

Daylighting

D-18. Without direct natural light.

Further considerations will become apparent in the explanatory texts of the Tables following.

TABLE I — DEFINITIONS OF DESCRIPTORS

D-1 Through traffic to another function

This does **not** consider traffic to other functions sharing the **same** space as "through traffic". This descriptor identifies functional deadends, and does not count connections to the same function in adjacent spaces as through traffic.

D-2 Direct doorway to outdoor courtyard

This does not count functions such as summer kitchens when they are located in the courtyard.

D-3 Direct connection to corridor and/or stair system, - which is directly connected to courtyard

This includes upper level verandas with connections to stairways and covered ground level arcades.

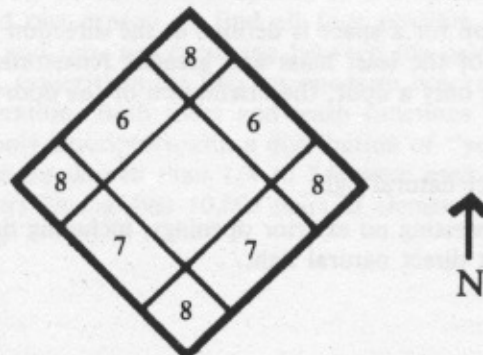
D-4 Direct connection to three different functions by doorway

This does **not** count activities which share the same space as being connected since descriptor reads "being a doorway"; a connection to a corridor/stair system counts as **one** connection. Stairway circulation is counted as a separate activity when other activities also share the stairwell space.

D-5 One story massing from courtyard level

This means no functions having **enclosed** space occur overhead. Although the courtyard is most often found on grade, high density conditions do sometimes force the entire dwelling, including courtyard, to occur above other built spaces. Open air courtyard kitchens are considered one-story activities.

(There is no descriptor dealing with multistory massing because no statistical conclusions could be drawn from available data for such a descriptor. This is **not** to say that multistory massing does not exist, but rather that it happens very frequently in many manners which defy any definite pattern).



- D-6 North section of compound
- D-7 South section of compound
- D-8 Corner section of compound
- D-9 On courtyard level
The function is located within a space having a floor elevation nearly equal to the courtyard elevation.
- D-10 Spaces tangent to compound wall but not to courtyard wall
This means a function is located within a space which uses the compound wall for part of its enclosure but shares no wall in common with the courtyard. The sharing must be of an actual wall segment and not just a theoretical corner point.
- D-11 Spaces tangent to courtyard wall but not to compound wall
This is the inverse of D-10 and has the same interpretation of tangency. It should be noted that spaces where neither D-10 nor D-11 apply can have two conditions — either tangent to both or tangent to neither courtyard nor compound wall. Tangency to a courtyard level open air corridor which connects to the courtyard does not constitute tangency to the courtyard itself.
- D-12 One-to-one space/function stacking
This means that the same function possessing the same size and proportion of space is found stacked in a two story arrangement where the walls of the space above align with those of the space below.
- D-13 Two-to-one space/function stacking
This means that two functions each with their own space are found either above or below a single space having a single function.
- D-14 Northeast orientation
- D-15 Northwest orientation
- D-16 Southeast orientation
- D-17 Southwest orientation
The orientation for a space is defined as the direction faced by the wall having a combination of the least mass and greatest fenestration. In the case of interior rooms having only a door, the orientation of the door signifies the orientation of the room.
- D-18 Without direct natural light
Functions possessing no exterior openings, including doorways, are considered as being without direct natural light.

Strict definitions of the 18 Descriptors, Table I, allowed each space to be answered as either "yes" or "no". The assumption underlying the following test is that each space is assumed to be independent of spaces of similar function possessed by other nuclear families and that as such they should possess a characteristic of randomness. Any pattern of non-occurrence, assuming sufficient sample size, then points to a condition suspect of having technological and/or socio-cultural constraints. The first set of patterns, called one-term brackets, refer to the non-occurrence of either "yes" or "no" for a single descriptor applied to each class of functional spaces,

for example; the bracket (-T4) refers to the non-occurrence of a "yes" for any toilets in the sample and may be read: "No toilet is directly connected to three different functions by doorway."

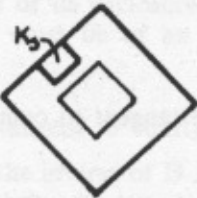
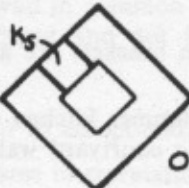
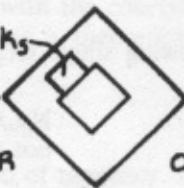
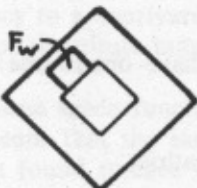
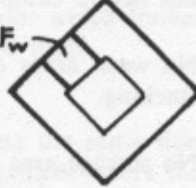
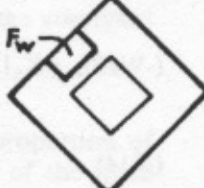
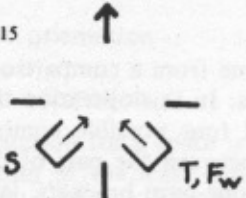
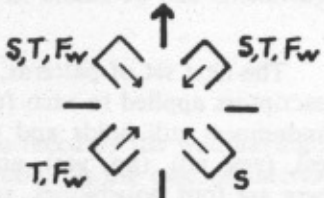
The following single term brackets are as follows:

