Order and structure in urban design: The plans for the rebuilding of London after the Great Fire of 1666

Julienne Hanson

Dr Hanson is Lecturer in Architecture at the Bartlett School of Architecture and Planning, University College, London. She directs the MSc in Advanced Architectural Studies which works in close association with the Unit for Architectural Studies and supervises a large number of MSc projects. She is also a co-author with John Makepeace of The Social Logic of Space (Cambridge University Press, 1984), and has recently contributed several chapters to the new edition of the Bartlett Sketchbook of Architecture which was edited by John Makepeace (Butterworths, 1987).

In recent years she was the coordinator of the second year design studies at the Bartlett.

Introduction

Whenever we design, whether it be a building, an urban area or a whole town, we tend to choose amongst a number of methods to organize the plan: order, in the sense of principles based on our generally accepted notions of sameness, repetition, and familiarity, harmony and the like. These concepts speak to us directly without mediation, and can be apprehended at once, almost as a gestalt. Because order concepts are formal, they appear logical. Order concepts are one of the main principles that we recognize the architectural imagination at work.

There is a tendency to assume that order yields structure in the experiential reality of the buildings and places we create through architectural structures, and that in the sense of making places intelligible through creating local differences which give both a sense of identity and a grasp of the relation between the parts and the whole, such that we are able reliably to infer the global form from any position within it.

In order and structure exist not the same thing at all. A plan or a bird's eye view represents buildings and places with a conceptual unity which cannot be replicated on the ground because we do not experience architecture this way. Moving about a building or place fragments our experience. We learn to read structure over time, hence, an apparently disorderly layout may turn out to be well-structured and intelligible to its users, whereas a highly ordered architectural composition may in fact be unstructured when we experience it as a built form.

However much we may appreciate order concepts when criticizing architecture on the drawing board, well-structured realities seem to be what matters most on the ground, not least by generating and controlling patterns of everyday use and movement.

This view is argued here by looking at an historical example from urban design: the proposals for the redesign of the City of London after the Great Fire of 1666. If order concepts are one of the main principles that we recognize the architectural imagination at work, then in the case of the City of London the question is: Are they any place in the architecture of the city of the future? To answer this requires an understanding of the city of the past, and especially the reconstruction of the City of London after the Great Fire.

The City of London on the eve of the Great Fire of 1666 was generally held to be the architectural organism, moulded by social and economic processes without the imprint of conscious design. All the accounts describe it as disordered, overcrowded and insanitary. A few houses were tall, from three to six stories high, but were of timber-framed construction built according to regulations first laid down in the eighteenth century. Streets throughout the City were narrow, overflowing with light and airless buildings and closed by open markets. The conditions in the interiors of the urban blocks were terrible, produced by a combination of dirt, open sewers, overcrowding and a maximum coverage of sites by buildings. The main thoroughfares were lined by the most prestigious houses of the merchants and traders from whose activities the City derived its wealth and power. In this way rich and poor lived side by side, and within which was precisely indexed through proximity and adjacency to the main theaters of public life.

This apparent disorder does not mean that the City was a state of decay. On the contrary, continental visitors of the time found it stimulating, vital and even awe-inspiring place which embodied the best of contemporary architecture and experience of the City. The main shopping street of the City, were thronged with customers and were lined through Europe for their cornices. The principal Church of the City was St. Paul's, the main shopping street of the City, were thronged with customers and were lined through Europe for their cornices. The principal Church of the City was St. Paul's, and the Tower. Both are ancient public buildings.

The Riverfront itself is closed off by wharves. North of Cheapside, development is relatively sparse and fragmented. The only large open spaces in the street network surround the dominant buildings of St. Paul's and the Tower. Both are ancient public buildings.

The City of London on the eve of the Great Fire of 1666 was generally held to be the architectural organism, moulded by social and economic processes without the imprint of conscious design. All the accounts describe it as disordered, overcrowded and insanitary. A few houses were tall, from three to six stories high, but were of timber-framed construction built according to regulations first laid down in the eighteenth century. Streets throughout the City were narrow, overflowing with light and airless buildings and closed by open markets. The conditions in the interiors of the urban blocks were terrible, produced by a combination of dirt, open sewers, overcrowding and a maximum coverage of sites by buildings. The main thoroughfares were lined by the most prestigious houses of the merchants and traders from whose activities the City derived its wealth and power. In this way rich and poor lived side by side, and within which was precisely indexed through proximity and adjacency to the main theaters of public life.

The apparent disorder does not mean that the City was a state of decay. On the contrary, continental visitors of the time found it stimulating, vital and even awe-inspiring place which embodied the best of contemporary architecture and experience of the City. The main shopping street of the City, were thronged with customers and were lined through Europe for their cornices. The principal Church of the City was St. Paul's, and the Tower. Both are ancient public buildings.
The integration core of the City (fig. 5) is concentrated in the heart of the commercial center, linking together the two major open public food markets which are known to date back to the Anglo-Saxon period, the western market which runs the whole length of the thoroughfare from Newgate to the Wallbrook with a main focus on Cheapside and the eastern market, which covers a wider network of streets including Eastcheap, Bridge Street, and Cheapside Street and runs along to Leadenhall. These markets are located on or near the principal east-west and north-south thoroughfares by way of the main City gates. The ancient dividing line of the City along the Wallbrook features early within the integration core, as does the street leading up to the medieval Guildhall, the administrative and government center. Bow Lane is also picked up in the south-west, pointing in the direction of the more recently established and more specialized local and produce markets centered around Old Fish Street and Queenhithe.

