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Ideas are in things: an application of the space syntax method to discovering house genotypes

B Hillier, J Hanson, H Graham
Unit for Architectural Studies, University College, London WC1H 0QB, England
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Abstract. Simple 'space syntax' techniques are used to explore the problem of spatially typing a sample of vernacular farmhouses in Normandy. It is suggested that such techniques can demonstrate that cultural ideas are objectively present in artefacts as much as they are subjectively present in minds.

1 Introduction to space syntax

Space syntax (Hillier et al, 1983; Steadman, 1983; 1984; Hillier and Hanson, 1984; Peponis, 1985; Hillier, 1985) is a set of techniques for the representation, quantification, and interpretation of spatial configuration in buildings and settlements. Configuration is defined in general as, at least, the relation between two spaces taking into account a third, and, at most, as the relations among spaces in a complex taking into account all other spaces in the complex. Spatial configuration is thus a more complex idea than spatial relation, which need invoke no more than a pair of related spaces. The theory of 'space syntax' is that it is primarily—though not only—through spatial *configuration* that social relations and processes express themselves in space.

The primacy of configuration in the 'social logic' of space does not just *happen* to be the case. It originates in the logic of space itself. This can be simply demonstrated. Figure 1 is a divided cell in which space *a* is linked to space *b* through a gap. The gap creates a 'relation'—we might call it 'permeability'—between the two spaces. But it means little until we know the relation of each to at least one further space—that is, until we know the position of each with respect to a *configuration*. For example, figure 2 shows two possible relations of spaces *a* and *b* to the outside, space *c*. In figure 2(a), both spaces are directly connected to *c* but in figure 2(b) only space *a* is so connected, so that it is necessary to pass through space *a* to get to space *b* from space *c*. This means that the relation between *a* and *b* is changed when *c* is considered. In one case, *a* controls the path from *c* to *b*; in the other, this is not the case.

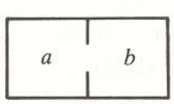


Figure 1. A divided cell.

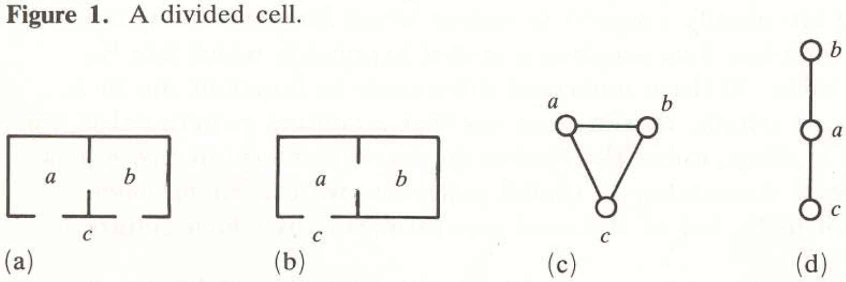


Figure 2. (a), (b) Two possible relations of spaces *a* and *b* to the outside, space *c*. (c), (d), the corresponding justified graphs.

This difference may be graphically clarified by a useful technique for representing spatial configuration: the *justified graph*. This is a graph in which a particular space is selected as the 'root', and the spaces in the graph are then aligned above it in levels according to how many spaces one must pass through to arrive at each space from the root. Thus figures 2(c) and 2(d) are justified graphs of figures 2(a) and 2(b), respectively.

These two graphs also serve to illustrate the two configurational properties of spatial layouts which seem most important in articulating cultural ideas and social relations. The first of these is the property of *depth*. A space is at *depth* 1 from another if it is directly accessible to it, at *depth* 2 if it is necessary to pass through one intervening space in order to move from one to the other, at *depth* 3 if a minimum of two spaces must be passed through, and so on. In the justified graphs, therefore, depth from one space to another will show as height when the first space is used as the root.

The second property is that of *choice*, that is, the existence or otherwise of alternative routes from one space to another. Regardless of depth, all graphs which are *trees*—that is, those which have k spaces and $k-1$ links—will have only one route from any space to any other. Alternative routes will therefore show themselves as *rings* in the graph, as in figure 2(c). Spaces can be distinguished from each other according to whether or not they lie on rings, how many rings they lie on, and which rings they lie on.

These two concepts will underlie all that is said in the following analysis. The first, *depth*, will, however, be used in a more developed and quantitative form which we call *integration*. The *integration value* of a space expresses the relative depth of that space from *all* others in the graph through the formula

$$\text{integration value} = \frac{2(\bar{d}-1)}{k-2}, \qquad (1)$$

where $\bar{d}$ is the mean depth of spaces from the space and k is the total number of spaces in the graph. This gives a value varying between 0 for maximum integration, that is, no depth [as in figure 2(c)] and 1 for maximum segregation, that is, maximum possible depth [as in figure 2(d)][(1)]. The integration value of a space thus expresses numerically a key aspect of the shape of the justified graph from that space.

In most spatial complexes, integration values will be different for different spaces, and justified graphs will show this difference visually. Figures 3(a) and (b), for example, are justified graphs of the same complex drawn from two different points. Figure 3(a) is relatively deep, with an integration value of 0.43 or 1.31 using the transformation given by Hillier and Hanson (1984, pages 109-113) whereas 3(b) is very shallow, with a value of 0.09, or 0.29 using the transformation.

Such differences are one of the keys to the way in which culture and social relations express themselves through space. For example, different *functions* or *activities* in a dwelling are usually assigned to spaces which integrate the complex to differing degrees. Function thus acquires a spatial expression which can be assigned a numerical value. If these numerical differences in functions are in a consistent order across a sample, then we can say that a cultural pattern exists, one which can be detected in *things*, rather than just in the way it is interpreted by minds.

This particular type of consistency in spatial patterning we call an *inequality genotype*. We believe it to be one of the most general means by which culture is

(1) This value must be subjected to one more transformation if spaces in graphs with different numbers of spaces are to be compared (Hillier and Hanson, 1984, pages 109-113).

built into spatial layout. How strong or weak these inequalities are in a complex or in a sample is therefore also of importance. To measure this, we have developed an entropy-based measure called *difference factor* to quantify the degree of difference between the integration values of any three (or more, with a modified formula) spaces or functions. This is essentially an adaption of Shannon's H-measure (Shannon and Weaver, 1948) for transition probabilties, in which we substitute the integration value of a space over the total integration for the three spaces for the transition probabilities in Shannon's equation:

$$H = -\sum \left[\frac{a}{t} \ln\left(\frac{a}{t}\right)\right] + \left[\frac{b}{t} \ln\left(\frac{b}{t}\right)\right] + \left[\frac{c}{t} \ln\left(\frac{c}{t}\right)\right], \qquad (2)$$

where H is the unrelativised difference factor for three spaces, a, b, and c are the integration values of the spaces, and t is their sum.

This H can then be 'relativised' between ln2 and ln3 to give a 'relative difference factor', H^*, between 0 (the maximum difference, or minimum entropy) and 2 (the minimum difference, or maximum entropy, that is, all values are equal):

$$H^* = \frac{H - \ln 2}{\ln 3 - \ln 2} \,. \qquad (3)$$

This relativisation is possible because the maximum H for k values is always $\ln k$ (in this case therefore ln3), and in the case of the integration measure, if one space has a value of 0, then it follows that the other two spaces must have a value of 1, in which case H is ln2, and this is the minimum possible. To give the feel of this measure, the difference factor for, say, 0.4, 0.5, and 0.6 is 0.97 (that is, close to 1 or very weak), whereas that for 0.3, 0.5, and 0.7 is 0.84, or considerably stronger, and that for 0.1, 0.5, and 0.9 is 0.39, or much stronger still.

These simple measures are, we believe, able to express culturally significant typological differences among plans because the two concepts on which they are based have in themselves a kind of intrinsic 'social logic'. *Depth* among a set of spaces always expresses how directly the functions of those spaces are integrated with or separated from each other, and thus with how easy and natural it is to generate relations among them; whereas the presence or absence of *rings* expresses the degree to which these relationships are controlled, or marked by an absence of choice, forcing permeability from one space to another to pass through specific other spaces. Figure 4 shows typical, easy-to-remember patterns with these characteristics.

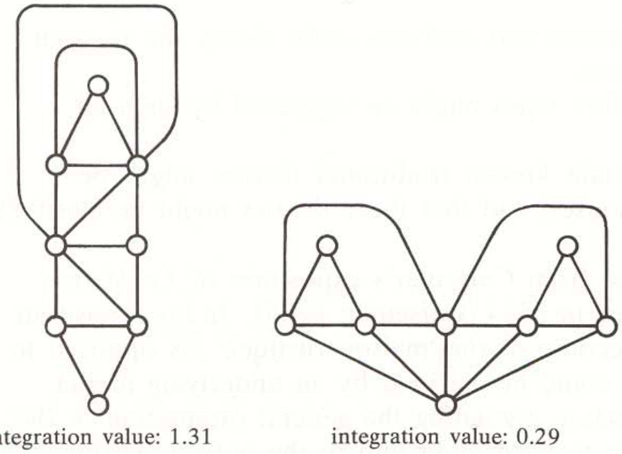


Figure 3. Justified graphs of the same complex drawn from two different points.

It must be emphasised, however, that it is the *quantitative picture* of a spatial configuration that betrays its cultural bias, not a simple qualitative diagram. In the case of housing layouts, ideas are built into things not so much through visual representation as through the configurational principles by which a spatial pattern is constituted by its makers into a cultural *intelligible*. It is the hypothesis of this paper that these principles are capable of quantitative expression.

