THE CHANGING CHARACTER OF STREETS IN CENTRAL AREAS with special reference to Sherbrooke Street as a principal street in City of Montreal - Canada

by

RATAN M. REGE

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Department of Architecture at McGill University, Montreal, Canada

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INTRODUCTION

"Streets and their sidewalks, the main public places of a city, are its most vital organs. Think of a city and what comes to mind? Its streets. If a city's streets look interesting, the city looks interesting; if they look dull, the city looks dull."

Jane Jacobs

in
The death and life of
great American cities

The central area of a city is commonly referred to as the heart of the city, since it supplies life-giving energy to the cells and tissues of the city. The circulatory system formed by veins and arteries moves the life-stream--people, goods,messages, and ideas, from the heart to all parts of the organization, and back again. Although the vitality of the urban core influences the circulatory system, the sound functioning of the heart,cells and tissues of the city depends largely on the health of the circulatory system. The lungs of the city are refreshing and recreating elements such as open spaces, landscape,and embellishments. Then circulatory system and the refreshing and recreating elements are integrated for the sound functioning of the city.+1

A similar statement has been made by Wolfe expressing his views on the street:--------- " We use the word street--two lines parallel uniform buildings fencing along straight artery through which the life-blood of the city circulates, life-blood being conceived always in terms of vehicular traffic.--------A street's essential nature as a precinct, a play-ground, a home-from-home, an escape--almost retreat from the various disciplines grinding service out of their routines in the bowels of the adjacent buildings. And true to its idea as play-ground as wdl as service area, the street spawned caves,inns,stalls,shops,the appurtenances of leisure, and in the process took on the aspect of a fair with the appropriate accompaniment of visual hazards in aid of cosiness, gaity and convenience,----"+2

A rather similar but more practical view is expressed in the Buchanan Report:----

----"It is often said that streets are for the passage of traffic only and although this may be a sound legal view, it has observed the fact that streets perform other functions, some of them vital. They give access to buildings, they provide an outlook from buildings, they give light and air, they are the setting for architecture, and they are the backbones of the everyday surrounding for many people. It is impossible to maintain that these functions are subordinate to the passage of vehicles." +3

From all these statements we understand that the environmental character of a street is not only determined by its functions as part of a circulatory system, but also by many other vital functions that serve the physical and visual needs of the community. While serving all these functions, a street deals with land use, activities, buildings (and spaces within), and movement of goods and people. These are the three important elements that determine the character of the street. Although all these elements change from place to place, and from time to time, on any street, they can be intensely observed on the principal streets in central areas. Changes in the elements affecting the character of such principal street is the major concern of this thesis.

The first part deals with the historical consideration of changes in the character of streets. We take the important cities from Preclassical to Modern Periods. The organization of streets and central activities are described, and the extent to which they influence the form of the streets in each city is reviewed with sketches and photographs. We also delineate influencing factors in each period. This review of changes in the character of streets helps us to discover basic elements that define this character. The historical review forms the basis for our next part, which outlines theoretical considerations of basic elements such as land use, buildings and movements of traffic. This theoretical section is focussed on modern aspects of these elements. In discussing the changes in these elements we observe some important forces that lie behind the change. After this we deal with the results of these forces-- the changing character of the streets in central areas.

The third part indicates some applications of the theoretical notions with some selected examples from new cities and redevelopment schemes. In this way we attempt to describe to what extent the basic elements are organized in recent concepts, and to what extent the theoretical ideals can be practically applied. It gives us some idea of future changes in the streets of central areas.

The fourth and final part of this thesis deals with a case study of Sherbrooke Street in the central area of Montreal. First of all we describe the evolution of the central area of Montreal, since we find that changes on Sherbrooke street are intimately related to the latter. Then we outline the changes that are observed in the land use, buildings and traffic on Sherbrooke street up to the present period. This part ends with a discussion of changes that are presently operative and that might occur in the future, with new happenings within the central area.

Our ultimate objective in undertaking this study is to attempt to define what is meant by the "character of a street", and by what means we might achieve an "environmental standard" for streets in today's rapidly growing cities.

+1 Gruen, Victor Heart of Cities Page

+2 Wolfe Italian Townscape Page 10

+3 The Buchanan Report Traffic in Towns Page 30

THE CHANGING CHARACTER OF STREETS IN CENTRAL AREAS

PART ONE

HISTORICAL CONSIDERATIONS

Four major periods are considered in describing the changing character of streets.

CHAPTER I

PRECLASSICAL AND CLASSICAL PERIOD

Man at the earliest stages, in his attempt to find the means of survival, left imprints of his movements on the Earth. His main objectives were protection and convenience. The resistance of nature determined the mode of his movement. After determining the factors over a passage of time, he utilised, adapted himself to, and transformed, physical conditions in the process of the formation and expansion of settlements.

Modern ethnology recognizes two basic types of settlement, the peasant and the nomad, each with its own development moulded by environment and activities. In the community of the peasant, the plants, his means of livelihood, are the determining elements in his culture. In the community of the nomad, animals are the determining elements; he perceives only reality and is opposed to all that is irrational.+1 These two types of men are met again and again in the course of history, regardless of economic,

+1 Hilberseimer, L. "The New City" p. 19
+2 Ibid p. 20

cultural, political and spiritual circumstances. The elementary reactions of man are unchanging; it is only the expressions of these reactions that change.+2 The co-existence of peasants and nomads also explains the contrast between two types of structural form: the "organic" and the"geometric", both creating and expressing different concepts of life. The prehistoric town of Glastonburg (Fig.1) with its organic layout and settlement, and Castellazzo di Fontenellato (Fig.2) in its geometrical layout, show the characteristics of the peasant and nomad communities.

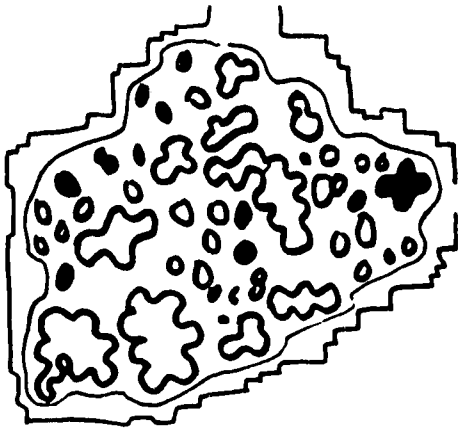


Fig.1.
Organic street pattern
in Glastonburg

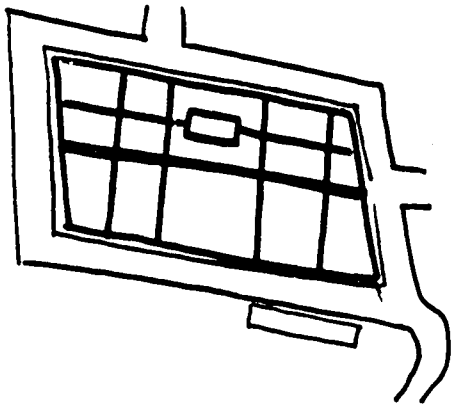


Fig.2.
Geometric street pattern
in Castellazzo di Fontenellato

For a fine sense of order in street planning, no early civilisation left such impressive results as the Egyptian civilisation. The city of Kahun, 3000 B.C., is a notable example. The city of Kahun was planned and built for the slaves and artisans engaged

+2 Hilberseimer, L. "The New City" p. 20

in building the pyramids. The city served merely as a dormitory for the workmen. Social stratification in the workmen has been expressed in the dwelling sizes. For its period, it was an advanced and humane form of industrial village planned for disciplined control.+3

Kahun implied that Egyptians planned cities, or tended to do so, with parallel, elongated streets. The street pattern expresses its elementary character of main streets from which spoke like, narrow alleys give access to the dwellings. Within the city there were no distinct characteristics of place and localities that are observed in the later periods. (Fig.3)

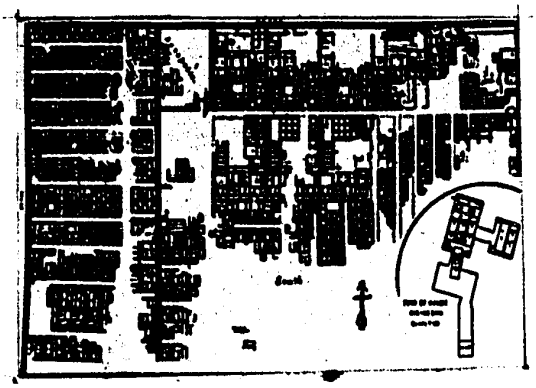


Fig. 3 Linear, spoke-like street pattern in Kahun

In Kahun, streets were merely the means of access to the dwelling.+4 Very little consideration had been given to pedestrian comforts, evidenced by the uniform and straight length of streets. Houses

+3 Hiorns, F.R. "Town Building in History" p. 14
+4 Gallion, A.B. & Eisner, B. "The Urban Pattern" p, 7

faced internally on courtyards to leave blank walls on the street. (Fig.4)

Another striking form of the street observed in the Egyptian cities, is the processional avenue, laid out at the temple and lined with sphinxes. Here we observe that the ceremonial function attached to the street that rose to popularity in the Renaissance period. (Fig.5)

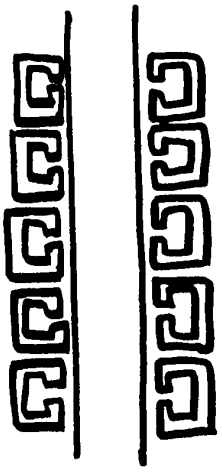


Fig. 4.
Monotonous street as an access

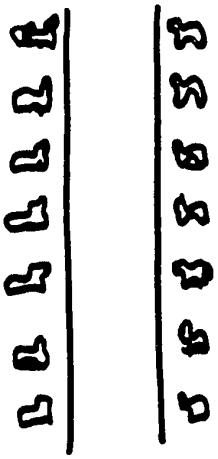


Fig. 5.
The processional avenue in Egyptian cities

The art of city building achieved its highest order during the Hellenic and Hellenistic period (from 500 B.C. to 500 A.D.). Greek city-states, as they came into being, provided the citizens with an opportunity for a rich and vigourous life.+5 The Polis is the

+5 Hilberseimer, L. "The Nature of Cities" p. 42

peculiar product of the Greek spirit which regarded urban life as of the highest order. The Agora was a symbol of thepolis, the centre of political as well as social and economic life. The location of the agora was usually at the geographical centre of the city and on higher ground. Since the size of the Greek city was small, it enabled each citizen to take an active part in the life of the agora.+6 Agricultural production in the surrounding countryside, external trade and manufacture sustained the economic life of Greek cities. The economic prosperity, so achieved, caused a tremendous growth of urban population and led to the founding of colonial cities. These colonial cities adopted a grid iron pattern based on the principles of Hippodamus. A notable example of Hellenic cities is Selinus, on the south-western coast of Sicily.

In the plan of Selinus, a remarkable simplicity is observed. We get a distinct sense of localities and central place as compared to Kahun. One main street is crossed at right angles by side streets. The size of the block has been determined by the plans of the houses.+7 The overall street layout is rectilinear rather than grid iron, and shows a remarkable adaptation to circumstances and coherence of arrangement. (Fig.6)

+6 Hilberseimer, L. "The Nature of Cities" p. 39
+7 Hiorns, F.L. "Town Building in History" p. 31

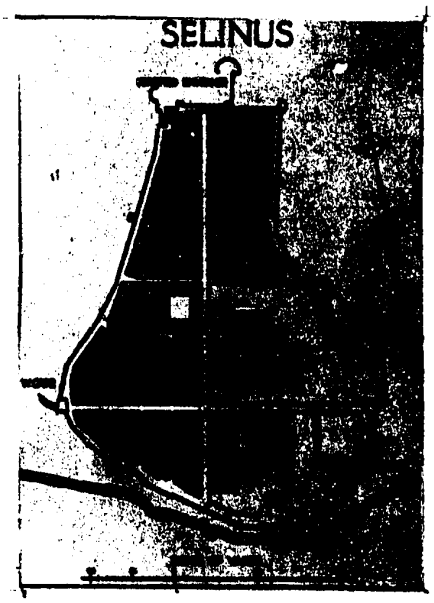


Fig. 6
Simple rectilinear pattern in Selinus

The city of Priene shows the influence of the Hippodamian plan. In an elevated position and in the goegraphical centre of the city, where the main streets crossed, the agora or Central Place was planned. To these main streets, parallel streets crossed to complete the whole system in a grid iron pattern.+7 The city and its components were planned on the modular relation of the street pattern. Here we observe the dispersal of some central activities, such as religion and recreation, which formed different cores of the city. (Fig.7)

+7 Hiorns, F. L. "Town Building in History" p. 31

Fig. 7
Grid iron street pattern in Priene

The disposition of grids on the sloping site lead to the development of two different types of street. The long streets, that ran parallel to contours, served the vehicular traffic and the short, narrow, residential streets crossed the site terraces in stepped form and served the pedestrians. (Fig. 8)

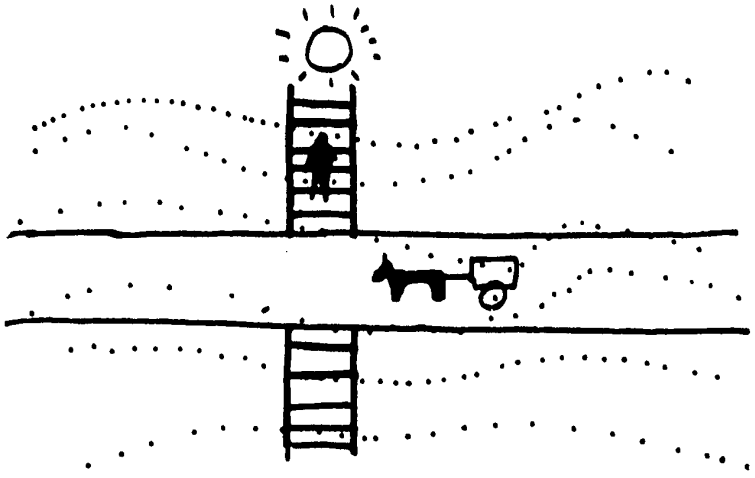


Fig. 8
The street as an access classified by topography

The function of the street was to give access. Forms of the buildings were dominant in the space, and human scale was related to the buildings. In the Hellenistic period Pompeii was a supreme example of civic art. The Romans grafted Hellenic form upon the irregular patterns of their villages.+8 Pompeii shows the irregular street system, but it is probable that the more regular pattern was established as the town grew in population.+9 But certainly we notice the drift from the grid iron pattern to a more practical plan which was prominantly found in Medieval cities. The Forum was the centre of the Roman city and provided a centre for the political, commercial and social life of the citizens. Vehicular access terminated at the periphery of the Forum and gates were provided to prevent vehicular access.(Fig. 9)

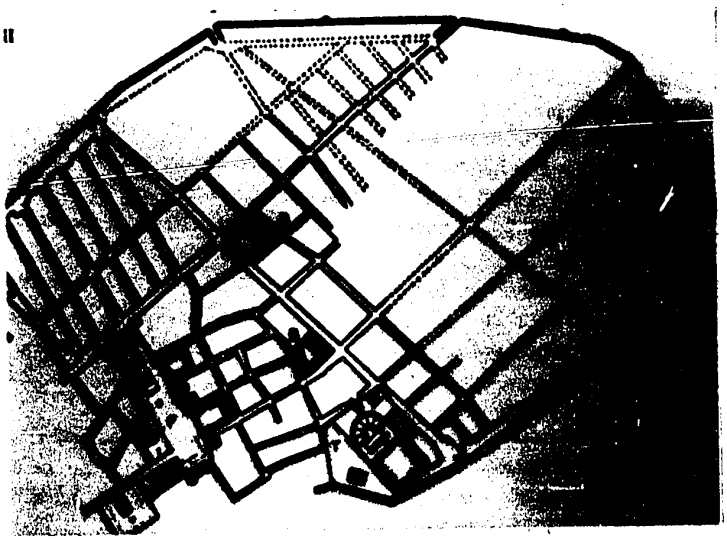


Fig. 9
Orderly street pattern adapted to site conditions : Pompeii

+8 Gallion, A.B., and Eisner, S. "The Urban Pattern" p. 26
+9 Ibid p. 27

In Pompeii all streets were well paved and provided with raided sidewalks. The colonaded roadways and sidewalks enabled horsemen and pedestrians to ride in the dry, and in shade, from one part of the city to another. On these streets three-storied houses were lined, with their balconies overlooking the street. Good water supply and drainage allowed the street fountains and tanks to bring additional lustre.+10 Roman street beautification played a great part in influencing the civic art of Renaissance cities. The unifying character of colonnadades, protection from climate and embellishments on the streets advanced notions of street design. Here we find that the streets were regarded as public open space and consideration was given to pedestrian comfort. (Fig.10)

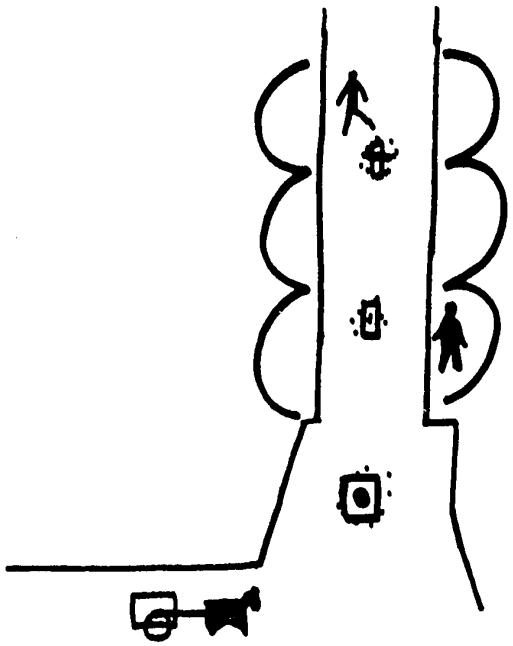


Fig. 10
The Roman street as a public space

+10 Gallion, A.B. and Eisner, S. "The Urban Pattern" p. 27

During the Augustan period, the Roman architect, Vitruvius, stressed the importance of street layout to achieve hygenic conditions in the city.+11 He criticised the Hippodamian grid iron pattern as it entailed travelling two sides of a triangle to reach any destination, rather than one - directly along the street. Further, on hilly sites it gave rise to a very steep gradient and was extremely monotonous. By way of remedy Vitruvius suggested radial planning: a superimposition of streets in the form of spokes in a wheel. These radials were placed with regard to orientation, and linked with the concentric streets. Further, to relieve the monotony of straight streets, he introduced open spaces. His ideal city concept influenced city planning in the Renaissance and Baroque periods, and brought geometric considerations into street patterns. (Fig. 11)

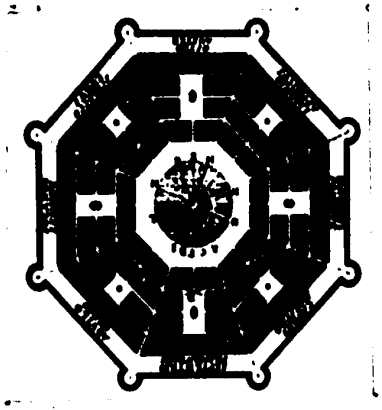


Fig. 11
Introduction of geometry in street pattern : Vitruvius

+11 Rosenau, H. "The Ideal City" p. 15

CHAPTER 2

MEDIEVAL PERIOD

Between the fall of the Roman Empire and the eleventh century, when the cities of the west awakened to a new life, lies the Medieval period. It was out of the incurable misery and terror of this age that certain special attitudes towards life grew up, which powerfully affected the development of the city. The need for protection rose above every other concern and made it necessary to build fortifying walls around the growing settlements. By means of a wall, any village could become another stronghold. With its local production and mainly local barter, social life gathered in little villages or in "suburbs".+1 The revival of trade, the political unification and land reclamation laid the foundations of the new Medieval type of city.+2

Indeed, it is by its persistent power of adaptation to site, and to practical needs, that the Medieval town presented

+1 Mumford, Lewis "The Culture of Cities" p. 14
+2 Ibid p. 16

such multiform examples of individuality. However, Medieval cities essentially developed from four different beginnings.+3

1. From existing Roman cities, preserving the old plan in the scheme of their reconstructed streets.
2. Around existing castles, monasteries, or independant church structures, their local community areas becoming the nucleus of later expansion.
3. Out of favourably located trading posts at a cross-road, or at a ford across a river, or on a harbor or bay.
4. As newly founded and organised communities.