Raising the core to 10 percent (fig. 6) merely adds the streets adjacent to Cheapside to draw the area of the streets and specialist shops selling luxury goods into the core. Radius three integration (fig. 7) confirms the 8 percent city-wide integration core, but there is an interesting shift away from the north-east and west, and hence away from the Guildhall and the principal residential streets of the wealthiest of the merchants and traders, towards the south-west markets in the area around Fish Street and Queenhithe. Local integration picks out the streets of the everyday marketing system, notable for the way the original market areas follow the center of the Guildhall and the houses of the ruling class of merchant traders.

Segregation (fig. 8) is concentrated around the outskirts of the City, picking up the area around the Tower in the east and the sites of Bank Hall and Montfichet's castles to the south-west of St. Paul's and then consolidating them into two large continuously segregated areas. These were the places where the monastic establishments found their bases in the large trading cities after the Norman Conquest of 1066, and it would be tempting to associate these "alien" implants with the distortion of the grid away from these areas. This is the northern fringe of the City is also relatively segregated, but there is not the same amalgamation of lines into segregated zones. The largest zone of segregated lines is in the extreme north-west of the City, on the site of the Roman fort. Segregation elsewhere is largely confined to the hinterland of some of the largest of the urban blocks which even at this time of extensive development were laid out as orchards and gardens.

In addition to this, a second possible account of this distribution of segregation. Within the center of the City, there is a very little segregated space indeed. The most coherent features of a considerable pattern is produced by the freestanding parish churches. Typically, these front onto a main street but are surrounded by more segregated alleyways whose purpose is to dissociate the church from its profane neighbors and to set it slightly apart. The peripheral segregation matches closely the distribution of monastic foundations within the City, and it is tempting to think that the monks and friars initially selected those locations for their houses which offered them relative seclusion from the hustle of everyday life.

Insular as integration is a precise index of the degree of space occupation and use. It is clear that the integration core of the City renders the commercial streets shallow and accessible to both the citizens and strangers from the outside. It constructs a dense and continuous trading interface within the heart of the city which to the medieval equivalent of the department store. The apparent visual disorder of the street grid is not symptomatic of an absence of spatial structure.

The first competition design

The story of the Great Fire of 1666 is a familiar one which will not be rehearsed here. What is less well-known is that as a result of this devastation, a number of designs were prepared for the rebuilding of London which, taken together, represent the earliest and possibly the most significant designs for the rebuilding of a major English town which exist. Furthermore, a comparison of the proposals reveals striking differences in the conceptions of a town held by the various authors, concepts which can still be found today in urban design discourse. Two of the plans, those by Wren and Evelyn (figs. 9 and 10), are generally held to be a product of an architectural imagination while the remainder of those which survive, by Hooke, Knibb, and particularly by Newcourt (figs. 11, 12 and 13), are ascribed to the domain of planning. This is made on the basis that the former appear to be more concerned with the laying out of buildings, aesthetics, and function while the latter are a product of functional requirement, the analysis of social processes, density, economics, and workability. In terms of the structure-order distinction outlined above, it is clear that all the plans are derived from order concepts, but that they differ in the degree of complexity involved.

The absorption of the designs reflects the extent of the bias towards order in the plans, singling out those which use a more complex set of order concepts as belonging to architecture and those which use a single generating idea as the precursors of modern towns planning. Consensus on the origin and focus of the concepts used to generate these town forms co-exists with a vociferous discussion as to the main criteria of the various plans proposed for the rebuilding of London, as compared with the medieval City of the City as it was rebuilt and recorded in 1676 by Ogilby and Morgan.
A transcription of the five plans into public open space maps - all with a 100-meter scale indicated. Fig. 11. Transcription of the plans for London prepared by Hooke, Knight (r.), and Newcourt (l.) into open space maps. Each of the plans except those of Newcourt and Hooke, which present the City area and its open spaces, were drawn in stages: first in terms of the area of the City within the City walls, to facilitate comparisons with the City itself; secondly, the whole City is considered, and lastly, the City in relation to its surroundings.

The plans are introduced and compared in terms of the open space patterns of open space and then analysed syntactically.

- Hooke's plan shows a square orthogonal grid punctuated by four major squares in which buildings or fountains were to be placed.
- Knight's plan is based on a grid of streets, with the City divided into blocks of equal size.
- Newcourt's plan is more complex, with a system of canals and a network of streets.

The plans are compared in terms of their open space patterns, with particular emphasis on the relationships between the City and its surroundings.

The City of London is divided into several districts, each with its own character and functions. The City is surrounded by a wall, and the open spaces within the walls are organized around the major streets and squares.

The City of London is surrounded by several parks, which provide open space for residents and visitors. The parks are connected by a network of paths and footpaths.

The City of London is well endowed with open spaces, which are used for various purposes, including leisure, recreation, and transportation. The open spaces are well-maintained and provide a pleasant environment for residents and visitors.

The City of London is a model of efficient open space planning, with a well-defined hierarchy of open spaces that are easy to navigate and provide a variety of amenities. The City of London is a great example of how open space planning can be used to enhance the quality of life in a city.
phasing the importance of these items in the daily diet of the day. The north-south streets again have a mixture of open spaces and intersections, consisting of parks, gardens, and squares.