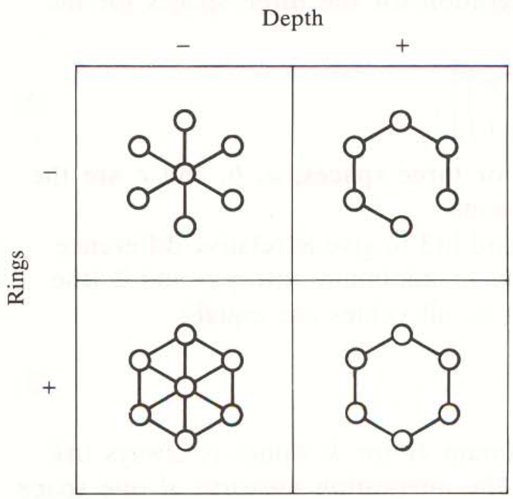


Figure 4. Typical patterns with characteristics and depth and rings.

2 The sample and the problem

In June 1985, Professor Jean Cuisenier, Conservateur en Chef du Musée des Arts et Traditions Populaires, after discussions in London, sent samples of plans of rural dwellings from various regions of France to the Unit for Architectural Studies for spatial analysis by means of the 'space syntax' method. It had been agreed that the analyses should initially be carried out 'blind', with no information apart from the plan labelled with its varius functions—one might say, with no more information than an archaeologist might have. Social, economic, and cultural information would be explored only after the initial spatial analysis. The question was: how far was it possible to analyse domestic space patterns with only *artefactual* or *archaeological* information? This paper is concerned only with this initial spatial analysis, and sociocultural issues are raised at the end only in the form of speculations requiring further—and a different kind of—research. Within these restrictions, the aims of the analysis were:

1 to see how far syntactic representations and analyses could clarify the relation between patterns of space and their use;

2 to ascertain how far regional or other types might be suggested by such an analysis;

3 to explore the possibility that certain known traditional themes might be reproduced in at least some of the houses, and that these themes might be clarified by syntactic analysis.

These traditional themes were derived from Cuisenier's exposition of *La Maison Rustique* by Charles Estienne, published in 1564 (Cuisenier, 1985). In his exposition Cuisenier proposed that Estienne's account of the 'maison rustique' (as opposed to the château or the manorial domain) could be clarified by an underlying model with three elements (figure 5): *orientation*, regulating the general orientation of the farm and its built elements in relation to each other and to the outside world; *frontalité*, regulating the distinction between front and back, and the associated functions; and *latéralité*, regulating the arrangement of functions both inside the dwelling and in the farm as a whole to the right and left of the 'master' as he stands at the front entrance of his dwelling welcoming guests. The concept of latéralité is of particular interest in a spatial analysis of the domestic interior, since it specifies not only a principle for the arrangement of rooms, but also a male-centred view of this arrangement. It will be of interest to see how far systematic analysis supports this spatial concept and its social interpretation.

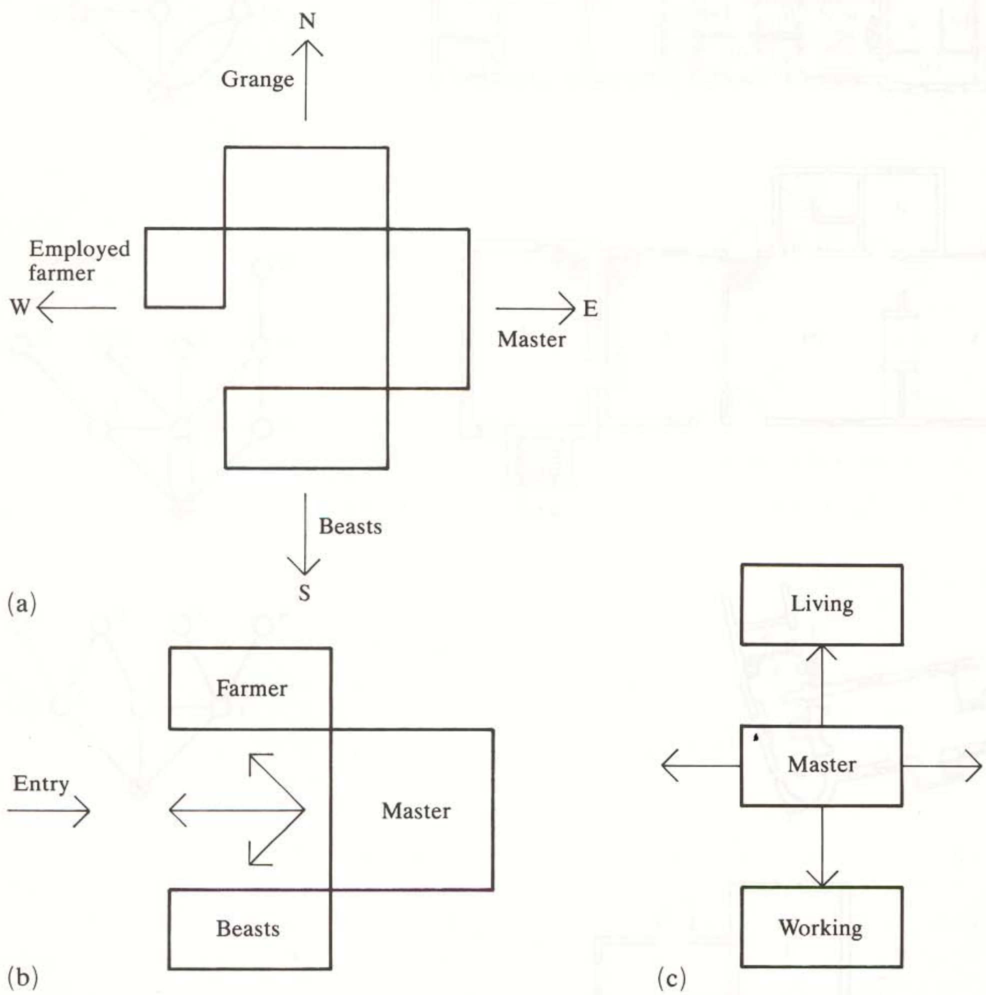


Figure 5. Three elements of a model of a farmhouse: (a) *orientation*, (b) *frontalité*, (c) *latéralité*.

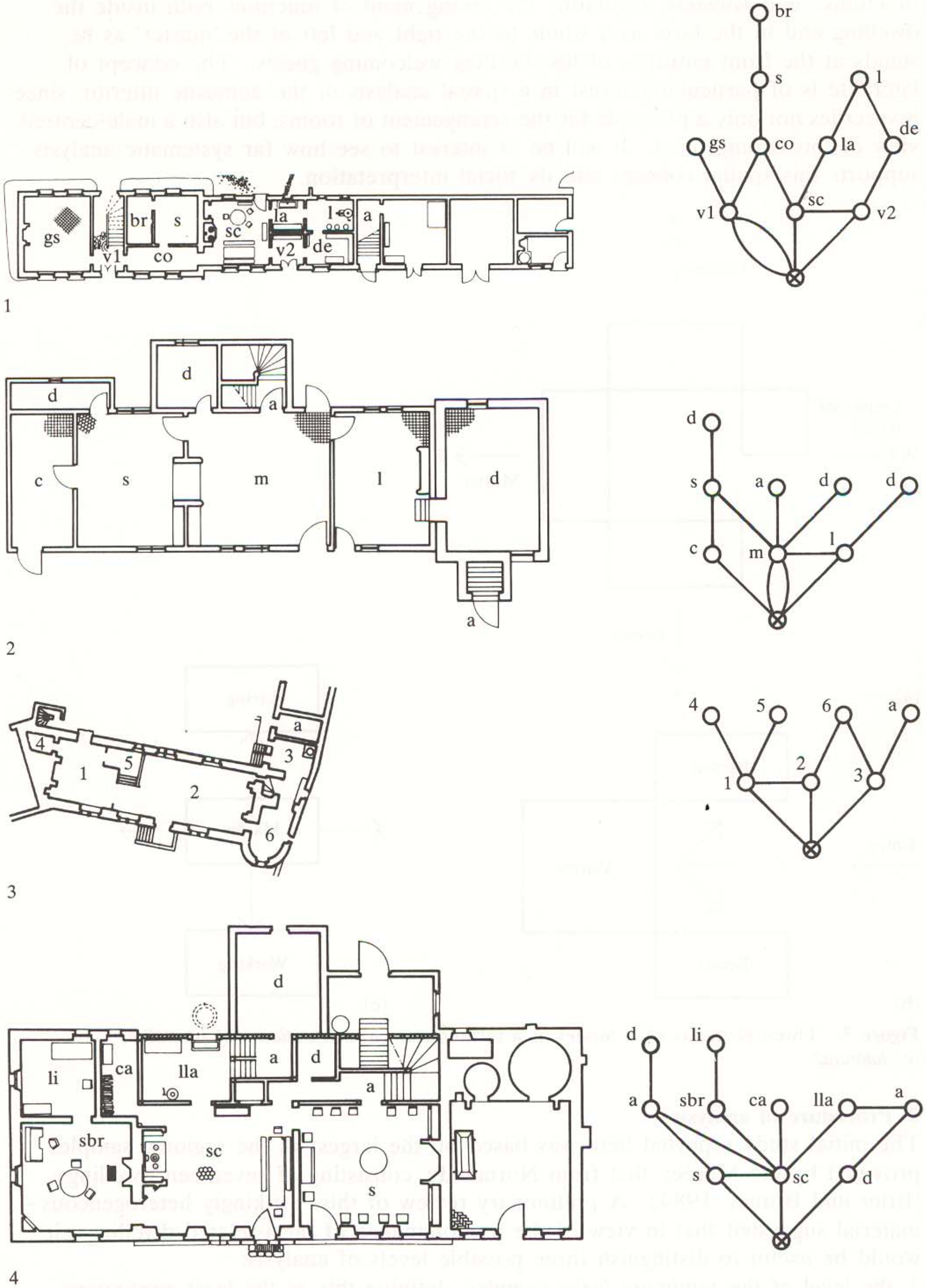
3 Procedure of analysis

The initial study reported here was based on the largest of the regional samples provided by the Musée: that from Normandy, consisting of seventeen dwellings (Brier and Brunet, 1984). A preliminary review of this—strikingly heterogeneous—material suggested that in view of the predominance of farm-related dwellings, it would be useful to distinguish three possible levels of analysis:

