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Syntactic Analysis of Settlements

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Résumé

Cet article introduit un modèle pour la représentation, l'analyse et l'interprétation de l'environnement habité: l'analyse syntaxique. Le modèle d'analyse considère l'habitat comme un système bi-polaire, distribué entre les entrées des bâtiments et le monde au-delà de l'environnement habité. La structure spatiale entre ces deux domaines est appréhendée comme un moyen pour gérer deux sortes de relations: celles qui lient les habitants entre eux et celles qui lient les habitants aux étrangers. L'essentiel de la méthode analyse la structure physique globale de l'habitat envisagé sans perdre de vue sa structure sociale. Dans un deuxième temps, qui s'articule sur le premier, elle établit une approche descriptive de l'espace qui permette d'y inclure ses tenants et aboutissants sociaux. Il apparaît enfin que c'est précisément par les relations entre structure locale et globale qu'on peut caractériser les habitats traditionnels et vernaculaires et les classifier spatialement.

Summary

This paper introduces a model for the representation, analysis and interpretation of settlement space: syntactic analysis. The model of analysis sees a settlement as a bi-polar system, arranged between the entrances to buildings and the world outside the settlement. The structure of space between these two domains is seen as a means of interfacing two kinds of relations: those among the inhabitants of the settlement and those between inhabitants and strangers. The essence of the method of analysis is that it establishes a way of dealing with the global physical structure of a settlement without loosing sight of its social structure; and second - a function of the first - it establishes a method of describing space in such a way as to make its social origins and consequences a part of that description. It is proposed that it is precisely in the relations between local and global structure that traditional and vernacular settlements can be characterized and classified spatially.

1. Introduction

1.1. The deformed grid

Urban space is that part of the built volume of a town that is defined by buildings, but not contained by them. How it is structured affects most kinds of everyday experience of a town. Most movement passes through it, most public activity takes place in it, and much of our sense of being in an urban space derives from it.

Most architects today believe that something has gone badly wrong with urban space. But the diversity of fashions and movements suggests there is very little agreement about what is wrong and what should be done. Some see the problem as simply an institutional one. The design of urban space has been lost in the interregnum between architecture and planning and piecemeal rules, whose rationale seems increasingly obscure, have taken over from conscious design.

However, the problem cannot just be one of who is responsible. Responsibility implies knowledge, and there is, at the very last, a substantial gap in *architectural* knowledge here. We cannot really explain to the public why certain types of physical arrangement of space so often seem associated with that curious air of desertedness, and even danger, any more than we can explain why the common-or-garden urban spaces of the past so often seemed to conjure up that easy, unforced, non-interactive co-presence of people that now seems to have been such an essential constituent of urban life and safety.

This lack of knowledge - and perhaps the responsibility problem as well - originates in a real conceptual difficulty. We simply do not have a set of concepts which enables us to describe and understand the kinds of spatial order that are to be found in complex physical objects like towns. Visual appreciation, as Cullen (1961) has shown, can of course take us some way. But a visual appreciation is, necessarily, a *local* appreciation. It is limited to what can be seen from a point. The problem of urban form is really that of understanding the *global*, or overall, pattern: a pattern that can only be seen from a multiplicity of points. It is the global pattern that seems most to affect how towns *work* and create the patterns of use and movement that we identify as urban.

The problem is made more difficult by the fact that this global order in towns can often appear to the geometrically educated eye as a kind of disorder. But geometrical order and spatial order are not necessarily the same thing. The two may even be quite different in their local and global properties. For example, a regular orthogonal grid looks like an intelligible order when seen from above (Fig. 1), where it can be grasped as a whole. However, it may not be an intelligible order when moving about within it, because each part seems too like every other part. As a result of the standardization of local geometric relations there is a loss of global intelligibility. On the other hand, the kinds of irregular *deformed grids* that are so characteristic of traditional towns (see Fig. 4) do not look like order when seen from above, but they do seem well-ordered when moving about in them because the local differences constantly give clues about the global pattern of the whole.

How this happens is the subject of this paper. By outlining a new method of spatial analysis developed at the Bartlett [1] we aim first to show that it is through the deformation of the grid that urban spatial patterns can be created which make local places identifiably different from each other and *at the same time and by the same means*, create the global pattern of the whole; and second, that once this is understood, then it becomes clear how these global patterns are a natural product of the way in which towns generate and control patterns of encounter.

[1] The method is set out in full in "The Social Logic of Space" by Bill Hillier and Julienne Hanson, Cambridge University Press, 1984. Current documentation is in the form of working papers of the Unit for Architectural Studies, Bartlett School of Architecture and Planning, University College, London. This paper is based on the results of research done in the Unit, and by M. Sc. and Ph. D. students working in close association with the Unit over a number of years. To date well over 300 cases have been investigated using the methodology, including both traditional and architect-designed localities, mainly from Europe and the Middle East. For a review of recent applications, see "Creating Life", below.