The initial impression of Evelyn's plan is one of an attempt to make each road intersection a unique combination of open spaces, public buildings, and streets. This is evidenced by the careful selection of routes and the articulation of the space of the plan, rather than by blocking the most important road intersections. In this respect, the views and the buildings in the plan are obscured. Moving about the City, one would be aware of moving from one important building to another. This plan, along with Evelyn's other works, highlights the concentration of public buildings and the intersections of the streets. As Evelyn himself says, it is not possible to pass through the City: "in all ten without variety, unsuitable crossings and intersections in public space, which ought to be built of stone and to have a beautiful front. Nor should these all be at the corner, but some of the sides, circular, and oval figures, for their better space and capacity. I would allow some of the principal streets to be less than a hundred feet in breadth except in any of the principal places of the City." Within the islands, Evelyn envisaged further developments taking place, including a system of lanes parallel to the streets, which would be necessary for the execution of these necessary to the proper execution of his design. So, here, as before, the plan is incomplete, but this time it is incomplete by the absence of the interiors of the "grand design" which are missing.

Compared with the plans of Hooke and Knight, Evelyn's plan is more basic in the layout of the principal streets, but it adds a kilometer of streets cutting the spaces of the plan with a directness in articulating the streets into a system of narrower and wider streets. Moreover, Evelyn's plan may have been intended to remain as an open space because of the obstructing bulks of two churches. Within each block, four roads converge on the nave of the church, with a line of trees surrounding each church (an arrangement identical to Hooke's "embroidery of St. Paul's in the center of the island block"). This has been raised to a general principle for the design of urban plans. The plan divides itself into a grid of thoroughfares running in both directions right across the city, a secondary system of end-stopped roads running from church to church, and a tertiary system of shorter roads in the hollows of the city. The city blocks are outlined by a series of streets and cross-roads to the outside of the block, as has been described. Like his contemporaries, Evelyn intended to use the streets of the City as public buildings, and to provide an appropriate relationship to the buildings and the surrounding city blocks. The streets are narrow and wide, with arcades on one side and with open spaces on the other, providing views which Evelyn blocks off.

Apart from its almost perfect geometry, the precise positioning of the streets, the careful selection of the primary and secondary features of Evelyn's plan is the same scale of the grid, but with a V-shaped formation continuing the line of the streets through the whole block. Each block, newcourt, lined, was to have the population of a parish, each minor square, a street, while the open squares, churches, and the central square was the location of public life of the entire City.

Comparison of the five plans

To summarize the approach to town, a visual inspection of the post-Royal Exchange plans reveals the following points of comparison and contrast. The commonality of the plans lies in their attempt to arrange buildings in a manner that grants their conceptual clarity. However, the way in which they project the idea of the City is markedly different in each of the plans:

- Hooke's plan is a geometrical city. It is based on a regular orthogonal grid. It displays a combination of long vistas and squares. Hooke's city is divided into a grid of streets and squares, which are traversed by the thoroughfares and the minor streets. The buildings, St. Paul's, and the Guildhall, are located within the island and are not associated with the major public spaces. The plan is characterized by local public buildings, the parish churches, are associated with almost all the east-west crossroads, but not placed at intersections with the major thoroughfares.

- Knight's plan appears to be more like the City of London, with a hierarchy in the size, length and general penetration of routes which is parallel to a hierarchy of size of public squares, which in turn relates to a hierarchy of public buildings. Those used by the entire population of the City are located in the main square where the generator of major thoroughfares coincides with a greenbout.
The Table 1: Characteristic measures for comparison of the changes envisaged by the five post-fine plans

| Plan Name | Number of existing buildings | Number of buildings to be added | Number of buildings unaffected | East-west extent of plan (m) | North-south extent of plan (m) | Movements
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Leake</td>
<td>575</td>
<td>98</td>
<td>196</td>
<td>964</td>
<td>972</td>
<td>468</td>
</tr>
<tr>
<td>Ogilby-Morgan</td>
<td>797</td>
<td>113</td>
<td>48</td>
<td>964</td>
<td>972</td>
<td>468</td>
</tr>
<tr>
<td>Knight &amp; Morgan</td>
<td>84</td>
<td>123</td>
<td>37</td>
<td>964</td>
<td>972</td>
<td>468</td>
</tr>
<tr>
<td>Elphinstone</td>
<td>94</td>
<td>134</td>
<td>28</td>
<td>964</td>
<td>972</td>
<td>468</td>
</tr>
<tr>
<td>Snowell</td>
<td>72</td>
<td>92</td>
<td>34</td>
<td>964</td>
<td>972</td>
<td>468</td>
</tr>
<tr>
<td>Newcourt</td>
<td>74</td>
<td>104</td>
<td>30</td>
<td>964</td>
<td>972</td>
<td>468</td>
</tr>
<tr>
<td>Meadmore</td>
<td>795</td>
<td>110</td>
<td>196</td>
<td>964</td>
<td>972</td>
<td>468</td>
</tr>
</tbody>
</table>

The varied distribution of segregation among the five post-fine plans indicates a measure of independence of order, geometry, and integration. It seems that there are two principal ways of raising the overall degree of asymmetry within a plan. The first may be considered more a global feature of the plan since it results from having different numbers of integration cores and large areas of contiguous segregated areas, either surrounding or segregated by this core. This suggests that the small, shallow local feature of the plan, in that small clusters of segregated areas are distributed throughout the plan so that they do not cohere among themselves.

Another way of looking at it might be to consider the first as being segregation in relation to the core, and the second as formation. These differences are gained substance when the shape of the cores is looked at in more detail.

Method of cores

In considering the organization of the integration cores and segregated areas for the five designs, the following are to be noted.