1 the level of the *minimum living complex*, defining this as the least continuous interior set of spaces which linked together the main living spaces, plus whatever functions formed part of that complex;

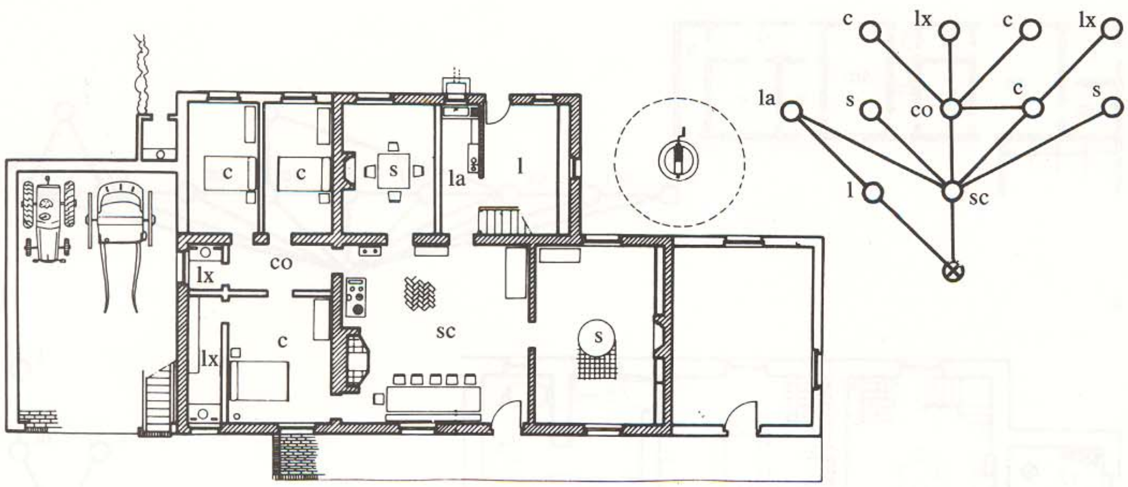
2 the minimum living complex plus a single space representing the exterior of the dwelling;

3 the whole complex including outbuildings and spaces only accessible from the minimum living complex through the exterior space.



1 La Bataille
2 Le Manoir, hameau de Mâquemonts
3 Ferme du Manet
4 L'Église
5 Le Cormier
6 Ferme de de Pommereuil
7 Le Jarrier
8 La Ferme neuve
9 Le Marais
10 Dodainville, Les Gossets
11 Le Quesnay de Bas
12 Douville
13 La Bazoque, au village
14 Le Domaine
15 Le Tourps
16 La Longue Marairie
17 Le Haut-Gallion

Figure 6. Plans of the houses studied and their corresponding permeability graphs. The rooms which are not labelled are storerooms, barns, cowsheds, etc.



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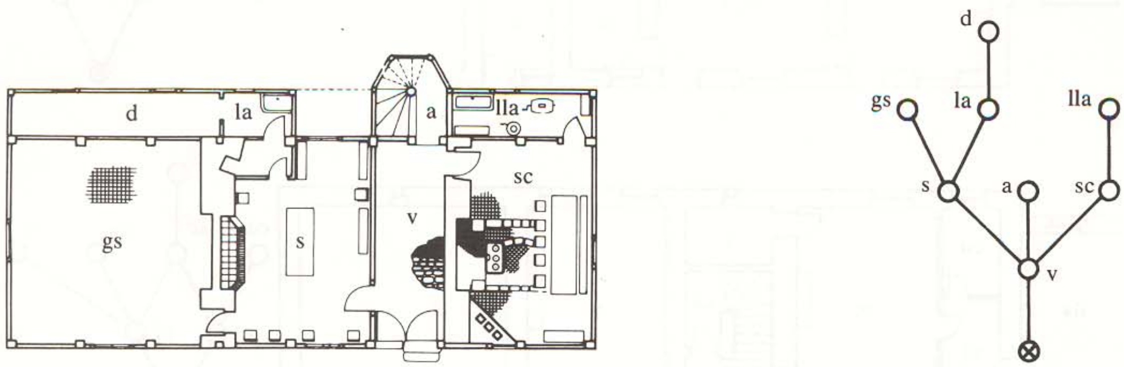

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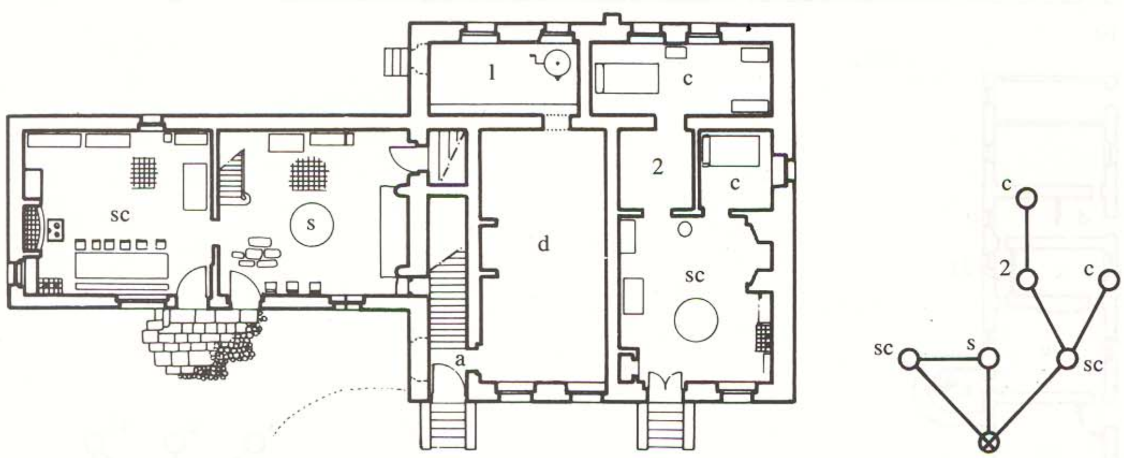

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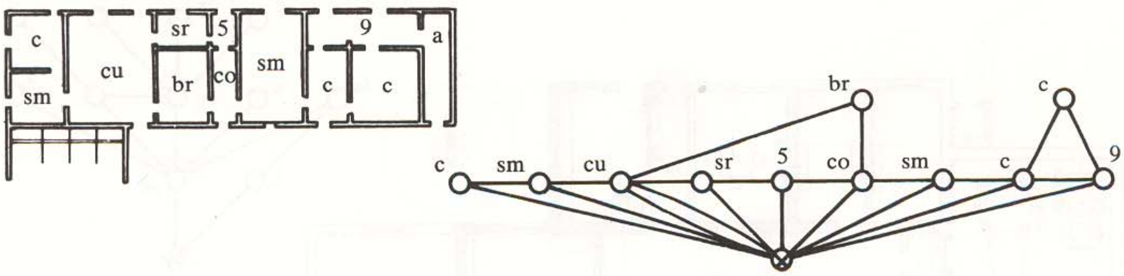
a Accès (access to upper floors)
br Bureau (study)
c Chambre (bedroom)
ce Cellier (wine and food store)
co Couloir (corridor)
cu Cuisine (kitchen)
d Débarras (storage)
de Dépense (preserving food)
gs Grande salle (reception room)
l Laiterie (dairy)
la Laverie (washing room)
li Lingerie (linen room)
lla Laiterie-laverie (dairy/washing room)
lx Lieux d'aisances (lavatory)
m Maison (equivalent to 'salle commune')
s Salle (room where fire not always lit, that is, not an everyday room)
sb Salle de bains (bathroom)
sbr Salon-bureau (sitting room/study)
sc Salle commune (everyday communal living and cooking)
sm Salle à manger (dining room)
sr Salle à manger des maîtres (masters' dining room)
v Vestibule (entrance hall)

Figure 6 (continued)



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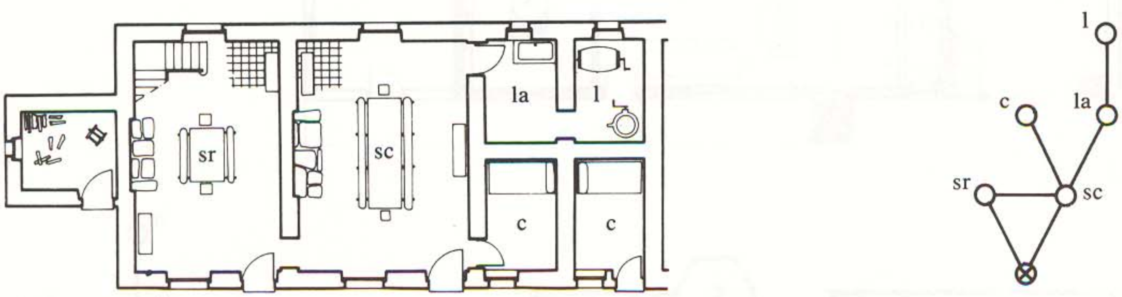

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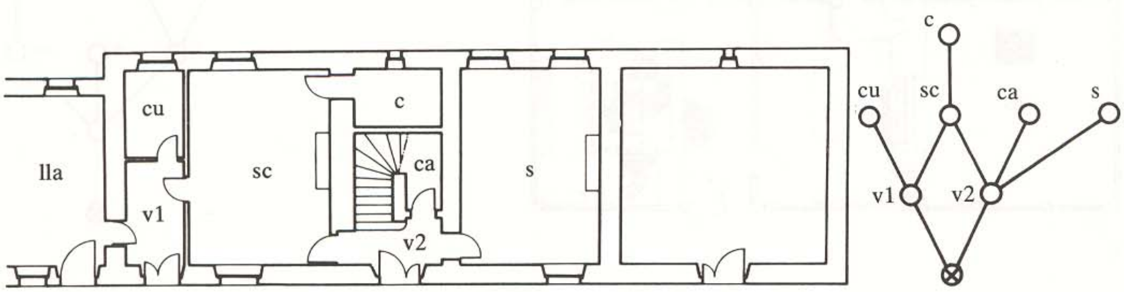