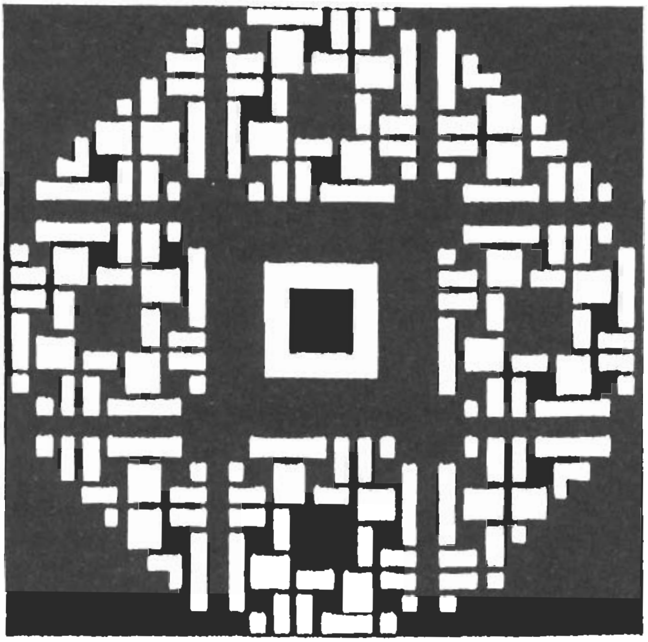

Fig. 1 A regular orthogonal grid looks like an intelligible order when seen from above, where it can be grasped as a whole. However, it may not be an intelligible order when moving about within it, because every part seems too much like every other part. Layout of a village in Algeria designed by Ricardo Bofil with open space structure shown in black.

Fig. 1 Une grille orthogonale et régulière propose un ordre intelligible lorsqu'elle est vue d'en haut, d'où elle peut être saisie en tant que totalité. Cependant, ce même ordre intelligible peut ne pas exister lorsqu'on se déplace à l'intérieur de lui, car alors toute partie ressemble beaucoup aux autres. Plan d'un village algérien par Ricardo Bofil avec l'espace extérieur en noir.

Fig. 2 Layout of the small town of G. in the Var region of France.
Fig. 2 Plan de la petite ville de G. dans la région du Var en France.

2. Analysing urban space

2.1. *Settlements as interfaces*

From the point of view of understanding their structure, and how they differ from one another, the plans of settlements may, at first glance, appear singularly uninformative. Most settlements seem to be made up of the same kinds of basic spatial "elements": "closed" elements like dwellings, shops, public buildings, and so on, which, by their aggregation define an "open" system of more or less public space - streets, alleys, squares and the like - which knits the whole settlement together into a continuous system. It is the relationship of these "closed" and "open" elements to form a global spatial pattern which both gives a particular settlement its spatial individuality and permits its identification as a member of a generic class of similar settlements.

Buildings, by the way in which they are collected together, create a system of open space - and it is the form and shape of the open space system, as it is everywhere defined by the buildings, that constitute our experience of the settlement. But if a syntactic and quantitative analysis is to focus on this relation by which the arrangement of closed elements define the shape of the open element, then a substantial difficulty is encountered. In an important sense (and unlike the closed elements which are clearly identifiable, both as individuals and as blocks) the open space structure of a settlement is *one continuous* space. How is it then to be analysed, without contradicting its essentially continuous nature?

Here, we find a great difficulty. If we simply represent the system as a topological network, then much of the idiosyncrasy of the system is lost. The equivalence class is much too large, and we have failed to analyse either the individuality, or the generic nature of the system. If, on the other hand, we follow the architectural method of calling some parts of the system "spaces" and others "paths" (e.g. McCluskey, 1979) then we will be faced, in most real cases, with unavoidable difficulties in deciding which is which - difficulties which are usually solved arbitrarily and subjectively, thus destroying any usefulness the analysis might have had in offering an objective description of spatial relations. Similarly, geographical approaches to the analysis of space (Carter, 1976; Conzen, 1960; Kruger, 1979) fail to deal with this problem of the continuity of the "open" space of settlement systems.

Settlements analysis, therefore, raises a problem which is anterior to analysis: that of the *representation* , preferably the objective representation, of the open space system of a settlement, both in terms of itself, and in terms of its *interface* with the closed elements (buildings), and in such a way as to make syntactic relations or rules underlying the production of spatial patterns identifiable and countable.

2.2. *Axial and convex space*

We can best show our approach to this problem by taking two worked examples: a small town situated on a hill in the south of France (G.), and a larger town situated in a plain in Provence (A.). These two towns have been chosen because, regardless of their difference in size and topography, they demonstrate the interplay between the local organisation of space and the global order of the systems as a whole. It should be borne in mind that neither is intended as an example to be followed in design. The purpose of the examples is only to illustrate a methodology. In what follows analysis