1. The integration core of the Hoekse plan (Fig. 18) is composed of five segments. The first of these is the main cross-
2. City route from Holborn to Aldgate, and the second is the rest most southerly east-west route. Between them, these cross the two major building blocks of the plan. St.
3. Paul’s and the Guildhall, and in the latter case the square in front of the Guildhall is actually traversed by the same.
4. Most other major blocks in the plan have their own small core.
5. Finally, if the mean depth (mean integration) of the system from all points is compared to that for the City as it existed historically, with the notable exception of Ely’s plan, there are not so many integration cores. But whereas in the case of the historically-affected area, much of the depth is accounted for by the present and the less densely developed in the Backland area of blocks, in Ely’s plan it is accounted for in the geometric heart of the City by the square of the major grid streets. The increase in mean integration in the remainder of the designs is a reflection of the imposition on average more regular orthogonal grid in the designs.

Open squares adjacent to the riverfront, and the fourth line lying along the Bank of England, which links the City with Westminster, to the public open space at Tower Hill. The new river frontage completes the east-west links in the core. The final two lines of the grid run in the north-south direction. Strikingly, these do not correspond to any major cross-City routes, but unlike those running in the east-west direction, rather than from the inside of the City wall to a new landing stage on the river, passing through either route of the new Guildhall building and thus completely encircling it with integrating lines. The shape of the integrated core as a whole is, therefore, asymmetrical in the geometric sense, and is directed more to the east of the City and the riverfront than to the north and west. This is despite the fact that the major integrating line is the most northerly. The spread of the core is, however, not completely on the same channel of movement, which varies in width across the river.

Within the design of the major grid roads is slight. There are differences in the way in which the movement occurs, at different levels and in different directions, particularly in the east of the City, despite the tip service paid to "integrate" it with the surrounding areas. To achieve integration across the river, joining streets together but rather some recognition of street alignments to be made, as is the case in the west of Hooke’s design.
This density of integration is bought at the expense of extensive segregated zones at the periphery (Fig. 19), which include almost all the area to the east of the Bishopsgate to London Bridge route where the majority of the largest axial lines in the design are concentrated, as well as a zone close to the river in the south-west at Blackfriars and a third large contiguous group erupting around the north-western perimeter and extending into the underdeveloped areas within Knight’s map. Whilst all these areas were relatively segregated historically, this effect has been greatly exaggerated in the case of Knight’s design. Moreover, the integrating core completely fails to reach the perimeter at any point in an east-west direction, despite the apparent east-west orientation of the design.

The effect of adding the area of Knight’s plan outside the walls toinclude “holes” between groups of integrated streets (Fig. 20) and to expand the integration core over a wider area of the City (Fig. 21). The area traversed by the core shifts westwards away from the Bishopsgate to London Bridge route to include the line passing across the west front of St. Paul’s and three streets immediately to the south of St. Paul’s, so that the cathedral is drawn into the center of the grid of shallow and accessible lines. Moreover, part of the river front is also drawn into the core. If one were to envisage the north-south routes compressed to the same distance apart as those running east-west, i.e. a dimensionless drawing of the core, then the core forms an irregular S-shape of well-integrated routes which connect St. Paul’s at their center but which fail to reach the periphery of the City in any direction.

The 50 percent segregation map (Fig. 21) is even more striking. Despite the move by the integration core in a westerly direction, this has very little effect in integrating these areas of the design outside the walls to the west of the City. The area added in the west is all segregated. The effect is to produce two extensive segregated zones on either side of the geographic center of the plan.

So far as rendering spaces accessible as destinations for all other spaces in the system is concerned, the principal effect of Knight’s layout seems to be that the City is divided into three clear areas: a central relatively accessible area with eastern and western sections which are completely inaccessible. More than any other, Knight’s plan illustrates the futility of continuing order principles with those of structure. The unimproved nature of his street grid actually serves to conceal the profound differences produced in the way in which individual streets are related to one another; so that at no point can the Thames be seen directly from the northern boundary of the built-up area of the City, but it is also true in the east-west dimension where the idea that the streets follow the curve of the river does not explain the precise way in which this is achieved by realigning streets in small groups at several points along their length.

The effect on the way space is structured means that streets are arbitrarily privileged or disadvantaged with respect to the configuration as a whole: arbitrarily because this makes sense neither in terms of the generating concept of the model – as throughout the City, not in terms of any attempt to acknowledge and organize relations between incoming routes and important destinations with a third large contiguous group erupting around the north-western perimeter and extending into the underdeveloped areas within Knight’s map. Whilst all these areas were relatively segregated historically, this effect has been greatly exaggerated in the case of Knight’s design. Moreover, the integrating core completely fails to reach the perimeter at any point in an east-west direction, despite the apparent east-west orientation of the design.

The effect of adding the area of Knight’s plan outside the walls to include “holes” between groups of integrated streets (Fig. 20) and to expand the integration core over a wider area of the City (Fig. 21). The area traversed by the core shifts westwards away from the Bishopsgate to London Bridge route to include the line passing across the west front of St. Paul’s and three streets immediately to the south of St. Paul’s, so that the cathedral is drawn into the center of the grid of shallow and accessible lines. Moreover, part of the river front is also drawn into the core. If one were to envisage the north-south routes compressed to the same distance apart as those running east-west, i.e. a dimensionless drawing of the core, then the core forms an irregular S-shape of well-integrated routes which connect St. Paul’s at their center but which fail to reach the periphery of the City in any direction.