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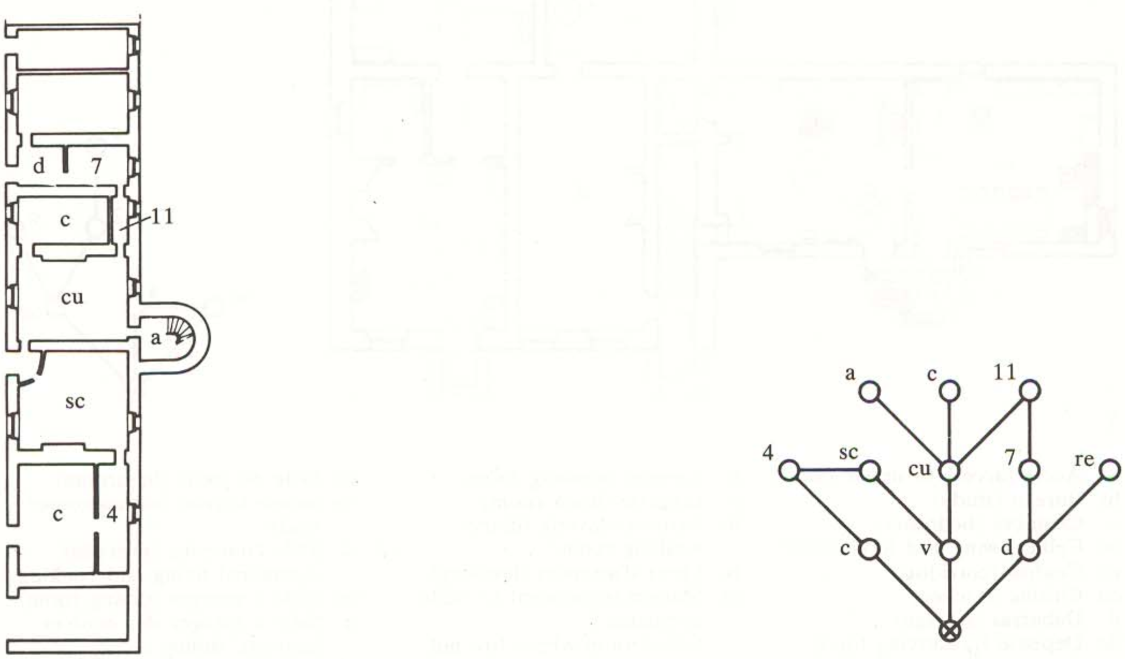

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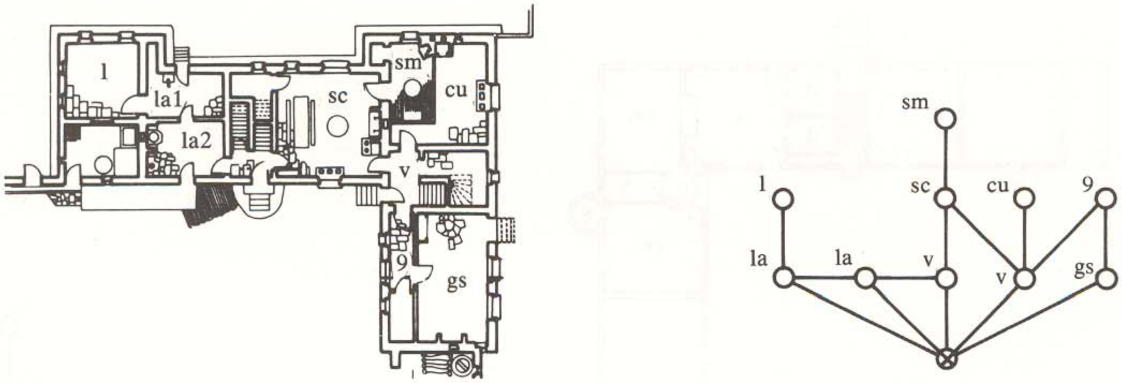

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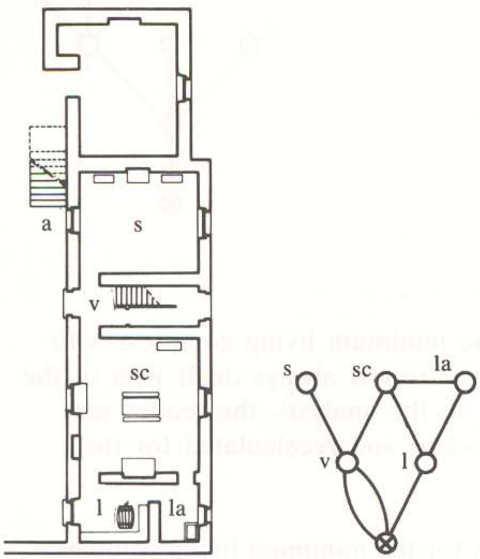

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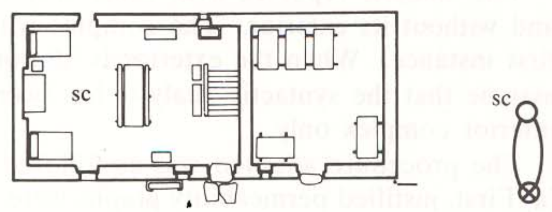

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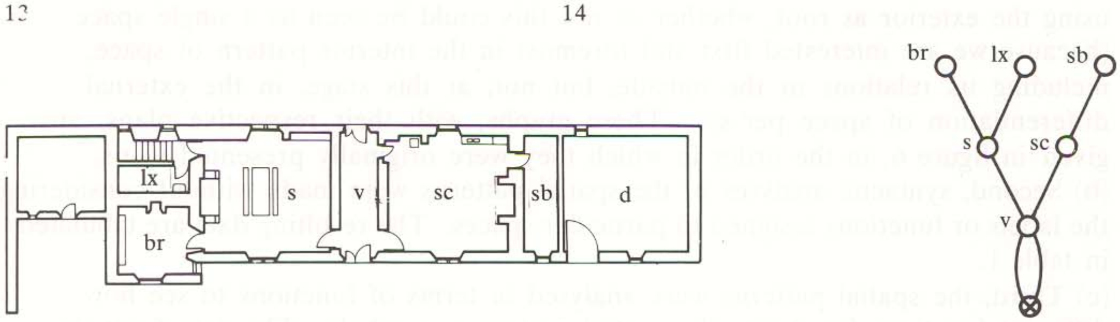

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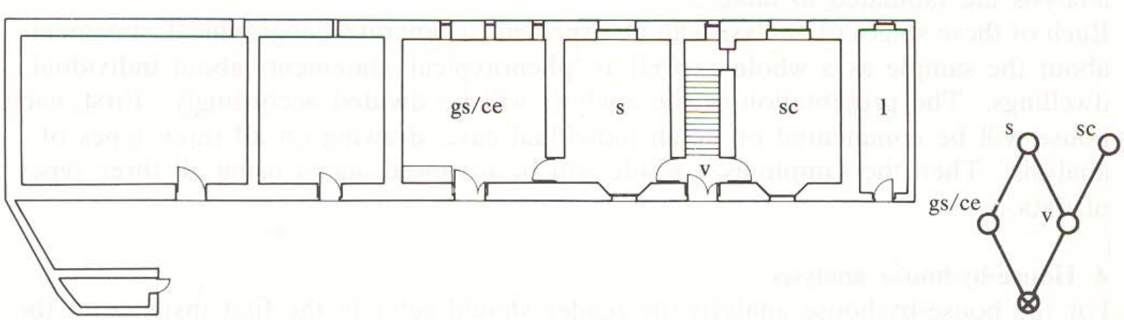

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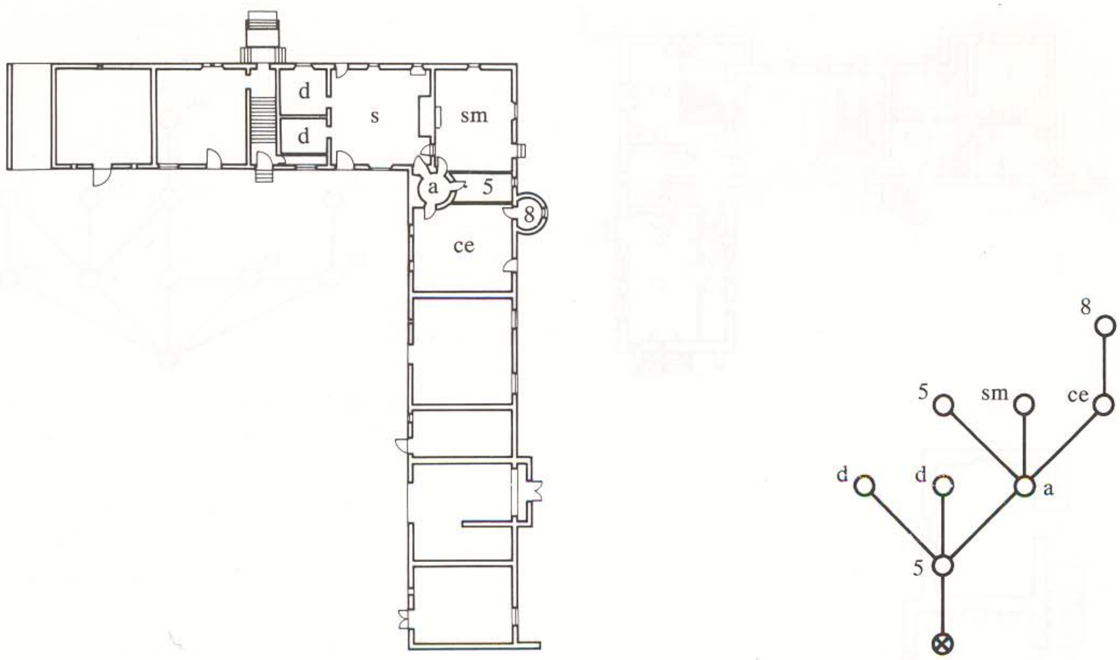

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Figure 6 (continued)

The analysis reported here deals only with the minimum living complex, with and without its exterior. The complex with its exterior is always dealt with in the first instance. When the exterior is 'discounted' in the analysis, the reader may assume that the syntactic analysis has been reworked and recalculated for the interior complex only.