- (-K_s10) No summer kitchen occupies a space tangent to compound wall but not to courtyard wall.
- (-F_w11) No winter family room occupies a space tangent to courtyard wall but not to compound wall.
- (-W12), (-K_s12) No wash areas or summer kitchens have one-to-one space/function stacking.
- (-S14) No storage area has Northeast orientation.
- (-T15), (-F_w15) No toilet or winter family room has Northwest orientation.
- (-K_s18) No summer kitchen is without direct natural light.

Diagrams of the preceding brackets have been drawn as a means of simplifying and facilitating the synthesis of the brackets. The single term brackets and their diagrammatic equivalents can be found in Table II.

The next set of patterns, two-term brackets, come from a comparison of each pair of descriptors applied to each functional class of spaces. In this operation the assumption of randomness still holds and one expects to find all four possible combinations of (yes, yes), (yes, no), (no, yes), and (no, no) occurring between the pair of descriptors. Since there are four possibilities, rather than the two for one-term brackets, larger sample sizes are necessary for this operation. Both toilet and wash functions were excluded due to small sample sizes. Also, only descriptors with a distribution of "yes" and "no" of close to 1/2, and 1/2, but no more skewed than 1/4 to 3/4 were used. After comparing 153 different pairs of descriptors having over 10,000 pairs of elements, 11 two-term brackets emerged as non-occurring.

TABLE II — GRAPHIC SINGLE TERM BRACKETS

NON-OCCURRING PATTERN		POSSIBLE OCCURRING PATTERN
D 4	-T4 	 OR 
D10	-Ks10 	 OR  OR 
D11	-Fw11 	 OR 
D12	-Ks12,-W12 	 
D14 D15	-S14,-T15,-Fw15 	
D18	-Ks18 	

Five of the 11 two-term brackets were dropped for such reasons as being tautologies, as for + D1—D4 :

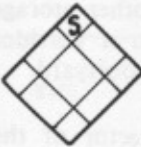
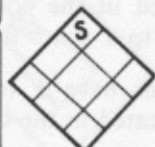
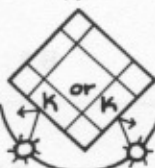
If a room does **not** have through traffic to a different function then it does **not** have direct connection to three different functions by doorway.

or for possessing an unusually low expected probability from the data set. The six remaining two-term brackets are as follows:

- | | |
|-----------------------------|---|
| B.1 (-S3-S12) Either/or | <p>If storage room is directly connected to a corridor and/or stair which is directly connected to courtyard, then it is not stacked 1 to 1 with another storage space.</p> <p>If storage room is stacked 1 to 1 with another storage space, then it is not directly connected to a corridor and/or stair which is directly connected to courtyard.</p> |
| B.2 (-S6-S12) Either/or | <p>If storage room is located in the North sector of the compound, then it does not have 1 to 1 space-function stacking.</p> <p>If storage room has 1 to 1 space-function stacking, then it is not located in the North sector of the compound.</p> |
| B.3 (+ S8-S12) Both/Neither | <p>If storage room is located in the corner sectors of the compound, then it has 1 to 1 space-function stacking.</p> <p>If storage room does not have 1 to 1 space-function stacking, then it is not located in the corner sector of the compound.</p> |
| B.4 (-F7-F17) Either/or | <p>If family room is located in the South sector of the compound, then it does not have Southwest orientation.</p> <p>If family room has Southwest orientation, then it is not located in the South sector of the compound.</p> |
| B.5 (-K4-K7) Either/or | <p>If kitchen is directly connected to 3 different functions by doorway, then it is not located in the South sector of the compound.</p> <p>If kitchen is located in the South sector of the compound, then it is not directly connected to 3 different functions by doorway.</p> |
| B.6 (-K7-K16) Either/or | <p>If kitchen is located in the South sector of the compound, then it does not have Southeast orientation.</p> <p>If kitchen does have Southeast orientation, then it is not located in the South sector of the compound.</p> |

As with the single term brackets, diagrammatic equivalents of the two-term brackets have been drawn and can be found in Table III. In both tables the diagrams are a synthesis of relationships where one descriptor is part of a nest of brackets. An example of this would be the composite diagram for descriptor D12 for storage.

