The activity called city planning, or urban design, or just planning, is being sharply questioned. It is not simply that these questions come from those who are opposed to any kind of planning. Nor is it because so many of the physical effects of planning seem to be piecemeal. For example roads can be proposed without any real consideration of their effect on environment; the answer to such proposals could be that they are just not planning at all. But it is not just this type of criticism that is raised. The attack is more fundamental: what is being questioned is the adequacy of the assumptions on which planning doctrine is based.

What are those assumptions? To put this in the most general terms, they resolve themselves into two powerful lines of thought. The first, which stems from the work of the Viennese writer Camillo Sitte, whose book *City Planning according to Artistic Principles* was published in 1889, can be called the doctrine of the visually ordered city. To Sitte the total city plan is the inspired and the all encompassing work of art. But Sitte went further: civic art must be an expression of the life of the community, and finally ‘works of art cannot be created by committee but only by a single individual’ (Collins 1965).‡ The planner then is the inspired artist expressing in the total city plan the ambitions of a society. There are indeed many who, though not prepared to accept this total – it would not be inaccurate to say this totalitarian – role of the planner, have nevertheless been profoundly influenced by Sitte’s doctrine of the visually ordered city. The doctrine has left its mark on the images that are used to illustrate high density development of cities. It is to be seen equally in the layout and arrangement of Garden City development. The predominance of the visual image is evident in some proposals that work for the preservation of the past: it is again evident in the work of those that would carry us on, by an imagery of mechanisms, into the future. It remains central in the proposals of others who feel that, although the city as a total work of art is unlikely to be achieved, the changing aspect of its streets and squares may be ordered visually into a succession of pictures. The second line of doctrine is severely practical. It can be called the doctrine of the statistically ordered city. We know it well. It is the basis of those planning surveys in which uses are quantified, sorted out and zoned into particular areas; population densities are assessed and growth and change predicted. It is the raw material of the outline analyses and the town maps of the 1947 Act.

Now it is precisely these two aspects of planning (the first concerned with visual images and the second with procedure, and sometimes of course used in combination by planners), that were so sharply attacked by Mrs Jane Jacobs in her book *The Death and Life of Great American Cities* (1961). For Mrs Jacobs, both ‘the art of city planning and its companion, the pseudo-science of city planning, have not yet embarked on the effort to probe the real world of

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‡ Some parts of ‘The grid as generator’ were used in the Gropius Lecture at Harvard University in June 1966. The argument was developed later into the theme delivered at the University of Hull under the title, ‘The Framework of Planning’, as the inaugural lecture by Leslie Martin as Visiting Ferens Professor of Fine Art. It is presented here in essentially that form.

‡ See also a review of both Sitte 1889 and Collins 1965 in L. March (1966).
living’. For her a city can never be the total work of art, nor can there ever be the statistically organised city. Indeed, to Mrs Jacobs, the planning of any kind of order seems to be inconsistent with the organic development of cities which she sees as a direct outcome of the activities of living. Planning is a restrictive imposition: the areas of cities ‘in which people have lived are a natural growth … as natural as the beds of oysters’. Planning, she says, is essentially artificial.

It is of course just this opposition between ‘organic’ growth and the artificial nature of plans, between living and the preconceived system within which it might operate, that has been stressed so much in recent criticism. Christopher Alexander in a distinguished essay ‘A city is not a tree’ puts the point directly when he says:

I want to call those cities that have arisen spontaneously over many many years ‘natural cities’. And I shall call those cities or parts of cities that have been deliberately created by planners ‘artificial cities’. Siena, Liverpool, Kyoto, Manhattan, are examples of natural cities. Levittown, Chandigarh and the British New Towns are examples of artificial cities. It is more and more widely recognised today that there is some essential ingredient missing in the artificial cities (Alexander 1966).