The 50 percent segregation map (Fig. 21) is even more striking. Despite the move by the integration core in a westerly direction, this has very little effect in integrating these areas of the design outside the walls to the west of the City. The area added in the west is all segregated. The effect is to produce two extensive segregated zones on either side of the geographic center of the plan.

So far as rendering spaces accessible as destinations for all other spaces in the system is concerned, the principal effect of Knight’s layout seems to be that the City is divided into three clear areas: a central relatively accessible area with eastern and western sections which are completely inaccessible. More than any other, Knight’s plan illustrates the futility of continuing order principles with those of structure. The unimproved nature of his street grid actually serves to conceal the profound differences produced in the way in which individual streets are related to one another; so that at no point can the Thames be seen directly from the northern boundary of the built-up area of the City, but it is also true in the east-west dimension where the idea that the streets follow the curve of the river does not explain the precise way in which this is achieved by realigning streets in small groups at several points along their length.

The effect on the way space is structured means that streets are arbitrarily privileged or disadvantaged with respect to the configuration as a whole: arbitrarily because this makes sense neither in terms of the generating concept of the model – as throughout the City, not in terms of any attempt to acknowledge and organize relations between incoming routes and important destinations within the City.

Three concentrations in the points where streets change direction are worth noting. However, because they suggest that Knight may not have been completely indifferent to the historically evolved City, but rather that his understanding was emphasizing a representation rather than an experiential level of reality. The whole of the eastern area beyond the road from Bishopsgate to the City is segregated because Knight consciously breaks the east-west street grid at this point, perhaps articulating some half-formed notion that the areas to the east were becoming less important and maybe less socially desirable. A second concentration of breaks in axiality is at the north end of the Tower of London, the ancient dividing line of the City. The third group is different from the previous two in character because the axial shift in east-west emphasis does not coincide with the line of a north-south street. Street alignments in the block adjacent to the Roman wall are shifted to acknowledge the direction of streets on the far side of the City walls but without any attempt to create access. This suggests that the relationship between the inter-mural City and the western suburbs is best handed. Whereas integration seems arbitrary and unrelated to use and movement within the City, segregation may reflect some deeper layer of structure which identifies the apparent east-west order which gives visual unity to Knight’s design.

Evelyn’s plan for London will also be examined in two stages. The design for the area within the walls contrasts with the previous two cases in that the 50 percent segregation core (Fig. 22) hugs the river frontage and the perimeter, and is completely embedded in the geometric heart of the built-up area of the design. The first line passes through an internal route which runs parallel to the river and is completely surrounded by large squares, but it does not pass any major buildings, of which there are many in the plan. The second line runs north from Billingsgate on the riverfront to Bishopsgate in the northern wall, crossing these two routes at right angles. The two main streets, running from the major open intersection in front of London Bridge to strike St. Paul’s in the west and St. Dunstan’s in the east. The 5th line runs north-west parallel to the Fleet River, just inside the western walls, to breach the northern boundary of the City at Smithfield. The 7th step adds a line just north of the river frontage which links across the Fleet into the devastated area outside the walls, and the 8th a south-south-west line running clear along the bank of the Fleet to mark the western boundary of the City. The design on the periphery begins to fill in on the fourth side of the square with line 9 which pushes west from Bishopsgate to reach Christ’s Hospital and Church which are located in a major intersection to the western walls. The final line in the segregation core links the Royal Exchange on the waterfront with the Murray’s house in the center of the City. Thus at 10 percent of lines, the integration core appears to almost completely encircle the City close to the perimeter, since within the area that relates this encircling band to most of the most significant religious and civic buildings. However, it does not perform as a normal city core nor, instead, as do the cores of historic London in that it completely fails to penetrate to and cross the heart of the City with strong integrating lines. Thus Evelyn’s plan has created a situation which is difficult to reconcile from a common sense point of view. His design is one in which the edges of the City are shallower to all other places in the plan than the center, despite its relatively compact shape. This kind of core is the defining feature of many "estates" forms today.

This is confirmed by the 50 percent segregation map (Fig. 23). This map shows that, despite its proximity to the most integrating line in the core, the whole of the river front along the east side of the City and all markets is segregated within the City fabric. A second major group of segregated spaces is found in the Tower of London, which is almost completely separated from the rest of the City by large open areas dominated by large squares, but it does not pass any major buildings, of which there are many in the plan. The second line runs north from Billingsgate on the riverfront to Bishopsgate in the northern wall, crossing these two routes at right angles. The two main streets, running from the major open intersection in front of London Bridge to strike St. Paul’s in the west and St. Dunstan’s in the east.
public buildings as destinations within the City fabric—what we might call the "Barbican effect." The routes which "work" best are those which are unimpeded by public buildings. Whether intentionally or not Evelyn has, by his decision to elaborate the interspersions of his grid by endowing them with free-standing public buildings which block the vistas, produced a City which works "inside-out" with a small, peripheral ring of long thoroughfares surrounding a more segregated heart in which views run direct from building to building, but movement is indirect and diverted around and away from them.

This effect is so powerful that it is very little altered by extending the scope of the analysis to include the devastated area outside the walls. The effect on the integration of the City is such that it seems probable that one integrating line in the area outside the walls, striking into the center of the octagon from a position west of the Fleet at Smithfield and reversing the directionality of the integrated periphery from east to west towards the Guildhall, with a heavy concentration of integration in the area of the Fleet River around Blackfriars—historically segregated. Apart from this line, nearly all the remainder of the large octagon to the west of the City is segregated (fig. 26). The sheer weight of numbers of the segregated lines in this area has the effect of reducing those within the City itself. The major public buildings on the riverfront remain segregated but less continuously so and St. Paul's leaves the segregated zone entirely. Nevertheless, the group of major public buildings including the Guildhall, Christ's Hospital, St. Dunstan's in the East, a number of parish churches, and many of the markets, large public fountains and the Mayor's House are still all strongly segregated.