1. In all these towns with the more or less well preserved Roman layout of streets and fortifications, the erstwhile forum or the centre of the castrum, is obliterated or no longer recognisable. Many other towns, having Roman skeletons, were clothed in the characteristic features of the Middle Ages. To this group belongs the city of Ascoli Piceno in Italy (Fig.12)

2. The town grew around the physical nucleus of power, the complex of a monastary or the individual structure of the Church. the plan of a town of this kind shows

+3 Tucker, Paul "Town and Square" p. 67

the radial and lateral pattern of irregular streets with the church plaza as the principal focal point in which open market activities were held. A typical example is the town of Noerdlingen in Germany. (Fig.13)

3. With the growth of trade, the main traffic arteries became marketing centres in the shape of broadened streets. The construction of fortification around these marketing centres led to the growth of population. A typical example is the Town of Lubeck in Germany. The principal streets roughly followed the contours of the terrain and the side streets branched off at right angles. (Fig.14)

4. During the thirteenth and fourteenth centuries, colonial cities were founded by young empires to protect their trade and provide military security. They were plotted for allocation of sites to settlers and the regular plan is a distinct contrast to the informal development of the normal medieval town.+4 The towns were generally small in size, varying in form to suit the site conditions, and enclosed by a protective wall and ditch. They were recognised, however, by the

+4 Gallion, A.B., and Eisner, S. "The Urban Pattern" p. 34

consistency with which they embodied a rectilinear pattern, with right angled, crossed streets and a spacious central market square to which the town hall and church gave added interest. Montpazier is a distinct prototype of the new cities.+5 (Fig. 15)

Whether adaptive or planned in an orderly manner, of slow growth or quick development, on old Roman foundation or not, the determining elements in the Medieval city are the boundary wall and the central open space.+6

+5 Hiorns, F.H. "Town Building in History" p. 124
+6 Mumford, Lewis "The Culture of Cities" p. 53

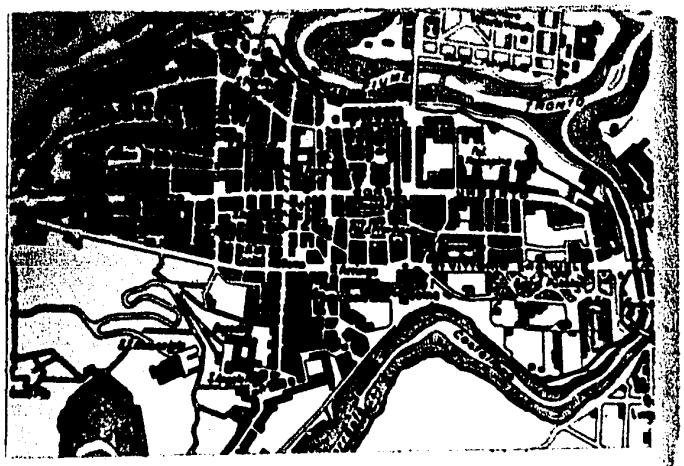


Fig. 12
The existing Roman street pattern is preserved:
Ascoli Piceno, Italy

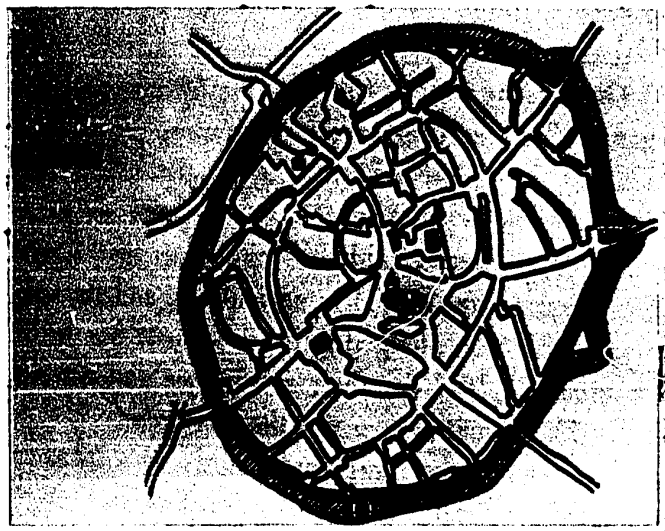


Fig. 13
The gowth of irregular street pattern around nucleus:
Noerdlingen, Germany

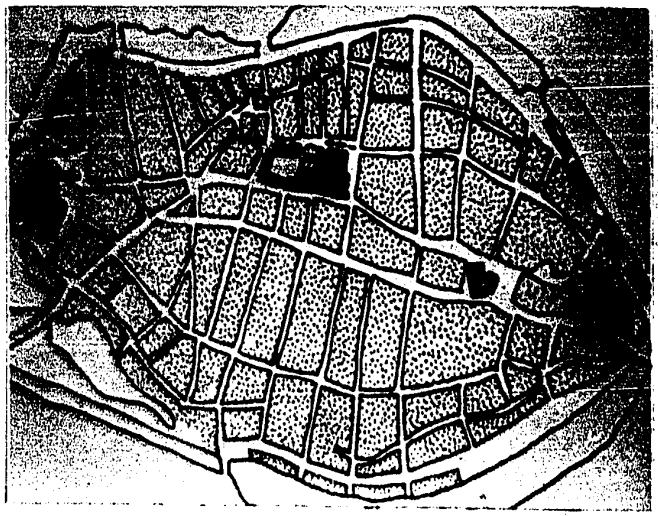


Fig. 14
The main traffic arteries becoming the nucleus:
Lubeck, Germany

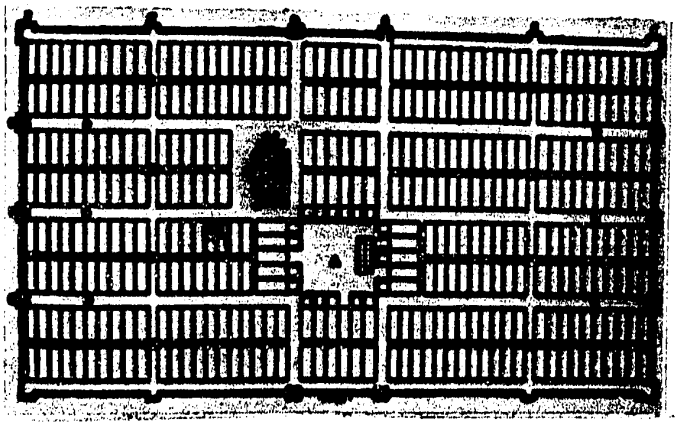


Fig. 15
Rectilinear street pattern of new colonial cities:
Montpazier, France

The street in Medieval cities had a completely different function compared to today. Except in the country, we inevitably think of houses being built along a line of predetermined streets. But on the less regular medieval sites, it would be the other way about; groups of trades or institutional buildings would form self contained quarters or "islands" the streets connecting urban tissues were essentially footways. Thus in the early medieval city, the street was a line of communication rather than a means of transportation. The unpaved streets were more like the courtyard of a farm. The streets were sometimes narrow and the turns and closures were frequent+7 The medieval street has intriguing characteristics for modern people. The congestion and lack of open spaces developed intense communal activities such as commerce and recreation on the street.+8 The intermingling of activities, private and public, was common in the Medieval streets. Arcaded streets were the most popular form of shopping streets. In the street design, a collective approach was taken and thus a unified character of the street was achieved. (Fig. 16)

+7 "The Culture of Cities" Mumford, Lewis p.56
+8 "The Cities" Halprin, L. p.17

Fig. 16

Arcaded shopping street of a Medieval city

CHAPTER 3

RENAISSANCE AND BAROQUE PERIODS

In the Renaissance period the practice of the arts became a profession.+1 The ideal city concept of Vitruvius, in the later Roman period, was greatly admired and influenced the Renaissance artists. Under the patronage of the Pope, kings and merchants, a host of individuals came forward with concepts for the ideal city and influenced the planning and replanning of cities. The outstanding contributions to planning by Alberti, Filerete, Scamozzi and Ledoux are worth mentioning here.

Alberti

Alberti dealt with various aspects of a town and experimented in the treatment of streets. He stated that streets should be laid in the manner of rivers, following a pattern of undulation. According to him,the approaches to large towns

+1 Rosenau, H. "The Ideal City" p. 36

and fortified cities should be straight in order to express dignity and greatness. He saw the advantages of distributing open spaces and shopping facilities in neighbourhoods. He is remembered as the precursor of modern functional tastes in street planning, forming a link between the Middle Ages and contemporary times.+2 (Fig.17)

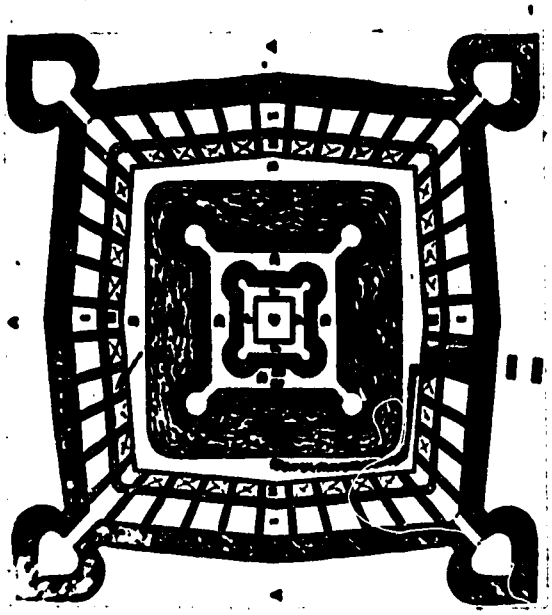


Fig.17

Streets should follow undulations : Alberti

Filerete

In his plan of theideal city, the streets are radiated from the main square of the town centre to reach the city limits. Sixteen subsidiary squares are placed on these streets halfway between, to break the monotony of straightness. Moreover,

+2 Rosenau, H. "The Ideal City" p. 36

every second street is replaced by waterways and colonnaded pedestrian ways. In this way, Filerete planned functional separation, and allowed for various types of movement. +3 (Fig. 18)

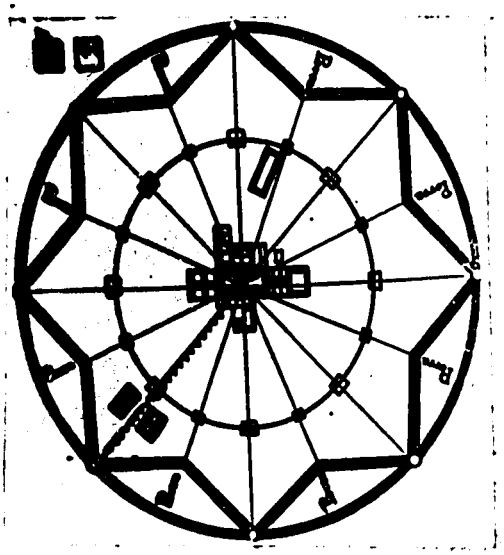


Fig. 18

Functional separation of streets : Filerete

Scamozzi

Vincenzo Scamozzi based his street pattern in the most effective way to improve the Vitruvian street layout. In his plan, he ignored the radial and concentric road pattern and adopted the formal plan of the Hippodomian grid iron. In it he placed four squares in four directions to alleviate the straightness of the long streets. He introduced, in his plan, original features such as canal communications,to

+3 Rosenau, H. "The Ideal City" p.39

bring the surroundings of the city within easy reach of the centre. He further avoided the town centre area becoming too accessible for traffic; the same is applied to the distributed squares. His street concepts are very practical and farsighted.+4 (Fig.19)

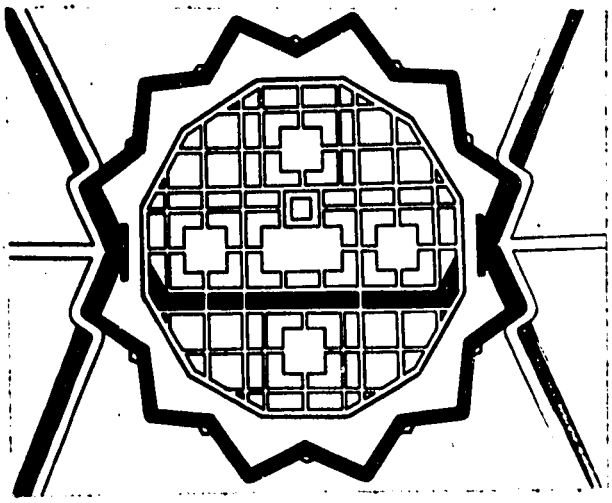


Fig.19

Central area not directly accessible to traffic : Scamozzi

Ledoux

Ledoux based his street layout on the principles of an open plan to include isolated parts of settlements around the city. For this, he planned a ring road around the centre, on which he placed main activities in a decentralized fashion. From this ring of activity, the streets are projected out to the country, giving the suburbs easy access to central amenities. He kept his central space open for recreation and communal gatherings. Among the outstanding features

+4 Rosenau, H. "The Ideal City" p.47

are separate traffic lanes which leave the residential quarters undisturbed and concentrate on the main arteries.+5 The plan was developed, considering the city as a dynamic organism, and its open plan consideration is very important in the planning and redevelopment of contemporary cities. Today we find 'open plan thoughts' in the city plans of Le Mirail, Kenzo Tange's plan for Tokyo, and many others. (Fig. 20)

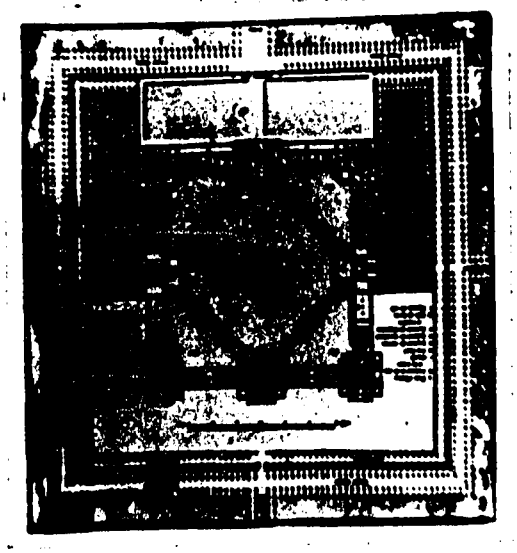


Fig. 20

Decentralised cores on a ring road, linked to the suburbs ; Lœbux

+5 Rosenau, H. "The Ideal City" p.87

The influence of the ideal city planning went further: the aristocratic society possessed patrons who appreciated the subtle relationship of the staged play and urban design.+6 Various stage sets of streets and urban schemes were designed by the architects and planners and the influence of these stage sets brought to the city some of the beautiful streets and squares in the Renaissance and Baroque period. (Fig.21)

Fig. 21

Influence of stage sets on visual deisgn of streets

In all these concepts, the emphasis has been placed upon geometry in the street planning, and this is a major shift from the irregular street pattern of Medieval cities. A

+6R Rosenau, H. "The Ideal City" p.50

central place as a static unit at the centre, and the formal distribution of squares, dominated the concepts. Streets were related to the central area and squares. Consideration had been given to functional separation of streets for different types of movement. These very elements in the concepts influenced city building and rebuilding in the Renaissance period.

Between the fifteenth and the eighteenth centuries a new complex of cultural traits took shape. Both the form and the contents of urban life were in consequence transformed. A new pattern of existence sprang out of a new economy, that of Mercantilist Capitalism; a new political framework, that of centralised depotism, usually focussed in a national state, and a new ideological form, that of mechanism.+7

The Renaissance was dominated by one city type which for a century and a half was impressed upon all schemes. This is the star shaped city.+8 From a symmetrical fortified polygon, radial streets lead to a main centre. The centre is left open, as in the city of Palma Nova in the state of Venice. (Fig.22)

+7 Mumford, L. " The Culture of Cities" p. 89
+8 Gideon, S. "Space, Time and Architecture" p. 42

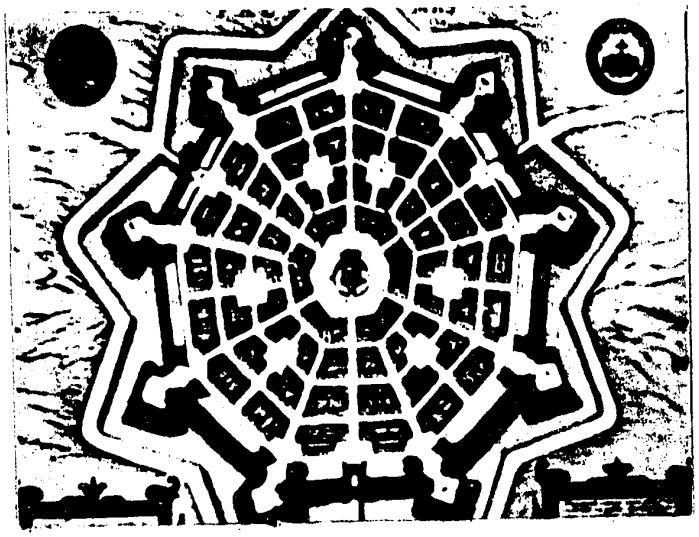


Fig. 22

Radial and concentric street patterns : Palma Nova

During the Renaissance period, the redevelopment of the large and crowded cities took place to a greater extent than the founding of new cities. The lessons that were taught by the ideal city planners influenced the reorganisation of streets and squares.+9 Although the Renaissance planners considered the old cities as haphazard creations and functionless, their beauty impressed them. The basic form of Medieval cities did not change but the structure was decorated with facades of classic elements. This is the outcome of re-interpretation of the aesthetic tenets of the ancient cities.+10 Out of cramped Medieval towns were carved new squares and streets on a formal basis. The monumental character of the Roman cities returned to the city. Every form had its centre

+9 Gallion, A.B. and Eisnel, S. "The Urban Pattern" p.43
+10 Ibid p.45

line, and every space had its axis. The ceremonial function of the street in Egyptian and Babylonian cities returned in the avenues of the Renaissance cities. (Fig.23)

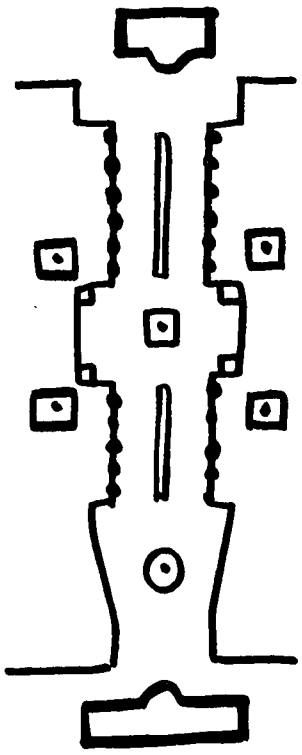


Fig. 23

Formality and axiality in Renaissance streets

The city of the Middle Ages was being relaesed from its clutter. Fortifications were removed and replaced by boulevards and promenades. The Renaissance modes shaded off into Baroque. The Renaissance perspective was based on a strictly limited range of distance, Baroque perspective was based on a limitless field of vision.+11 Focal points and expanding sectors

+11 Rosenau, H. "The Ideal City" p. 59

of fanlike design were two elements well fitted to express the ideology of Baroque. The city of Karlsruhe is an example of Baroque form. (Fig.24)

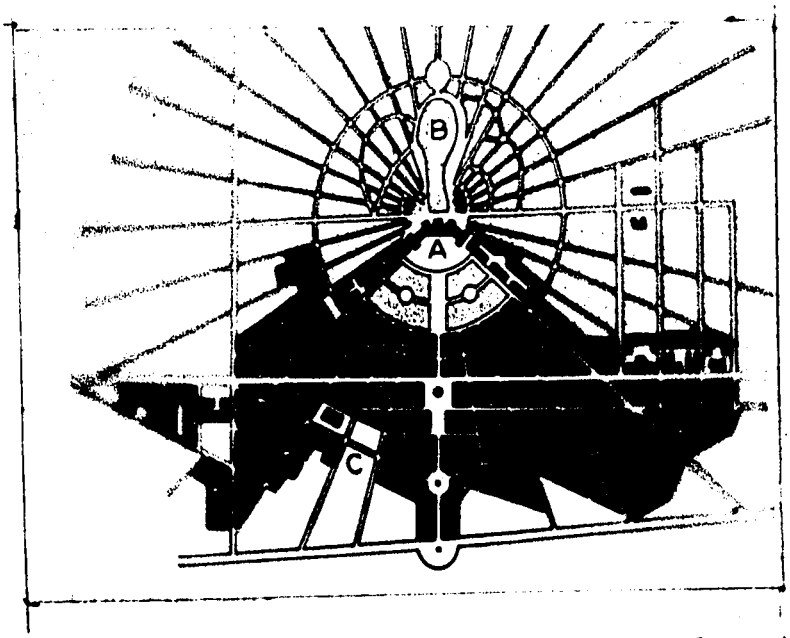


Fig. 24

Focal points from which streets radiated towards nature : Karlsruhe

Within the existing cities, the rulers were mainly concerned with such improvements to the urban environment that would maintain the prestige and glory of their exalted positions in society. The broad avenues provided more than satisfaction for the ego and vanity of despots; they were a strategic means with which to impress the populace with the power and discipline of marching armies.+12 However, it was discovered by the Baroque planners that ample provision of favourable sites is one of the merits of the diagonal street planning.