Let us consider this. First of all would it be true to say that all old towns are a kind of spontaneous growth and that there have never been ‘artificial’ or consciously planned towns in history? Leaving on one side ancient history, what about the four hundred extremely well documented cases of new towns (deliberately planted towns) that Professor Beresford has collected for the Middle Ages in England, Wales and Gascony alone (Beresford 1967)? What about the mediaeval towns such as those built in Gascony between 1250 and 1318 on a systematic gridiron plan? All these towns were highly artificial in Alexander’s sense. The planted town, as Professor Beresford observes, ‘is not a prisoner of an architectural past: it has no past’. In it the best use of land meant an orderly use, hence the grid plan. In siting it and building it estimates had to be made about its future, about its trade, its population, and the size and number of its building plots. This contributes a highly artificial procedure.

But it is of course by no means uncommon. Indeed it is the method by which towns have been created in any rapidly developing or colonial situation. A recent book by John Reps, The Making of Urban America (1965) is a massive compendium of the planting of new towns throughout America, practically all of them based on highly artificial gridiron plans. He points out that there is a sense in which not merely cities but the whole of Western America is developed within an artificial frame: ‘the giant gridiron imposed upon the natural landscape by … the land ordinance of 1785’.

The coloniser knows that the natural wilderness has to be transformed: areas must be reserved for agriculture as well as plots for building. The man-made landscape is a single entity: cities and their dependant agricultural areas are not separate elements. All these things are matters of measure and quantity. They are interrelated between themselves and numbers of people. The process demands a quality of abstract thought: a geometry and a relationship of numbers worked out in advance and irrespective of site. The 20-mile square plan for the proposed colony of Azilia, the plans of Savannah and Georgetown, are typical examples of this kind of thought. William Penn’s plan for Philadelphia, the plans of such towns as Louisville, Cincinnati, Cleveland, New York City itself, Chicago and San Francisco, are all built on the basis of a preconceived frame.

In the case of the mediaeval towns described by Beresford, whilst some failed, a high proportion succeeded in their time. In a large number of American cities, the artificial grid originally laid down remains the working frame within which vigorous modern cities have developed. It is quite clear then that an artificial frame of some kind does not exclude the possibility of an organic development. The artificial grid of streets that was laid down throughout Manhattan in 1811 has not prevented the growth of those overlapping patterns of human activity which caused Alexander to describe New York as an organic city. Life and living have filled it out but the grid is there.

And this brings us closer to the centre of Alexander’s main argument. What he is criticising in the extended content of his essay, is the notion that the activities of living can be parcelled out into separate entities and can be fixed for ever by a plan. The assumption is common in much post-war planning. Consider an example. Housing is thought of in terms of density: 75, 100, 150 people per acre. That will occupy an area of land. Housing requires schools and they need open space: that will occupy another specific area. These areas in turn may be thought to justify another need: an area for recreation. That is one kind of thought about planning. But alternatively an effort may be made to see the needs of a community as a whole. It may be discovered
that the way housing is arranged on the ground may provide so much free space that the needs of schools or recreation will overlap and may even be contained within it (Martin 1968).

In the first instance the uses are regarded as self-contained entities: Alexander equates this kind of thinking with an organisation like that demonstrated by a mathematical tree. In the second instance the patterns of use overlap: the organisation in this case is much closer to a far more complex mathematical structure: the semi-lattice. The illustration of the separate consideration of housing, schools and open space is elementary. But it is Alexander’s argument that whole towns may be planned on this basis. And it is this attempt to deal with highly complex and overlapping patterns of use, of contacts and of communications in a way which prevents this overlap from happening that Alexander deplores. Hence the title of his paper: ‘A city is not a tree’. In this sense of course he is correct. But the argument can be put in a different way. It can be argued that the notion (implied by Mrs Jacobs) that elaborate patterns of living can never develop within a preconceived and artificial framework is entirely false. This can be developed by saying that an ‘organic’ growth, without the structuring element of some kind of framework, is chaos. And finally that it is only through the understanding of that structuring framework that we can open up the range of choices and opportunities for future development.