The procedure adopted was as follows:

(a) First, justified permeability graphs were drawn for the minimum living complexes, using the exterior as root, whether or not this could be seen as a single space (because we are interested first and foremost in the interior pattern of space, including its relations to the outside, but not, at this stage, in the external differentiation of space per se). These graphs, with their respective plans, are given in figure 6, in the order in which they were originally presented to us.

(b) Second, syntactic analyses of the spatial patterns were made without considering the labels or functions assigned to particular spaces. The resulting data are tabulated in table 1.

(c) Third, the spatial patterns were analysed in terms of functions to see how different functions fitted into the spatial pattern as a whole. The data from this analysis are tabulated in table 2.

Each of these stages of analysis can be expected to generate 'geographical' statements about the sample as a whole as well as 'phenotypical' statements about individual dwellings. The presentation of the analysis will be divided accordingly. First, each house will be commented on as an individual case, drawing on all three types of analysis. Then the sample as a whole will be reviewed, again using all three types of data.

4 House-by-house analysis

For the house-by-house analysis the reader should refer in the first instance to the plans and justified graphs in figure 6. This figure also provides a key to room functions. Other material, mainly numerical, will be drawn from tables 1 and 2.

House 1 appears at first sight to be a simple linear plan, but the justified graph shows a good deal of morphological differentiation among the spaces. Three spaces in the minimum living space are at depth 1, that is, linked directly to the exterior. Of these two are transition spaces and one is a function space: the *salle commune*. The salle commune also has a property which is not at all clear from the plan, but made clear by the justified graph: it lies on all three nontrivial circulation rings (that is, those involving more than two spaces). Of these three rings, two are external (that is, pass through the exterior) and one is internal. The internal ring passes through several work-related spaces, including the *laiterie* and the *laverie*. Of the two external rings, one simply links the salle commune to the exterior by way of a *vestibule*, but the other is the main link from the salle commune to the other living functions, including the *salle*, the *grande salle*, and the *bureau*. The salle commune in effect acts as a kind of hinge linking and separating two functionally differentiated circulation rings.

Table 2, which sets out the integration values of all the spaces in order of integration, shows that the salle commune is also the most integrating space, and by far the most integrating of the function spaces. A strong *inequality* thus exists among the main living spaces with the order: salle commune < exterior < salle < grande salle (meaning that the salle commune is more integrating than the exterior which is more integrating than the salle which is more integrating than the grande salle). All this remains the case when the exterior is discounted, although in this case the *couloir* takes on an equal value to the salle commune as the most integrating space.

Table 1. Basic syntactic data.

House number	Number of cells	Space-link ratio[a]	Integration with exterior			Base difference factor[b]	Integration without exterior			Base difference factor[b]
			mean	min.	max.		mean	min.	max.	
1	10	1.36	1.12	0.60	1.88	0.76	1.36	0.73	2.00	0.81
2	8	1.33	0.95	0.34	1.47	0.66	1.23	0.44	1.80	0.68
3	7	1.25	1.02	0.58	1.45	0.84	1.74	0.98	2.75	0.80
4	10	1.27	0.93	0.30	1.51	0.60	1.22	0.45	2.09	0.62
5	11	1.17	0.89	0.31	1.34	0.66	0.97	0.37	1.58	0.66
6	8	1.00	1.30	0.54	2.03	0.71	1.45	0.73	2.18	0.79
7a	2	1.33								
7b	4	1.00	1.52	0.47	2.37	0.61	2.00	1.00	3.00	0.78
8	11	1.02	0.60	0.13	1.09	0.42	1.52	0.90	2.41	0.82
9	5	1.17	1.15	0.29	2.00	0.49	1.52	0.47	2.37	0.61
10	7	1.13	1.12	0.58	1.74	0.78	1.40	0.59	2.16	0.72
11	11	1.17	1.10	0.67	1.60	0.86	1.71	0.90	2.71	0.78
12	10	1.36	0.96	0.45	1.68	0.69	1.67	0.91	2.73	0.78
13	5	1.50	0.96	0.57	1.72	0.76	1.33	0.47	2.37	0.59
14	1	1.50								
15	6	1.14	1.40	0.59	2.16	0.72	1.62	0.86	2.58	0.78
16	4	1.20	1.14	0.47	1.89	0.68	2.00	1.00	3.00	0.78
17	8	1.00	1.15	0.45	1.80	0.68	1.23	0.44	1.89	0.66
Mean		1.25	1.08	0.46	1.73	0.68	1.50	0.70	2.35	0.73

[a] The space-link ratio is the number of links plus one, over the number of spaces. A tree will therefore have a value of 1, and values above 1 indicate the degree of 'ringiness' in the complex.

[b] Base difference factor is the difference factor for the minimum, maximum, and mean integration values in the complex, and thus gives some indication of how much differentiation is available in that complex, which may or may not be taken up by the various functions.

The salle commune thus has a striking set of syntactic properties: it is the most integrating space; it lies on all rings; it is shallow from the exterior; and it links and separates the two main functionally differentiated zones of the house. It will be of interest to see how far these four properties are reproduced in other cases.

The three other main living spaces—the salle, the grande salle, and the bureau—all have quite different syntactic characteristics. All three are nonring spaces, being either endpoints or on the way to endpoints (see cited texts for a theoretical discussion of this property). The bureau is both an endpoint and also the 'deepest space' in the complex. It is also the most segregated space if the exterior is included, and equally most segregated if the exterior is discounted. The grande salle is also an endpoint, and the second most segregated space in the complex if the exterior is included, and equally the most segregated space with the bureau if the exterior is discounted. Unlike the salle and the bureau, however, the grande

Table 2. Order of integration of functions, house by house.

House Number	Order[a]											
1	sc <	co <	ex =	v <	v <	la <	s <	d <	l <	gs <	b	
	0.60	0.68	0.83	0.83	0.90	1.06	1.21	1.28	1.51	1.58	1.88	
2	m <	ex =	s =	l <	c <	d =	a <	d =	d			
	0.34	0.68	0.68	0.68	1.01	1.13	1.13	1.47	1.47			
3	ex =	2 =	1 <	3 =	6 <	a =	5 =	4				
	0.58	0.58	0.58	1.01	1.01	1.45	1.45	1.45				
4	sc <	ex =	s <	lla =	a <	sbr <	ca <	d <	a <	d <	l	
	0.30	0.68	0.68	0.75	0.75	0.82	0.98	1.13	1.21	1.43	1.51	
5	sc <	co <	c <	ex =	la <	s =	s <	c =	l =	c <	lx <	l
	0.31	0.45	0.57	0.83	0.83	0.96	0.96	1.08	1.08	1.08	1.21	1.34
6	v <	s <	sc <	la <	ex =	a <	gs <	lla <	d			
	0.56	0.68	1.13	1.24	1.35	1.35	1.47	1.92	2.03			
7b	sc <	2 <	ex =	c <	c							
	0.47	0.95	1.89	1.89	2.37							
8	ex <	c =	sm =	co =	cu <	9 =	5 =	sr =	sm <	c <	br <	c
	0.13	0.51	0.51	0.51	0.51	0.57	0.57	0.57	0.57	0.70	0.89	1.09
9	sc <	la <	ex =	sr <	c <	l						
	0.29	0.86	1.15	1.15	1.43	2.00						
10	v =	sc <	ex =	v <	s =	ca =	l <	cu				
	0.58	0.58	0.87	0.87	1.45	1.45	1.45	1.74				
11	v <	ex <	cu <	d <	11 <	7 =	sc <	c <	4 <	c =	a <	re
	0.67	0.70	0.77	0.96	1.02	1.09	1.09	1.15	1.34	1.40	1.40	1.60
12	ex <	v <	la =	v <	sc <	la <	gs <	9 <	cu <	sm <	l	
	0.45	0.53	0.75	0.75	0.83	0.90	0.98	1.06	1.21	1.51	1.58	
13	sc =	v <	l =	ex <	la <	s						
	0.57	0.57	0.86	0.86	1.15	1.72						
15	v <	s <	sc <	ex <	la =	br <	sb					
	0.59	0.79	1.18	1.59	1.77	1.77	2.16					
16	v <	ex =	s <	gr <	sc							
	0.47	0.95	0.95	1.42	1.89							
17	a <	s <	ce <	sm =	5 <	ex =	d =	d <	8			
	0.45	0.56	1.01	1.24	1.24	1.35	1.35	1.35	1.8			

[a] For key to room functions, see figure 6; ex exterior.

salle is also shallow in the complex. The salle is a relatively deep and relatively segregated space, both with and without exterior, but less segregated than either the bureau or the grande salle.

Of the remaining spaces, all the work-related spaces—laverie, laiterie, and *débarras*—are segregated, but all less so than either the grande salle or bureau. If the exterior is discounted, the laverie is a little less segregated. Among the transition spaces, the couloir is a strong integrator, with and without exterior, but the vestibules much less so.