Adding the octagonal suburb to the west of the City walls therefore modifies Evelyn's design rather than transforms it. Indeed, it modifies it rather little when it is considered that the plan is thereby enlarged by about 25 percent. This is because the area added is so strongly cut off from the remainder of the City and is a largely independent part of the "broomed" intersection device used by Evelyn throughout the central area of the City. The extramural suburb seems to work more as an area of integrated activity in connection with the major modifying force within the design.

The order concepts which make Evelyn's design so visually attractive are in an important sense self-defeating.

Wren's plan, therefore, differs markedly from Evelyn's in its coverage and density of integrated lines in the area within the walls. The integration core strikes right through the heart of the City in all directions, with major cross-City thoroughfares. All of these pass by major buildings or through large plazas. At the same time, the fine grid integrates the Royal Exchange directly into the "nave of the town"—with key commercial facilities on the waterfront. Where the grid strikes the buildings it is integrated into the City and the major cross-routes. At the same time, it produces a strong concentration at integrating lines in the commercial heart of the City, but again directly linked to the gates and the bridgehead, unlike Evelyn's. Where these lines are directly to the bridgehead, the gates and the main cross-routes. At the same time, it produces a strong concentration at integrating lines in the commercial heart of the City, but again directly linked to the gates and the bridgehead, unlike Knight, who produced a more complex and more complete concentration at the expense of creating large segregated zones at the periphery of the City.

Wren's plan contains few such segregated lines (fig. 27). Most of the segregated lines, particularly in the central areas, are segregated "singletons"—isolated, short, secluded streets running between the longer and more axially and more slender grid lines. In making his churches free-standing within the blocks, Wren also creates, at intervals, a flange of more secluded streets which runs roughly parallel to the "embellished" facades to the sides and rear (fig. 27). Only in one place do these lines of "rear access" begin to aggregate together with those passing across the principal facade to form a more extensive zone of segregated lines. This occurs to the south of the Royal Exchange. Here, where the Cathedral is at all strongly segregated are the lateral streets ringing the Royal Exchange are segregated. A second wedge of segregated lines is to be found to the rear of the Royal Exchange running northwards towards London Wall. Thus, the Royal Exchange is well-integrated with the City as a whole, but it is segregated with respect to its immediate neighborhood. Its global orientation is not accompanied by local prominence. There is a slight build-up of segregated lines towards the western boundary of the City, but this is not pronounced compared with the other designs, nor indeed with the City as it evolved historically.

The addition of the spaces in the fire-damaged area outside the walls results in a shift in the concentration of integrated streets (fig. 28) towards the west, becoming particularly dense in the area west of St. Paul's. The waterfront enters the City to the west of the Fleet. A fine line runs right through the heart of the octagonal suburb to meet this new axis and fill in the orthogonal grid between the east front of St. Paul's and Wallbrook. Two lines are added to the grid in this direction, one to link it directly to London Bridge and a second to give a second north-south integrated through-route to the west of the Exchange.

Looking at the shape of the cores, it can be said that...
while Evelyn and Vernon share a common idea of what constitutes order in design, a common motif in the use of the major public buildings to articulate the overall pattern, a common appreciation of the value of a network of streets, a common interest in radial orthogonalities, and even a common preoccupation with the relationship between the major public building and the organization of the street grid, from the point of view of structure this is where all similarity ends. Both in terms of the organization of their respective plans within the walled area, and in the way in which the extra-mural parts are related to the design of the walled City, the two could not be more different. Vernon's plan takes the principal features of the medieval City and projects them into reality, which is both well-ordered and well-structured.

The changes which he makes with respect to the medieval plan may not, therefore, be completely consistent with the old City's policies or the new City's policies, but the result is an overall coherent and deliberate intention, notably the reorganization of the Guildhall into a lower structure and the elevation of the Royal Exchange into a prominent feature of the design, both from the point of view of order and that of structure. It is conceivable that he may have detected the gradual shift in the focus of economic and political power from the Mayor and Common Councils of the City, the tradesmen and merchants of the street-oriented market economy, to the bankers and traders who frequented the Exchange and whose activities the City's wealth was in the ensuing centuries increasingly more dependent on.

**The final design.** By Newcourt, it is similar to that of Hooke in that it covers a larger area than the old walled City. As with Hooke, the plan is examined in its entirety. At 10 percent of the best integrated lines (fig. 30) Newcourt's plan clearly picks out the major grid of thoroughfares. The effect of the extreme regularity of the design is also reflected in the tendency to place the major streets in the same way that the other plans were located at the same time. The grid streets run through the center of the plan and sweep the whole of the integrated area from the north to the south, whereas Newcourt's scheme from reproducing the hierarchy of spatial elements referred to earlier, as a syntactic hierarchy of banded values from relative integration to relative segregation.

The development of a geometrically centered at the level of order produces a tendency to homogeneity in the structure of overall design. By 10 percent of the integrated lines the core picks up all the major streets, including all the streets which intersect the major central square and the two smaller squares, and the smaller squares in the lower central square, and the distribution of the streets again reflecting the non-completion of the grid by the major church.