The argument is this. Many towns of course grew up organically by accretion. Others, and they are numerous and just as flourishing, were established with a preconceived framework as a basis. Both are built up ultimately from a range of fairly simple formal situations: the grid of streets, the plots which this pattern creates and the building arrangements that are placed on these. The whole pattern of social behaviour has been elaborated within a limited number of arrangements of this kind and this is true of the organic as well as the constructed town. Willmott and Young, studying kinship in the East End of London (1957), were able to show that everywhere elaborate patterns of living had been built up. All these elaborations, and a great variety of needs, were met within a general building pattern of terraces and streets. Change that pattern and you may prevent these relationships from developing or you may open up new choices that were not available in the original building form.

The grid of streets and plots from which a city is composed, is like a net placed or thrown upon the ground. This might be called the framework of urbanisation. That framework remains the controlling factor of the way we build whether it is artificial, regular and preconceived, or organic and distorted by historical accident or accretion. And the way we build may either limit or open up new possibilities in the way in which we choose to live.

The understanding of the way the scale and pattern of this framework, net or grid affects the possible building arrangements on the land within it, is fundamental to any reconsideration of the structure of existing towns. It is equally important in relation to any consideration of the developing metropolitan regions outside existing towns. The pattern of the grid of roads in a town or region is a kind of playboard that sets out the rules of the game. The rules outline the kind of game; but the players should have the opportunity to use to the full their individual skills whilst playing it.

2

How does the framework of a city work? In what way does the grid act as a generator and controlling influence on city form? How can it tolerate growth and change?

The answer to these questions is best given by historical examples, and in order to give the argument some point we can deliberately choose the most artificial framework for a city that exists: the grid as it has been used in the United States, and so well illustrated by Reps (1965).

We can start with the notion that to the coloniser the uncultivated wilderness must be tamed into a single urban–rural relationship. In the plan for the proposed Margravate of Azilia (the forerunner of the colony of Georgia) the ground to be controlled is 20 miles square, or 256,000 acres. Implicit in the subdivisions of this general square is a mile square grid; and out of the basic grid the areas for farmland, the great parks for the propagation of cattle and the individual estates are built up. At the centre is the city proper. The Margravate was never built, but the concept of the single urban–rural unit and the principle of a grid controlled land subdivision within this remains. In the County map of Savannah, Georgia, made in 1735, a grid of (slightly less than) one mile square sub-divides a rectangle nearly 10 miles long and 6 miles deep. Thirty-nine of these squares remain wooded areas: within this primary subdivision, further subdivisions create farms of 44 acres and 5-acre garden plots. These are the related grid systems of

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the city region. On the river front within this main system is the city itself.

Now it is this city grid of Savannah that can be used as a first example of a city grid. A view of Savannah in 1734 illustrated in John Reps’ book describes the principle: the plots and streets of the embryo city are being laid out: some buildings are complete. The unit of the Savannah grid is square: it is called a ward and is separated from its neighbours by wide streets. Within each square (or ward) building plots for houses are arranged along two sides, the centre itself is open, and on each side of this open square are sites for shops and public buildings. Savannah grew by the addition of these ward units. In 1733 there were four units: in 1856 no less than twenty-four. The city became a checker board of square ward units, marked out by the street pattern. But within this again, the plaid is further elaborated. The central open spaces of each ward are connected in one direction by intermediate roads, in the other direction the central areas become a continuous band of open spaces and public buildings. Here is a unit grid with direction and orientation.

The second example of a grid is absolutely neutral. It lays down an extensive and uniform pattern of streets and plots. The whole process can be illustrated in one single large scale example. In 1811 the largest city grid ever to be created was imposed upon a landscape. The unlikely site for this enterprise was an area of land between two geophysical provinces in which a succession of tilts, uplifts and erosions had brought through the younger strata two layers of crystalline rock. These appeared as rocky outcrops under a thin layer of soil and vegetation. Into their depressions sands and gravels had been deposited by glacial action to create swampy areas through which wandered brooks and creeks. Some of these still wander into the basements of the older areas of what is now Manhattan.