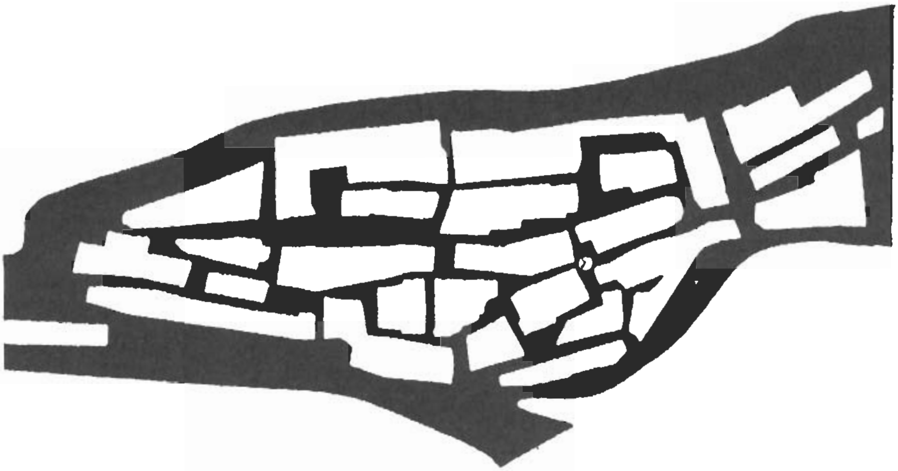

Fig. 3 Layout of the town of G. with open space structure shown in black.
Fig. 3 Plan de la ville de G. avec la structure de l'espace extérieur en noir.

Fig. 4 Irregular deformed grids that are characteristic of traditional towns do not look like order when seen from above, but they do seem well ordered when moving about in them because the local differences constantly give clues about the global pattern of the whole. Layout of traditional town in France with open space structure shown in black.

Fig. 4 Les grilles irrégulières et déformées qui sont tellement caractéristiques des villes traditionnelles ne proposent pas d'ordre vues d'en haut. Cependant elles donnent une impression d'ordre lorsqu'on s'y déplace parce que les particularités locales fournissent constamment des indices sur la forme de l'ensemble. Plan d'une ville traditionnelle en France avec l'espace extérieur en noir.

will be based on the town G. with comparative references to A. Both, however, illustrate syntactic properties which have been found to exist, in different degrees, in whole classes of traditional and vernacular settlements, including the historic cores of the cities [2].

Fig. 2 is an ordinary map of the town G. with the buildings shown in the usual way. Fig. 3 is the same map, but with the open space shown in black instead of the buildings. Fig. 4 is a similar diagram of the open space structure of A. The analysis of this irregular continuous structure, and how it relates to the buildings and the outside world is the main problem to be solved. Topologically, of course, the structure is the same as an orthogonal grid: a series of intersecting "rings" of space surrounding the "islands" of buildings. The task of analysis therefore is to understand the nature and degree of *deformation* of the grid.

A great deal can be understood simply by considering the space structure in two different ways: as a two-dimensional or *convex* structure; and as a one-dimensional or *axial* structure. The convex organisation of a system describes the degree to which any space extends in two dimensions - literally its variation in width, whereas the axial organisation of a system describes the degree to which any space can be extended linearly. Take, for example, the point marked *y* in Fig. 3. It is part of a two dimensional space in which all points are directly accessible to and visible from all other points (the space must therefore be convex, and not turn corners); and it is part of a system of one dimensional spaces, or axial lines, in that at least some points in other convex spaces are directly accessible and visible from it. Fig. 5 shows both in magnified form.

Axiality and convexity can each be used to represent the *whole* system of space. A convex map will be set of fattest and fewest spaces that cover the system (Fig. 6); while an axial map will be the set of longest and fewest straight lines that go through all convex spaces and make all axial links (Fig. 7). By comparing these maps to each other, it is easy to see that one way of assessing the deformation of the grid is in terms of how the two are related. In G. there is a powerful tendency for axial lines to pass through many convex spaces. This phenomenon explains the characteristic spatial quality of many traditional settlements, where the articulation of the building line ensures a degree of *local* differentiation, at the same time as the axial extension of space maintains the *global* cohesion of the town by linking convex segments together.

Now the idea that every point in the system has *both* a one and two dimensional form is quite different from the "streets and squares" idea, where spaces are expected to be *either* one or two dimensional. Seeing every point in both ways means that every point already has within itself both a local and a global form. A convex space is the most *localized* space because it extends only so far as is consistent with every point being visible and directly accessible to every other point; while an axial line is the most *globalized* since it extends as long as there is at least one point visible and directly accessible.

This has implications for both use and legibility. A convex space describes where you are in the system, whereas axial lines give information about where you might be going. Axiality adds relationships to those created locally, and inserts a space into the overall structure of spatial order and movement within a town. Axiality, therefore, seems closely associated with patterns of movement. Convexity, on the other hand, seems less associated with movement than with the co-presence of those

[2] See "Creating Life" below, on the structure of traditional urban areas.

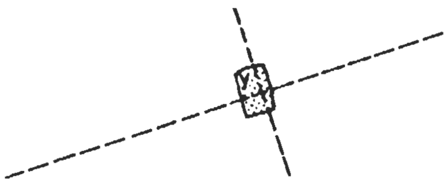

Fig. 5 The point marked "y" is part of a two-dimensional space in which all points are directly accessible and visible from all points. The space must thus be convex. It is also part of a system of one-dimensional spaces, or axial lines, in that at least some points in other convex spaces are directly accessible and visible from it.