The map of 50 percent (fig. 31) then picks out the local streets in which the parish churches are situated. Most of these are completely encircled by segregated streets, but in the vicinity of the most integrated through routes these are only partially encircled by segregated streets. Unlike the other plans looked at so far, where secluded spaces are found directly connected to the major thoroughfares as defined by Wren's radial streets and roads, the segregated streets do not, on the whole, connect integrated spaces but are meditated by intermediate areas which are neither particularly shallow nor deeper than the mean. This distribution of relative

---

of a generation of post-war planners. Evelyn's preoccupations with leading individuality to the local intersections of streets, while ignoring the way in which these are configured, have been analyzed at length in the City's preliminary report, which notes that Wren's is a syntactic solution in the spirit of the Hamburger model, in which the free flow of traffic and the internal self-contained urban block. That is, the case suggests that there are fewer strategies available to the designer of urban space than those available to the designer of the grid. That these are generated by the logical possibilities for design at least as much as by the particularities of historical circumstances.

**The phoenix arises.**

The process by which the City was reconstructed in the 18th century after the Great Fire has been well documented elsewhere. From the point of view of the public space structure, which resulted from the rebuilding, a visual inspection suggests continuity with the pre-fire period (fig. 32). The Roman walls still present an obstacle to movement in and out of the City by channelling traffic through the City gates. The disorderly appearance of the urban block which makes up the fabric within the walls remains, and the island blocks perpetuate the variety in shape and size and composition which was a feature of the pre-fire City. With the introduction of a new grid of streets and the adoption of a true grid plan after the Fire, the City has actually become more pronounced as the level of resolution and detail in the plan has risen. The street grid shown in the open space map (fig. 33) is highly distorted and irregular. The clearance of market areas from the major thoroughfares has achieved by the post-fire reconstruction and the City is rebuilt in accordance with a road widening and straightening program. All this is achieved without any major displacement in the complex network of land ownership and property ownership which had shaped the physical form of the medieval City, thus, although some streets which were designated as major thoroughfares were substantially widened and minor thoroughfares were made of arcade structures, only 14 ft wider (approx. 4 m) there is no attempt in the rebuilding to geometrize the City in line with the principles of town planning exemplified by the set of ideal plans looked at earlier and the plan of the City published a decade after the Great Fire by Ogilby and Morgan displays a remarkable continuity with the earlier map.

The complete axial break up of the City at the time of Ogilby and Morgan is shown in figure 34 and the sub-set of thoroughfare streets is shown in figure 35. This map, roughly speaking, picks out the structure of streets, lanes and alleys from that of closed courts and yards and presents a realistic picture of the complexity of the public street network of the City of London at the time of the Restoration. The addition of a new strip of shrubs waving down the river can be picked out and the hinterland of the blocks to the north of Cheapside is much more fully developed, but the preservation of a family likeness with the medieval City is striking, particularly when the longest and straightest axial lines are compared. However, identity in general shape does not necessarily guarantee the reproduction of a particular connection of streets, and any differences in configuration brought about by the post-fire reconstruction are best considered in relation to the rebuild-up and the overall shape of the integrated space. Figure 34 shows the integration core of the City at 96 lines, the same number as shown in the Leake core (fig. 6) and just 3 percent of the area of the original 1,000 lines in the plan. As a result of its straightening Cheapside has moved into the most
The integration core of the City in 1676 is relatively restricted in its size and scope. It reaches the edge of the City at only one point, London Bridge. The mode of growth of the core is through a series of waves of expansion, where long axial lines push the coverage of the core out from the center, followed by consolidation where lines are added to fill out the density within its established coverage. The thrust of the core is axialistic; loaded towards the south and east. Compared with its medieval counterpart, it is more airy and more evenly distributed through the center of the City. St. Paul’s in the west, the Guildhall in the north, and the Eastcheap Market at Cornhill all acquire concentrations of well-integrated axial lines. The siting of the Royal Exchange at Cornhill ensures its accessibility.

The 50 percent segregated map of the 1676 City (fig. 38) is equally revealing. First, there are still almost no segregated spaces in the heart of the City between St. Paul’s and the north-south route from Bishopsgate to London Bridge in the area south of the Guildhall. Those which exist are isolated singletons or small groups, distributed across the surface rather than forming clusters of segregated lines. In the area close to the walls, the converse remains the case. There are no lines which are more integrated than average and those which exist are singletons rather than clusters of connected shallow and accessible streets. Blackfriars, the Cheapside area, the streets to the rear of the Guildhall, the north-east corner of the City and the vicinity of the Tower are all strongly segregated, as is the new market at Newgate to the immediate west of St. Paul’s. The effects of the pre-fire plan are exactly reproduced.

If it might appear from this that little changed with the Great Rebuilding. This is an understandable inference from looking at the structure of the street grid of the City. The urban grid seems merely to have been finetuned, and the opportunity taken to increase the prominence of major buildings. Both syntactically and visually. However, this view does not survive inspection of the built form of Restoration London and morphological continuity is accompanied by a radical transformation in the appearance of the City both in public and in everyday buildings. Order concepts found a place not in plan but in elevation, and the City of Restoration London presented of urbanization which is given by the pattern of streets and urban blocks rather than by addressing those features which are immediately available to visual inspection. For the most part this results in a negative disconnection which identifies and focuses upon what is absent in organic cities — lack of order — rather than what might be present. This is no less true with visually well-ordered...
designs where the very transparency of the visual order and geometry of the city is in question, the question is never out of plastic space a matter of an assumed inability to contain the complex overlapping realities. There is another way. Resolving a structure from a level analysis, investigation leads to a situation of formal manipulation, the shapes made at the drawing board are capable of translation into well-structured and therefore liveable urban places.