In 1613 the original Dutch settlement was limited to the tip of the island. In 1760 there was little expansion beyond this and contemporary illustrations depict to the north a rolling landscape. Taylor’s plan of 1796 shows the first modest growth of a city laid out on a gridiron pattern. Surveys in 1785 and 1796 extending up the centre of Manhattan set out the basis for a grid, and in 1811 the special State Commissioners confirmed this in an 8 ft long plan which plotted the numbered street system of Manhattan as far north as 155th Street. The plan showed 12 north–south avenues each 100 ft wide and 155 cross streets each 66 ft wide. The size of the rectangular building plots set out by this grid are generally 600 ft by 200 ft. There were some public open spaces. (Central Park was of course carved out later.) And it is this framework that has served the successive developments of the built form from 1811 to the present day.

The third example of a city grid is of interest because of its dimensional links with the land ordinance, suggested by Thomas Jefferson and passed by Congress in 1785. Under that ordinance a huge network of survey lines was thrown across all the land north and west of the Ohio river (Robinson 1916). The base lines and principal meridians of the survey divided the landscape into squares 36 miles each side. These in turn were subdivided into 6-mile squares or townships and further divided into 36 sections each one mile square. The mile squares are then subdivided by acreage: the quarter section 160 acres with further possible subdivisions of 80, 40, 20, 10 or 5 acres. The 5-acre sites lend themselves to further division into rectangular city blocks (not unlike those of Manhattan) and subdivision again into lots or building plots.

In 1832, according to Reps (1965), Chicago was not much more than a few log cabins on a swamp. The railway came in the mid-century and by the seventies and eighties a mile square grid had been extended over a considerable area of the prairie and the city framework had developed within this through a plaiting and weaving of the subdivisions that have been described.

Here then are three types of grid, that of Savannah, the gridiron of Manhattan and that of Chicago. Each one is rectangular. Each one has admitted change in the form and style of its building. Each one has admitted growth, by intensification of land use or by extension. Savannah, as it grew, tended to produce a green and dispersed city of open squares (Fig. 8.1). In Manhattan, the small scale subdivision of the grid and the exceptional pressure to increase floor space within this, forced buildings upwards. Chicago spread, continually opening out the pattern of its grid. In each case the influence of the original grid remains: each one offers different possibilities and choices of building and of living.

In order to trace the influence of the grid, we can examine the building arrangement that developed within it in New York. We can identify at once what might be called the streets and the system that is established by the grid. If we now use the language of the urban geographers, we know that this defines the general plot pattern. The building arrangement develops within this (Conzen 1962).
The stages of this latter process can be traced in the early plans of Manhattan produced in 1850. The grid of roads is already built. Within this general plot pattern the separate building plots are being established. To the north, on the building frontier, there is a line of huts and shacks. Further south more permanent but separate buildings are being built. And in the most developed area further towards the tip of Manhattan the full building arrangement has solidified into connected terraces of four to six-storey houses arranged around the perimeter of the site and enclosing private gardens. Views of Manhattan in the 1850s show a city developed in this way: and this pattern of building arrangement can still be seen in many areas. At this point the building land is replete. A balance is maintained between the plot, the amount of building that it can reasonably support and the street system that serves this.

But as the pressure for floor space increases, the building form changes intensively at certain nodal points (Fig. 8.2). Deeper and higher perimeter buildings first of all submerge the internal garden space. A process of colonisation of the individual building plots begins, so that larger areas of the general plot are covered by higher buildings. In 1916 the first single building to occupy an entire city block rose a sheer 600 ft; its roof space almost exactly equalled the area of its ground plan. It was this building that most clearly illustrated the need for the comprehensive zoning ordinances adopted that year, after arduous study and political compromise, to safeguard daylight in streets and adjoining buildings.