Fig. 5 Le point marqué "y" fait partie d'un espace bi-dimensionel où tous les points sont directement accessibles et visibles de tous les autres points. L'espace doit aussi être convexe. Il fait aussi partie d'un système d'espaces uni-dimensionels, autrement dit de lignes axiales, du fait qu'au moins certains points dans d'autres espaces convexes sont directement accessibles et visibles depuis celui-ci.

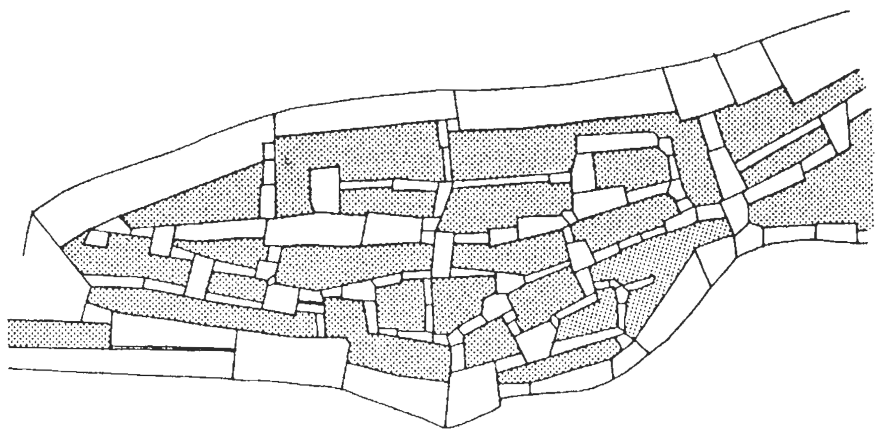

Fig. 6 Convex map of the town of G.
Fig. 6 Carte convexe de la ville de G.

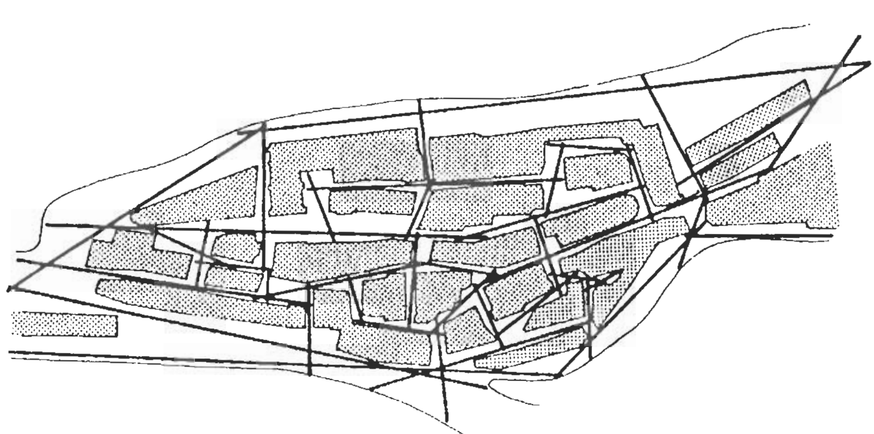

Fig. 7 Axial map of the town of G.
Fig. 7 Carte axiale de la ville de G.

who are already there. Axiality might then be expected to be particularly important to the presence of strangers, or relative strangers in different parts of the system, while convexity might give more advantage to inhabitants.

Both maps - the axial and the convex - can be considered from two points of view: from the point of view of how they relate to buildings, or rather to the building entrances, where inhabitants come from; and from the point of view of the entrances of the settlement, where strangers come from. But because of the association of inhabitants with convexity and strangers with axiality, it has been found useful to look at the convex map from the points of view of building entrances, and the axial map, initially at least, from the point of view of the world outside the settlement.

2.3. Continuous relations to building entrances

In order to analyse the convex system we can transform the map of G. into a *graph* which represents the spatial relations between the buildings and the system of convex space. If we represent each convex space in G. by a circle, each building by a dot, and each relation of direct access by a line, then we have Fig. 8. This represents the interface between building entrances and public space.

This "interface map" immediately shows a very important property. Nearly all the convex spaces have direct access to at least one entrance. This means that whenever you are in the open space system, you are adjacent to somebody's door. If by chance you are in one of the few spaces that are not "constituted" by at least one entrance, then you can be sure that the next space you enter will be an entrance, since no convex space in the system is more than two steps away from an entrance.

Such a systematic property, which is also present in A., cannot have arisen by accident. It is evident that spatial principles were being followed as the settlement grew. We call this property the "continuous constitution" of space by buildings. It is a very common principle of design in vernacular settlements, although an extremely rare one in contemporary neo-vernacular schemes. In most types of vernacular settlement, convex space is everywhere "shallow" from building entrances - that is, it is one or at most two steps away.

This means that *global* transitions through the system of axial space are at the same time transitions through *local* domains at the interface with building entrances. In modern interpretations of vernacular layouts, by contrast, the effect of articulation is usually to make much convex space "deep" from entrances - that is, several steps away. The result is that the *continuous* control of space from entrances - a global property of the system - is lost, as a direct result of concentrating building entrances on a few spaces rather than distributing them across the entire urban surface.