+11 Rosenau, H. "The Ideal City" p. 59
+12 Gallion, A.B. & Eisner, S. "The Urban Pattern" p. 49

Diagonal streets supplemented the straight streets to re-instate the geometry of ideal city concepts. The most dramatic example of Baroque ideology are the avenues radiating from the palace of Louis XIV at Versailles, France. (Fig.25)

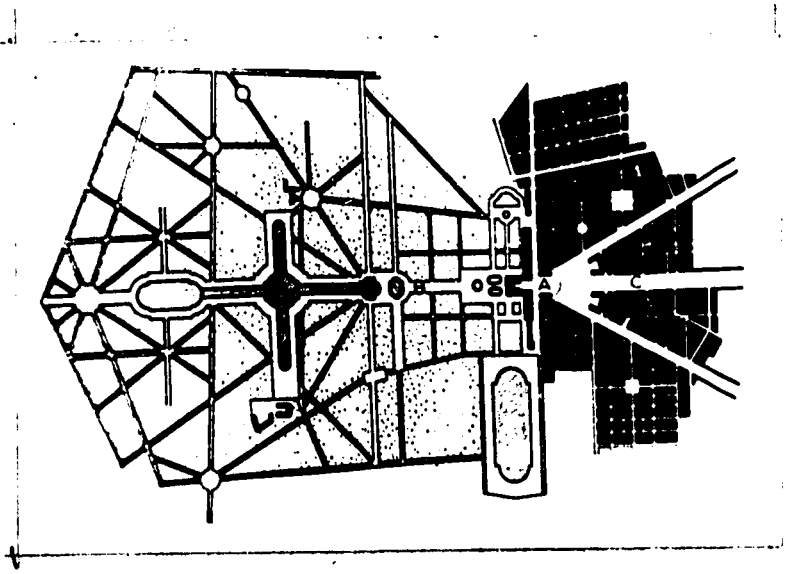
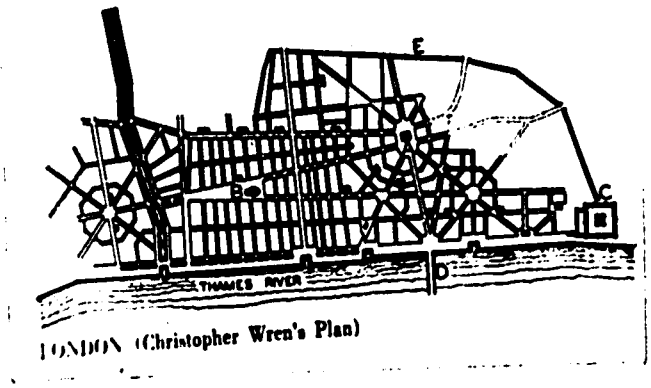


Fig. 25

Diagonal streets in the form of avenues : Versailles

In the Baroque period, whatever may be the ideology, we find attempts have been made not only to bring public amenities such as open squares into the crowded parts, but also to bring in nature from the outside. Nature and space within and without the city, have been linked by broad avenues of a diagonal nature. This diagonal character of streets, without disturbing the limitless field of vision, brings the walls into the foreground.

The most important planning philosophy came into practice through Sir Christopher Wren, who attempted to show historical continuity and the underlying similarities in differing forms. In the plan for rebuilding the city of London, Wren substituted broad streets and generous spaces for cramped buildings. The important buildings were brought into the foreground and further linked together by ring roads. (Fig.26) Sir Christopher Wren has shown the way to achieve unity and historic continuity in the overall growth of the city. To achieve the same with streets is another matter, as we shall observe in the redevelopment of historic areas of Philadelphia.



LONDON (Christopher Wren's Plan)

Fig. 26

Streets related to important buildings : Wren

Another movement that was taking place in the Baroque period, was the colonisation of North America. Colonies in the Americas were settled by pioneers impelled by a burning desire for freedom and to seek opportunities of which they had been deprived in their homeland.+13 The initial settlement was sometimes an irregular plan; as in New Amsterdam (the present New York) and Boston. But most of the towns were plotted in advance for allocation of the land to settlers and finally took the grid iron street pattern. New Amsterdam, Williamsburg, and Philadelphia are some examples of colonial towns in North America.

In New Amsterdam, New York, we find the influence of the Medieval irregular street plan of the Dutch towns in Europe. The irregularity was not due to site condition nor to the shape of fortifications, but to the transfer of cultural patterns from the Old World.+14 (Fig. 27)

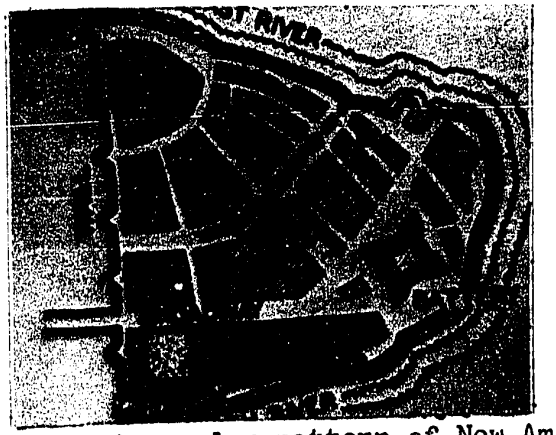


Fig. 27 : The irregular pattern of New Amsterdam

+13 Gallion, A.B., & Eisner, S. "The Urban Pattern" p.49
+14 Ibid p.54

In Williamsburg, Virginia, the quiet, formal repose of the English town was transplanted to a new land. The main street was ninety-nine feet wide and extended from the college to the capital. A "green" was placed at right angles to the main avenue and terminated at the palace. It was a formal plan, but it did not revolve about a monumental feature as in the Baroque cities of Europe.+15 (Fig. 28)

Fig. 28

The formal plan of Williamsburg

For Philadelphia a rigid grid iron plan was adopted by William Penn. Two major streets crossed in the centre of town and formed a public square. A square block park was placed in each of the four quadrants.+16

+15 Gallion, A.B., & Eisner, S. "The Urban Pattern" p.53
+16 Ibid p.54

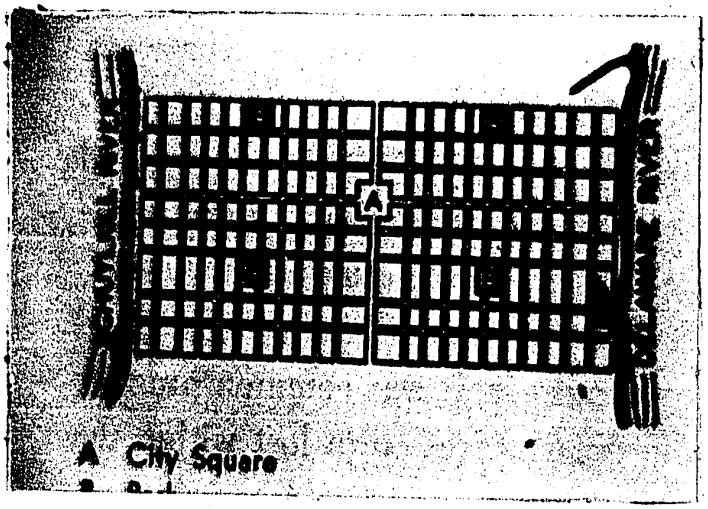


Fig. 29

Grid iron street pattern : Philadelphia

A major change in the city street patterns took place after the design of the capital city, Washington, D.C., by L'Enfant, a young French Architect. With his background of the Baroque atmosphere of Paris, his plan received a geometrical order. (Fig.30) Following the example of their capital city, a number of cities wrapped themselves in the radial plan; a system of diagonal streets laid over a grid iron pattern.+17

Fig. 30

Geometrical street pattern : Washington

+17 Gallion, A. B. & Eisner, S. "The Urban Pattern" p.55

CHAPTER 4

MODERN PERIOD

The cities of the nineteenth century embodied with utmost fidelity all the confusion and contradictions of a period of transition. New techniques, based on machines and specialisation, divided the process of production to an extent hitherto undreamed of. Meanwhile, the new production required increasing concentrations of labour. Workers in great numbers had to be drawn together wherever manufacturing took place. The inevitable result was the formation of the large settlements which we think of as contemporary.+1 Further, the railroad and the new system of propelled ships provided a system whereby goods could be transported from all parts of the earth. The masses, concentrated in the great cities, could thus be supplied with food with comparative

+1 Hilberseimer, L "The Nature of Cities" p. 105

ease. The world divided into the area producing raw materials and food, and those producing manufactured goods.

The standard factory slum was the chief achievement of the nineteenth century. The mechanical city plan was invented, blocks of identical size seperated by streets and avenues of standard widths. From the seventeenth century on, the extension of old towns, took place by the addition of rectangular blocks. The form of the street in the industrial cities is comparable to that of the early Egyptian city, Kahun. Here we have the dreary and monotonous 'bylaw street' of narrow width. The street provides the only open space. Every street had the same facade and every building had the same order. (Fig.31)

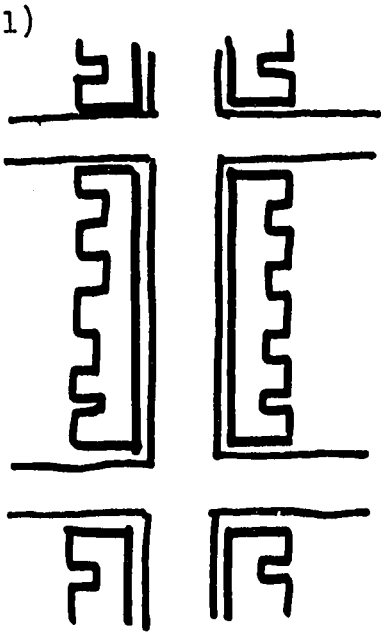


Fig. 31

Monotonous 'bylaw street' in industrial city

Meanwhile the real city was showing its sprouts. The industrial system was no longer primarily a technical problem; it was now a commercial process. Financing and distribution were the new points of emphasis. Factory management turned its attention from production of goods to commercial organisation, banking, and large trade associations. Commercialism with its entourage of shops, hotels, offices and such like, descended upon the city.+2 Of all the amazing products, none had made more striking progess than the vehicles of transportation.

The car revolutionised the patterns of land use faster than the theoretical conception of social time and distance. It paralized the physical structure of the street pattern and necessitated the adjustment of the whole system.

In the central area of the modern city, the physical structure of streets maintained the rectilinear and grid iron pattern that was, primarily, laid out for single family residential neighbourhoods. But the increase in the floor space of central activities has created heavy traffic and pedestrian flows on the principal streets.+3 Lack of space and increasing land values led to the multi storied development of buildings. Small and narrow street blocks, with high frequencies

+2 Gallion, A.B. & Eisner, S "The Urban Pattern" p.82
+3 Rashleigh, E.T. "Observations on Canadian Cities" 1960-61

of crossings, hamper the sound organisation of central activities and traffic. Various improvements were carried out in piecemeal fashion to adapt the street pattern to the demands created by traffic. Street widenings, highways, lot assembly, and other measures proved to have little effect in solving the problems, or in changing the basic pattern.+4

In the modern city, the changes in central activities and buildings have prime consideration. As society has become more complex, technology has multiplied the items of consumption and specialised business functions and services have continued to chrystallize in increasing numbers. It is true that over a period of time certain functions and activities have disappeared from the central area; but almost certainly there has been a net gain in variety. The same variety has given the principal street in central areas a most diversified character.+5 Further, the activities having similar needs cluster together and create various environmental areas. The central area of the modern city is a galaxy of constellations - clusters of activities which appear to have locational affinity, one for the other.

Streets that serve these environmental areas can then be described as shopping streets, financial streets, or commercial

+4 Gallion, A.B. & Eisner "The Urban Pattern" p. 287
+5 Ratcliff, Richard "The dynamic efficiency in the locational distribution of urban activities" p. 315

streets. The modern city is a dynamic organism constantly in the process of evolution. This evolution involves both a modification of long established functions and the addition of new functions. Such functional development calls for new forms, for modification of forms previously established, and for extensions of, and realignments of, the urben pattern. Apparently these developments of function, form, and pattern are governed by a definite, as yet imperfectly recognised, set of forces.+6 This evolutionary characteristic of functions and their effect on the forms are the main factors that constantly change the character of the principal streets in the central area.

The form of the principal streets in the central areas of the modern city is constantly changing in the process of evolution of central activities. The most notable change is the vertical growth of the building due to increasing demand for space and increasing land values. Streets are, merely, dark, narrow corridors passing through these tall structures. Open spaces are lost due to the extensive building coverage. The human scale, that played such an important part in the past, has been impossible to maintain in the ever increasing vortex of growth. The concentration has been placed mainly on the street frontage design. Another very important characteristic is the heavy pressure of pedestrian and traffic

+6 Colby, C. "Centrifugal and Centripetal forces in Urban Geography" p. 287

movement within the narrow streets that has paralysed the sound functioning of the activities. Traffic congestion and traffic pedestrian conflicts are the important features of the principal streets. The environmental standards of the street have been destroyed by these problems. Further, various advertisements, street furnishings and traffic control objects have been organised in a disorderly manner to destroy the appearance of the street. (Fig.32)

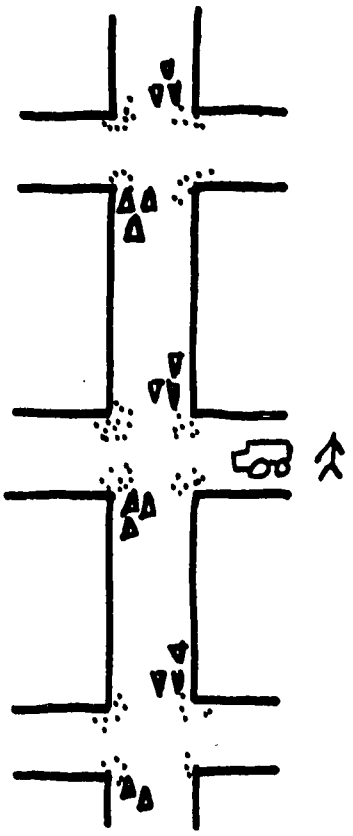


Fig. 32

The street as a traffic artery in the modern city

PART ONE

HISTORICAL CONSIDERATIONS

CONCLUSIONS

Sensitive to surge between oppression and justice, the physical form of cities has been shaped by the economic, social and political forces of society. The degree to which freedom or slavery has dominated the lives of men, the manner in which war has been waged, the instruments of destruction and defense, the tools for peaceful pursuit and the waytthey have been used, the consideration, neglect or disdain men have shown their fellow men, all account for the kind of cities man has built for himself, and their effect on urban development may guide us charting our future enterprise in city building. Influenced by the social, political, economical, and also technological factors, the changes in the forms and patterns of streets and central activities have been summarized in Table One.

TABLE ONE

Period	Influencing factors	Street Pattern	Central Activities	Street Form
PRECLASSICAL	Rulers and slaves, workmen	Orderly, rigid, linear streets	No central place	Street as an access - monotonous in order
CLASSICAL Greek	Free states - democratic society Influence of Hippodamian grid iron pattern	New cities - grid iron pattern modular order	Central place - Agora - market assembly recreational	Dominant forms in space - proportion and scale related to human being - street as an access
CLASSICAL Roman	Imperialism - Colonialism	Redevelopment - Orderly plan - practical adaptations to site conditions rectilinear pattern	Central place Forum - market political, religious recreational	Dominant forms created spaces within - relation of street to forms and spaces - pedestrian and vehicular separation - arcaded sidewalk for climatic protection - Embellishments within the street enclosure street as an access and for public comforts Human scale was maintained

Period	Influencing Factors	Street Pattern	Central Activities	Street Form
MEDIEVAL	Trade cities and princely states - socially and politically insecure - influence of defensive wall population limited hilly sites	New cities Practical adaptation to site conditions - irregular pattern concentric and radial form	Central place intermingling of activities - market, shopping street, church and castle diversity in activities	Streets were spaces created by forms - spaces are dynamic focal points visual elements such as accents and enclosures human scale was maintained streets as an access Public, commercial recreational space
RENAISSANCE	Influence of the ideal city concepts National state and mercantile capitalism	Redevelopment Formality, axiality and symmetry in design of streets and square relationship	Central place market, shopping street, political cultural, religious, open spaces	Forms and spaces informal and static relation to streets. Monumentality and embellishment within the spaces. Human scale maintained. Street as an access public, commercial and ceremonial space Slow vehicular traffic

Period	Influencing Factors	Street Pattern	Central Activities	Street Form
BAROQUE	Imperialism, Colonialism, Privileged landowners and subdivision. Influence of Ideal city concepts	New cities and redevelopment Orderly plan and introduction of geometry in the existing cities	Central place Commercial, shopping, industrial, religious, political public open spaces	Forms were focussed and spaces were treated in limitless perspectives. Tree-lined and processional avenues. Human scale was maintained. Formality and symmetry were retained
INDUSTRIAL AGE	Industrialists and workers. Introduction of machines. Transportational prosperity railway, steamboat, population growth within the city and social conditions	New cities and growth of the existing cities having labour source, ports and raw materials. Rigid rectangular plan in mechanical order	Lateral growth of central place into a district. manufacturing, wholesale, warehousing, market and shopping streets, commercial governmental, institutional, financial	monotonous form and spaces. Congestion due to lack of space. No consideration to landscape and embellishments. Bad and unhealthy street environment

Period	Influencing Factors	Street pattern	Central Activities	Street Form
MODERN CITY OF COMMERCE	Technology, population growth specialisation of functions, rapid transit, communications, finance and distribution, increase in land values	Development of existing cities and redevelopment accretion of rectilinear and grid iron pattern	Interdependance of central activities formations of clusters of activities, chrystallization of activities and variety, complexes and precincts. new activities, i.e. professional and service	Forms grew vertically, spaces were shrunk. Human scale was lost. Street became a narrow and dark corridor, lack of landscape and establishments. traffic and pedestrian congestion and conflict. Chaotic order of furnishings, advertisements

From the above analysis, we observe how the street pattern changed from the simple linear and spoke-like form to the grid iron and geometrical form. Few cities in which great cultures thrived began with a plan. They developed by a process of accretion - the growth was irregular in form, sensitive to changes in habits of people, and dynamic in character. They began as free cities which men settled in voluntary choice. Orderly and geometrical form has evolved according to the manner in which the land was apportioned among the inhabitants. Colonial cities founded by great states were given a formal pattern predetermined by ruling authority. Privileged land owners plotted their land for allocation to settlers, the plot being generally regular in form, almost static in character.+1

In our analysis of street form, we notice the way each period contributed in achieving the relationships between buildings, spaces and street, and also in relation to human scale. This relationship also has a bearing upon the street pattern which permits the scope for movement of pedestrians and vehicular traffic, and embellishments have played their part inchanging from an access to activity, to the space for commercial and recreational activities (public open space).

+1 Gallion, A.B. and Eisner, S. "The Urban Pattern" p.4

From this review of the streets in historic cities, it is concluded that land use activities, buildings, and spaces within them, and movement of pedestrians and vehicles, are the basic elements that are served by the street, and that the same elements define the character of the street. Various social, economical, political, and technological factors influence the changes in these basic elements. The character of these elements, their changes, and the factors that influence them, will be discussed in the following theoretical part of this thesis.

THE CHANGING CHARACTER OF STREETS IN CENTRAL AREAS

PART TWO

THEORETICAL CONSIDERATIONS

The theoretical part of this thesis, although dealing with the street in general, concentrates upon the principal streets in Central Areas. Further, in the modern city, the street pattern, or physical structure, of the Central Area has changed little; and changes have mainly taken place in the other elements that affect the character of streets, such as the function and form of a street.

1. ELEMENTS : (a) LAND USE

The function of a street is to give an access to land use activities. The street acts as a linkage to various establishments of activities, and provides the space for movement that is caused by the interaction of these activities.