But the grid now exerts a powerful influence: the limited size of the grid suggests the notion that increased floor space in an area can only be gained by tall buildings on each separate plot. The notion suggests the form; the regulations shape it into zig-gurats and towers. Under the regulations that prevailed until recent years, if all the general building plots in central Manhattan had been fully developed, there would have been one single and universal tall building shape. And, to use an old argument by Raymond Unwin (1912), if the population of those buildings had been let out at a given moment, there would have been no room for them in the streets. The balance between area of plot, area of floor space and area of street has disappeared.

Now these descriptions of the grid, which have been used as a basis for the argument, have exposed the points at which it can be, and has been, extensively attacked for more than a century. A grid
The grid as generator

of any kind appears to be a rigid imposition on the natural landscape. It is this reaction against the grid that is voiced by Olmstead and Vaux writing in support of their design for Central Park in 1863: ‘The time will come when New York will be built up, when all the grading and the filling will be done and the picturesquely varied rocky formation of the island will have been converted into formations for rows of monotonous straight streets and piles of erect buildings’ (Reps 1965).

In their opposition to the grid, the relief from its monotony became a specific aim. Central Park itself is an attempt to imitate nature and to recreate wild scenery within the grid.† The garden suburb with its curving streets is one form of attack on the grid system, and an attempt to replace it. And at the end of the century, the Chicago Fair (1893), Cass Gilbert’s schemes in Washington (1900), and the plans for San Francisco (1905) and Chicago (1909) by Burnham are another attempt to transform the urban desert by means of vistas and focal points, into the ‘city beautiful’. However, we recognise at once a contrast. The various types of grid that have been described opened up some possible patterns for the structure of a city but left the building form free to develop and change within this. The plans of the garden city designers or those concerned with making the ‘city beautiful’ are an attempt to impose a form: and that form cannot change.

It is not possible to deny the force behind the criticisms of the grid. It can result in monotony: so can a curvilinear suburbia. It can fail to work: so can the organic city. What has been described is a process. It is now possible to extract some principles. Artificial grids of various kinds have been laid down. The choice of the grid allows different patterns of living to develop and different choices to be elaborated. The grid, unlike the fixed visual image, can accept and respond to growth and change. It can be developed unimaginatively and monotonously or with great freedom. There can be a point at which the original grid fails to respond to new demands (Fig. 8.3). As in Manhattan, it congeals. And it is at this point that we must try to discover from the old framework a new ordering principle that will open up new opportunities for elaboration by use.

† This movement which began with gardens, was less appropriately applied to city layout. In Olmstead’s words, ‘lines of roads were not to press forwards’. Their curving forms suggest leisure and tranquility. Compare this with the almost contemporary (1859) statements by Cerda in his plan for Barcelona in which there is ‘a reciprocal arrangement between that which is contained’ (building plot and arrangement) and ‘that which contains’ (grid and street system). ‘Urbanisation is an appendix to universal movement: streets are for movement but they serve areas permanently reserved and isolated from that movement which agitates life’ (the environmental area).
called organic: London, Liverpool or Manchester. They too have a network of streets and however much the grid is distorted, it is there. At a certain scale and under certain pressures the grid combined with floor space limits and daylight controls is just as likely to force tall building solutions. And it is just as likely to congeal. It lends itself just as readily to regenerative action. The theoretical understanding of the interaction between the grid and the built form is therefore fundamental in considering either existing towns or the developing metropolitan regions.