2.4. Depth and shallowness

The concept of depth is one of the most important *relational* ideas in space syntax. Depth exists wherever it is necessary to go through intervening spaces to get from one to another. Shallowness exists where relations are direct. No arrangement of space can have more depth from a point than the simple sequence shown in Fig. 9, and none can be more shallow than where all are connected to the point of origin, Fig. 10. The amount of depth in any spatial arrangement can be visually shown by what we call a *justified* graph. This means simply that the graph is re-arranged by placing the circle representing the outside of the system on an imaginary baseline, then aligning

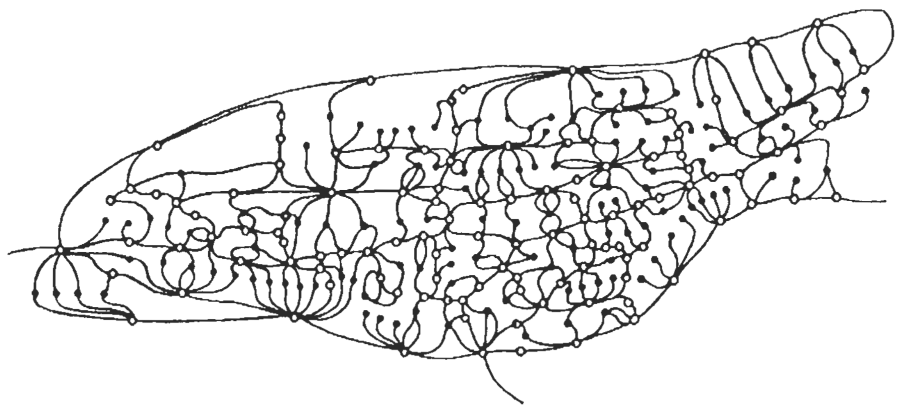

Fig. 8 Interface map of the town of G. The dots are houses, the circles convex spaces, and the line relations of direct permeability.

Fig. 8 Carte d'interface de la ville de G. Les points sont des maisons, les cercles sont des espaces convexes, et les lignes des relations de perméabilité directe.

Fig. 9 Unilinear sequences of spaces: maximum depth.
Fig. 9 Séquence unilinéaire d'espaces: la profondeur est maximum.

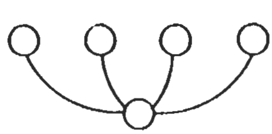

Fig. 10 Bush diagram with all spaces connected to point of origin: mimimum depth.
Fig. 10 Diagramme arborescent où tous les espaces sont connectés au point d'origine: la profondeur est minimale.

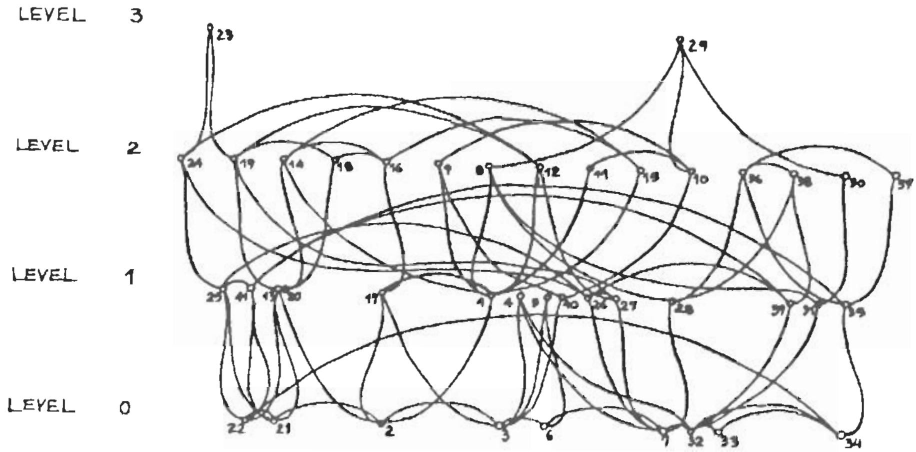

Fig. 11 Depth diagram of the town of G. from the perimeter spaces.
Fig. 11 Diagramme de la profondeur de la ville de G. depuis les espaces périmétriques.

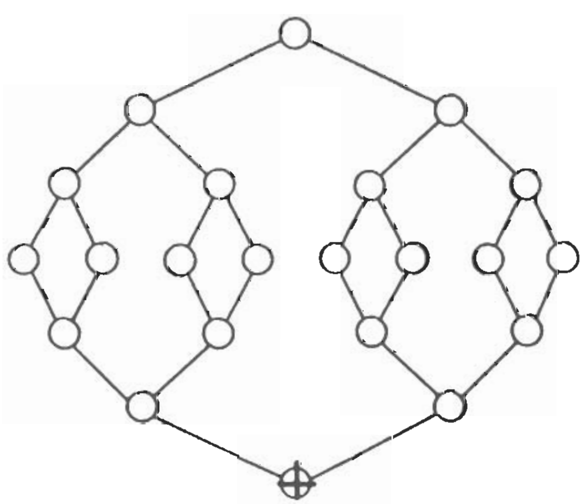

Fig. 12 Diamond-shaped graph used for calculating integration.
Fig. 12 Graphe en forme de diamant employé pour calculer le coefficient d'intégration.

all the other spaces on levels above that according to how many spaces deep they are from that point.