Streets are permanent in nature, however, and in a static position, whilst activities change. Changes in activities are most intensely found in the central area. The principal streets that serve these changing patterns of activities, change in their character constantly. To understand the effect of land use activities in changing the character of the street in the central area, we have to observe the changes in the internal land use arrangements of the central area.

Land use, in the form of activities (the function), shapes the structure of the central area. This happens in changing patterns, eigher over a wide area or at a given location (interchange of activities at a fixed location). The structure is the impact of the economic and social activities of the people on land occupancy, causing relationships of the vertical masses and planes of buildings, to the horizontal planes of streets and open spaces, and to the subterranean maze of utility lines.+1 John Rannells elaborates the pattern of interaction

+1 Petshek, Kirk "Urban Renewal and the Changing Urban Structure" p.5

between people, both as individuals and in groups, into three stages.+2

1. Routines: Fairly repetitive, some regularly patterned, some casual, or infrequent, e.g., going to work, shopping, etc.
2. Institutional processes: When routines of many people come together in common activities, forming repeated patterned actions in the physical structures, e.g., schools, theatres, office building, etc.
3. Organization of processes: is the continued interaction between different institutionalized processes and creates patterned cross relationships. They are seen most clearly in the service processes such as transportation, advertising, banking, and also include government education.

This pattern of interaction between people establishes the pattern of land use in the central area. But the land use pattern of any urban area is a reflection not of the immediate and current space requirement of the community, but rather of the cumulative needs over a period of years. The physical structure of streets, building, and utilities are representative of generations past.+3 This fixity of investment of land has been cited as being responsible for the lag in adjusting the physical aspects of community to new social,

+2 Rannells, John "The Core of the City" p. 7
+3 Ratcliff, Richard "Urban Land Economics" p.386

economic and technological needs. Thus activities are conditioned by the physical environment provided by the city in which the people live and work. To understand and describe this complex interaction which is city life - both activities and physical environment serving each other, adjusting to each other, conditioning each other, it is necessary to begin with activities for in these is the source of the vitality of the particular area.+4 When activities are seriously curtailed, the physical environment begins to deteriorate; as different kinds of activity change in relative importance, the physical environment adjusts to the new balance. Beside the existing physical structure, there are various other factors that influence the pattern ofland use and its changes. These factors have been discussed later.

An establishment is a concentration of people's activities at a definite location, and in turn it is a unit in the chains of action which link all kinds of activities into the continually changing network. It is both a unit of land use and a unit of organisation.+5 Every establishment in the course of its regular operation, is engaged in several systems by linkages. These linkages are the units by which the relationship of land use and its change can be traced.+6

+4 Rannells, John "The Core of the City" p. 1
+5 Ibid p.11
+6 Ibid p.19

Each of the many linkages that converge at a given establishment, may be imagined as exerting an attractive force between them. The net balance of pulls exerted on each establishment by its linkages with others, is a major factor in the spatial arrangement of land uses, so that each new establishment tends to locate where the forces of its expected linkages will be in equibibrium. This suggests a free-to-move arrangement, in which the organized activities of each portion of a city are constantly adjusting themselves in space as the relationship between separate activities gain or lose in strength, and as establishments are formed and die out.+7

This changing arrangement of land uses effects the streets that serve them.

There are four types of linkages distinguished by John Rannells, depending of the form of relationships between the linked establishments.+8

1. Competitive Linkage:

   Each establishment strives to hold or increase its own share of the same market.

2. Complementary Linkage:

   Both establishments supply the same market or a single customer.

+7 Rannells, John "The Core of the City" p.20
+8 Ibid p. 29

3. Commensal Linkage:

   Both establishments use the same facilities or depend upon the same supplier or the same market.

4. Auxilliary Linkages:

   Services supplied by one establishment to the members of another.

Changes in all these systems of linkages reflect changes in organisation and bring about changes in the land use pattern.

Central area activities are constantly readjusting their locational arrangements to gain maximum efficiency depending on the most desirable linkages.

Efficiency in land utilisation is measured in terms of productivity. The goals of urban productivity are to minimize the social costs of distance or space and to distribute locational costs equitably in accordance with benefits received.+9 These are the economical factors that determine the efficiency in locational arrangement of land use.

In an idealised arrangement of land uses with aggregate cost of friction at a minimum, each site occupant would bear a rent burden properly representative of the savings in transportation cost for his enterprise.+10 But by looking at our central

+9 Ratcliff, Richard in "Readings in Urban Geography" p.301
+10 Ibid p. 304

area, we observe imperfections, lags, and obstacles to the free operation of the economic forces that establish the land use patterns in the central area.

Our streets and the problems that are created by traffic and intensity of land uses and obsolete buildings on the streets, are the main causes of the locational maladjustment. This has led to decentralisation of some central activities in outlying districts and on traffic arteries in the form of "ribbon development". The business depression, thus created, has seriously deflated property values and business mortality has caused the retail district literally to shrink in area. Accessibility has been harmed by traffic congestion. Parking facilities have increased in the central area and are scattered all over, to create holes in the fabric of the central area. This has resulted in a disintergration of the cohesive nature of the central area, and has harmed its efficiency.+11

Further, an imcompatible mixture of land uses is observed in the central area of most of the cities. It is mainly due to excessive zoning, and the permission of "lesser economic" land uses within the areas of "higher economic" land uses is the major cause of this incompatible mixture.+12

Various measures have been devised to combat the forces that harm the efficiency of land use patterns. Improved parking

+11 Ratcliff, Richard in "Readings in Urban Geography" p.305
+12 Bartholomew, H. "Land Uses in American Cities" p.19

traffic control, freeways, added parking space, and street widening - all contribute to increase accessibility. Further the public rapid transit facilities and their attractive qualities have been able to solve the traffic congestion and parking problems.+13 A refined type of zoning and taxation might be developed that would adjust locational arrangement of activitities making them more suitable to the environment and to exclude locationally inappropriate uses from areas where their presence will increase frictions. Also it may be necessary to maintain and achieve the variety of activities and the concentration of employment of compatible types, so as to bring diversity on streets.

More recently, the editors of Architectural Forum hypothesize that the future down town area will have fewer land uses. Warehouses, manufacturing, and distribution will probably no longer appear there, leaving shopping, living, offices, hotels, entertainment, and cultural facilities. In addition there will be pedestrian walkways, bridges, parks free from all vehicles except slow, short-distance, public transportation, peripheral parking adjacent to the shopping core, and mass transit facilities. Living accommodation in the down town area will be for people who are wealthy and childless; the return of the middle class is uncertain. A great variety of experience will be provided - concert halls, basketball

+13 Ratcliff , Richard "The dynamic efficiency in the locational distribution of urban activities" p. 323

arenas, waterfronts with a "World Fair" decor, open spaces - because the flashy suburban shopping centre has taught some strong lessons about retailing that would indicate that such an environmental quality is necessary for commercial success.+14

The hypothesis, as representative of the general climate of opinion among people who venture capital in business (the particular segment of the reading public to which Architectural Forum usually directs itself), confirms that the future environment in central areas will be oriented towards pedestrian comforts, with traffic and pedestrian segregation. It is not necessary to discuss especially, what character the principal streets will have in the future central area. There will be a variety of experiences, amenities and embellishments which a pedestrian can safely enjoy while he is on the street.

It is also true that in the future, the community will play an important role in deciding what environmental character a particular street should have, and in order to achieve it, what sort of land use activities it should serve. No doubt some existing factors will be taken into consideration but all these factors are not beyond control by the community.

In dealing with the part the community plays in bringing "desirable" environment on the street, Jane Jacobs comments

+14 "Downtowns dramatic comeback" Architectural Forum (February, 1964) p.99

as follows:

To generate exuberent diversity in a city's streets, four conditions are indispensible:+15

1. It must serve more than one primary function; preferably more than two. These must ensure the presence of people who go outdoors on different schedules and are in the place for different purposes, but who are able to use many facitities in common
2. It must mingle buildings that vary in age and condition, including a good proportion of old ones so that they vary in the economic yield they must produce. This mingling must be fairly close grained.
3. There must be a sufficiently dense concentration of people for whatever purposes they may be there.
4. Street blocks must be small with opportunities to turn.

Here Jane Jacobs is discussing particularly the principal streets that are dominated by a pedestrian environment, and not a traffic artery. Further she has placed an emphasis on the diversity of land uses of a compatible nature such as retail, entertainments, institutions, and residential development. Accordingly, the zoning causes monotony of land uses on the principal streets. But in considering traffic and economic efficiency, zoning of districts would be necessary. It may be possible that she is considering those streets that mainly deal with retail trades. The four conditions, that she has

+15 Jacobs, Jane "The Death and Life of Great American Cities" p. 150

forwarded, are very advantageous for the principal streets on which the intermingling of residential and non-residential activities are taking place. An example of this is Sherbrooke Street, in the central area of Montreal, which we shall discuss in the latter part of the thesis.

1. ELEMENTS : (b) FORM

The integral part of land use is thephysical accommodation for the activities of establishments+1 The physical accommodations of many systems of activity into which the city's life is organised.+2 The street functions to serve these activities of establishments and thus serve the buildings. Buildings define the enclosure of a street and give form to the street. Intensity and character of activities within these buildings shape the form of a street. Thus buildings that are served by the street, play an important role in the character of the street.

Internal and external activities determine the space and location of the establishment and its building. The internal activities of establishments bring about requirements which are practically specifications for building space, the descriptive attributes of thephysical structure being the following:+3

1. Arrangement: sizes and shapes; headroom, clear space; ratio of length to width; position and size of windows; doors; corridors; circulation.

+1 City Planning Department, Calgary "Urban Renewal Symposium" p. 6
+2 Rannells, John "The Core of the City" p.35
+3 Ibid p.38

2. Structure: (physical) load capacity; type of construction; single or multi-storey; partitioning; finishes; amenability for renovation or major alteration.
3. Organisation of work: allocation of space among different activities.
4. Attached services and inherent facilities: frontage on one or more streets; show windows; shipping facilities.
5. Mechanism for operating: storage, display.

This is not only the designed form of building but it also includes alteration of the building space itself for the establishment's special purpose.

The external activities of establishments bring about requirements which have to do with locations of the establishments and their relative buildings. It also deals with the linkages between them.+4

1. Exterior of buildings: accessibility, entrance, shipping platform, frontage for display, appearance (symbolic, including height and bulk) for different activities.
2. Site and position: Neighbouring land uses and natural features; available services for communication and transportation, and services supporting internal activities; location and distance of linked establishments; suitability of neighbourhood (symbolic) for different activities.

+4 Rannels, John "The core of the City" p. 38

3. Establishment's contact with people: Shoppers, clients, agents. The symbolic attributes of location under No. 1, and No. 2, above are frequently important in their relationship.
4. Establishment's communication: Face-to-face, by telephone, or by mail.
5. Persons movement: pedestrian, mass transit, auto, rail.
6. Goods handling: by hand or hand-truck, via transportation system.

Both these sets of requirements are satisfied imperfectly at best, by the combination of buildings and locations which constitute the total supply of available accommodation in an area. It gives the explanation for a particular form of a street - for it is inevitable that the requirements change more rapidly than the great bulk of the accommodation can be adapted, and in this case external activities take a major part in shaping the form. Changes in the requirements explain changes in the form of a street.

The strongest elements of the street form are the buildings themselves. Buildings enclose the street and create a variety of spaces. In fact, these outdoor spaces are rarely created by complete enclosure, but rather partially, by the confirmation of the floor and by vertical planes which define it.

These outdoor spaces are mainly horizontal, and any vertical features or changes take an exaggerated importance.+5

A space has a scale with respect to the observer himself, and either appears in touch with him and measureable by him, or takes on an awesome and superhuman size. A few tentative qualities can be assigned to the size and proportion of external spaces. Outdoor spaces of three to ten feet seem extremely or intolerably small, while dimensions of forty feet appear intimate.+6 Moreover, as these are limits to the angle of clear vision, it is often said that an external enclosure is most comfortable when its walls are one half or one third as high as the width of the space enclosed, while if the ratio falls below one fourth, the spaces ceases to seem enclosed. Streets in central areas are mostly of an enclosed nature, since the desirable ratio of height of buildings and width of street does not exist. This makes us overlook the upper part of buildings and concentration is mainly placed on the part of the buildings within possible angles of vision.

The spaces of streets vary in effect by the way in which they are enclosed, passed through, and left behind.+7 Their appearance is modified by the activity that goes on, by the

+5 Lynch, Kenvin "Site Planning" p.57
+6 Ibid p.60

way faces of the buildings are treated, and various street elements that are placed in the street. Spatial dimensions are reinforced by height, colour, texture, and details of all these elements.

In the light of studies by Sir Raymond Unwin and Henry Wright, efficient control is more than an obsession to save; it is also a method to improve. Standards are the measurement by which we must be guided rather than remain content with what Elizabeth Denby called "the intellectual pleasure which the architect got from a triumphant arrangement of inadequate space."

It must be clear that space in the city must first and foremost provide for adequacy; it must be ample. This means enough space so that buildings may stand alone or together without violating the sensibilities of those who see and use them.+8

The concept of space means:

1. A relatively constant limitation onpopulation density, regardless of height that structures may reach. The prospect of squeezing more people into the same space creates instability, not only in land value, but in urban services. Either course is an extravagant venture as city budget and utility bills attest.

+8 Gallion, A.B. & Eisner, S. "The Urban Pattern" p.200

2. Room for the vehicles of transportation to circulate with ease and safety.
3. Parking space for the free-moving vehicles.
4. Room enough for people to walk in safety and some degree of beauty.

It may be suggested that the concept of space described above is not a practical one but it clearly defines the objective of public control, and its capacity to compromise is a requisite for accomplishment. We see about us the results of thus being "practical"; we see these results repeated time and again; more congestion, more traffic problems, more deterioration, more expense, and boundless confusion and bewilderment. If we peer behind this scene, we may well find the reason: the process of planning began with a compromise.

We might hark to the words of Lewis Mumford:

"As so often had happened during the last quarter century, the self-styled practical men turned out to be the weak, irresponsible dreamers, afraid to face unpleasant facts, while those of us who were called dreamers have, perhaps, some little right now to be accepted - at least belatedly - as practical men. By now history has caught up with our most dire prophecies. That is at once the justification of our thinking and the proof of its tragic failure to influence our contemporaries."+9

+9 Mumford, Lewis "Architectural Forum" May, 1945

Buildings and spaces moulded within, define the form of the street that passes through them. The form of a street has its own image or quality which enables us to identify changes in street character.

The image of a street form can be described by taking the street as a path with predominant elements. The image of a street can be strengthened by other elements described in later discussion. But streets or paths can also be distinguished by their own image quality.

1. Path: A concentration of some special quality, a special texture of floor or facade, a particular lighting pattern, a unique set of smells or sounds, a typical detail or mode of planting.+10
2. Edges: They are barriers or boundaries between two phases. They play an important role of holding together generalised areas.+11 A streetcan be a path and at the same time can also act as an edge.
3. Districts: Medium to large areas, conceived of as having two dimensional extent, which the observer mentally enters "inside of". It has an identifying character, and also identifying form if visible from outside.

+10 Lynch, Kevin "The Image of the City" p. 96
+11 Ibid p. 70

4. Nodes: Strategic spots in a city into which an observer is travelling (junction of paths or places at breaks in transportation). Some of these nodes are focal points of the district.
5. Land mark: External type of point reference, rather simply defined physical object: building, statue, mountain, etc.

None of these elements exist completely alone. The path is the main element in the organisation of the whole area, at any broad or any limited scale. The elements are patterned together, creating the form. The form created by elements of images could be further distinguished according to their structural quality; the manner in which their parts are arranged and interrelated. They have the following physical qualities:+12

1. The various elements are free: no structure or interrelations between parts.
2. The structure is positional: the parts are roughly related in terms of their general direction and perhaps even relative distance from each other, while still remaining disconnected.
3. Flexible structure: parts were connected one to the other, but in loose and flexible manner, as if by elastic ties.
4. Rigid structure: when connection multiplied. Parts are poorly interconnected in all dimensions: any distortions become built in.

+12 Lynch, Kevin "The image of the City" p. 90

These characteristics of structure could be applied in different ways at different levels. Depending on the arrangement of the elements, the image of the form could be dense, rigid or vivid, put together heirarchically or continuously.

1. ELEMENTS : (c) TRAFFIC

The function of a street is to give access to activities. Since activities are not located at one place, they create movement on the street. This movement of people, of recorded information, or of goods for the purpose of communication, generates traffic. Thus street and traffic are interrelated and any change in traffic affects the street.

Further, linkages, the unit by which relationships between activities are traced in the study of land use and its changes, are defined as follows: a relationship between establishments characterized by recurrent interactions which require movement of persons or of goods or the exchange of information.+1 Here we observe the relationship between traffic and activities. This point can be noticed in the Buchanan Report: Traffic is a function of activities; since the interaction of activities causes the movement.+2 Activities, mainly take place in buildings. Therefore, the pattern traced by all the vehicles is closely related to the manner in which the buildings are arranged.+3

Traffic will be taken, following the definition of the Buchanan Report, "to include the presence of vehicles, both moving

+1 Rannels, John "The Core of the City" p. 19
+2 The Buchanan Report "Traffic in Towns" p. 33
+3 Ibid p. 35

and at rest".+4 Thus it presents together the interrelated concepts of streets, activities, buildings, movement and parking. But here the arrangement of activities plays an important part in controlling all other components of it.

The Chicago Area Transportation Study makes a statement that the movement of persons and goods is the means by which separate land use activities can exist and yet function. Another aspect of the relationship between land use and traffic is brought out in the study: the location of transportation facilities will determine to a great extent the pattern of land development. Thus the transportation system can be used as a means for obtaining the deserved quality of environment.+5 This is mainly applicable to new development. In existing cities it is not practical since the existing physical structure of streets is difficult to alter.

There are the four basic ways in which motor vehicles are used in connection with these activities:

1 Transportation of raw materials, merchandise, food·
2. Conveyance of passengers in bulk (public transportation);
3. Conveyance of persons individually (cars);
4. Mobile services (Fire Engines).+6

This gives us the classification of vehicles and helps us in classifying the streets. But classification of streets

+4 The Buchanan Report "Traffic in Towns" p. 38
+5 Chicago Area Transportation Study p. 2
+6 The Buchanan Report "Traffic in Towns" p. 34

mainly refers to the speed of movement and fuctions it serves. Thus we have a hierarchy of distributors. Basically there are only two kinds of street - distributors for movement, and access roads to serve the buildings.+7

This explains one important fact: that each street is classified to serve a particular function of traffic at a particular speed. The vehicles passing on this street are of one particular type - heavy or light.

In the classifications explained above, private cars and public transportation are in conflict with trucks or vehicles carrying raw materials. This explains that the mixture of traffic is probably due to the mixed use of incompatible activities such as industry and residences. It also may be true that a street carries a mixture of traffic since it acts as a street for through traffic.

Before we go forward to discuss the problems that have been created by traffic on a principal street, it is necessary to understand the pedestrian environment on the street.

Closely associated with the quality of the environment is freedom of pedestrian movement. The simple act of walking plays an indespensable part of many other matters, such as

+7 The Buchanan Report p. 45

looking in shop windows, admiring the scene, or talking to people.

To recapitulate, the several ways in which motor vehicles 'menace' the environment of streets are through danger, intimidation, noise, fumes, vibration, severance and visual intrusion. These effects are mainly felt by pedestrians and the occupants of buildings, though to varying degrees, but they may also be felt in part by the occupants of vehicles. They are largely experienced, of course, on account of the ubiquitous presence of the vehicular urban street.+8

These effects are intensely felt on the principal streets in city centre, and have brought undesirable environments to the street.

We are likely to have the street for a very long time, so that much of the study of environmental standards must be concerned with the conditions under which the street can continue to play an effective role.+9

In achieving a good environmental capacity for streets, it is necessary to understand the problems that have been created by traffic affecting the environment.

+8 The Buchanan Report p. 49
+9 Ibid p. 49

1. Through traffic in a street which is usually explained by the nature of an inherited system of streets;
2. A mixture of traffic is explained by mixed uses: mixtures of incompatible land uses create conflicting movements;
3. Jumbled arrangements of buildings create a complicated web or criss-cross journey;
4. Intensive growth of activities in tall buildings without any relation to the street that serves it;
5. Visual intrusion due to standing vehicles or open parking lots.

These are some of the important forces that destroy the character of a street.

In discussing the traffic problem, Albert Mayer makes a statement to the effect that our urban traffic problems may be the symptom of another problem, and that difficulties with urban traffic may stem from the fact that we are trying to treat the symptom instead of the disease. The disease, he points out, may be the present patterns of development, which need to be adjusted so that places of living, working and recreation will be integrated.+10 In fact the present central area is moulded into the same character, since the residential activities are returning to the central area.