The process of understanding this theoretical basis rests in measurement and relationships and it goes back certainly to Ebenezer Howard. Lionel March has recently pointed out a number of interesting things about Howard’s book Tomorrow: a peaceful path to real reform first published in 1898. It is a book about how people might live in towns and how these might be distributed. But the important thing is that there is no image of what a town might look like. We know the type of housing, the size of plot, the sizes of avenues. We know that shopping, schools and places of work are all within walking distance of the residential areas. On the basis of these measurements we know the size of a town and the size of Howard’s cluster of towns which he calls a city Federation. We know the choice that is offered and we know the measurements that relate to these. If we disagree with the choice we can change the measurements. Lionel March (1967) took Howard’s open centred city pattern linked by railways and showed that it could be reversed into a linear pattern linked by roads and that such patterns could be tested against the land occupied by our present stock of building and our future needs.

Now that is theory. It contains a body of ideas which are set down in measurable terms. It is open to rational argument. And as we challenge it successfully we develop its power. The results are frequently surprising and sometimes astonishingly simple. Ebenezer Howard’s direct successor in this field was Raymond Unwin. The strength of his argument always rests in a simple demonstration of a mathematical fact. In an essay ‘Nothing gained by overcrowding’ (Unwin 1912), he presents two diagrams of development on ten acres of land. One is typical development of parallel rows of dwellings: the other places dwellings round the perimeter. The second places fewer houses on the land but when all the variables are taken into account (including the savings on road costs) total development costs can be cut. From the point of view of theory, the important aspect of this study is the recognition of related factors: the land available, the built form placed on this, and the roads necessary to serve these. He demonstrated this in a simple diagram.

Unwin began a lecture on tall building by a reference to a controversy that had profoundly moved the theological world of its day, namely, how many angels could stand on a needle point. His method of confounding the urban theologians by whom he was surrounded was to measure out the space required in the streets and sidewalks by the people and cars generated by 5-, 10- and 20-storey buildings on an identical site. The interrelationship of measurable factors is again clearly demonstrated. But one of Unwin’s most forceful contributions to theory is his recognition of the fact that ‘the area of a circle is increased not in the direct proportion to the distance to be travelled from the centre to the circumference, but in proportion to the square of that distance’. Unwin used this geometrical principle to make a neat point about commuting time: as the population increases round the perimeter of a town, the commuting time is not increased in direct proportion to this.

The importance of this geometrical principle is profound. Unwin did not pursue its implications. He was too concerned to make his limited point about low density. But suppose this proposition is subjected to close examination. The principle is demonstrated...
again in Fresnel's diagram (Fig. 8.5) in which each successive annular ring diminishes in width but has exactly the same area as its predecessor. The outer band in the square form of this diagram has exactly the same area as the central square. And this lies at the root of our understanding of an important principle in relation to the way in which buildings are placed on the land.

Suppose now that the central square and the outer annulus of the Fresnel diagram are considered as two possible ways of placing the same amount of floor space on the same site area: at once it is clear that the two buildings so arranged would pose totally different questions of access, of how the free space is distributed around them and what natural lighting and view the rooms within them might have. By this process a number of parameters have been defined which need to be considered in any theoretical attempt to understand land use by buildings.

This central square (which can be called the pavilion) and the outer annulus (which can be called the court) are two ways of placing building on the land. Let us now extend this. On any large site a development covering 50% of the site could be plotted as forty-nine pavilions, as shown in Fig. 8.6, and exactly the same site cover can be plotted in court form. A contrast in the ground space available and the use that can be made of it is at once apparent. But this contrast can be extended further: the forty-nine pavilions can be plotted in a form which is closer to that which they would assume as buildings (that is low slab with a tower form over this). This can now be compared with its antiform: the same floor space planned as courts (Fig. 8.7). The comparison must be exact; the same site area, the same volume of building, the same internal depth of room. And when this is done we find that the antiform places the same amount of floor space into buildings which are exactly one third the total height of those in pavilion form (Martin and March 1966).