For example, if we take the perimeter space all around G. as the starting point, and align the axial map above it, it will give Fig. 11. The graph makes it immediately obvious that the largest numbers of spaces are two deep from the outside. This might seem surprisingly shallow. But a closer look at the axial map will show that one reason for this is that the central areas are strongly linked to the outside by axial lines that pass through numerous convex spaces. The effect is so strong that once again it can hardly be seen as accidental. Axial shallowness from the outside, especially of the central areas, seems a *global* principle of the spatial layout.

The degree to which a particular line integrates a system can be expressed numerically through a formula which compares the system to a simple sequence (Fig. 9) and a bush (Fig. 10) with an equivalent number of spaces [3] . To allow comparison of systems of different sizes, this "integration" value is compared to the degree of integration present in the "diamond-shaped" graph shown in Fig. 12. A value below 1 will express an integrating structure and a squashing down of the diamond shape, a value above 1 a segregating structure, or a vertical drawing out of the diamond shape. The mean of these values will then exactly express the degree of integration in the system as a whole. The value for G. is .73 or a little over half a diamond, while for A. it is .85.

But a much more important result comes from asking each line in turn to act as a starting point. From some lines the system is relatively shallow, from others relatively deep. A line from which the system is shallow can be said to draw the system towards itself and therefore to *integrate* it, more than one which pushes the system away from itself and keeps it deep. From the point of view of integration, the system is, literally, different from one point to another. The pattern of more integrating and more segregating spaces is not local but a *global* phenomenon. Towns are arranged in such a way as to privilege certain spaces with respect to others: the main square or high street may tend to be more easily accessible than the moré secluded quiet areas, to *all* the other parts of the town.

2.5. *Integrating cores*

Precisely because the system is different from different parts, we can use integration values to discover a crucial global structure. The *integrating core* of a settlement will be the pattern made by the 10%, or 25% most integrating lines [4]. The 25% integrating core of G. is a very powerful structure, which links lines on the edge of the system to some in the centre, in three directions (Fig. 13). It approximates the shape of an incomplete and highly deformed *wheel*, with rim, spoke and hub. The most segregating lines then cluster in the interstices of the wheel to form relatively segregated sub-areas. A similar distribution of integrating lines that link the centre to the edges with the interstices filled by segregating clusters is found in the town of A. (Fig. 14).

[3] The formula is IV (Integration Value) = 2 (MD - 1) / (K - 2) where MD is the mean depth of lines from that point and K is the total number of spaces in the system. The result is a number between 0 and 1, with 0 meaning maximum integration and 1 maximum segregation.

[4] It has been found that a 10% integration core reveals the underlying integrated structure of large settlements (more than 100 spaces), and 25% integration that of small settlements, like G. or A.

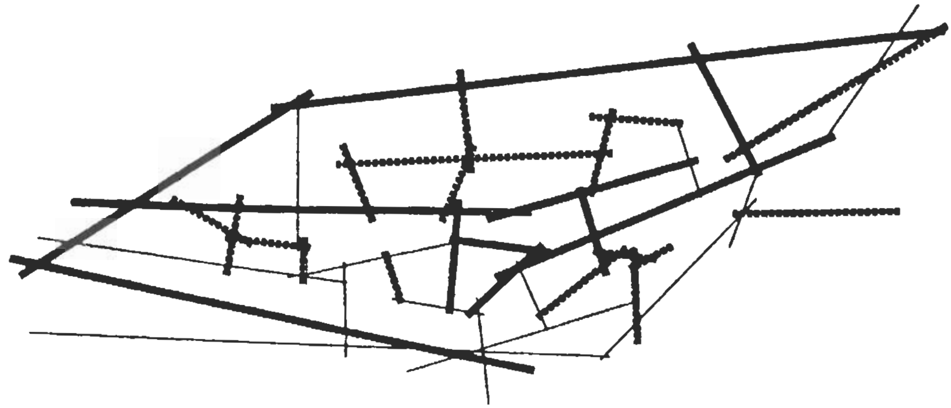

Fig. 13 The integration map of the small town of G. showing 25% most integrating lines in heavy black, and 50% most segregating lines dotted. The 25% integrating core of G. links lines on the edge of the system to some in the centre, in three directions. It approximates the shape of an incomplete and highly deformed wheel, with rim, spoke and hub. The most segregating lines then cluster in the interstices of the wheel to form relatively segregated sub-areas.
Fig. 13 Le plan d'intégration de la petite ville de G. où le 25% des tracés à plus forte intégration est indiqué en noir gras et le 50% des tracés à plus forte intégration est indiqué en pointillé. Le 25% avec la plus forte intégration joint des tracés aux limites du système avec d'autres au centre et cela en trois directions. La forme générale se rapproche de celle d'une roue incomplète et très déformée, avec jante, rais et moyeu. Les tracés à plus forte ségrégation se regroupent dans les interstices de la roue pour former des sous-régions avec une relative ségrégation.