Cities like the City of London which grow up by accretion are like paintings in which different identifiable ordering principles but they may be well-structured. Planned cities may be more obviously ordered but is often more difficult to discern than its absence is indicative of chaos. An understanding of both, looked at separately and together, is a necessary step to unify the field of urban morphological studies. Looking at cities in this way may even make the terminology of the "natural/artificial" debate obsolete.

Both cities and the unhappy diseases of all urban configurations. The problem is not to classify them in terms of "either/or" but to capture the degree to which either or both are necessary to make a working, pleasing town. Because they are different dimensions of the morphological field, rather than opposite poles of an either/or dichotomy, they do not necessarily work hand in hand or in opposition, to create different kinds of town. When's plan reproduced much of the structure of the Romans and their plan of the Thame.

Leach's plan was commissioned by those responsible for the rebuilding as a basis for scaling the ideas of the Times, and as a means of providing a new arrangement of theThames and the layout of the 140 acres of the Fire. It does not record every alleyway, but the main and the important streets are marked. The burned area is portrayed as a more conventional map view.

The idea that this was the lowest bridge point of the Thames is a matter of record but the story of the stairs is not.

This was a minor area which could only be negotiated by shallow steps. The City had 108 churches shown hatched on Leach's map, each a focus of a small spatially defined parish community. Only three of the number 20 public or trade associations, shown as steeles on Leach's map, which drew members from the citizens of the City. A map of the City shows where the houses probably in order of spatial structure almost arbitrarily so that had been built, the working life of the town would have undoubtedly been shorter. The facts are that the effects of the two were actually opposed, so that the very places where he envisaged that the public life of the buildings would be crowded, he has found the noblemen and the great companies the City were displayed.

Integration in a mathematical manner that expresses the extent to which a street or area lines all other streets it is to be considered. This is the most important of the three measures which are included. A 5 percent increase in cost is shown here.

The rigidity of all the gloved activities at which the magnificence of the Lord Mayor and the Twelve great Companies of the City were displayed.

In the map a measure which indicates a level integration up to three spaces around every root space, it shows which spaces have a level integration. When the first Jewish colonies were founded in London in Norman times, providing the only source of ready capital for the nouveaux riches left to the 12th century. These were held in a level area and in the vicinity of the Church of St. Paul's.

St. Paul's began as a monastic foundation, and the monasteries and churches which arrived in London during the 12th and 13th centuries were supported by wealthy citizens, including those previously occupied by the Norman castles in the south-west. The south-western area thus became a place where space was everywhere considered a commodity and brought to life, and as a result it acquired the reputation of being one of the most valuable and coveted areas of London until that right was revoked in 1937.

The City was at least one other plan proposed by Peter Mills, the Surveyor of the City, which is unfortunately no longer available. The first London plan is the earliest surviving representation of the Roman Wall, but this was clearly not a product of the design so much as a constraint imposed by the existing sites used for buildings.


There was a plan for a perfectly regular orthogonal grid with the same number of streets by the formula: L = L₀/T, where T is the number of axial lines in the system and L₀ is the number of axial lines in the system. The result was between 0 and 1 with high values favouring a grid and low values favouring linear.

Mean integration from all lines, looking in all cases just at the set of thoroughfares streets and omitting long deepening effect of dead streets.

The limiting case is a perfectly regular square orthogonal grid, it would be exactly the same as his plan of London.

10. Spatial integration is pan 10 percent of lines in all cases except where otherwise stated.

Integration is the best index of the relative success of a plan. Inspection of the plan and integration of the street system. Studies of a large number of towns from all parts of the world show that the best plans are those in which the (and through movement are largely determined by this variable, which is defined as the accessibility of a space as a destination factor.

A proposed model by Mary Douglas, in Rules and Meanings, is an advance in this direction.

The cattle market and slaughterhouse of the City which was located just to the north of the walled area.

The site is the location of a new station is on the line connecting the two.

The Bishopsgate area was beginning to decline in importance at the time, known for its famous International Art Centre, and it was generally seen as a barrier to trade between the East End of London, a large crowded and industrial suburb. This shift forewarned of the changes of the next few decades.

The opposite direction to Leach's plan.

The Barbican is a recently built cultural complex just outside the City which is notoriously difficult to find and negotiate as a stranger to the area.

The River Thames is a dramatic phenomenon already noted in the medieval City.

Again, an artifact of the non-completion of the grid which is a reason for the high streets and the fact that what would otherwise be a highly repetitive design.


The site of the Fire of London (London: Historical Publications Ltd., 1856).

The Barbican area had been erected on a site some had shaken as little as 11 ft.

Charles II had returned from exile on the Continent in 1660, to take the throne which his father lost to Cromwell. His return was against the wishes of Parliament and he was initially sympathetic to the idea of a new layout for London and St Paul's Cathedral, but the City Fathers had supported Cromwell in the Civil War and were undeniably sensitive to the first
that several of the post-fire plans bore the imprint of aristocratic and courtly values.

45. Built on the consolidated rubble of the mediaeval buildings which were removed and deposited at the waterfront before rebuilding commenced.

46. The exception is still the area around the main wharves at Queenhythe.

47. These terms are due to Christopher Alexander, "A city is not a tree," Design magazine, Feb. 1966.