This brings the argument directly back to the question of the grid and its influence on the building form. Let us think of New York. The grid is developing a certain form: the tall building. The land may appear to be thoroughly used. Consider an area of the city. Seen on plan there is an absolutely even pattern of rectangular sites. Now assume that every one of those sites is completely occupied by a building: and that all these buildings have the same tower form and are twenty-one storeys in height. That would undoubtedly look like a pretty full occupation of the land. But if the size of the road net were to be enlarged by omitting some of the cross streets, a new building form is possible. Exactly the
same amount of floor space that was contained in
the towers can be arranged in another form. If this
floor space is placed in buildings around the edges
of our enlarged grid then the same quantity of floor
space that was contained in the 21-storey towers
now needs only 7-storey buildings. And large open
spaces are left at the centre.

Let us be more specific. If the area bounded by
Park Avenue and Eighth Avenue, and between 42nd
and 57th Street is used as a base and the whole area
were developed in the form of Seagram buildings
36 storeys high, this would certainly open up some
ground space along the streets. If, however, the
Seagram buildings were replaced by court forms
(Fig. 8.8) then this type of development while using
the same built volume would produce buildings
only 8 storeys high. But the courts thus provided
would be roughly equivalent in area to Washington
Square: and there could be 28 Washington Squares
in this total area. Within squares of this size there
could be large trees, perhaps some housing, and
other buildings such as schools.

Of course no one may want this alternative. But it
is important to know that the possibility exists, and
that, when high buildings and their skyline are being
described, the talk is precisely about this and not
about the best way of putting built space on to
ground space. The alternative form of courts, taken in
this test, is not a universal panacea. It suggests an
alternative which would at once raise far-reaching
questions. For instance, the open space provided in
the present block-by-block (or pavilion) form is simply
a series of traffic corridors. In the court form, it could
become traffic-free courts. In this situation the ques-
tion which needs answering is: at what point do we
cease to define a built area by streets and corridors? At

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FIGURE 8.7

FIGURE 8.8

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what point could we regard a larger area as a traffic-free room surrounded by external traffic routes?

In all this the attempt has been simply to give a demonstration of procedure. The full repercussions of the questions are not obvious. They are highly complicated. But the factual aspect of the study establishes a better position from which to understand the nature of the complication and the limits of historical assumptions. What is left is something that can be built upon and needed decisions are brought back to the problem of the built form of an urban area not merely of a building. Here, the choice of the built form is critical in a number of ways, not least as a means of securing a new unity of conception.

Take for instance the question of the size of the road net. Professor Buchanan has looked at this from another angle (Ministry of Transport, 1963). Looking at cities in relation to traffic, he saw that most of them are built up from a collection of localities. He called these 'environmental areas'. These areas are recognisable working units. They are areas in which a pattern of related uses holds together: local housing, shopping, schools, etc., would be one obvious example. These areas are recognisable in Manhattan just as clearly as they are in London. They form, in Professor Buchanan's terms, 'the rooms of a town'. They need to be served by roads but they are destroyed when roads penetrate and subdivide them. His solution was to try to recognise and define these working areas and to place the net of roads in the cracks between them. By estimating the amount of traffic that might be generated by the buildings in such areas, Professor Buchanan was able to suggest some possible sizes for the networks. He had in fact by this procedure redefined the grid of a town in terms of modern traffic.

Here then is a proposition for a framework within which we can test out some possible arrangements of the built form. Professor Buchanan selected St Marylebone as one of his test areas. This happens to adjoin the main London University site (already defined as a precinct in the London Plan) and this in turn is contiguous with the area around the Foundling Estate which has been used in some Cambridge studies of the built form (Fig. 8.9). All three areas are approximately equal in size. The Foundling area (bounded on the north and south by Euston Road and Theobalds Road, and on the west and east by Woburn Place and Grays Inn Road), is about 3700 ft from north to south and 2000 ft wide. It developed a cohesion of its own. How did this happen?