+10 Mayer, Albert "Architecture as Total Community" Architectural Record Vol. 136, 1964 p. 160

Returning to the environmental capacity of a street in the central area, it is necessary to define environmental areas as urban rooms of activities where people can live, work, shop and look about, and move around on foot in reasonable comfort and freedom from traffic.+11

Environmental areas (residential, shops, offices) in the central area will be defined by the locational distribution of land uses to achieve maximum efficiency. The discussion of this has already been carried out in the land use section. These environmental areas of various activities, will be served by distributing the traffic network on a hierarchical basis. The maximum size of an environmental area is governed by the need to prevent its own traffic building up to a volume that in effect, necessitates sub-division by the insertion of a further distributory link in the network.+12

This will classify the streets and attach to them the primary function that they serve. If the primary function is an environmental function (e.g., shopping, residential), then the yard-stick for planning and improvement works must be the environmental capacity. It is also necessary to find out the environmental capacity of the street that serves the environmental area. This would be possible by examining its dimensions, the uses and character of the adjoining buildings,

+11 The Buchanan Report p. 42
+12 Ibid p, 43

and the amounts of pedestrian traffic along and across it; to define the volume and character of traffic permissable in the street. This amount of traffic will be called the "environmental capacity".

It is a fact that the pattern of streets and lots remain unchanged from an earlier era although the use of land has changed. In most cases the original use of the land was residential, the lots were small; there were many individual owners, and the streets were designed for small volumes of traffic. As time has passed, this land was put to central business use, and the earlier pattern of lots, streets, and land ownership has become obsolete for its new use; but the pattern persists. Private builders usually find great difficulty in changing this pattern; land assembly has been a costly and difficult job. As a result, the logical expansion and growth of central areas are inhibited by a mould impressed upon them in the past and inflexible to the needs of the present.+13

The frequency of crossing that has been created by the outmoded street pattern in the central area, is the major cause of traffic congestion. It allows the movement to progress only from stop-light to stop-light. Seen from above, such streets reveal numbers of cars, buses and pedestrians stopped

+13 Rashleigh, E.T. "Observations of Canadian Cities" 1960-61 Plan Canada Vol. 3 No.4 (1962) p.62

and clogged together at intervals; each mass is separated from the next by a large space of unoccupied street; and the sidewalks are cut into pieces, creating a kind of obstacle race for the pedestrians.+14 Another great difficulty of the inherited street pattern arises from the fact that access to the great majority of buildings is gained from the main street on to which they front.+15

Over the last twenty years or so there has been much discussion and argument about the pattern best suited for the main traffic routes. This discussion has been largely dominated by the idea of ring roads. Historically most of our towns have developed with a strongly marked radial road system.+16 The presence of through traffic on these radials has caused a heavy traffic congestion in the centre. The obvious 'solution' is to divert the traffic around the centre and form a complete ring. This inner ring provides relief to the centre. Within the centre, various ways have been discussed of controlling traffic movement.

To achieve good environmental conditions on a street, the following methods have been used:

1. The reduction of traffic to match the environmental capacity, which could be achieved by squeezing out all the extraneous traffic with no business in the street;

+15 The Buchanan Report p. 38
+16 Ibid p. 42

2. If it is a shopping street, where environmental needs ought to come before everything else, it would follow that the street should be closed to vehicular traffic and pedestrians be given the free run of it.

There are a number of policies that can be adopted, but the estimation of the environmental capactiy of a street will point out what policy should be adopted for that street.

2. FORCES : (a) CENTRIFUGAL - CENTRIPETAL

The development of function, form and pattern, are governed by a definite, although as yet imperfectly recognised, set of forces. Among these forces, two groups stand out prominently. The first group is made up of the centrifugal forces which impel functions to migrate from a central zone of a city toward, or actually to, or beyond, its periphery; whilst the second includes powerful centripetal forces which hold certain functions in the central zone, and attract others to it.

In describing these two important forces, the hypotheses of Charles C. Colby have been taken into consideration; since it remains as the basic recognised study up to this date.+1

Centrifugal Forces

The central zone of a rapidly growing city always or nearly always, shows evidence of expansion. It is not only expanding laterally, but also upward with its towers and downward with a subway.

+1 Colby, Charles, C. "Centrifugal and Centripetal Forces in Urban Geography" in Readings in Urban Geography (Eds.) H.M.Mayer & C.F.Kohn 1959 pp 278 - 298

Six of these forces stand out predominantly:

1. the spatial force, under which congestion in the central zone uproots, and the vacant spaces of the outer zones attract;
2. the site force, under which the greatly modified and intensively utilised natural landscape of the central zone is balanced against the relatively unchanged and little used natural landscape of theperipery;
3. The situational force which arises from unsatisfactory functional spacing and alignments in the central zone, and the promise of more satisfactory functional spacing and alignments in the periphery;
4. The force of social evaluation, under which such conditions as high land values, high taxes, and inhibitions growing out of the tyranny of the past in the long-established central zone, create the urge to move, and low values, low taxes, and freedom from restriction imposed by previous occupance of the newly developing periphery, represent the invitation to come;
5. The status and organisation of occupance in which such things as the obsolete functional forms, the crystallized pattern, traffic congestion, and the unsatisfactory transportation facilities of the central zone in may instances stand opposite the modern forms, the dynamic pattern, the freedom from traffic congestion, and the highly satisfactory transportation facilities in the outer zones;

6. The human equation, which includes such potent migratory impulses as arise from religious tenets, personal whims, real estate booms, manipulated politics and the like.

Centripetal Forces

The centripetal forces in urban development, focus on the central zone of the city. In this zone, number and complexity of urban function increases greatly. Functional congestion necessitates complex functional forms and frequent adjustments in the zonal pattern.

1. Site attraction: some feature of the natural landscape, inconspicuous as it may be in the present urban complex, invited occupance;
2. Functional convenience: many functions remain in or gravitate to the central zone of the urban area because in that zone, they can be carried on more conveniently than elsewhere. In many cases, this functional convenience endows the central zone with such active qualities that it takes on a more diverse character and a more rapid tempo than the outer zones;
3. Functional magnetism: the concentration of one function in the central zone, operates as a powerful magnet attracting other functions. The attraction exerted by a cluster of functional units on the other units of the same type, represents another type of functional magnetism;
4. The human equation: the human desire to be in the centre

of things probably leads to an over-estimation of the value of a location in the central zone. Choice, emotional attachment, civic pride, and vanity, act as centripetal forces.

In order to recognise and describe the centripetal and centrifugal forces as sharply as possible, the method thus far has been to focus attention first on one set of forces, and then on the other. Both the forces can be used to achieve a desirable effect, and this will depend upon what type of environment we are looking for in our central area. The balance of the two forces can be achieved by measure of public control.

2. FORCES : (b) LAND VALUES

Land values influence form through land use. "It has been hypothesized that competitions for the use of land and the ability of some activities to pay higher land rents than others, is the basic force underlying city structure. If this be the case, one way of viewing the structure of the city would be in terms of the patterns of land values.+1

Urban land provides area and support for buildings and other capital improvements, which during their physical life become an integral part of the land. They provide shelter and facilities that are essential to its use as housing, or for commercial and production purposes. Their location -- the space relationships with all other physical features of the landscape -- invests the land with a complex quality of convenience that is primarily basic to its utility in the urban economy.+2

The value of the land depends on various factors. E.H. Boeckh lists the following factors:

(a) Land: depth, shape, topography, corner lot, alleys, street width, plottage value (the increment in value by consolidation of plots);

+1 Bogue, Donald "Relationships between land value AND land use in a CBD" p. 1

+2 Ratcliff, R. "Urban Land Economics" p.346

(b) Service: paving, sidewalks, street lighting, fire protection, public utilities, transportation, advertising value;

(c) Utility: natural traffic, (includes all traffic other than that bound for the central business district), business traffic, air rights, one-way streets, natural barriers, effects of distance to major activities;

(d) Conditions: zoning laws, actual occupancy of district, exposure, occupancy hazard, building utilities, insurance rates, tax rates, utility service rates.

It may be said that the character of the location is the prime determinant of thelevel and future pattern of gross revenues that may be produced under various development programmes; and the development progremme in terms of capital outlays and operating policies is the determinant of the distribution of the revenues.+4

This explains the changing character of buildings and activities at different location on a street. This characteristic is primarily found on principal streets in the central area since it is the place where various central activities are constantly in competition for favourable locations.

The outgrowth of this market process of competitive bidding for sites among the potential users of land is an orderly pattern of land use, spatially organised to perform most

+4 Ratcliff, Richard "Urban Land Economics" p. 370

efficiently, the economic functions.+5

The ideal land use pattern is, of course, never attained. Site bids are too often matters of trial and error. The complexity of the forces impinging upon each site precludes any accurate measurement of its future utility. The widespread use of leases tends to perpetuate errors in site selection and to delay the process of rearrangement. Finally, the perpetual evolution of our economy, technological change, and social mutations are continually creating alterations in economic functions and giving rise to maladjustments in the pattern of building and activities that can be corrected only slowly and painfully.+6 The long physical life of the improvement to a site creates a serious obstacle to the readjustment of land use to changing conditions. Further, the replacement of existing improvement is not justified until the value of the cleared land exceeds the present value of the original enterprise - building and land. The one-storey "taxpayer", who holds the obsolete buildings on the site so as to gain extra profit when the site is ripe for large development, is another obstacle to the readjustment of land use. Traffic congestion and lack of parking facilities also cause harm to the land use pattern process.

+5 Ratcliff, Richard "Urban Land Economics" p.369
+6 Ibid p.369

The basic objective of city planning is to attain the same land use pattern that would emerge naturally from the processes of the urban real estate market under conditions of perfect competition. But the market is not perfect; hence the city planner, having determined on the most advantageous grouping of uses or environmental area, must enforce this grouping through zoning ordinances. The most convenient arrangement results in the lowest aggregate transportation costs, the advantages of the more convenient sites are reduced. Improved parking, reorganisation of street networks, public transportation, street widening, etc., all contribute to increased accessibility and the diminution of the aggregate sum of site rentals.+7

Every effort should be made to adjust the central structure to social, economic, and technological change, so that its physical rigidity - of building and street pattern - will not hamper prompt locational adaptation. In this connection, discouragement should be given to the use of long term leases and to the erection of special purpose buildings, since the highest degree of flexibility should be maintained to permit the free and constant rearrangement of land uses in patterns which maintain friction at a minimum, in the face of changing conditions.

+7 Ratcliff, Richard "The dynamics of efficiency in the locational distribution of urban activities" from Readings in Urban Geography p. 323

2. FORCES : (c) PUBLIC CONTROL

It is an accepted principle that the ownership of land is exclusive but not absolute; each owner may use his own property to the exclusing of all others, but he must use it with due respect to the limitations imposed by society.+1 The set of these limitations, public control, over private properties, guides the evolving form and structure of a city in the public interest.

Public control can organise land use patterns, and the relationships between buildings, spaces and traffic to bring about the desirable environment for a street in the interests of the community. The forms of public control are discussed as follows:

1. Zoning

(a) Land Use - Zoning is the legal regulation of the use of land.+2 Zoning, not only, establishes the uses to which land may be put, but it sets the standard by which improvement upon the land may be developed. Zoning deals only with future land development involving either the original dedication of the land to its original use, or a change in use. Zoning is retroactive and is not used to require the removal of non-conforming uses that exist at the time

+1 Ratcliff, Richard "Urban Land Economics" p.406
+2 Gallion A.B. & Eisner, S. "The Urban Pattern" p.203

of the adoption of the zoning ordinance.+3 Hence, in view of the many non-conforming uses and the constant need to make accommodations to fit a normal, and often desirable change, most zoning ordinances have been kept flexible, through the medium of appeal boards that permit both general and specific amendments.

(b) Buildings: Zoning ordinances are also the vehicles of control over the placement and bulk of the structures that are erected and, in many cases, the population or family density. The placement of the structure on the land is controlled by setback regulations. The purpose of such limits is to assure light and air, and provide for an orderly and attractive arrangement of the buildings.+4 These limits have been the criteria in measuring adequate space and building relationships, but their relative importance has been modified by advances in artificial lighting, sound insulation, and air conditioning. The exterior spaces in which the environment may be enriched with landscaping, and in which the human scale may be retained, is a mounting challange.+5 The primary issue in the future seems to be the need for regulations directed to a balance between bulk and exterior space required for circulation vehicular storage, and the evolution of a city scape which satisfies more of the basic material needs of humanity.

+3 Ratcliff, Richard "Urban Land Economics" p. 413
+4 Ibid p. 414
+5 Gallion, A.B. & Eisner, S. "The Urban Pattern" p. 212

The principle of "Floor Area Ratio" offers some encouragement in this direction. This is a regulation of the ratio between the area of building floor space and the area of the lot is occupies. This approach affords flexibility in the shape of buildings to serve their particular function and will be able to create adequate ground space for pedestrian and vehicular needs.

(c) Traffic: Traffic is a function of activities; buildings accomodate these activities. Therefore, zoning, applied to buildings and land use activities, can indirectly, affect control of traffic. Zoning ordinances could be used for traffic betterment. The following provisions in the zoning ordinances can benefit traffic.+6

1. Building height and bulk regulations;
2. Front, rear, side yard requirements - adequate space for future traffic requirements and parking;
3. Set-back, limitations, adequate space for future street widening;
4. Provisions requireing off-street loading and parking facilities according to building type and land use;
5. Corner control - maintenance of corner site distances;
6. Curb-cut contrd; and
7. Restriction on densities in the buildings.

In addition to these, there are traffic laws that control the speed, type of vehicles, and direction of traffic.

+6 Mogren, E. & Smith, W. "Zoning and Traffic" p. 18

Another important instrument of social control over private properties is "taxation" on private properties.

2. Taxation

This is a traditional instrument for maintaining economic and social equilibrium. The changes in tax policy, in tax rates, or in assessment procedures may have a marked effect on the profitability of real estate investments, and on the burden of shelter costs in the family budget.+7 A tax reduction will enhance the property value; an increase will create a proportional decline. The present order of real property taxation penalizes new construction and encourages the retention of old buildings until they have reached the last stages of decay. This trend must be checked then reversed. Taxation would then assume an effective role as an instrument for encouragement of expanding production, protection against blight, and revenue to the community for public service.+8

3. Other Controls:

There are complex changes that are constantly occuring in the functions of the urban mechanism, in technology, and in the value systems of individuals and groups, so that the legal framework is adapting itself to new conditions.

There are two areas in which the public can assert its intentions directly:

+7 Ratcliff, Richard "Urban land Economics" p.423
+8 Gallion, A.B. & Eisner, S. "The Urban Pattern" p.327

1. The public domain: some forty percent of the city area is in streets, walks, parks, and civic reserves. Herein is a broad and impressive scope for creative treatment of space arrangement, landscaping, street furniture, lighting, signs and structures.

2. The realm of public regulation of three-dimensional volume, related to community design: this involves integrated use of open spaces and landscape-structures, the character of building fronts, advertising media, ingress and egress for pedestrians and vehicles, and set-backs related to public rights-of-way.

Sensitive attention to the formulation of these regulations may accomplish some effective results in aesthetic order, without engagement of "rules of taste". In future, the device may be established by a more advanced knowledge of urban design.

3. CHANGE : (a) PRESERVATION

The physical structure of a city, i.e., buildings and streets, is of a permanent nature and even though functions, for which the physical structure was designed, changed, the physical structure has been preserved. This is a form of natural preservation of the structure since it is costly to alter or to redevelop. There is another way by which buildings are preserved. It is due to imperfections of the market, the inherent obscurity of future market shifts, and the fallibility of entrepreneurial judgement.+1

A series of old buildings observed in any city, and they are found mainly in the central area. Most of them are preserved due to economic factors, and there is no guarantee of their future existence.

Although we have taken into consideration some aspects of existing old buildings, the term "preservation" is mainly applied to the buildings or areas that have historic, national, architectural or aesthetic significance. Recently, there has occured the marriage of art and economics - a union which considers aesthetic as well as historic and national contingencies in preservation.+2 It has been found that refurbishing

+1 Ratcliff, Richard "Urban Land Economics" p.351
+2 Tunnard, C. "Man-made America - Chaos or Control" p.405

of some older buildings can be more profitable than pulling them down and rebuilding. Many isolated old buildings or groups of buildings are preserved. The preservation of these reminders of the past has helped to maintain the historic continuity on the street. Chambers of Commerce, and the historical societies in many cities, have realised that the preservation of significant old buildings on a street could make it more attractive and could enhance the physical character of the street. The gamut of changes run from the planting of trees to the creation of malls. Thus, interpretation of public welfare and interest has changed, and aesthetics and historical values have managed to get legal foothold.

Preservation action can be described as public, private, or a combination of the two. These public and private actions can be for 'museum' or 'non-museum' purposes. A combination of public and private interests is most desirable in preservation which is so closely involved with both. Any private action in preservation involves the matter of property rights, which in turn involves law and public policy.

Recently there has been a display of official municipal interest in taking an inventory of existing buildings. Postulates for preservation were laid as follows:+3

+3 Tunnard, C. "Man-made America - Chaos or Control" p.414

a. prepare criteria for determining and evaluating structures and architectural landmarks;
b. prepare a system of identifying and marking such landmarks;
c. listing and identifying landmarks;
d. prepare a policy and framework for preservation;
e. take steps to stimulate public education and interest.

Unfortunately in most cases only historic buildings are considered, but such inventories must be broadened to include aesthetic considerations other than historic and architectural factors, such as vistas, groupings, and open spaces. Various methods have been worked out for visual design survey. It is a fact that worthwhile structures, landmarks, and interesting buildings groups are not necessarily found together; but many occur in discontinuous strips or belts. In this case, it is necessary to use a system of Design Districts and Design Axes, which sometimes interpenetrate. A Design Axis can, in most cases, be a street - linear district, e.g., Beacon Street interpenetrates both Beacon Hill and the Back Bay, in Boston.+4

The method of preservation can be negative and limited, or positive and general, depending upon the situation. The various types of method have been discussed as follows:+5

+4 Tunnard, C. "Man-made America - Chaos or Control" p.415
+5 Ibid p.416

(a) Restrictive covenants:

The most negative method. It is a contract and a reciprocal negative easement. While zoning spells out legal duties by ordinance, a covenant describes legal duties by contract. This is a common method in-England. Even though this method has been harshly criticised, it is expedient and quick and it avoids pitfalls of vagueness found in many ordinances;

(b) Bulk zoning:

A means of controlling use and bulk in a comprehensive public programme, it is an indirect process of preservation by discouraging new activities or new buildings in the area to be preserved;

(c) Tax abatements:

A political method of not only holding on to buildings but also of ensuring their continued existence. Here, taxation is the instrument to preserve the significant buildings;

(d) Historic District Zoning:

The most popular and successful method of preservation. In most cases these historic districts have been set up independently of an overall zoning plan, and within them any new development is controlled so as to be in harmony with the existing character.

Although we have discussed the preservation of historic, national and architectural buildings, it is also necessary to have some other old buildings on the street so as to bring a diverse character to the street. Jane Jacobs, in her descussion on the need of aged buildings, states:+6

"Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them. By old building I mean not museum-piece old buildings, not old buildings in an excellent and expensive state of rehabilitation - although these make fine ingredients - but also a good lot of plain, ordinary, low value, old buildings."

Although this statement seems to be in conflict with our ideals of maximum productivity in land use arrangements in the central area, i.e., through removal of obsolete buildings and urban redevelopment, Jane Jacobs has cleared up this paradox by saying:

"Chain stores, chain restaurants and banks, go into new buildings; but foreign restaurants, pawn shops, book stores, antique dealers, studios and art galleries can successfully go in the old buildings."+7

Preservation of old buildings for these various purposes acts against the redevelopment and renovation of forms on the street.

+6 Jacobs, Jane "The death and life of great American cities" P.188
+7 Ibid p.188

and preserves its character. This tendency is most noticeable on the principal streets in central areas, since here a large number of the remainders of the past are existing, and here the changes are mostly taking place.

3. CHANGE : (b) OBSOLESCENCE

Buildings are tailored through the skill of their designer to serve specific functions in a particular fashion. As function and fashion change, however, buildings that are frozen into the capital assets are subjected to a more rapid change than the aspirations and behavior of the people who use them. Thus form becomes obsolete when it cannot serve the funtions for which it was designed. When conflict between form and function becomes acute, the form is remodelled for the same function or converted for other functions.