It is also useful to look at the degree of differentiation among the integration values of the different functions. The three main living spaces, for example—the salle commune, the salle, and the grande salle—have a mean integration value of 1.13, but a difference factor of 0.83, which indicates a strong degree of differentiation among the values. In fact, this differentiation among the living spaces is almost as great as it could be in that complex, because, unusually, the most and least integrating spaces are living spaces. If the bureau is substituted for the salle, then the difference factor is even stronger at 0.77.

If, on the other hand, we take the three main work-related spaces—the laverie, the laiterie, and the débarras—then the mean integration at 1.28 is only a little higher than for the living spaces. But the difference factor for these spaces is very weak at 0.97. For the three transition spaces—the couloir and the two vestibules—the mean integration is 0.8, but the difference factor at 0.98 is even weaker than for the work-related spaces. Both of these difference factors are weaker than the ones we obtain by taking the *mean* integration values of the three *types* of space (living, working, and transition): 0.95, even though this averages out the differences between individual spaces.

These difference factor results are striking and unusual. It is not common to find such strong differences between living spaces, nor for these functions to take up so much of the possible differences in a spatial complex. It will be of interest to see how far the strength and the order of these differences are reproduced elsewhere in the sample.

House 2 has a justified graph which has certain striking resemblances to house 1. Most notably, there is a space which has all four syntactic properties of the salle commune: it is the most integrating space; it is shallow; it lies on all rings (although there are only two, and both external); and it links and separates living from work functions. In this case, however, the space is labelled *maison*, but there seems to be strong functional and syntactic grounds for regarding this space as similar to the salle commune(2).

There are also a number of differences: there is no grande salle; the salle links directly rather than indirectly to the most integrating space; the work-related spaces to the right of the maison form a dead-end sequence rather than a ring sequence; there are no transition spaces and no bureau; and there is a *chambre de commis* (bedroom for a clerk) on the ground floor. The plan is thus in certain respects less spatially complex and less functionally differentiated than house 1. Nevertheless, the justified map shows a striking syntactic resemblance.

This resemblance is reinforced by numerical analysis. The order of integration of the living spaces is maison < exterior < salle < chambre, and the difference factor for the three living spaces is again strong at 0.79, much stronger than for the three work-related spaces at 0.89. This still fairly strong value reflects the fact

(2) Consultation of the Brier and Brunet text confirms that the two terms are often used interchangeably.

that the laiterie is a relatively integrating space in the complex (though much less so if the exterior is discounted).

House 3 is a plan without function data, and geometrically dissimilar to the two previous cases. But the justified graph does suggest certain resemblances. Most striking is that there is a space—marked 2 on the plan—which has the three spatial properties of the salle commune or maison: it is shallow, it lies on all rings, and is the most integrating space in the complex. (This is, however, only the case if one ignores two small spaces—seemingly too small to count as rooms—attached to space 1. If either is included, then it equalises the integration values of spaces 1 and 2.) On the other hand, the external space in this instance is divided into front garden, inner courtyard, and approach road (leading to the side door) and cannot realistically be treated as a single space. If this is corrected, then space 2 does become the most integrating space. There is also a comparable difference factor of 0.78 for the three main spaces, and a comparable mean integration for the whole complex of 1.02. However, if space 2 is a salle commune, it is unclear how the other spaces are to be functionally interpreted, and it is perhaps safer to note the syntactic resemblances, but not to speculate too far on the assignment of functions.

House 4 has a salle commune with all four defining characteristics noted for house 1, with one internal and two external rings, and a comparable mean integration of 0.93 for the complex. The order of integration for living spaces is, as before, salle commune < exterior < salle < *salon*/bureau, and the difference factor is again strong at 0.82. In this case, however, the salle is both shallow and on an exterior ring, while the salon-bureau is deep and on a dead end sequence. Internal work functions are again on an independent ring sequence linked to the exterior.

House 5 again has a salle commune with all four defining characteristics, with one internal and one external ring. It has two salles, both of which are endpoints, and a relatively integrating chambre lying on an external ring. The mean integration is 0.89, and the order of integration is salle commune < chambre < exterior < both salles. Difference factor for salle commune, chambre, and salle is very strong at 0.76. The laiterie is the most integrating work function at 0.83.

House 6 is spatially unlike any previous case, although its functional labelling is familiar in that salle commune, salle, and grande salle are the main spaces. As the justified graph shows, the spatial form is that of a tree with a single entrance: it has no rings, internal or external. The salle commune is, however, relatively segregated at 1.13, and the salle is the most integrated of the living spaces at 0.68, reversing the previous order. The mean integration of the complex is 1.30, substantially more segregated than previous cases, and the order of integration for living spaces is salle < salle commune < exterior < grande salle. The exterior is substantially more segregated than any previous case at 1.35, and the most integrating space of all is the vestibule at 0.56. The difference factor for salle commune, salle, and grande salle is weak at 0.89, and only by including the vestibule can strong difference factors be found.

House 7 is a special case, since it is split into two distinct living complexes, each with its own salle commune. The one on the left is very simple: a salle commune and a salle connected directly to each other and to the outside, meaning that is maximally shallow, maximally integrating, and minimally differentiated. Little can be said of typological interest except perhaps that the salle commune does preserve the spatial characteristics previously noted of being shallow, integrated, and on all rings, but, obviously, not uniquely so.

The right-hand complex is a simple tree form, with the salle commune shallowest and most integrating, and controlling access to two chambres, one directly and one indirectly. The complex is as a whole relatively segregated at 1.52, but the salle commune is a strong integrator at 0.47, giving a very strong difference factor for living spaces of 0.61. In spite of its simplicity, the right-hand complex does reproduce the order of integration: salle commune < exterior < chambres. In spite of their differences, therefore, left-hand and right-hand complexes can both be said to reproduce at least some of the spatial characteristics found in most previous cases.

House 8 is both spatially and functionally quite unlike any house so far. Every space barring the bureau and one chambre are directly linked to the outside, creating a complex with nine external and two internal rings. The complex is highly integrated at 0.60 if the exterior is included, and very segregated at 1.52 if it is discounted. (In this case, it is unrealistic to treat the exterior as a single space, since it divides sharply into rear walled garden, inner courtyard, and outside proper. However, even with the garden treated as a separate space, the mean integration with exterior is 0.64 and the complex behaves in a very similar way.) There is no salle commune, no salle, and no grande salle, but there is a bureau which combines the properties of being one of the two spaces 2 deep in the complex, of being the second most segregated function space (one chambre is more segregated) if the exterior is included, but the most integrated function space if the exterior is discounted.

Instead of the more common function spaces, there is a *cuisine*, a *salle à manger des maîtres* and two other *salles à manger*, one directly linked to the cuisine and small, the other large, separated from the cuisine by two intervening spaces, and said to be '*d'apparat*', meaning that it is for special occasions. Difference factors for the major spaces are very weak: 1.00 for large salle à manger, cuisine, and bureau without the exterior, 0.91 with the exterior. Without the exterior, the couloir is the most integrating space, and with the exterior it is equally most integrating with the cuisine and the large salle à manger. The order of integration changes with and without the exterior, and either way is unlike any previous case. With the exterior we find exterior < couloir = large salle à manger = cuisine = small chambres < bureau < large chambre. Without the exterior, we find couloir < bureau < large salle à manger < cuisine < chambres. Both with and without the exterior, the salle à manger des maîtres is average in integration, but with the bureau it seems to divide the house into two zones. Both functionally and spatially the division suggests a fundamental distinction between masters and servants rather than between living and working.

House 9 has a much simpler salle plan, and returns, in a simplified form, to some of the salle commune themes. The salle commune is the most integrating space, lies on the only (external) ring, is shallow and separates living from work functions. This time, however, the salle commune is described as '*des domestiques*'. There is neither salle nor grande salle, but there is a salle des maîtres, and this is much larger than in the previous case. Spatially the salle des maîtres seems comparable in some respects with the salle in that it is less integrated than the salle commune, but more integrated than the chambre. On the other hand, it is both shallow and lying on the external ring, and in this resembles the normal salle commune. Mean integration for the complex is normal at 1.14, and difference factors are strong with 0.62 for salle commune, salle des maîtres, and chambre. The order of integration is: salle commune < exterior < salle des maîtres < chambre. The bureau is external and independent, and does not form part of the minimum living complex.

House 10 introduces some new features into a pattern that nevertheless continues to resemble the salle commune type. The first, deep in the plan, is a small cuisine, which has not so far coexisted with a salle commune. The second is a pair of vestibules—one resulting from the same partitioning that created the cuisine—which unlink the salle commune from the exterior. Even so, at 0.58 the salle commune remains the most integrating function space, equal to the central vestibule, when the exterior is included, and easily the most integrating space at 0.59 if the exterior is discounted. The cuisine is the most segregated space both with (1.74) and without (2.16) the exterior. The salle is also strongly segregated. Mean integration is average at 1.12, and the order of integration for living spaces is salle commune < exterior < chambre < salle < cuisine. Difference factors are strong with 0.83 for salle commune, salle, and chambre, and 0.79 for salle commune, salle, and cuisine.

House 11 is another rare case where a cuisine coexists with a salle commune, though in this case the cuisine has become, with or without the exterior, the most integrated function space at 0.77, compared with 1.09 for the salle commune. With the exterior, the rudimentary vestibule is the most integrating space of all, though without the exterior the cuisine takes over. Spatially, the complex is characterised by two deep, external rings, but no internal rings. Mean integration is average at 1.10, but becomes highly segregated at 1.71 without the exterior. Order of integration for living spaces is exterior < cuisine < salle commune < chambre. Difference factors are weak with 0.92 for cuisine, salle commune, and large chambre.