This in turn can be related back to the main line of argument. In 1787 the whole of this area consisted of open fields: there were no controlling features. A plan of 1790 divides the land into building plots by its network of streets and squares. The subsequent history, so well traced by Olsen (1964), shows the development and elaboration within this pattern. By 1900 the area could have been described by the language that Mrs Jacobs applies to Greenwich Village. The intellectuals were there: so were the working Londoners: so were the Italians around their hospital in Queen Square. There were handsome houses; tenements and mews; hotels and boarding houses. The area had its own Underground station and its own shopping area along Marchmont Street. It served a complex community.

By 1960 the balance within the original pattern had radically altered. Fast moving traffic using the small scale grid of streets had subdivided the area. Site by site residential development at a zoned density of 136 people to the acre produces only one answer: tall blocks of flats. Redevelopment of sites for offices created taller and thicker buildings. The hospitals, which needed to expand, were hemmed in by surrounding development. The pattern congealed.

In this situation only a new framework can open up a free development. And if Professor Buchanan's surrounding road net is accepted as a basis for the development of the environmental area, the problem
can be seen within a new unifying context. What sort of advantages could a rearrangement of the built form now create? Professor Buchanan in his study area outlined three possible solutions with progressive standards of improvement. The merit of this is that it sets out a comparative basis of assessment. But even his partial solution leads to an extensive road and parking system at ground level. From the point of view of the pedestrian the position is made tolerable by the use of a deck system to create a second level. Above this again, some comparatively tall buildings are required to rehouse the built space that is at present on the ground. This kind of image of the architecture of cities has a considerable history in modern architecture and has been much used as an illustration of central area reconstruction. But, as Professor Buchanan himself asks, what building complications does it produce and what sort of an environment does it create? Is it in fact worth building?

Professor Buchanan's range of choices could in fact be extended by applying some of the theoretical work which has been described. And when this is done the results are significantly different. The boundaries of the total area that are being considered have been defined by this new scale of the road network: the grid. Within this, the existing floor space can be assessed (Fig. 8.10): 34% of the site is occupied by housing: 25% by roads: 15% by office and commercial use: 12% is open space. In addition there is an important shopping street, a major hospital and several schools and educational buildings. With this information available it can be considered at a theoretical level how this might be disposed in a new building arrangement.

First, the shopping street, Marchmont Street, could be established as a north/south pedestrian route associated with the Underground and some housing. If all the office space which is at present scattered throughout the area could be placed in a single line of buildings around the perimeter of the area (where some of it already is), it need be no higher than eight storeys. All the housing at present in the area could be placed within another band of buildings sited inside this and no higher than five storeys. Of course it could be arranged on the ground to include other forms and types of housing. But in theory, the bulk of the building at present covering the area could be placed in two single bands of building running around its edge, leaving the centre open, which would be a park-like area.
about the same size as St James’s Park (Fig. 8.11). Precisely the same amount of floor space would have been accommodated. There need be no tall buildings, unless they are specifically wanted. All the housing could look onto a park. Buildings such as schools could stand freely within this. There would be a free site and a park-like setting for new hospital buildings.

All that may sound theoretical and abstract. But to know what is theoretically possible is to allow wider scope for decisions and objectives. We can choose. We can accept the grid of streets as it is. In that case we can never avoid the constant pressure on the land. Housing will be increasingly in tall flats. Hospitals will have no adequate space for expansion. Historic areas will be eaten into by new building.

A total area once unified by use will be increasingly subdivided by traffic. We can leave things as they are and call development organic growth, or we can accept a new theoretical framework as an outline of the general rules of the game and work towards this. We shall know that the land we need is there if we use it effectively. We can modify the theoretical frame to respect historic areas and elaborate it as we build. And we shall also know that the overlapping needs of living in an area have been seen as a whole and that there will be new possibilities and choices for the future.
References

Howard, Ebenezer (1898). Tomorrow: A Peaceful Path to Real Reform, republished 1945, as Garden Cities of Tomorrow, Faber.


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