TABLE III (CONT.) — GRAPHIC TWO TERM BRACKETS

	STORAGE	FAMILY	KITCHEN
D8	B.3 Given: +S8  then <u>HAS</u> S12 		
D12	B.1, B.2, B.3 Given: +S12  then -S3, -S6 +S8 		
D16			B.6 Given: +K16  or  then <u>NOT</u> K7 N 
D17		B.4 Given: +F17  or  then <u>NOT</u> F7 N 	

(Ed. — Empty cells denote non-existence of pattern between a given function and a given descriptor.)

TABLE III — GRAPHIC TWO TERM BRACKETS

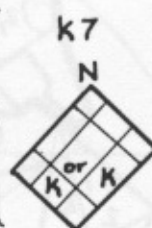
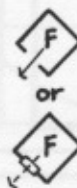
	STORAGE	FAMILY	KITCHEN
D3	B.1 Given: +S3  COURT YARD then NOT S12 		
D4			B.5 Given: +K4  then NOT K7 
D6	B.2 Given: +S6  then NOT S12 		
D7		B.4 Given: +F7  then NOT F17 	B.5, B.6 Given: +K7  then NOT K4, K16 

TABLE IV — PROPORTIONS IN AN OLD CITY CLUSTER

Source of Aerial Plan: Kazimee

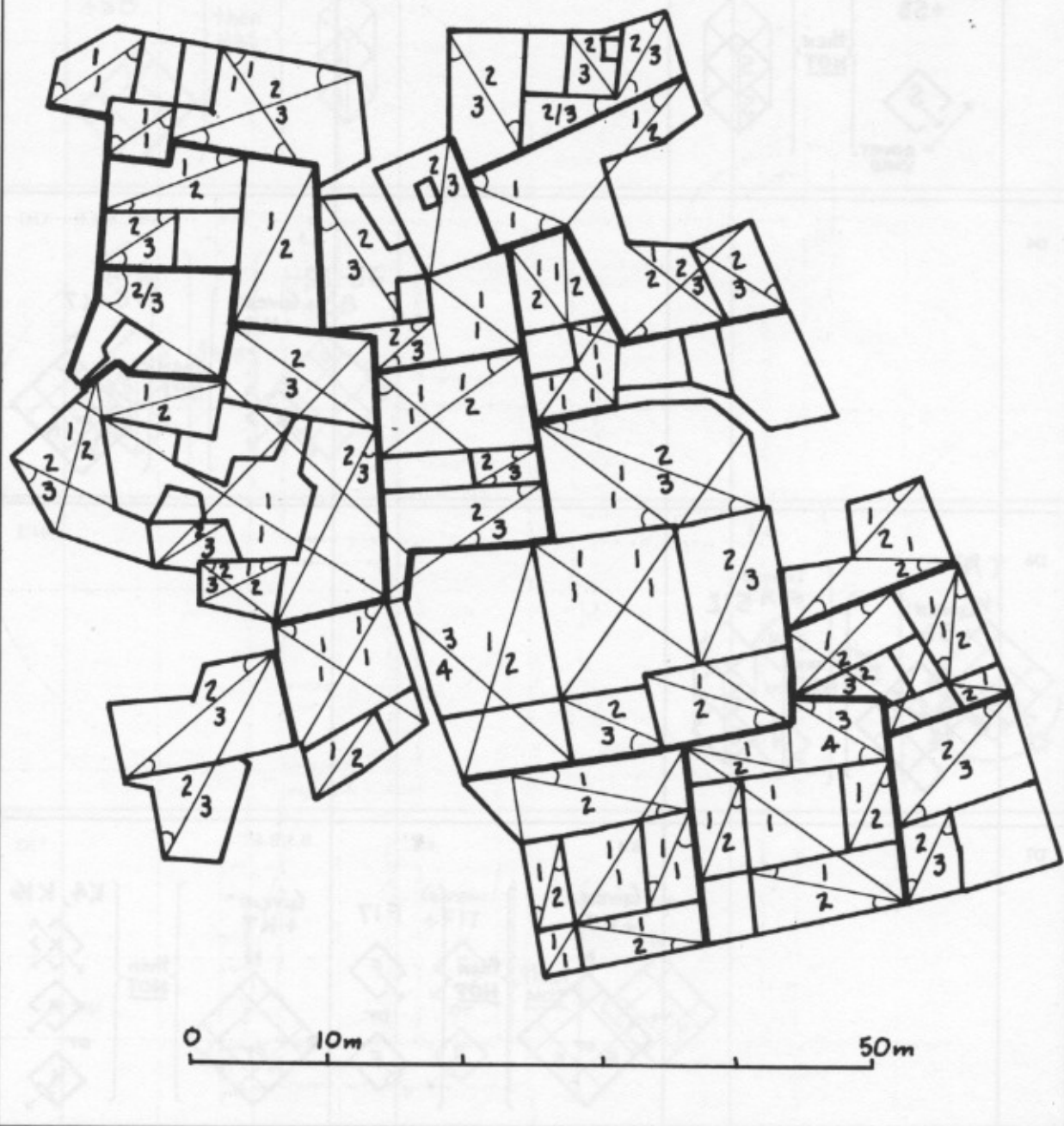
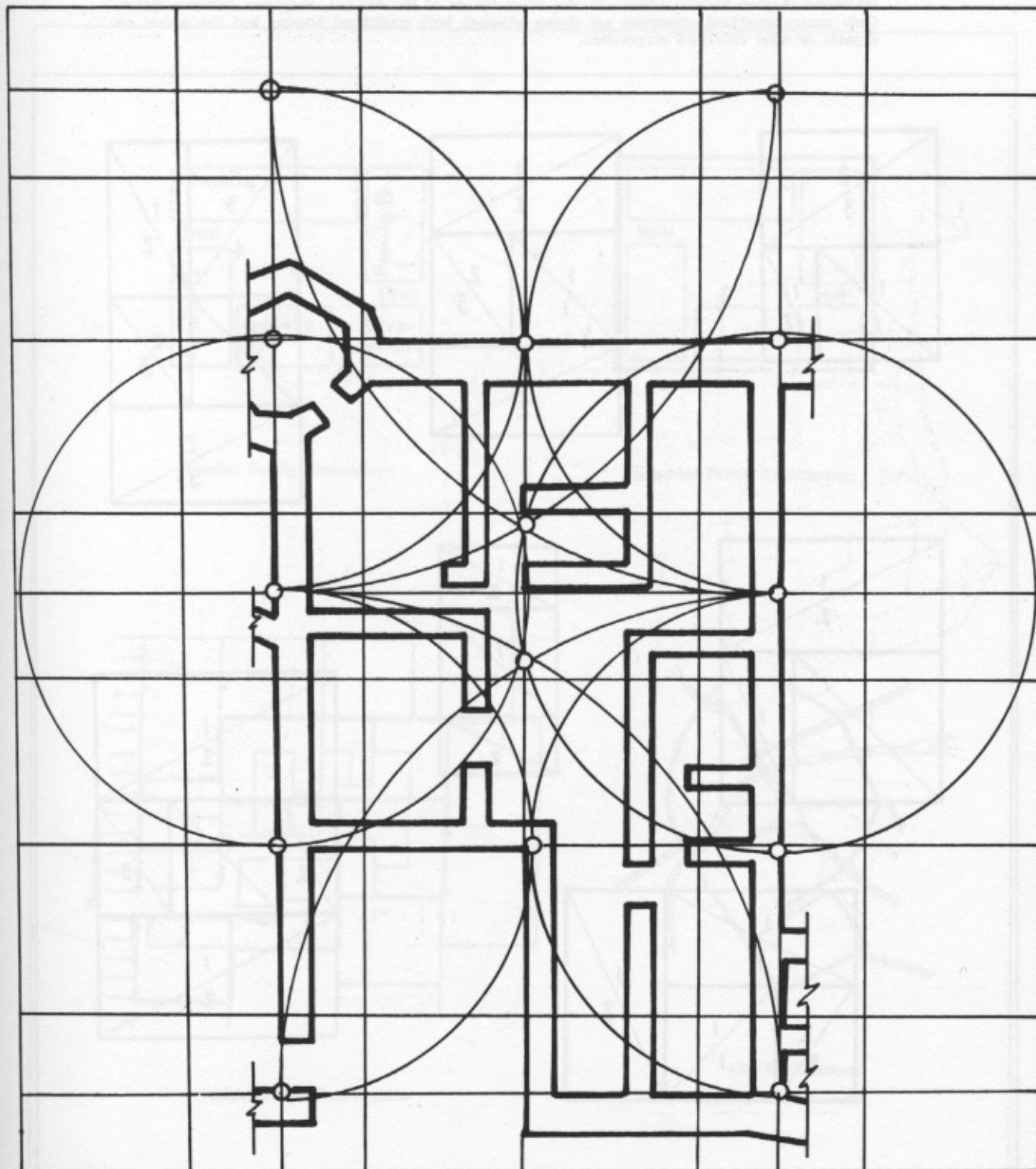


TABLE V — COMPASS DECOMPOSITION AND MATRIX OF A RESIDENCE

Source for Residence: Szabo, families D & E



**TABLE VI — PROPORTIONAL CLUSTERS OF THE MATRIX
WHICH ARE ALSO FOUND IN TRADITIONAL AFGHAN HOUSING**

NOTE: These proportional clusters are examples of spatial arrangements found in the study of documented traditional Afghan housing which can **also** occur by use of the one, one, two, two two-way matrix. Only square courtyard conditions are shown although both traditional housing and the matrix are capable of other courtyard proportions.

