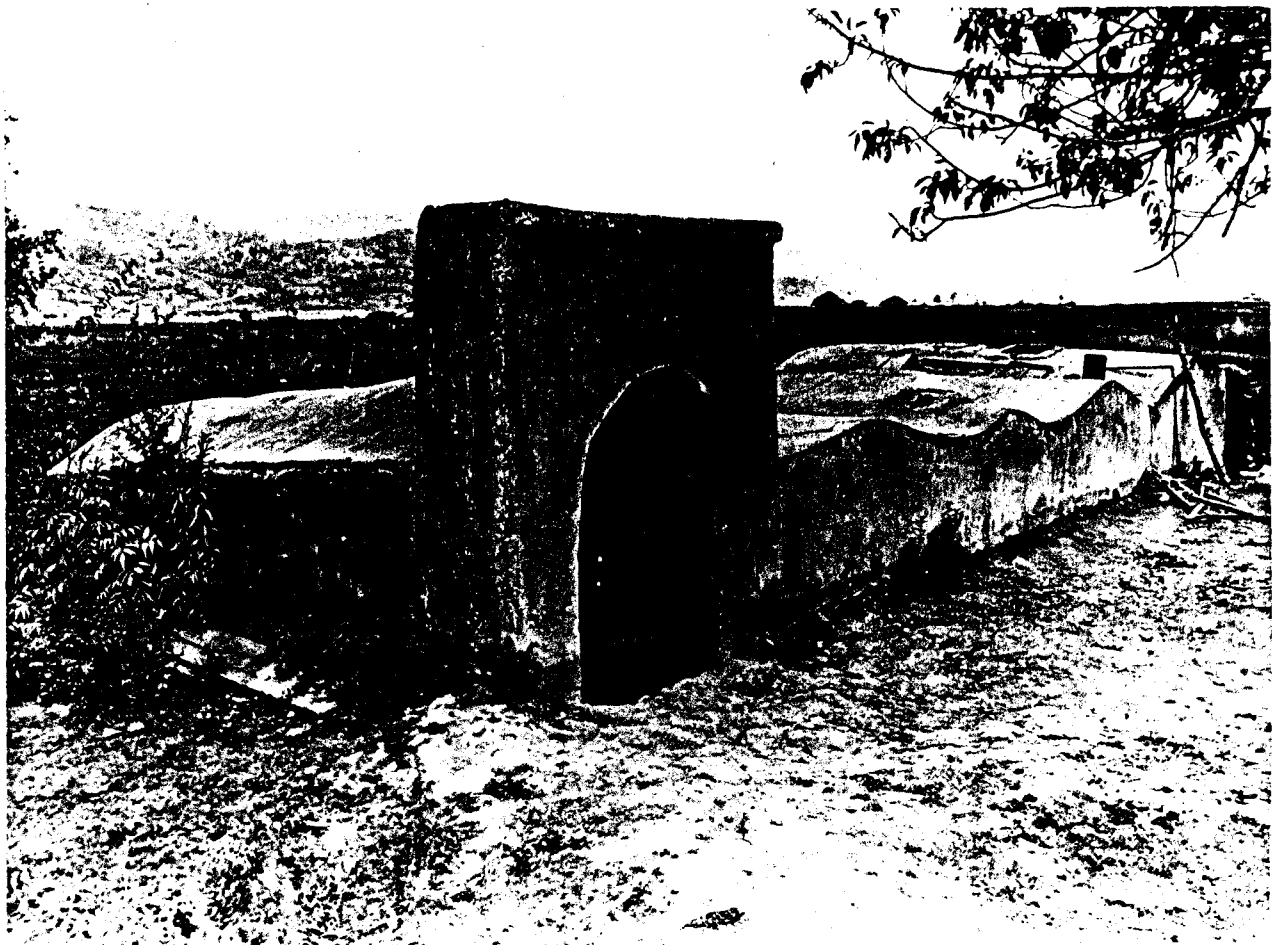


Hammam at Mashalahabad, Mazandaran





Hamman at Mashalahabad near Abbasabad. Wood fired and relying on gravity controlled water supply.



Hamman south of Sari, wood fired.

through existing market squares. In some ways this intrusion of the vehicle into a basically pedestrian space has detracted from its human scale and community meeting function. On the other hand road access has facilitated servicing and deliveries. Where roads have been built through or adjacent to market squares they have been incorporated as activity areas with roadside stalls being set up and buying and selling activities overflowing onto the asphalt.

Road and transportation development have led to the creation of new service and market centres. In many cases these are located along main roadways, and therefore reflect the linear nature of the road, with shops built side by side and temporary stalls being set up on the roadside verges in front of the shops on market days.