These obsolete structures, in the process of constant change, deteriorate.

In central areas, activities change more rapidly and we find, not one or two structures, but whole street blocks becoming obsolete. Obsolescence of buildings on a street and their frequent conversions affect the character of the street.

If the physical life of buildings were linked to the economic life, building money would continue to flow into the production of new buildings.+1 Improved methods would find normal reception

+1 Gallion, A.B. & Eisner, S. "The Urban Pattern" p.328

and application. So long as old and obsolete buildings remain on the market, however, they suffocate new building production.

Obsolete buildings, not only harm the land values of an area, but also are obstacles for natural readjustment of central activities. Further, another difficulty arises from the different periods that are taken by different buildings in the deterioration of their structures and thus, if we observe the streets in the central area primarily, we find that these obsolete and deteriorated buildings are scattered at different locations. This causes piecemeal development of a street and obstructs theunity and continuity of the street facade.

There is not yet available an effective method to control the spread of obsolescence. Pressure is ever present to "save" obsolescent areas by permitting a greater intensity of land use. There are few instances where this insidious process has restored to deteriorated areas, a decent standard of residential or commercial development. Intensity of land use moves relentlessly from the city centre, and the obsolete areas are drawn into this unending vortex. Land values and density increase and deteriorate the physical structures of streets. The mixture of land uses leaves a series of derelicts in its wake. Dirorderly expansion continues.+2

+2 Gallion, A.B. and Eisner, S. "The Urban Pattern" p. 327

Control of obselescence has a twofold purpose: we are concerned with the maintenance of both a stable economy through continuing full production, and of adequate standards through continuous improvement.

All things grow obsolete with time and change. That is inevitable. But obsolescence must be brought under public control and treatment. It would be possible to establish a low tax for a new building and thereafter increase the tax from year to year. After fifteen to twenty years the increase would rapidly move upward at such a rate that a major improvement to sustain a profitable income on the building, or a complete removal to make way for a new structure more suitable to the market.+3 It is consequently a public responsibility to devise machinery to control obsolescence.

+3 Gallion, A.B. & Eisner, S. "The Urban Pattern" p.328

3. CHANGE : (c) REDEVELOPMENT

The urban redevelopment deveice is a method of accelerating the natrual readjustments of the land use pattern.+1 It is through the process of succession, the replacement of one land use by another, that natural redevelopment takes place. The succession of uses is induced by various physical, social and economic factors, often working on concert. For example, the aging of structures that results in reduction in their productivity, and environmental changes that alter the pattern of rental income, are factors that often work together to create situations in which the replacement of original land uses becomes economically advisable.+2 But the present land use structures of the mature cities stand as testimony to the inadequacy of the natural process of urban redevelopment through succession.+3

Minor alterations and additions to existing built-up areas through natural redevelopment do irreparable harm to streets. The redevelopment primarily takes place in piecemeal fashion, and new buildings rarely consider the existing character of the street. Many of the fine streets have been ruined by badly designed objects and renovations.

+1 Ratcliff, Richard "The Dynamics of Efficiency in the Locational Distribution of Urban Activities" p.323

+2 Ratcliff, Richard "Urban Land Economics" p.427

+3 Ibid p.428

It is this ineffectiveness and lag in the process of readjustment through land use succession that has been urged as the justification for social intervention through urban redevelopment legislation.+4

It is typical of any transitional part of a principal street that there is a lack of uniformity among individual properties with respect to their readiness for redevelopment. This is the major reason why piecemeal development can be controlled as to its form and functions so as to bring desirable environments on the street with proper scale and ample spaces; but there has not been found any method by which an aesthetic control can be put to the new buildings.

However, if redevelopment is carried out on a large scale, it can be advantageous from the point of view of increase in site rents, and also good aesthetic results will be achieved in relation to the street. It will also create a variety of spaces on the street and break the monotony that is created by "hard-corridor" building lines. Further there are various other components that are included in the redevelopment such as parking provision, street widening, and provision for cultural and entertainment facilities, which can be planned easily in the large-scale redevelopment.+5

+4 Ratcliff, Richard "Urban Land Economics" p.428
+5 Ibid p.431

Redevelopment laws are all designed to facilitate land assembly, or to employ subsidies for the purpose of filling the financial gap between present net revenues of existing land uses, and the site rent that can be produced by redevelopment.+6

Zoning ordinances are the control measure of redevelopment so as to secure desirable activities and buildings and their densities. It seems necessary to establish a board of adjustment of the municipality that can work with, and assist property owners and private architects, so as to bring merits to redevelopment projects.

+6 Ratcliff, Richard "Urban Land Economics" p.431

PART TWO

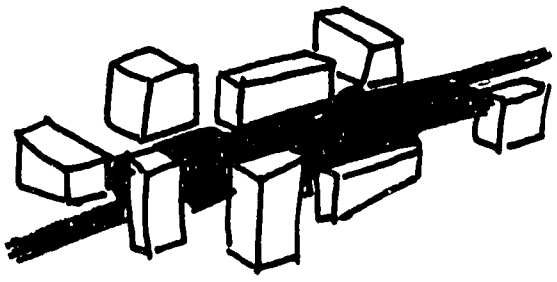
THEORETICAL CONSIDERATIONS

CONCLUSIONS

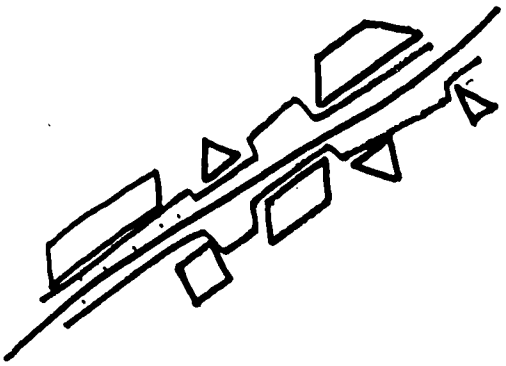
Changes in the character of a street have a direct relation to the functions it serves. The main funtion of a street is to give access to activity - land use. Activities are not static, changing in place and time. These changes in activities bring about changes in the street.

Traffic is a function of these activities. Streets become the channels for the movement of goods and people. The traffic on a street is affected by the changes in the activities. The changes in traffic are also explained by the improvement in the means of transportation. Thus changes in traffic change the character of a street.

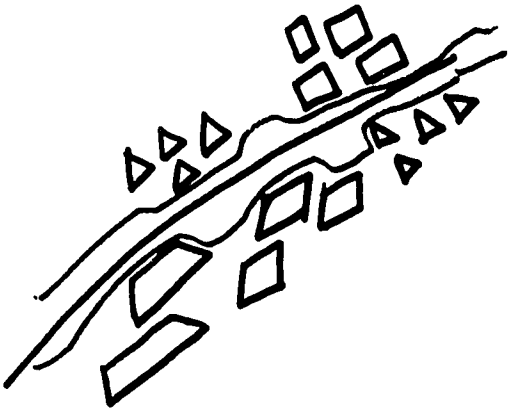
Activities take place mainly in buildings. Buildings arrange themselves on the street that serves them to create a



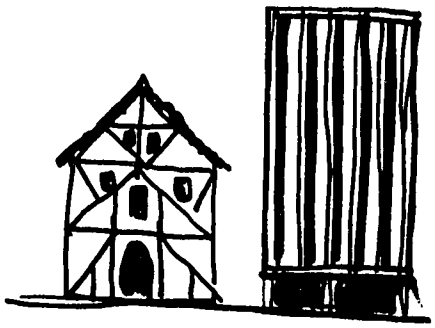
variety of enclosures. Thus buildings give form to the street. The change in the form of streets is explained by the changes in the activities. Form follows funtion. Activities mould their own forms. Different activities have different forms.



Similar activities cluster on a street. They give a group form. This identifies a group form. Various group forms on a street result in the image of a street.

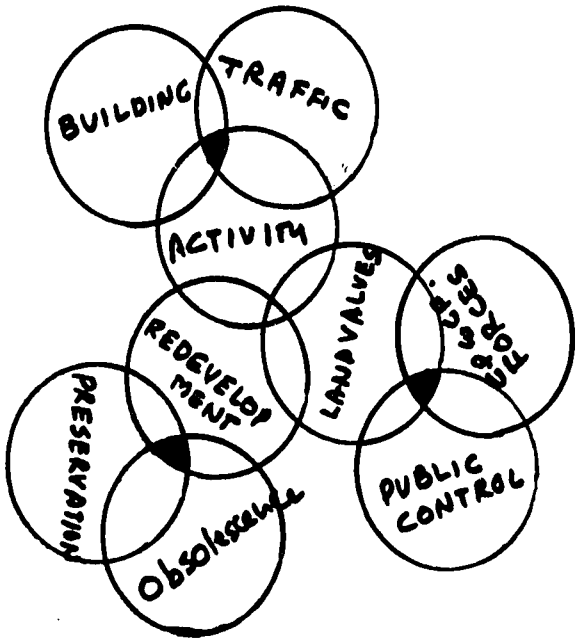


Buildings face the street. The face of a building has its architectural expression. Architectural expressions of form are influenced by the architectural style. Changes in architectural style bring changes in the forms and faces of the street.



Changes in activities are influenced by the forces that act on them. Thus these forces play an important part in changing the character of a street.

Forces such as centripetal and centrifugal movements play an important part in changing the activities and bringing about changes in the street.



There are forces other than natural ones that control the changes in activities and forms. These are public control, such as zoning and taxation. These controls are enforced to obtain an efficient locational adjustment of activities to bring proper form and space relationships, and to bring about good social and economic environments by controlling obsolescence.

There are also private or public controls that act against changes in a street. These private and public efforts may be directed towards the preservation of a building or an area that has extraordinary religious, institutional, historic or national significance.

Changes in activities create new requirements for the buildings that contain them. This makes existing buildings obsolete. Obsolescence of a building or an area, plays an important part in affecting the streets that are related to it.

Various redevelopment projects; piecemeal or large-scale, are carried out in order to weed out the obsolete buildings on a street. New developments create a new environment and give new character to the street.

The various theoretical aspects of change in the character of a street have been discussed in a general way, but the scope of this study is narrower since the amount of research that has been carried out on this subject has been limited by time and resources. Thus in Part Three we discuss some recent concepts of street patterns and design, before examining in more detail the Montreal situation.

THE CHANGING CHARACTER OF STREETS IN CENTRAL AREAS

PART THREE

SOME RECENT CONCEPTS

This part follows the theoretical discussion on changes in the basic elements of streets in central areas: land use, activities, buildings and traffic. It deals with some concepts in the planning of new cities, and the redevelopment of central areas of existing cities. It gives us an idea of the extent to which the theoretical notions have been applied in the organisation or reorganisation of central activities, their buildings and traffic in relation to the streets. In choosing examples of cities in this respect, attention has been given to a group representing a wide variety of circumstances. The examples that have been studied, are as follows:

NEW CITIES

CHANDIGARH, India: Le Corbusier +1

1. In the plan by Le Corbusier, pedestrians play an important role, since it will take a long time to achieve complete motorization. The future demands of traffic have been considered in the plan, however. Public transportation facilities, such as the autobus, have been the main factor in deciding the street pattern of the city. (Fig.33)

2. The city has been divided into almost equal sectors, each with their own environment. Each of these sectors is 240 acres in size and has dimensions of one half mile by three quarters of a mile. This has been influenced by the desirable size of the environmental areas and the distance between 'bus stops.

3. A traditional cross-road has been planned on the two main axes, and at their intersection, the commercial and civic centre has been located. At the entrance north of the

+1 Ritter, Paul "Planning for Man and Motor" p.

of the North-South axis, the Government Centre has been located as a separate entity. Educational, institutional, and industrial activities have been decentralized. All these decentralised cores of the city have been linked with the civic promenade (traffic free).

4. The environmental areas or sectors, have been served by a network of streets, classified as shown below, and given the character to maintain the environmental standard:

v1 An expressway of regional importance and with minimum disturbance to vehicular traffic;

v2 Civic avenues of monumental character, traffic free and with amenities of urban importance;

v3 Fast traffic roads - distributory network serving sector to sector (from which entry to buildings and sidewalks and pedestrians excluded);

v4 Shopping streets - pedestrian streets in the shade of trees and provided with amenities of entertainment;

v5 Distributor streets from shops to neighbourhoods and linking neighbourhood centres;

v6 Service streets to houses;

v7 Footpaths and greenways.

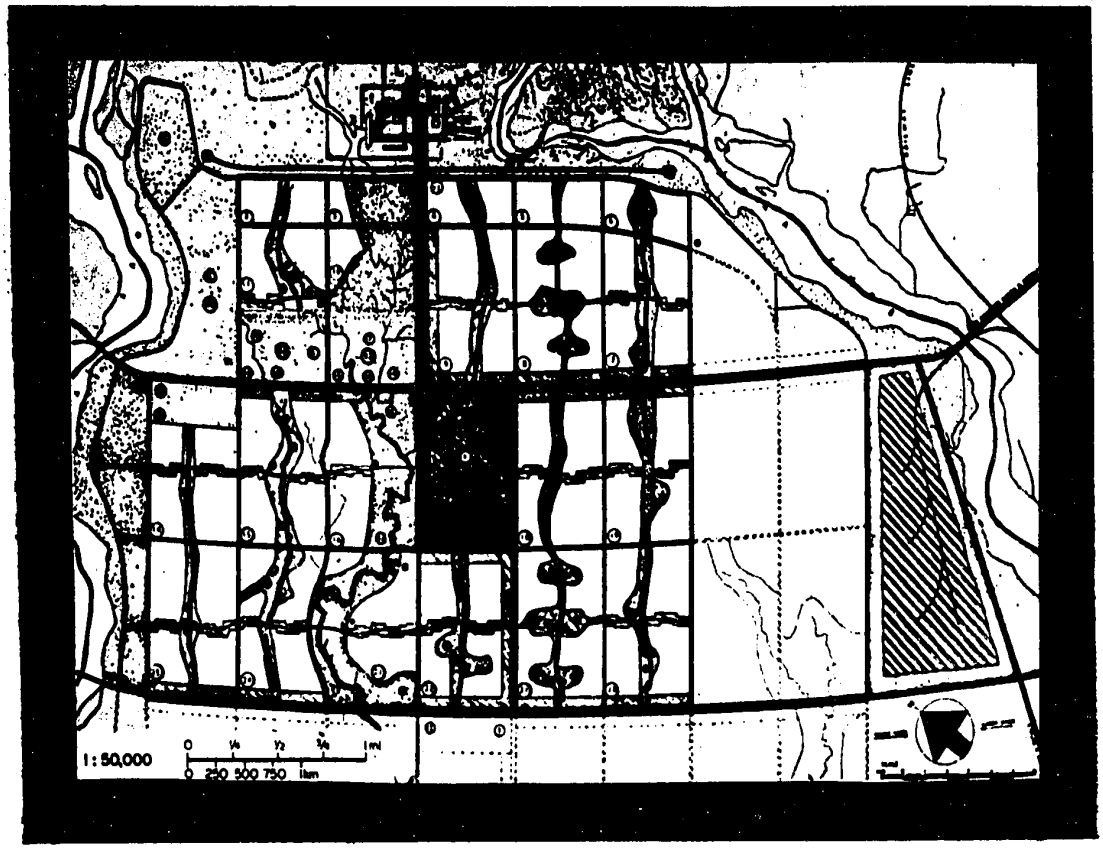


Fig. 33

CHANDIGARH, India.

BRAZILIA, Brazil : Lucio Costa +2

1. Vehicular movement plays an important role in the plan of the city and gives its scale to the form of the city. (Fig.34)

2. Planned structure, is, like Chandigarh, the traditional cross-road pattern on the main axes, intersecting at the city centre and designed in a Baroque manner with the monumental vistas and focul points.

3. But, unlike Chandigarh, we find that a separate character has been given to these axes. The main axis is the civic axis: straight, wide, and in a dignified way, it approaches the government centre. Around this axis, various central activities, such as commercial, cultural, recreational, and entertainment have been planned in a linear fashion. It acts as a linear centre of the city. The other axis is mainly residential, and takes curvilinear form, so as to break the monotony and reduce the speed of traffic.

4. The residential axis of the city links the grid iron streets of the residential areas. The sectors are smaller than those of Chandigarh and planned with consideration of high population density and motor traffic.

+2 Architectural Design May, 1965

5. Pedestrians play a minor role, but emphasis has been placed on segregation of different traffic by multi-level street systems. Traffic and pedestrian segregation is missing.

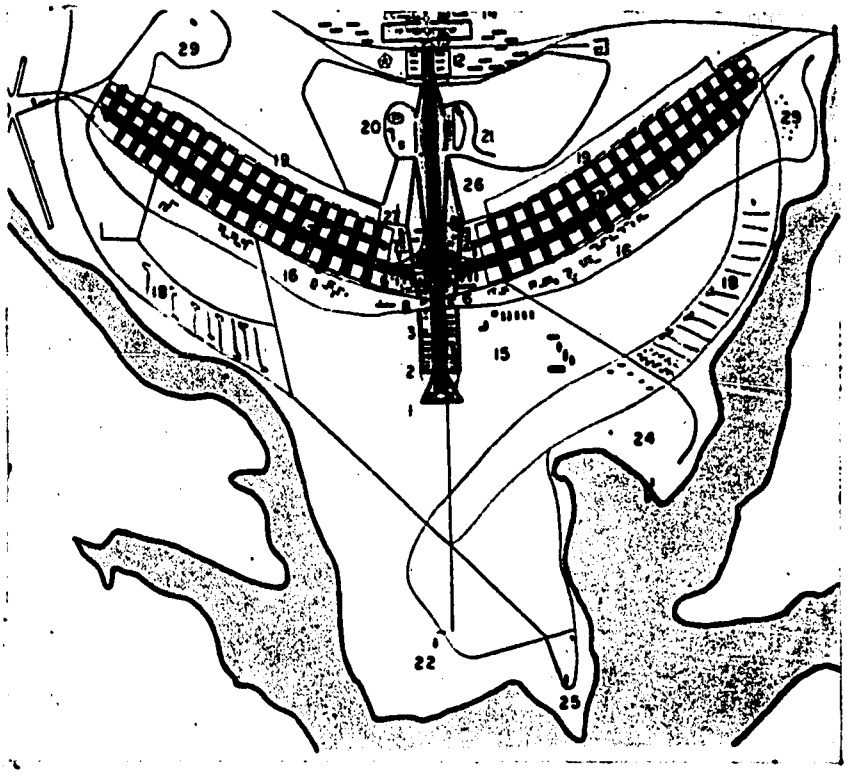


Fig. 34

BRAZILIA, Brazil

HOOK, England : London County Council Architects +3

1. Pedestrian and car take equal importance in the plan; but segregation between them is achieved so as to maintain the environmental standard of both. Dispersal of working areas is planned to achieve an equilibrium in traffic loads on the streets. It was also considered that a bus service will play a complementary role in obtaining the traffic balance. (Fig.35)

2. On these factors, the street pattern is simplified into a near-rectangular pattern of three parallel main streets. One of these main streets is axial and runs through the centre of the city.

3. On this main axial street, the linear centre has been planned so as to be within walking distance from the living areas. The linear centre takes a multi-level deck form and the main axial street passes under the pedestrian activity level.