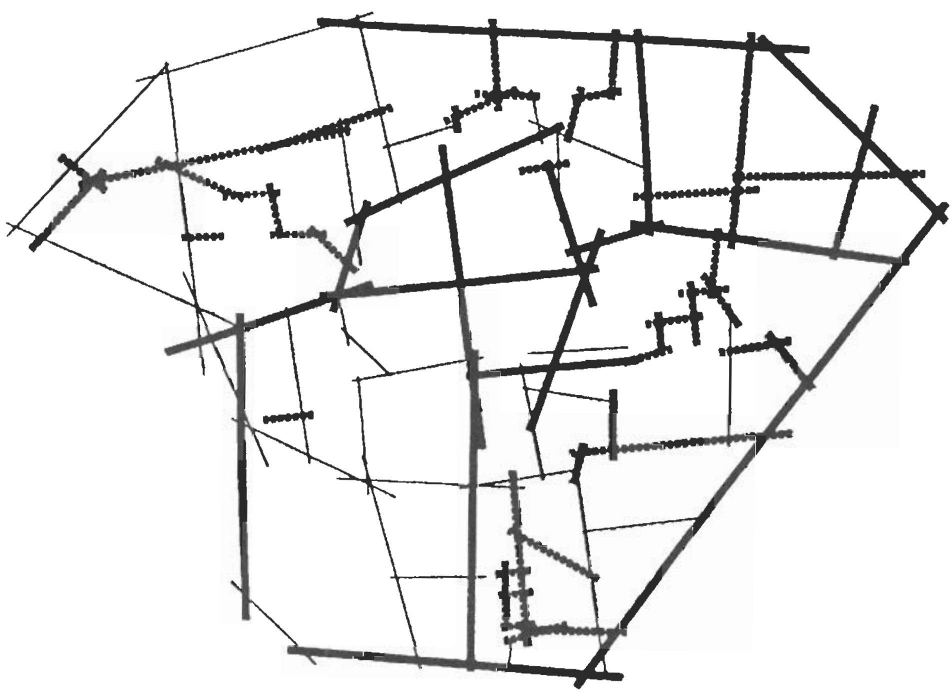

Fig. 14 The integration map of the town of A. showing 25% most integrating lines in heavy black and 50% most segregating lines dotted. It shows a distribution of integrating lines similar to the settlement of G. that link the centre to the edges with the interstices filled by segregating clusters.
Fig. 14 La plan d'intégration de la ville de A. où le 25% des tracés à plus forte intégration est indiqué en noir gras et le 50% des tracés à plus forte ségrégation est indiqué en pointillé. Le plan indique une distribution des tracés intégrateurs semblable à celle de la petite ville de G. qui unit le centre aux limites avec les interstices remplis par des faisceaux ségrégateurs.

However, this segregating effect is created while retaining a high degree of connectivity both to the integrating core and to the outside of the settlement. They remain shallow to both.

Now if the principle that axial organisation has more to do with global patterns of movement (it will be shown in a later article that this is indeed the case in "normal" urban systems) [5], then all three aspects of the spatial pattern seem to be suggesting the same conclusion. Shallowness from building entrances, shallowness from outside and the distribution of the integrating core all suggest that the space is arranged so as to facilitate, but at the same time to control, movement through the system - but in such a way that there will be busier, more integrating areas, where more strangers are to be found, and quieter, more segregated areas where inhabitants will predominate. In other words, the picture of the global spatial pattern that people develop ought also be a rough and ready picture of the encounter potential of the system.

The *global* properties of an urban surface can therefore be described by axial organisation and its integration structure. But a more *local* property of the relation of spaces can be captured by taking into account the number of connections between any space and its neighbours. The control value [6] of a space expresses the degree to which a space is better or worse connected than its neighbours: for this reason spaces with a high control value can be seen to be locally strong in so far as they will be well connected to their neighbours, but not necessarily well integrated with respect to the whole system.

By superimposing those spaces which are both *locally* well-connected and *globally* well-integrated it can be seen that a *global pattern* of a town will emerge. G. is typical of traditional towns in that these spaces tend to be the dominant parts of an urban area, where the major convex spaces and public facilities are located. In other words, the major open spaces are aimed at the global system of movement rather than, say, identifying "territorial" groups of inhabitants in the more segregated areas. The global pattern seems, in fact, to have evolved in traditional towns in order to structure patterns of movement and encounter - with a strong bias towards creating and controlling the interface between inhabitants and strangers in the system.

The integration core is probably the most important *deep structure* of the town plan. It will vary from one type of town to another, but can usually be described as some part of the deformed wheel core (which we therefore believe to be fundamental). For example, we find *covering* cores (hub and spokes without the rim), *centralised* cores (hub only), *peripheral* cores (rim only), *penetrating* cores (one spoke and part of the rim), *linear* cores (one series of lines), and so on. Cores of any of these morphological types can then be *localized* in one part of the plan or *globalized* in the plan as a whole; *shallow* or *deep* in the plan; and *fragmented* or *unified* , and so on. Which is used depends on how the town plan is intended to function, and this in turn depends on the social structure.

[5] See the section on the relation between integration cores and patterns of observed pedestrian movement in "creating Life", below.