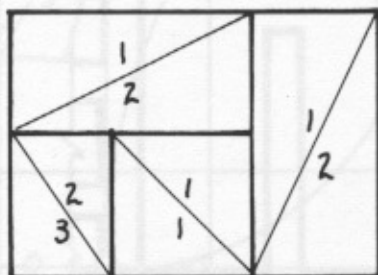
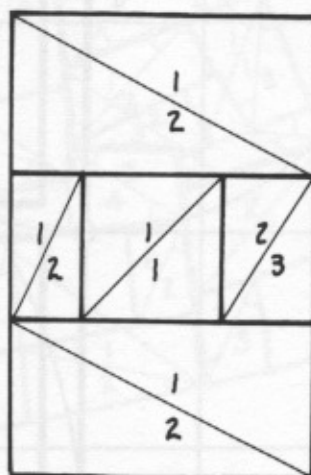
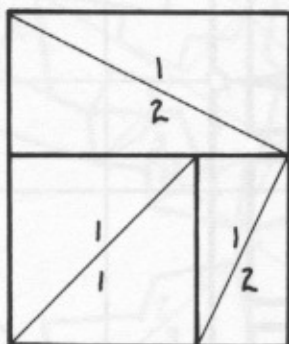
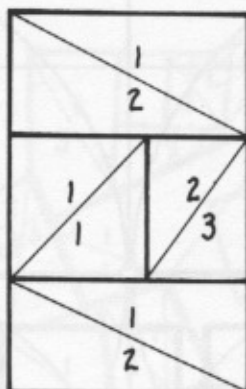
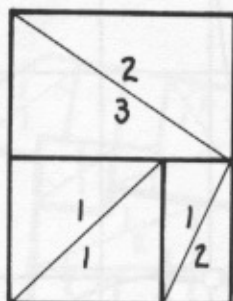
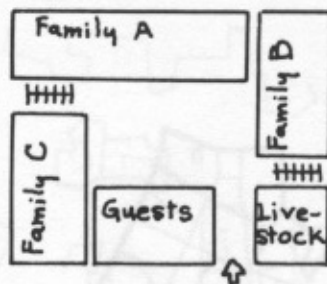
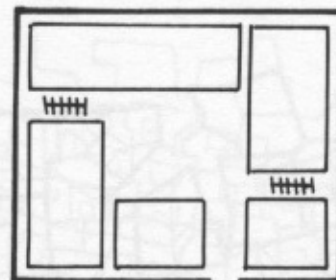