House 12 has more functional differentiation of living spaces than any other case, with salle commune, cuisine, salle à manger, and grande salle. Even so, it reproduces some—but not all—of the features of the dominant salle commune type. With the exterior, the salle commune remains the most integrating living space, but the exterior is much more integrating as are both the central vestibule and one laiterie (because of the strong integration of the exterior). Discounting the exterior, the salle commune becomes uniquely the most integrating space. Order of integration of living spaces with exterior is salle commune < grande salle < cuisine < salle à manger; and, without, salle commune < salle à manger < cuisine < grande salle. Mean integration is normal at 0.96, but this is largely because of the effect of the exterior. Without the exterior, mean integration is 1.67. Difference factors for living spaces are weak with the exterior, with 0.92 for salle commune, grande salle, and salle à manger, but become stronger when the exterior is discounted, with 0.88 for the same three spaces. With the exterior, strong difference factors only arise if the central vestibule is one of the spaces considered. Finally, all four rings in this complex are external, but the salle commune does link and separate living and work functions.

House 13 is another case of the dominant salle commune type in simplified form. The salle commune, in spite of being unlinked from the outside by a vestibule and the laverie, is the most integrating function space (equal to the vestibule at 0.57) with the exterior and by far the most integrating space of all at 0.47 without the exterior. It also lies on both rings, one internal, one external, and links and separates living from internal work functions. Mean integration is average at 0.96, going up to 1.33 without the exterior. Order of integration is salle commune < exterior < salle, following the dominant pattern. Difference factors are strong with 0.78 for salle commune, salle, and laverie, but there is not enough living space to compute this for living spaces alone.

House 14 has a single space minimum living complex, and cannot therefore be analysed. Even so, the fact that the single space—which must already be shallow and integrating—lies on a ring and functions as a salle commune is not without typological relevance. It could be argued that the complex would only have to develop to preserve the features that are already present, to arrive at the dominant salle commune type.

House 15 has a salle commune, but clearly does not conform to the dominant type. Spatially, the complex is split by the entrance vestibule into two branches of a tree, with the salle commune on one branch and the salle on the other. Because there is one extra space on the salle side, the salle appears as the most integrating function space, though with the rather poor value of 0.79, compared with 1.18 for the salle commune. The vestibule is the most integrating space, and the exterior is strongly segregated at 1.57. Mean integration is 1.42 with exterior and 1.62 without. The bureau is again strongly segregated at 1.77 and deep in the complex. Order of integration for living spaces is salle < salle commune < exterior < bureau. Structure factors are fair with 0.87 for salle, salle commune, and bureau, but this is more a result of the segregation of the bureau than of the strong integration of any spaces. It is perhaps worth noting that several of the properties of the dominant salle commune type would be restored if the—apparently added—partition between the *salle de bains* and the débarras were removed.

House 16 although spatially it could approximate a simplified version of the dominant salle commune type, in fact it inverts it by having the salle commune as the most segregated space at 1.89 and the only endpoint. The salle both integrates more than the salle commune and lies on the single exterior ring, but it integrates less than the vestibule. Mean integration is normal at 1.14 with the exterior, but if the exterior is removed, the complex becomes a single sequence of spaces with a mean integration of 2.00. Difference factors for function spaces are very weak, in spite of the strongly segregated salle commune, but become very strong if the vestibule is considered as one of the spaces—for example, salle commune, salle, and vestibule have 0.65.

House 17 is another tree form, without salle commune, but with a salle as the most integrating function space at 0.56 and a deep transition space as the most integrating space of all at 0.45. Mean integration is average at 1.15 with exterior and 1.23 without, showing that integration depends little on the exterior. Order of integration for living spaces is salle < salle à manger < exterior. Difference factors are weak unless the transition space is taken into account, in which case we find 0.75 for transition space, salle, and salle à manger.

5 The problem of type

The house-by-house review suggests that, although there is no obvious single house 'type' in the sample—defined perhaps as a more or less standard way of constructing the house and arranging its rooms—there is evidence of at least one underlying spatial-functional 'genotype'—defined in terms of relational and configurational consistencies which show themselves under different 'phenotypical' arrangements. However, sometimes this dominant genotype is realised strongly, in that all the spatial-functional themes are present, sometimes more weakly, in that some are present and some are missing, whereas in other cases these themes seem to be totally lacking, or even inverted.

The questions to be addressed in this section therefore are: "can the idea of a dominant genotype be formally demonstrated?" and, "is there a second type, and can this be formally demonstrated?" The first step in trying to answer the first question is to consider the spatial and functional properties of the sample as a whole. Table 3 sets out each main type of space that occurs in the sample, the number of times it occurs, and its mean depth and integration value when it does occur. This shows that the commonest types of function space are salles communes and chambres, with thirteen each, then salles, followed by transitions and various work spaces. Cuisines are rare, as are grandes salles.

There are also clear across-the-board differences in the way in which these functions are spatialised. Salles communes occur in the sample with a mean depth of 1.47 and a mean integration value of 0.74 (0.79 without exterior); salles with a mean depth of 1.91 and a mean integration of 1.01 (1.13 without exterior); grandes salles with a mean depth of 2.00 and a mean integration of 1.34 (2.00 without exterior); and chambres with a mean depth of 2.07 and a mean integration of 1.21 (1.67 without exterior). These differences are sufficient to give a difference factor of 0.93 for these means for salle commune, salle, and grande salle, which would not be strong in an individual case, but is strong in a sample.

Among the less common spaces, cuisines are rare, but where they occur their mean depth is 1.75 and mean integration 1.06 (1.52 without exterior). Cuisines, in effect only appear occasionally and in deep and segregated spaces. Salles à manger are similar, but the two salles des maîtres are both shallow and relatively integrating. Bureaux, on the other hand, are on average strongly segregated at 1.34. Work functions are in general considerably more segregated than living functions, and there are less differences among them. Laveries are both the deepest of all function spaces and the most integrating of the work functions at 1.15. Transition spaces, on the other hand, are common, and on average both shallow and strongly integrating. The overall mean integration for all spaces in the sample is 1.08, and very broadly one might say that living functions are on the integrated side of the mean and work functions on the segregated side.

These strong trends across the sample are in themselves strong evidence of an underlying spatial culture expressing itself through the spatial form of the houses. However, this spatial culture expresses itself in spite of the numerous inversions and oppositions that were noted in the house-by-house review. It seems likely, then, that, if more than one genotype could be identified, spatial cultures would show through and be expressed even more strongly.

A commonsense, conjecture-test procedure seems most appropriate. The house-by-house review suggested a dominant type based on the existence of a salle

Table 3. Numbers, mean depths, and mean integration values for functions.

Function	Number of cases	With exterior		Without exterior
		mean depth	mean integration	mean integration
Exterior	16		0.93	
Salle commune	13	1.47	0.74	0.79
Chambre	13	2.07	1.21	1.67
Salle	11	1.91	1.01	1.13
Vestibule	9	1.00	0.68	0.95
Laverie	9	2.20	1.15	1.42
Laiterie	8	2.00	1.33	1.76
Cuisine	4	1.75	1.06	1.52
Salle à manger	4	2.00	0.96	1.45
Grande salle	3	2.00	1.34	2.00

commune with the four properties of being shallow, most integrating, lying on all rings, and linking and separating living from work functions. House 1 seems a clear case; house 2 can be allowed since maison and salle commune are used interchangeably elsewhere; house 3 is unlabelled and must be omitted; but house 4 is clear, as is house 5. House 6 is clearly not a case, and house 7 is a reasonable case, but perhaps should be omitted as being too small. House 8 is not a case, but house 9 and 10 reasonably are. House 11 is not a case, but house 12 is. House 14 is too small, and then houses 15-17 are all clearly not cases. Disregarding the houses which are too small, we thus have eight possible cases of the dominant genotype and six cases which clearly do not conform to this genotype.

Table 4 divides the sample into two along these lines, showing mean integration with and without exterior, the function and integration value of the most integrating space, the difference factor for the main living spaces, and the integration value for the exterior. The table shows a number of interesting results:

1 The mean integration of the genotype sample is very stable at around 1. The houses that strongly deviate from the mean are all in the nongenotype sample, which also has a slightly higher mean.

2 If the exterior is discounted, the mean integration of the genotype sample is much stronger at 1.37 than the nongenotype sample at 1.59.

Table 4. Data on two possible types of house. (The abbreviations are explained in figure 6.)

House number	Mean integration[a] with	Mean integration[a] without	Most integrating space[a] with	Most integrating space[a] without	Difference factor for main function spaces	Integration value of exterior
Genotype						
1	1.12	1.36	sc 0.60	sc 0.79	0.83 (sc, s, gs)	0.83
2	0.95	1.23	sc 0.34	sc 0.44	0.79 (m, s, c)	0.68
4	0.93	1.22	sc 0.30	sc 0.45	0.82 (sc, s, sb)	0.68
5	0.89	0.97	sc 0.31	sc 0.37	0.76 (sc, s, c)	0.83
9	1.10	1.52	sc 0.29	sc 0.47	0.62 (sc, sm, c)	1.15
10	1.12	1.40	sc 0.58	sc 0.59	0.83 (sc, s, c)	0.87
12	0.96	1.67	ex 0.45 (sc 0.83)	sc 0.91	0.88 (sc, gs, sm) (0.92 with ex)	0.45
13	0.96	1.33	sc 0.57	sc 0.47	0.78	0.86
Mean	1.01	1.37	sc 0.48 v 0.64 0.80[b]	sc 0.56	0.79	0.79
Nongenotype						
6	1.30	1.45	v 0.56 (sc 1.13)	s, v 0.73 (sc 1.31)	0.89 (sc, s, gs)	1.35
8	0.60	1.52	ex 0.13 (co 0.51)	co, v 0.90	0.91 (sm, cu, br) (1.0 without ex)	0.13
16	1.14	2.00	v 0.47 (sc 1.89)	s, v 1.00 (sc 3.00)	0.91	0.95
11	1.10	1.71	v 0.67 (sc 1.09)	cu 0.9 (v 1.13)	0.92 (sc, c, cu)	0.70
15	1.40	1.62	v 0.59 (sc 1.18)	s, v 0.86 (sc 1.43)	0.87 (sc, s, br)	1.57
17	1.15	1.23	a, v 0.45	a, v 0.44	0.88 (s, sm, ce)	1.35
Mean	1.12	1.59	v 0.55 sc 1.32 0.54[b]	v 0.84 sc 1.81	0.90	1.01

[a] With and without exterior.