4. The classification of streets has been carried out as follows:

v1 Motorway or regional expressway;

v2 Town collector roads or main distributory roads (pedestrians

+3 London County Council "The Planning of a New Town"

excluded);

v3 Residential distributor streets. These are streets taken in loop form from the main distributors;

v4 Industrial distributor roads serving industrial areas;

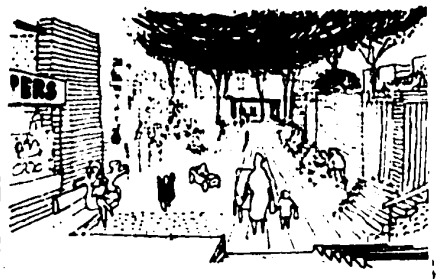
v5 Main spine road or commercial distributor road, passing under the centre of the city and providing services and parking underneath;

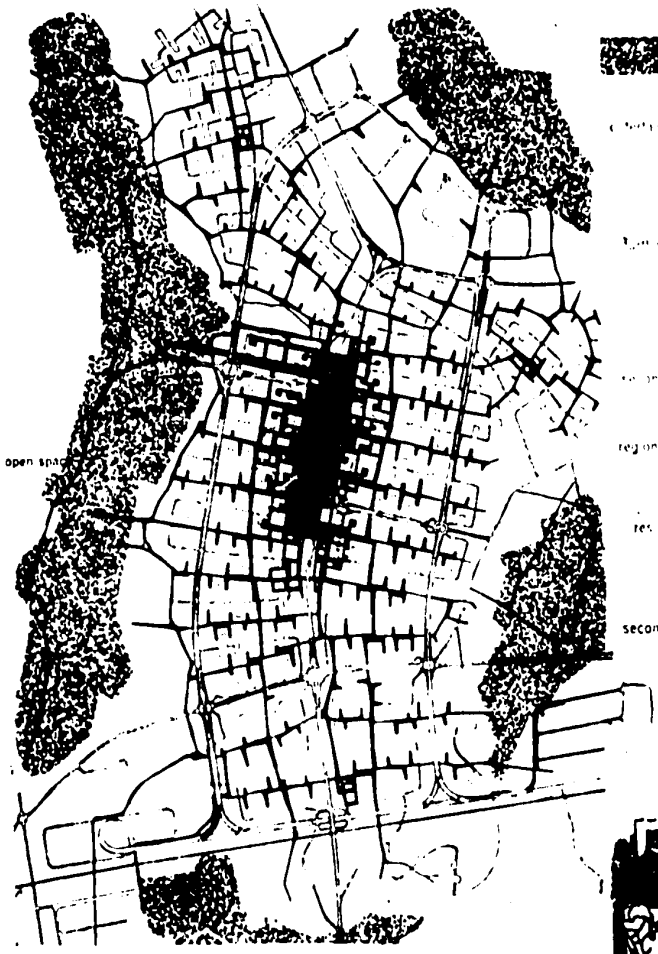
v6 Pedestrian ways (traffic excluded) that pass between the loop roads and link neighbourhood amenities;

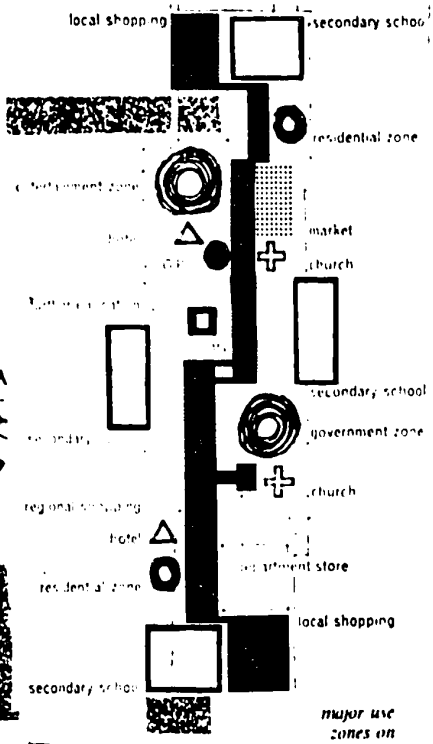
v7 A pedestrian deck or platform in the central area, about one mile long, runs above the main spine and on which various central activities are planned. It links the pedestrian ways.

Above, ground level bus stops with ramp, escalator and lift to pedestrian deck

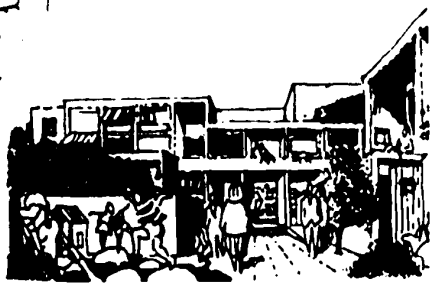
Below, the pedestrian way with children's play areas in residential area



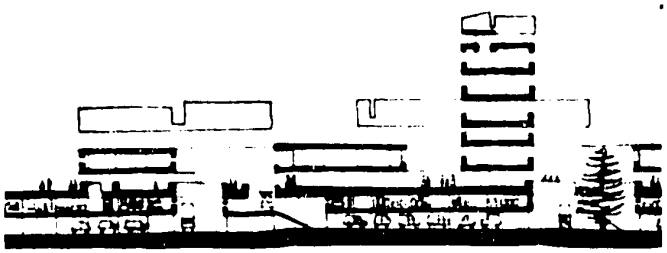




major use zones on pedestrian level



Below, section showing organization of levels



HOOK

Fig.35

LE MIRAIL, France : G. Candilis, S. Wood & A Josiac +4

1. The plan serves both the pedestrian and the car; but the segregation between them is achieved in a most remarkable way. The total concept has been based on the linear association of streets and activities in a stem form and into which housing units are plugged. Pedestrian streets which have been closely attached to central activities and living areas, and vehicular streets, have independant character. (Fig.36)

2. The linear centre concept of Hook has been adopted but here it has geometric order by which its form and pattern relates to that of the city at all stages of growth.

3. Pedestrian corridors and housing are integrated into a stem while the traffic street is associated with parking and servicing.

4. The stem has been derived as a line, open-ended. It has no dimensions and changes direction at will. It is flexible in its growth and can take either linear or cellular form.

+4 Ritter, Paul "Planning for Man and Motor" p.

5. The main stem or spine of central activities, into which the stems of housing units are plugged, and pedestrian movement is kept continuing all over the city.

6. The traffic stem makes its pattern independantly and without having any conflict with the patterns of other stems. It serves independantly living and central activities.

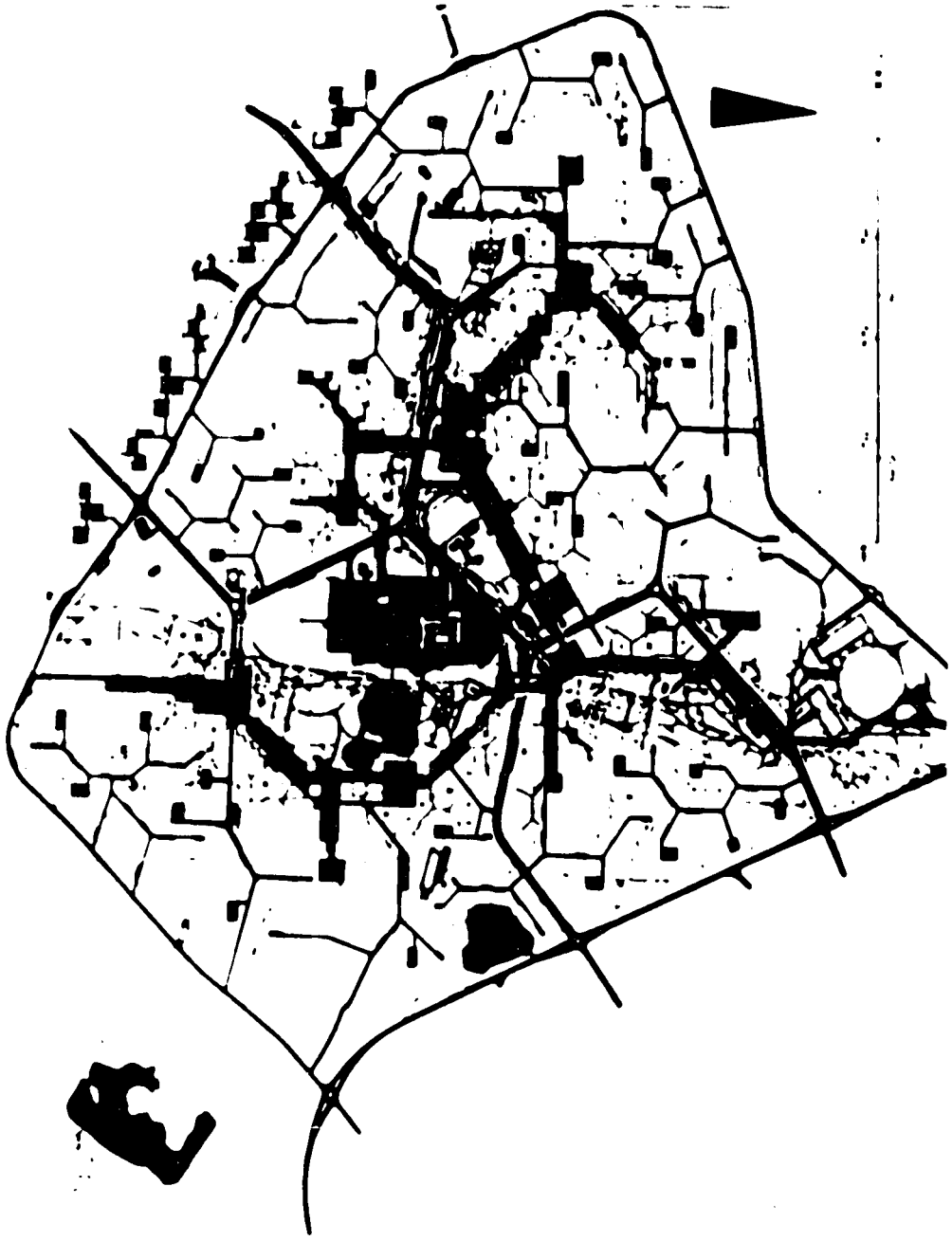


Fig. 36 Le Mirail

Conclusion

In the study of these four different concepts on new cities, we observe that future traffic demands have played an important part in the organisation of streets, central activities and their buildings. Traffic has been considered necessary for sound functioning of the central area but the pedestrian environment is more dominant in the central area. Physical and visual needs of pedestrians have been taken into consideration. Pedestrian and traffic segregation is observed in all the cases. The segregation is either lateral or vertical depending on the degree of its function. This classification of streets forms a hierarchy of distributors within the street pattern. The overall street pattern varies from a simple, linear form to a hexagonal geometrical pattern.

REDEVELOPMENT OF CENTRAL AREAS

COVENTRY, England : The Planning and redevelopment Committee, Coventry City Council

1. The environmental standard within the central area has been based on pedestrian comforts and safety from traffic. This has been achieved by the removal of vehicular traffic and the forming of a precinct.+1 (Fig.37)

2. The very exclusive shopping precinct reserved entirely for pedestrians is much more than an ordinary street merely closed to vehicles. It is rather, a whole series of connected open spaces with fronting shops, full of variety and interest. Part of the precinct has shops at the upper level, served by a balcony or pedestrian deck. Part is covered over, and elsewhere there is a good deal of protection from the weather without shutting it out altogether. There are flowers, treet, pools, and sculpture.

3. The precinct is enclosed by an "inner circulatory road" which will carry the central area bus service and distribute commercial vehicles to the service entrance of buildings.

+1 Development and Redevelopment in Coventry: Council House, Coventry p.11

4. Beyond the "inner circulatory road", is an "inner ring road" which acts as fortification to the central area. Nine major radial roads run into the inner ring road and thus traffic is circulated around the central area. The inner ring road gives access to the car parking system.

5. The car parking system is conceived almost entirely at roof level, or in multi-storey garages, with a quite elaborate linkage at roof level to give access from one car park to another.+2

6. Classification of streets has been achieved to maintain the environmental standard of each, and in accordance with the function it has to serve:

v1 Major radial roads as the primary urban network;

v2 The inner ring road as the main distributor, acting as buffer to direct traffic and giving access to central area and its parking;

v3 The inner circulatory road as a service street to central areas with bus stops and accesses to commercial service entrances;

v4 Pedestrian and cycleways, running under or over the inner ring road;

v5 Pedestrian ways within the precinct as open spaces with variety and interest catered to pedestrians.

+2 The Buchanan Report "Traffic in Towns" p. 214

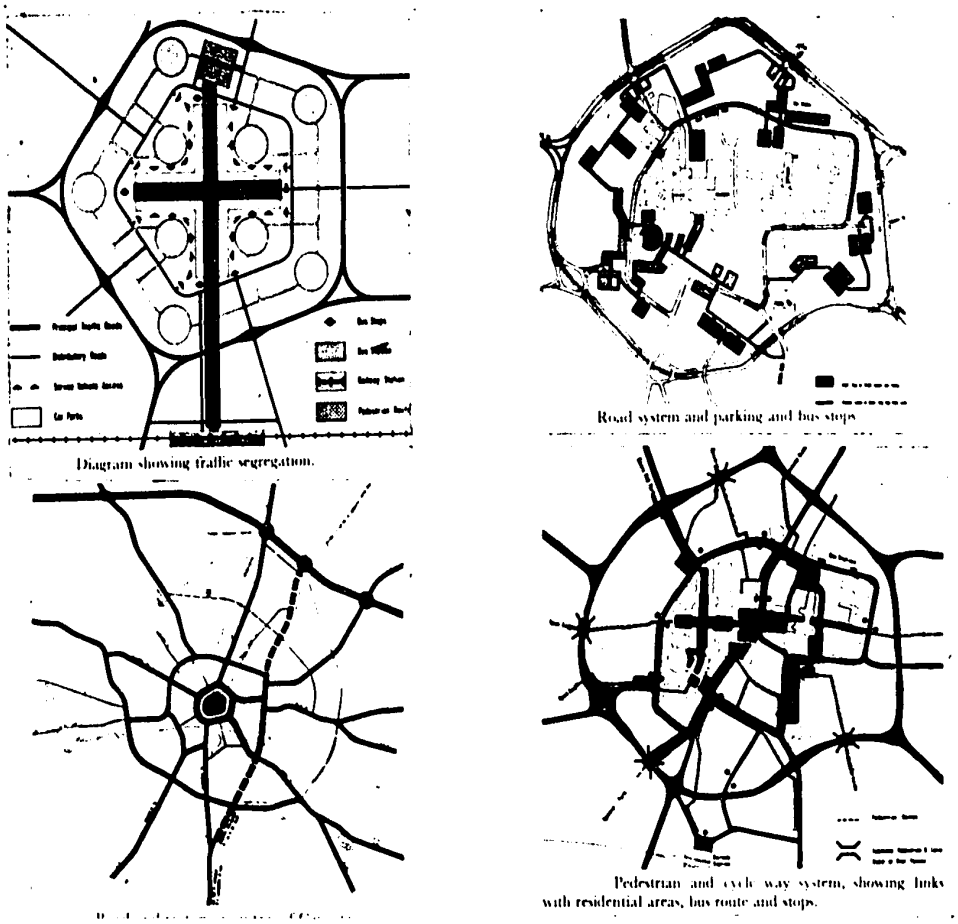


Diagram showing traffic segregation.

Road system and parking and bus stops.

Pedestrian and cycle way system, showing links with residential areas, bus route and stops.

Fig.37 Coventry

Conclusions:

Coventry central area development is based on maximum benefits to pedestrians, and to achieve this, traffic has been removed from the central area. Here we find that segregation between pedestrians and traffic is lateral in order. A small proportion of people are able to travel by individual car since the capacity of streets and parking places is limited. The majority of people will still travel by public transport. Considering the population of the city and the extent of the central area, accessibility has been reasonably well achieved; but the same system may not be applicable to a larger city with a larger central area.

FRANKFURT, Germany : Wood, G. Candilis, A. Josiac +3

1. The redevelopment scheme is based on a complete rebuilding of the central area, where pedestrians and traffic are segregated from each other by different vertical levels. (Fig. 38)

2. The whole central area has been conceived as a multi-storey complex structure of streets, activities, open spaces and utilities. The complex is designed on three-dimensional grid to give order at all the stages of growth.

3. Central area activities are arranged on a series of horizontal platforms and act as urban rooms. They are directly served by pedestrian streets - as urban corridors.

4. Streets have been classified and segregated vertically as follows:

v1 Main distributory streets on the ground. They give access to service streets and to vertical ducts of escalators and elevators, which replace the streets and act as media of access to the upper platform of activities. This creates three dimensional movement;

v2 Service streets give access to parking on sub-basement levels, and provide services for service units that are

+3 Progressive Architecture October, 1964.

situated in the basement;

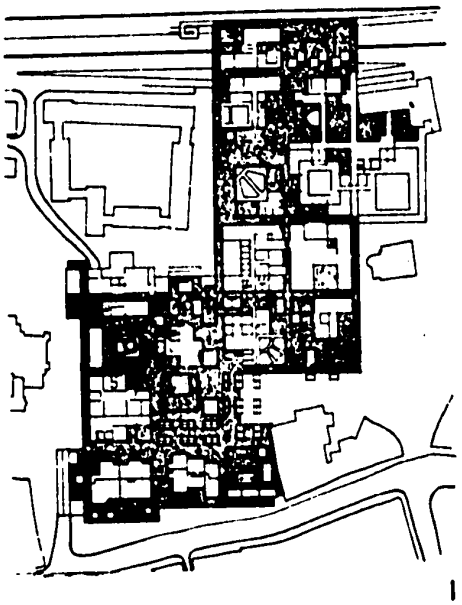
v3 Pedestrian streets on upper platforms act as corridors giving access to various urban rooms of activities.

5. A series of platforms make the whole complex of six storey height. The platforms are perforated to create variety of open space to bring landscape, light and air to the complex.

Conclusion:

This concept of central area redevelopment is unique in its own way. It has flexibility in its growth. The growth has an order of the grid. Compared to Coventry's scheme, this scheme is ambitious and of a highly urban character. It creates the same precinct as the Coventry scheme, but in space, on various levels.

The vertical segregation of the pedestrian environment, combined with central activities and traffic below, is very admirable. It gives accessibility to a great extent since the whole complex is compact. The horizontal space-distance has been eliminated and elevators play an important part in accessibility. There is no doubt the scheme is not financially practical, but it gives us an idea of how the central areas can be developed as a complex, and not in parts.



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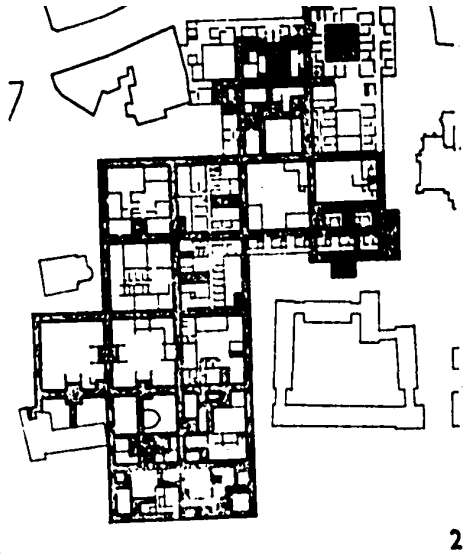


2

1 & 2
Two consecutive floors

3
Typical and diagrammatic sections

4
Photograph of model

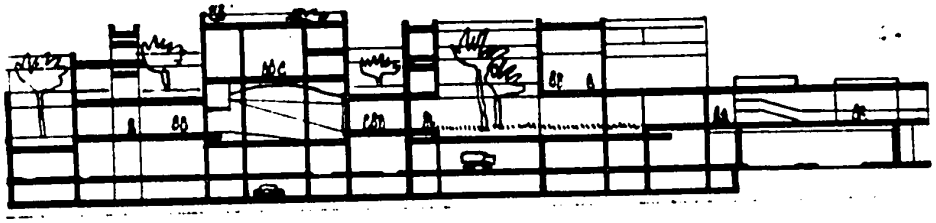
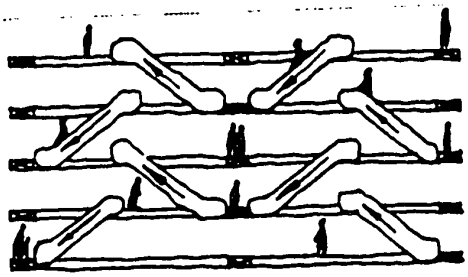
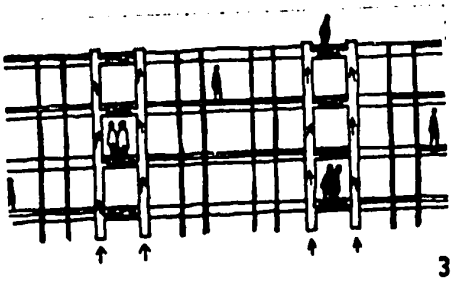


Fig.38 Frankfurt





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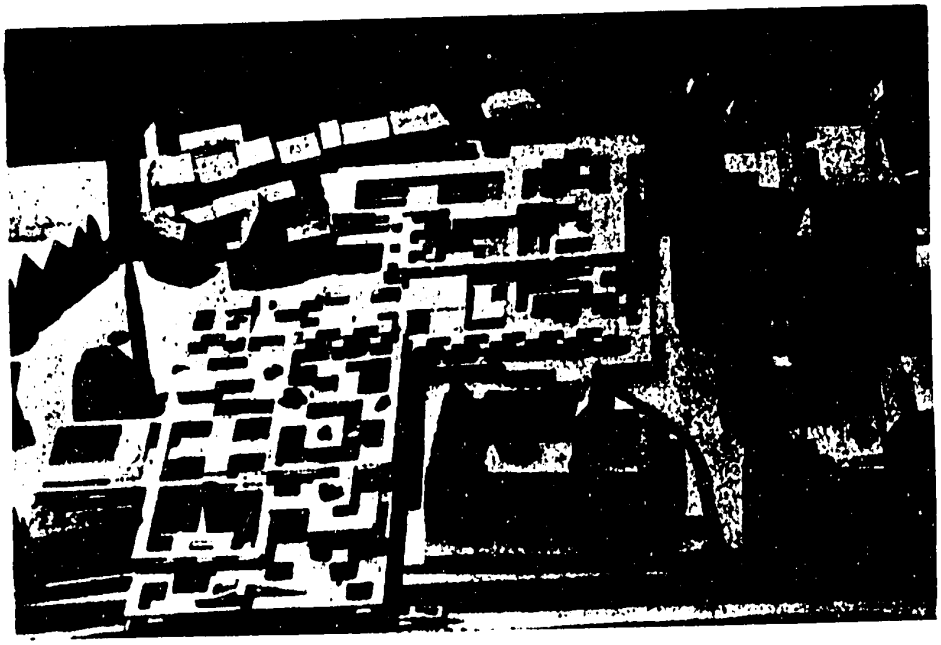


Fig. 38

A CENTRAL LONDON BLOCK, England : The Buchanan Committee

Four different studies were carried out according to degrees of reconstruction and elaboration of the network. They are of the following nature.