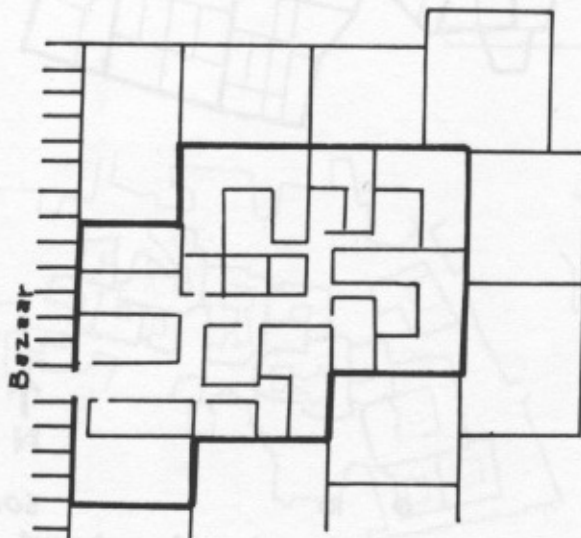
TABLE VII — HIERARCHIES OF ENCIRCLEMENT
IN TRADITIONAL PATTERNS OF SETTLEMENT



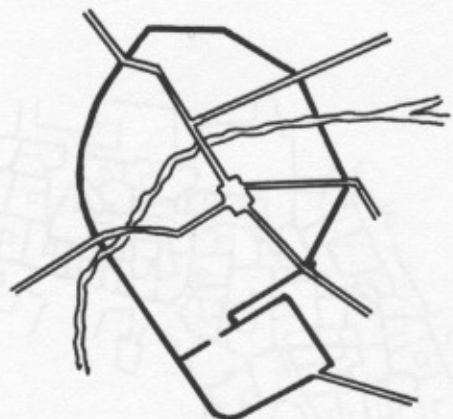
Nuclear Family Encirclement



Extended Family Encirclement



Neighborhood Encirclement

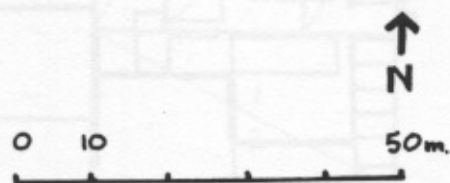
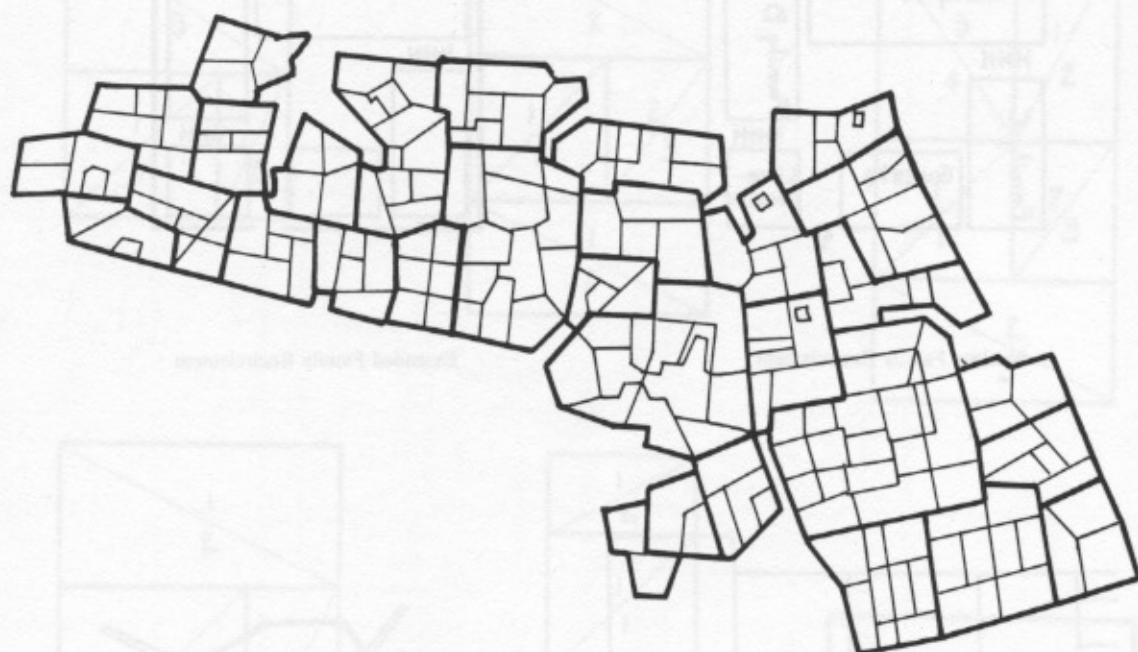


City Encirclement
(Kabul circa 1876)

**TABLE VIII — DECOMPOSITION OF AN OLD CITY CLUSTER
INTO ELEMENTARY GEOMETRICAL SPACES**

Source of Aerial: Kazimee

NOTE: Alignments of interior walls between socially autonomous dwellings occur often. Such common intersections of walls between adjacent dwellings would be structurally advantageous for serious seismic conditions such as those of Kabul.