[b] All transition spaces.

3 The mean integration for salles communes in the genotype sample is 0.47 with exterior and 0.6 without; for the nongenotype sample the mean is 1.32 with exterior and 1.81 without.
4 The salle commune is the most integrating space of all throughout the genotype sample. The only exceptions are house 10, where the vestibule is equally most integrating if the exterior is included, but the salle commune is uniquely and strongly most integrating if the exterior is discounted; and house 12, where the exterior is the most integrating space and the salle commune only the most integrating living space if the exterior is included; but again the salle commune becomes uniquely and strongly most integrating if the exterior is discounted.
5 A quite different, yet consistent, pattern of most integrating spaces is found in the nongenotype sample: in house 6, the vestibule is most integrating, although the salle is equally so if the exterior is discounted; in house 8, the exterior is by far the most integrating space, but the couloir follows, and becomes most integrating if the exterior is discounted; in house 11, the vestibule is the most integrating, though it becomes second to the cuisine if the exterior is discounted; in house 15, the vestibule is again most integrating, though again the salle has an equal value if the exterior is discounted; in house 16, the vestibule is again most integrating, though again it is joined by the salle if the exterior is discounted; and in house 17, the small interior transition space is most integrating, remaining so when the exterior is discounted.
6 The mean integration for these transition spaces in the nongenotype sample is 0.54 with exterior and 0.84 without. The comparable figures for transition spaces in the genotype sample are 0.78 with exterior and 1.02 without—in other words, salles communes and transition spaces change places in the two samples.
7 Difference factors then reflect this change: the mean difference factor for living spaces in the genotype sample is 0.79, whereas for the nongenotype sample it is 0.90. In the nongenotype sample, strong difference factors are only found when transition spaces are included in the space considered, and vice versa in the genotype sample.
8 Last, the mean integration of the exterior in the genotype sample is 0.79, whereas for the nongenotype sample it is 1.01.

In other words, two distinct genotypical tendencies can be demonstrated in the sample. One centres on the highly integrating salle commune, creates strong spatial differences among living spaces, incorporates the exterior in its pattern of strong integration, has a more integrating interior, and a more integrating exterior. The other centres on the transition space, creates more internal segregation amongst living spaces and less spatial differences among them, separates the inside more clearly from the outside, and has a more segregated exterior. These genotypes do not appear to be correlated either with size or with the overall geometry of the building. On the contrary, they appear to be two distinct spatial-functional tendencies, each of which expresses itself through several different built forms.

6 An interpretative speculation

In considering these two genotypes against the background of the concepts drawn from Cuisenier's interpretation of Estienne, the concept of latéralité, implying the division of the dwelling into living and working zones on either side of a central space, seems particularly apposite. It is a pervasive theme throughout the sample, though with great variation in the way it is realised and the degree to which it is realised.

However, when it is related to the two genotypes, a more complex picture emerges, Cuisenier's model specifies a latéralité with three strong properties: it has a geometric, or left-right element; it is organised around a central transition space; and it is based on the point of view of the male master of the house. None of these properties can be left without further comment.

On the geometric, or left-right question, it is clear that this does sometimes apply, for example in houses 1 or 9. But in other cases, the latéralité is as strongly realised in the syntax of the spaces, but takes on either a front-back geometry, as for example in houses 4 or 5, or a more indeterminate form, as in house 12. It seems more reasonable on the basis of this evidence to think of latéralité as a primarily *syntactic* property which sometimes takes one geometric form, sometimes another. It is pervasively present, but its form seems more to do with the cultural arrangement of practicalities than with an exogenous conceptual model.

On the central space question, it is clear that, although latéralité is sometimes organised around a central transition space, more often it is organised around the dominant *function* space: the salle commune. Which alternative is selected seems to be the principal choice that leads to one genotype or the other. This raises an important question: does latéralité organised around a transition space mean the same thing as latéralité organised around a main functional space? Or does it arise in different social circumstances?

This in turn raises the question of the male-centred view of latéralité. The salle commune, with its linking of cooking and everyday living, seems to be a space in which women would be expected to be dominant, the more so since the work functions which the salle commune typically separates from other living functions are those associated with female roles—the laverie, the laiterie, and so on. It is difficult to avoid the inference that the salle-commune-centred form of latéralité is in fact organised around the female functions of the household. One is almost tempted to the view that the transition-space-centred form of latéralité, following Cuisenier's interpretation of Estienne, is associated with a male view of the household, and the salle-commune-centred form with a female view.

However, the attractions of this simple 'explanation' of the two genotypes must at least be put in question by an awkward fact: the distinction between transition-space-centred and function-space-centred domestic space organisation has been made before in quite different explanatory circumstances. For example, Hillier and Hanson note such a distinction in distinguishing domestic space styles which express class more than gender differences (Hanson and Hillier, 1982; Hillier and Hanson, 1984, pages 151-163), whereas Glassie associates such a distinction with social changes over a period of time linked to changes in house locations and changes in privacy needs (1975, pages 114-122).

In both of these studies, however, a similar view is taken of the social mechanisms underlying domestic space patterning. Both emphasise the importance of considering the house not only in terms of the relations among its inhabitants, but also in terms of the relations between inhabitants and visitors. Domestic space cannot be understood without understanding the dynamics of both types of relationship, and the house can only be understood as a device for managing both types of interface. In both studies the house is thus seen as a spatial and symbolic means to social and communal solidarities, as much as an instrument of family and individual privacy.

In pursuing these ideas we explore what we might call the experiential dimensions of space, and in particular, the changing experience of the house as one moves from one space to another. A key aspect of this is often the relationship between permeability and visibility. The permeability structure of a complex is essentially a matter of how the relations of spaces to their immediate neighbours builds into a system of possible routes. It defines where you can go and how to get there.

The visibility structure, on the other hand, tells you how much space you are aware of without moving. In a sense, it tells you where you already are.

The relations with visibility are often, it seems, a means by which the basic permeability syntax of a complex is fine-tuned into a more effective device for interfacing or distancing different kinds of relationships. This certainly seems true of the Normandy sample. If, for example, one looks at the salle commune in house 1 (assuming doors are open) there is a line of sight and direct access that crosses the salle commune, passes through the couloir controlling access to the salle and bureau, then through the front-back transition space, and then through the grande salle. Another such line crosses the salle commune then passes through the main entrance vestibule to the outside. Another crosses the salle commune and passes through both laverie and laiterie. In a sense, all the major spatial relations in the complex are governed visibly from the salle commune: the interface between the salle commune (that is, space of everyday living) and the other living functions of the house; the interface between the salle commune and the interior work functions; and the interface between the salle commune and the world outside.

In total contrast, in house 11 the visibility relations from the salle commune are hardly more than the immediate neighbouring permeabilities, and even these are highly restricted. None of the three interfaces of visibility that are so evident in house 1 are realised to any degree in this case except, dubiously, that with the outside world. To be in that space is only to be in that space, not to be visibly part of a complex system of spaces, involving both interior and exterior. Similar differences are found if one compares, say, house 5 with house 6.

In contrast, the most striking cases of visual relationships in the transition space type occur with the transition space itself. Houses 6, 11, 15, and 16, for example, all have the strongest visual relations from the vestibule just inside the main entrance, whereas house 8 has a seven-space enfilade with this point in the couloir as its centre. House 17 does not have this property, but even there, in a less strong sense, the interior transition space is the strongest visual integrator.

These distinctions are, it seems, reinforced by the ring structure. In the salle commune type, the eight salles communes lie on a total of fifteen rings, or 1.87 per salle commune. In fact, with the exception of house 12, where the salle commune lies on only one of three rings, the salles communes lie on all rings in the complexes. On the other hand, if the external rings are cut, then in each case the salle commune becomes a controlling space which must be passed through to move from one part of the house to another. In contrast, of the four salles communes in the transition space type, only one lies on a ring, and that a single ring. In this type the transition space becomes the controlling space which must be passed through to move from one part of the house to the other, with much more restricted opportunities to use the exterior for alternative routes.

The salle commune in the salle commune type is, it seems, a controlling space for the interior—its control of certain aspects of interior permeability is unavoidable—but only a strategic space for the interior-exterior relation; it is powerful, but avoidable. The transition space in the transition space type is, on the other hand, more often a controlling space both for interior and for interior-exterior relations.

It is hard to avoid the inference that these relations are linked to the ways in which domestic space creates and structures the possibility and form of encounter among inhabitants and between inhabitants and visitors, and that the differences between the two genotypes express some difference in the forms of social solidarities. The salle commune type seems to suggest a pattern that works by creating spatial differences between functions, strong interior integration with everyday living as the centre, and a permissive rather than controlling relation to the outside world.

The transition space type works by more uniformly segregating interior functions through a central transition space which controls both interior relations and relations with the outside.

The first might be seen as a *constitutive* or *spatial* model in which the social role of space is expressed directly through the way in which the space pattern is lived; whereas the second might be seen more as a *representative* or *conceptual* model, in which individual function spaces are assigned a spatial identity more through separation and control than through the organisation of complex interrelations.

Such a distinction may, however, itself be related to the different ways in which gender relations can express themselves through space. The suggestion has been made before (Hillier and Hanson, 1984, pages 239-240). There seems perhaps a possibility that we may be dealing with a pair of 'genotypical' tendencies of some generality. But their further exploration would require 'nonarchaeological' forms of data, and thus lies beyond the scope of this present paper.

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