[6] The measure of control is calculated by a simpler, but perhaps more laborious procedure. Each space has a certain number of immediate neighbours, n. Each space therefore *gives* to its neighbours 1/n, and those are then summed for each *receiving* space to give the control value of that space. In effect each space is partitioning one unit of value among its neighbours and getting a certain amount back from its neighbours. Spaces which have values greater than 1 will be strong control spaces; those below 1 will be weak control spaces.

3. Conclusions

3.1. The no-neighbours model

Once the global principles of traditional and vernacular settlement space are clear, it is easy to see why modern practices are so different: they are the reverse in almost every respect. Instead of continuously relating space to building entrances, entrances are clustered in few spaces with "unconstituted" zones in between. Instead of keeping space axially shallow from the outside, space is made deep, especially where the building entrances are to be found. Instead of making strong axial lines penetrate to the heart of the system, lines are shortened as we go deeper, creating a kind of spiral effect. Instead of integrated but deformed grids we have more segregated, even tree-like structures. Most of all, instead of global structures we have a kind of localization principle: everything is invested in what the local spaces are like, and little attention is given to the global system per se.

It is important to realize that this is not simply the result of higher building, or people living in flats rather than houses. The global principles of the past can survive perfectly well in a system where everyone lives in a flat, just as modern practices continue from high rise estates - admittedly their most extreme form - through into most low rise developments. Nor is it simply the result of the motor car. The transformation began in the middle of the nineteenth century, fifty years at least before the car.

It would in any case be naive to try to explain the new urban landscape in terms of a single, extraneous cause. It is clearly supported by a conscious social ideology of space, one based on the paramount values of hierarchy and privacy. Not only are individuals and families said to require seclusion - which does happen in traditional urban forms - but also local groups of neighbours, whole neighbourhoods and even whole communities are also said to require it above all else - which does *not* happen in most traditional urban forms. The multi-level segregation of the modern urban landscape, often achieved in spite of high population densities, seems to many theorists an ideal to be aimed at.

The spatial consequences of this ideology can be captured in another kind of "justified graph". Instead of putting a space or group of spaces as the base of the graph, we put all the building entrances. Spaces are then aligned above according to how many steps deep a space is from the nearest entrance. If we then apply the principle that each small group of neighbours is to share an exclusive group space, then a group of such clusters is to share an exclusive space, and so on, then the result will look like Fig. 13. We call this - with some exaggeration - the "no-neighbours model", since it has the effect that as you go from your entrance towards the public areas, then you are always as far away from other entrances as you are from your own. Obviously this is quite the opposite to the effect we found in traditional urban form, where you were adjacent to building entrances wherever you were in the system [7].

[7] No system does this perfectly. But we can measure the degree to which it does so by first noting that the no-neighbours model has the form of a pyramid. We can calculate the amount of depth in a system by working out its "integration" from building entrances, then comparing the result with what we would find in a pyramid of equivalent size. A value of 1 will then approximate a pyramid, and can be considered a highly segregative structure. The town of G., for example, is only .2 of a pyramid - fairly typical of most kinds of traditional urban space. This is increased by about a factor of 5 in most current neo-vernacular schemes, and of course by even more in high-rise developments.

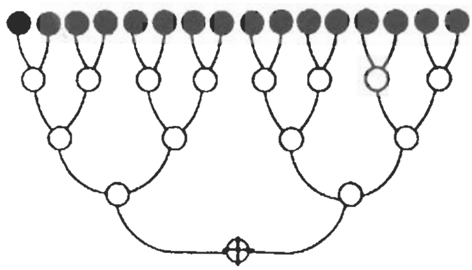

Fig. 15 Diagram of the "no-neighbours" model: it shows that as you go from your entrance towards the public area, you are always as far away from other entrances as you are from your own. This is opposite to the effect in traditional urban form, where you are adjacent to building entrances wherever you are in the system.

Fig. 15 Diagramme du modèle "sans voisins". Ce modèle illustre l'effet suivant: lorsqu'on s'éloigne de sa propre entrée pour se rendre vers les parties publiques, on est aussi éloigné des entrées des autres que de la sienne. Ceci est l'effet opposé de celui qui est à l'oeuvre dans les formes urbaines traditionnelles, c'est-à-dire que l'on est adjacent aux entrées des constructions quelle que soit sa situation dans le complexe.

3.2. Global design

So what does all this imply for design ? It implies that if we want to recreate urban life, then we have to learn to design from the global to the local, that is, we have to start by reading the large scale pattern of an area, then design the internal structure of new developments to take advantage of them - not fixing them forever, but adapting them with understanding as well as good intentions.

Of course, everyone claims to be doing this already. Certainly, no one can design today without at least paying lip-service to questions of global design. But it is rarely realistic. The first criterion of architectural excellence, outside as well as within the profession, remains that of creating discipline and côherence within a scheme. It is strongly enough established to be assumption rather than deliberate policy, and as such it is all the more subtle and far-reaching in its effects.

But it *cannot* have been so deeply engrained in the past since the existence of global structure in urban areas achieved *only* through the way buildings are arranged - the traditional city had no landscaping - shows that part of the design task, whether conscious or not, was somehow to *describe*, through the placing, orientation, articulation and massing of individual buildings, the global structure of the town as a whole.

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