**TABLE IX — REPRESENTATIVE STAGES OF GROWTH AND CHANGE IN AN
OLD CITY CLUSTER**

Source of Aerial: Kazimée

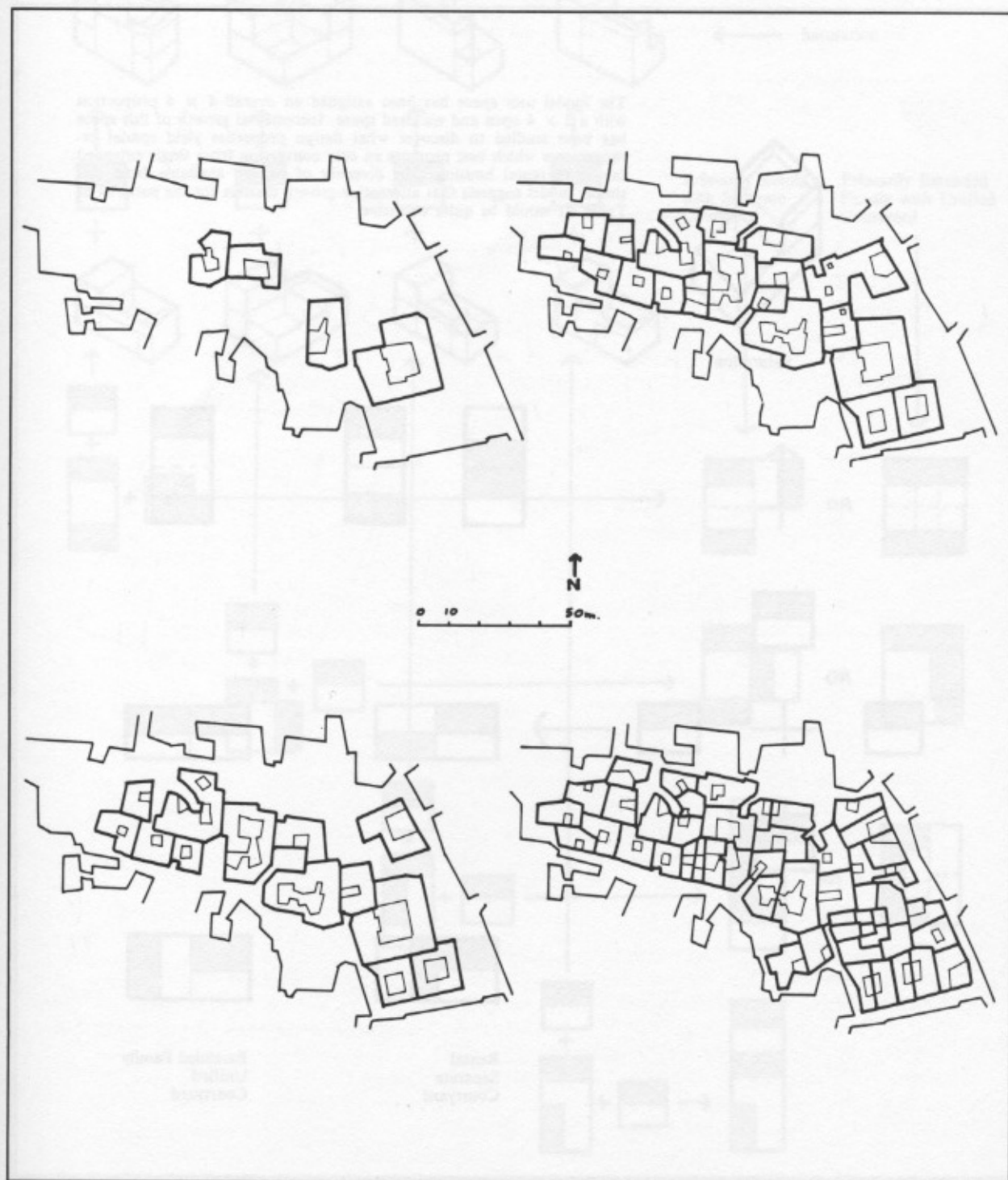


TABLE X — PATTERNS OF HORIZONTAL AND VERTICAL GROWTH FOR A SINGLE UNIT SPACE

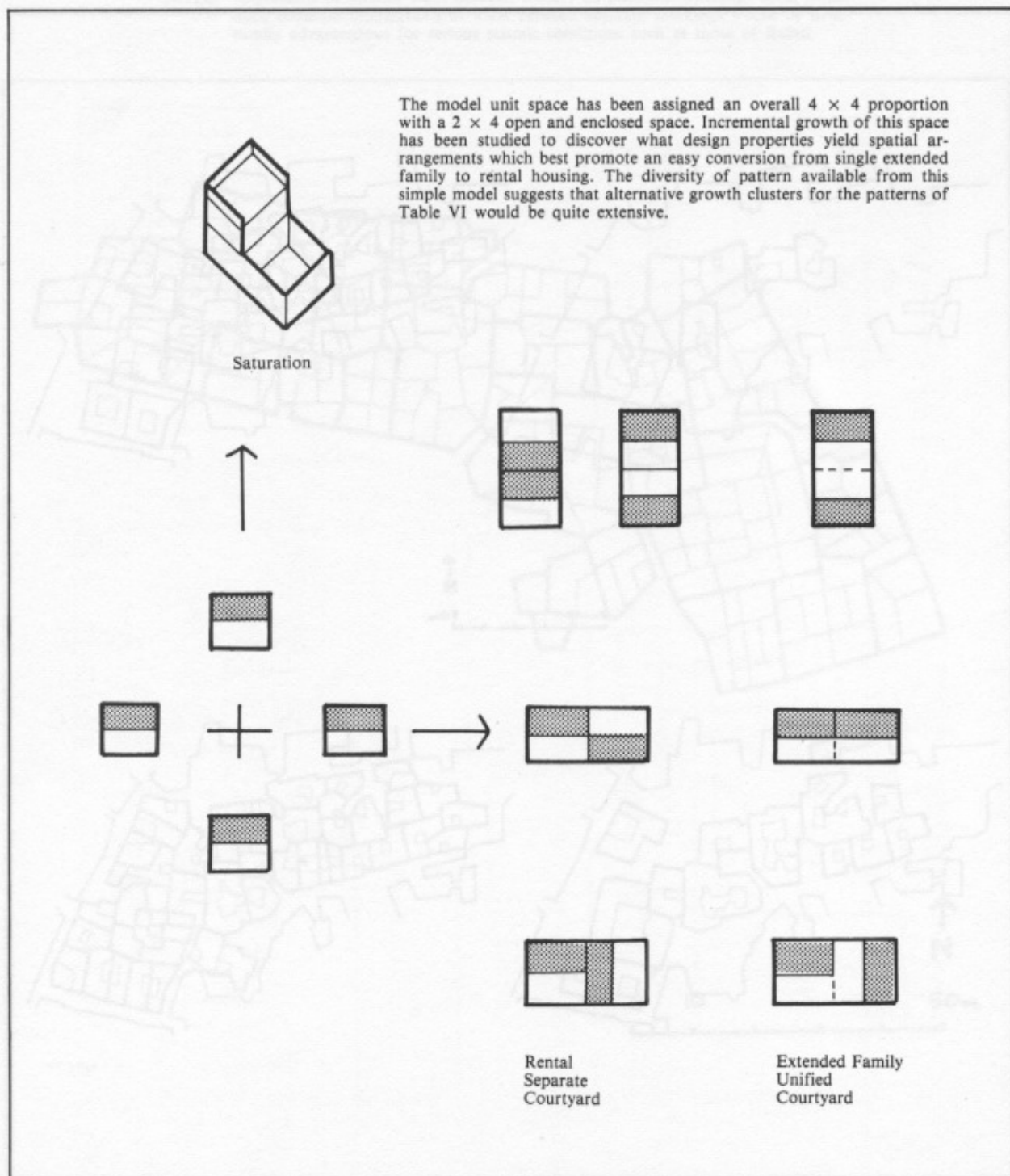
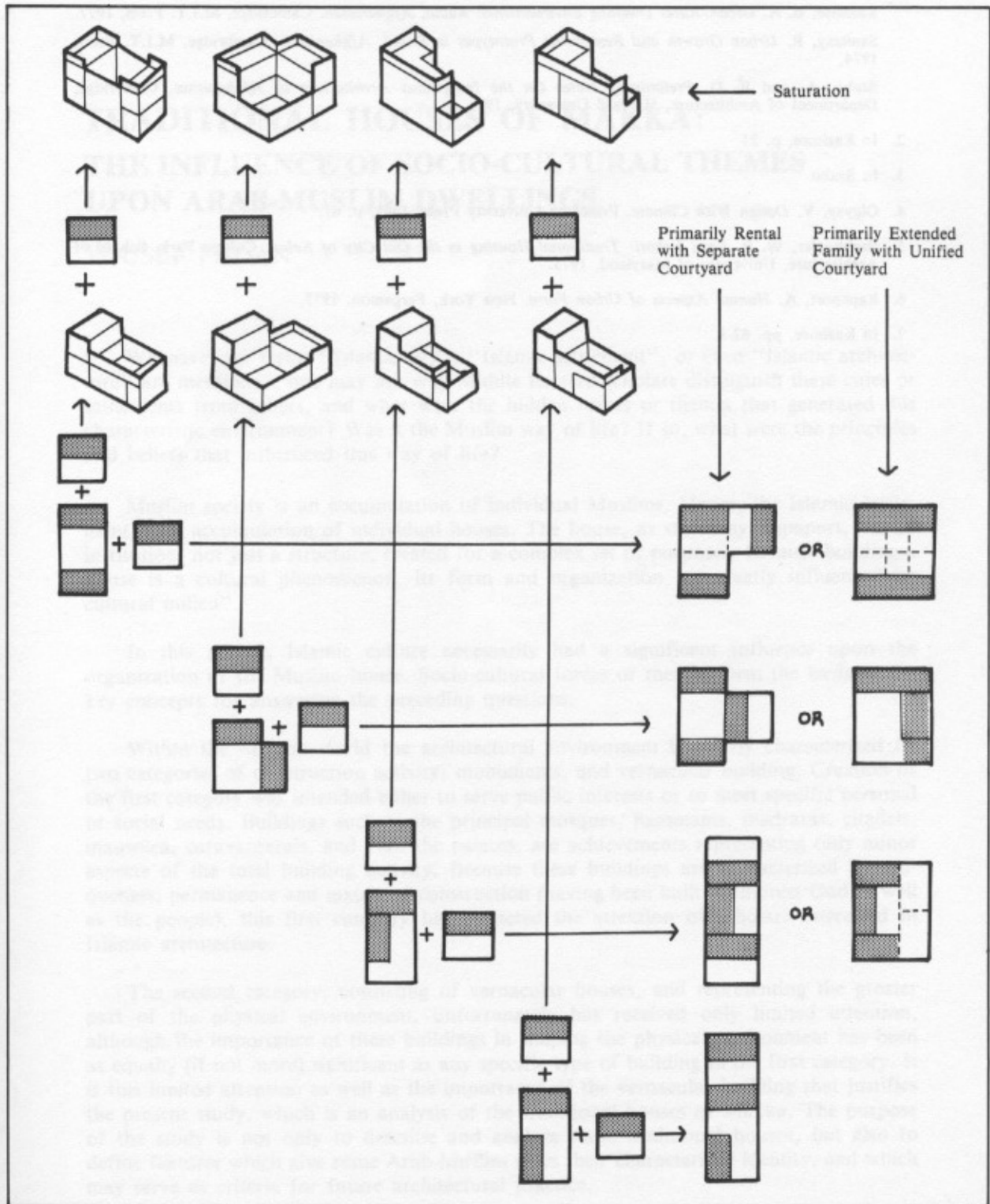


TABLE X (CONT.) — PATTERNS OF HORIZONTAL AND VERTICAL GROWTH
FOR A DOUBLE UNIT SPACE



REFERENCES

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Szabo, A. and B. D. *Preliminary Notes On the Indigenous Architecture of Afghanistan*. Cambridge, Department of Architecture, Harvard University, 1978.
2. In Kazimee, p. 21
3. In Szabo
4. Olgyay, V. *Design With Climate*. Princeton University Press, 1963, p. 61.
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7. In Kazimee, pp. 62-3.