A. Complete redevelopment.

B. Partial redevelopment.

C. Minimum redevelopment.

D. Piecemeal redevelopment.

For the purpose of this thesis, only the first three schemes have been considered. The fourth, since it deals briefly with the reconstruction of individual buildings, is not within our scope. Further, we shall not go deeper into the statistical analysis, and so we deal with the schemes that have been planned for the first three degrees of reconstruction of the block.

A. Complete Redevelopment

1. It was decided, unless serious difficulties were met, that the replacement within the area of all existing uses should be accepted as a condition of redevelopment with roughly the amounts of floor space as now exists.

The present location of these activity groups was maintained with some improvements.+4 (Fig.39)

2. Density of different uses (including residential) was estimated, so as to achieve a sound environment within the area.

3. The grid was selected after estimating the highest possible level of traffic generated within the area and in consistent with the capacity of the street system both inside and outside the area. It was estimated that, if there were no restraints whatsoever on the use of cars for journeys to work, about 70% of people working in the area would choose this means of travel.

4. The scope given by complete redevelopment allowed to adopt a one-way hexagonal system which provides a freely flowing system with simple uncontrolled, three way intersections.

5. The density of development and the area needed for roads, parking and servincing, were such that a multi-level plan would be required in order to gain the necessary space.

6. The primary motorway distributor was kept at the lowest physical level of all the streets in the distributor hierarchy, and preferably below ground level in open cuttings.

+4 The Buchanan Committee "Traffic in Towns"

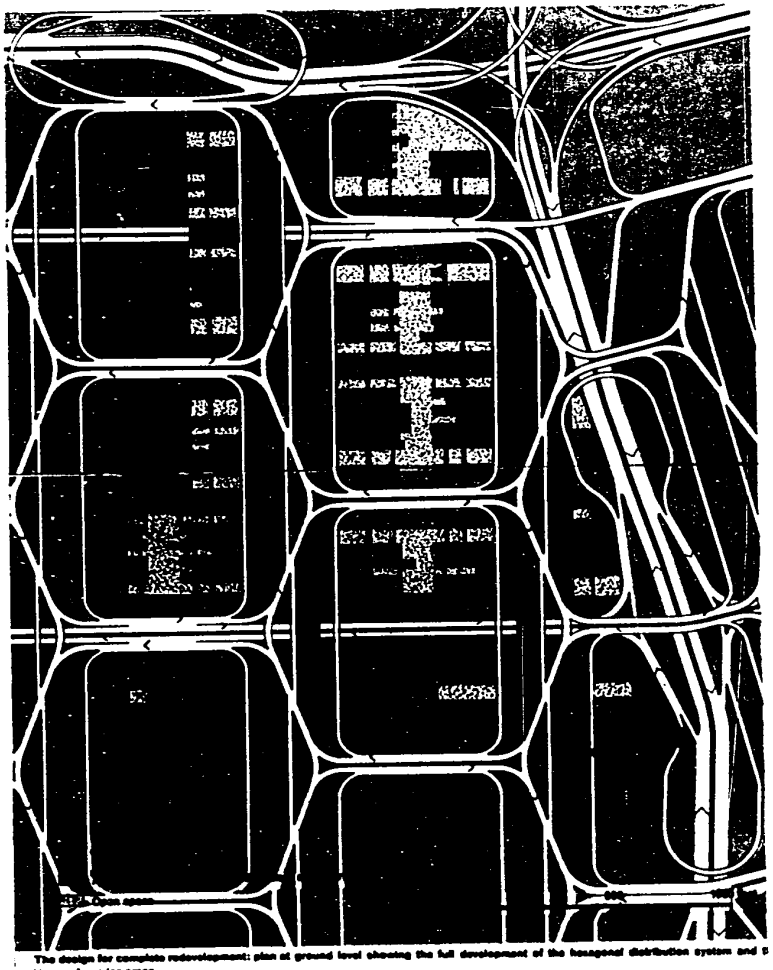
7. With regard to the relationship between the local distributors and the buildings themselves, and to achieve economy and flexibility in the planning of the buildings, it was considered necessary to keep the hexagonal grid of local distributors at ground level. With the local distributors, the various relevant uses were spread on the ground, such as parking, servicing, garaging, and open spaces.

8. The decision to 'spread' the parking rather than concentrate it, the need to avoid excessive excavation of the site for parking, and the desire to create a good environment for pedestrians, all led inevitably to a design with a pedestrian circulation system set above the traffic.

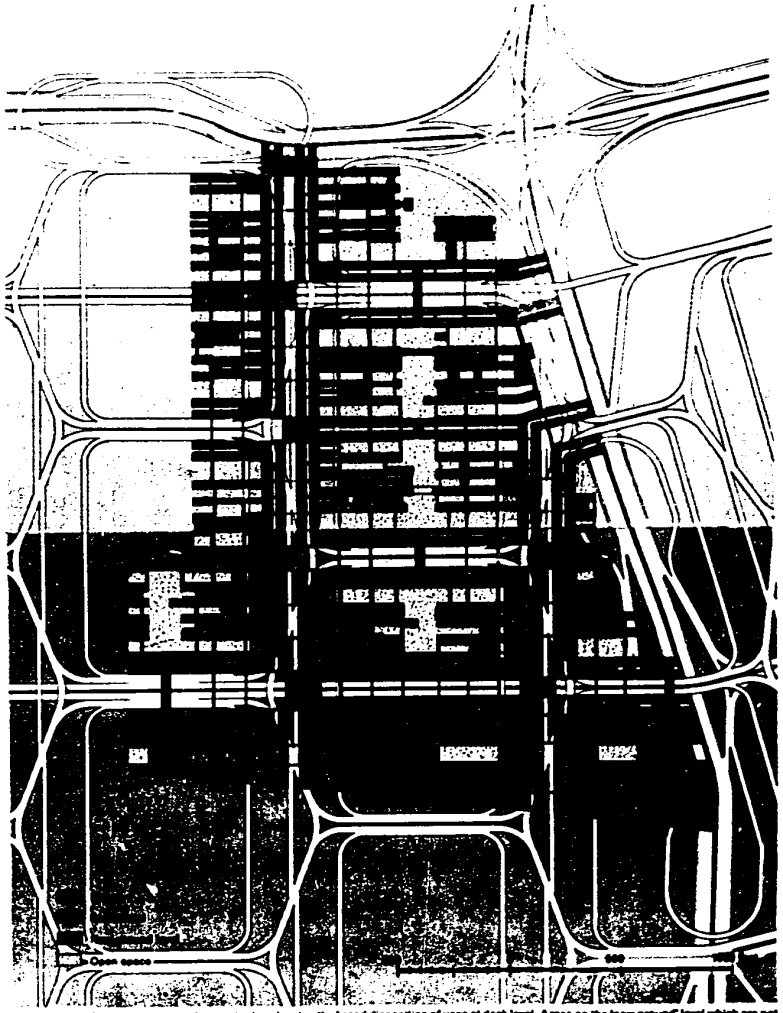
9. The pedestrian platform forms the 'new ground' level, a platform from which the buildings would rise. The 'new ground' level would have a criss-cross of building sites and pedestrian ways with frequent openings to let light, air and views to the lower level, and with pedestrian systems descending at many points to open spaces on the ground level. Various activities on the platform are arranged in relation to the character of the traffic underneath.

Conclusion:

The scheme prepared for complete redevelopment has similar characteristics as that of the Frankfurt scheme. But here the grid order has been given to the traffic network rather than pedestrian network. Further, it is rather loose in nature, applied to the human scale, and with ample provision of open spaces within the complex. The scheme creates a complicated network of traffic which is certainly distracting from the driver's point of view. Further, even with complete redevelopment, there would be a strict limit to the amount of traffic it could accomodate and it would have to depend very largely upon public transport.



The design for complete redevelopment: plan at ground level showing the full development of the hexagonal distribution system and s parking and service areas.



The design for complete redevelopment: plan showing the broad disposition of uses at deck level. Areas on the 'new ground' level which are not indicated for shops or residential use are for office, commercial, and industrial purposes.

Fig. 39 A Central London Block

B. Partial Redevelopment

1. It was stipulated that the buildings of architectural and historic interest should be preserved, and that the redevelopment should be capable of being carried out by different developers in stages. (Fig.40)

2. Since the emphasis lay on preservation, it was decided to adopt a larger network grid which will not divide the environmental areas. This, of course, reduced the capacity of the network.

3. The density and the standards were maintained as in the first scheme, and seek again to replace within the area all the uses and accomodation at present existing level except for those to be preserved.

4. It was necessary to plan for redevelopment in stages, and therefore the existing arrangement of streets and buildings had to be taken into account. Accordingly, a rectangular pattern was devised, with signal controlled intersections.

5. A multi-level plan was adopted similar to the first scheme. The primary distributors were best placed below ground level and the other local distributors at ground level. Again it was resorted to a 'new ground' level in order to separate pedestrians and vehicles in the areas to be redeveloped and to fit in all the activities and the extensive parking requirements.

6. But here the local distributors take on a different character. They have been divided into two 'one-way' streets, passing behind the shopping. The pedestrian ways in this case, are inward looking, with many links over the local roads to other adjoining buildings. The space between the twin local distributor streets has been placed, for parking and serving of the shops, on the ground.

7. Through traffic in Oxford Street would be removed partly by a regional distributor for central London and partly by the primary distributors of the grid. It was considered that complete redevelopment of Oxford Street would be necessary to retain the frontages of the street on their present line, but to create a new pedestrian street above ground level, with service access at ground level and parking at various levels below the deck.

Conclusion:

The scheme is more practical than the first one since it gives consideration to the preservation of important buildings and the use of the existing physical structure of the streets. It also allows for stages of redevelopment. Further, it allows the use of two existing streets to serve the function of local distributors, and also very effectively, serve the shops at their rear. It is interesting to observe the way that the existing streets adapted to serve the purposes of the scheme.

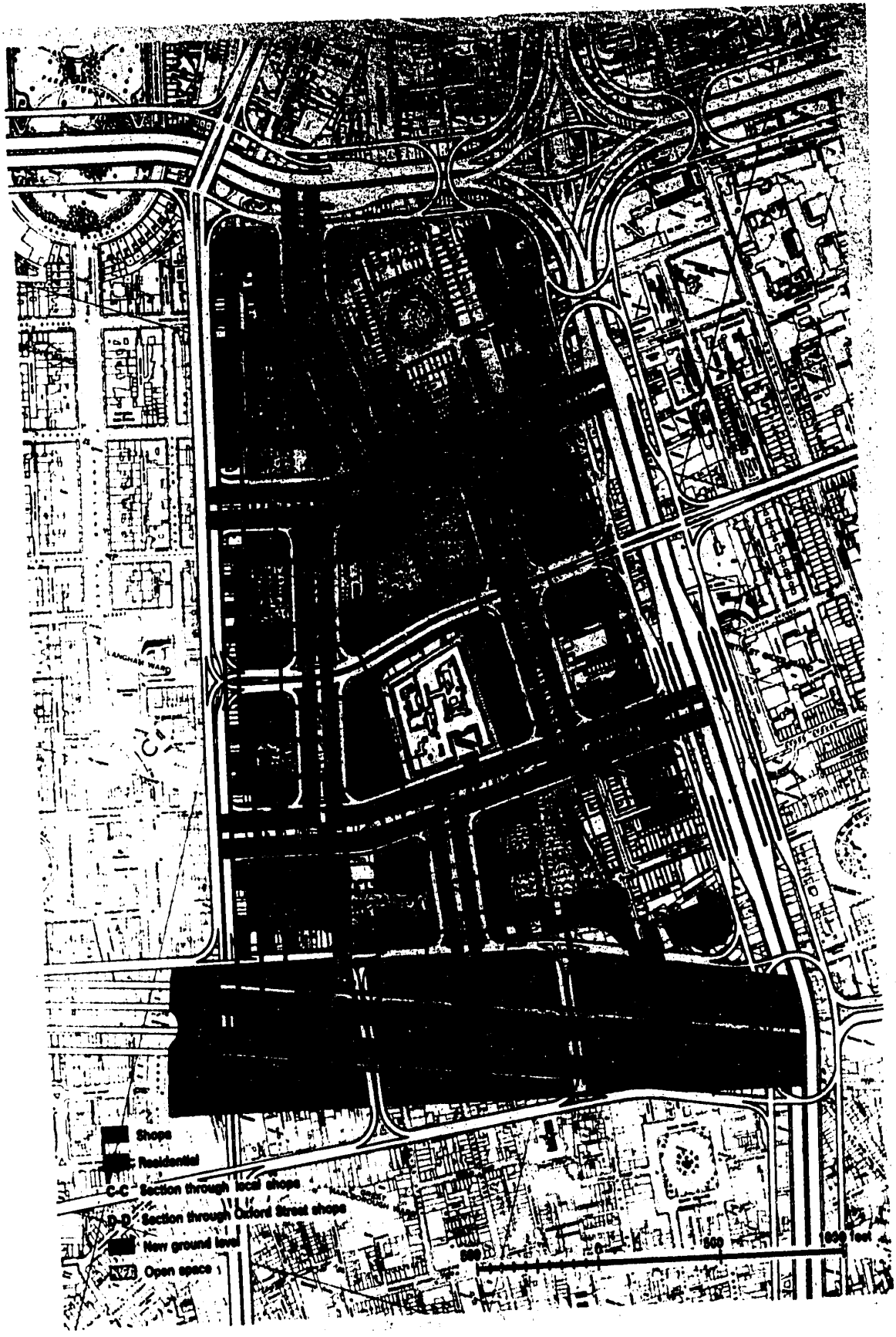


Fig. 40 A Central London Block

C. Minimum Redevelopment

1. To restrict redevelopment to the absolute minimum.

2. Through traffic in relation to the central area had been removed by some kind of regional distributor. (Fig.41)

3. A primary distributory system for the central area had been devised, of which the roads bounding the West End, were part. These distributor systems would have six lanes, undivided, and a variety of intersection types, including an occasional two-level arrangement.

4. Various environmental areas of land use were defined within the study area.

5. The capacity of existing streets is considered in relation to the demands of traffic made by the environmental area and the environmental standard that is required by the street. It created the necessity to widen some streets.

6. With this system of networks, Oxford Street acts both as a distributor and also as a major shopping street. This problem was solved by an ingenious idea of an elevated free standing pedestrian mall, down the centre of the street for its full length.

7. It was realised that the conditions on the district distributors would not be satisfactory until redevelopment had made possible the removal of frontage uses that generate heavy pedestrian traffic.

8. With this system, the volume of tarffic could be handled by the arrangements for access to buildings and parking, but it would be necessary, on certain roads, to combine to a limited extent, the functions of local distributors and roads giving access to buildings.

9. The scheme allows off-street parking to meet the demands of traffic and also allows for servicing from the one side of access roads and access distributors. Many access streets that give access to buildings were terminated so as not to distrub the traffic on the district distribution.

Conclusion:

The scheme is very practical since it mainly deals with reorganisation of the traffic and traffic generating activities to achieve a balanced environment for the functioning of both. Within existing conditions of physical structure the hierarchy of distributors has been achieved. But also with these proposals, it would be necessary to have special consideration for public transportation, and it needs a different solution for parking rather than off-street parking.

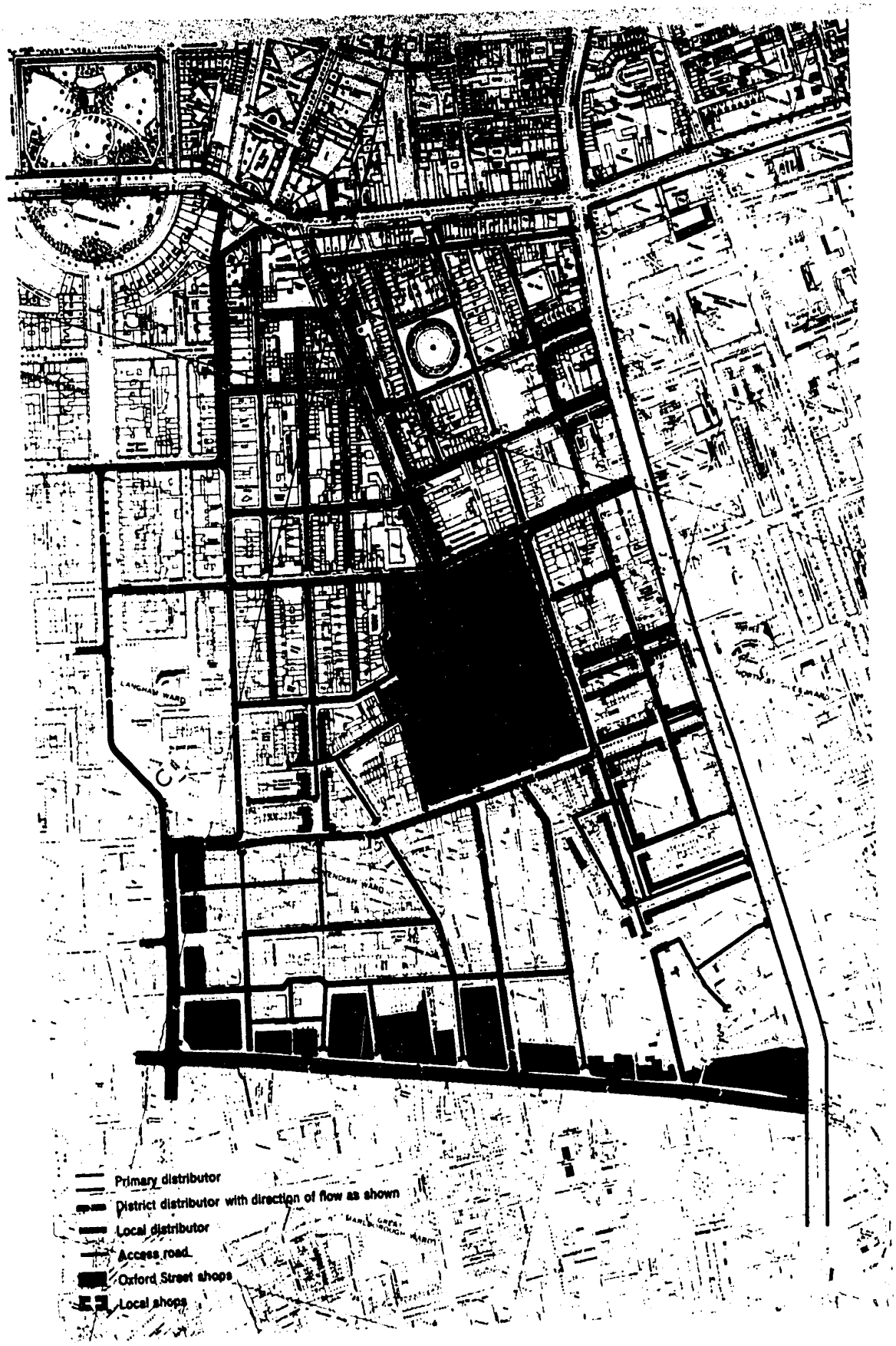


Fig. 41 A Central London Block

General Conclusion:

The primary concern of the schemes has been to demonstrate, and to show various degrees of reconstruction and elaboration of network that are required to serve various amounts of traffic demands. It follows, inevitably, that a means must be found to restrict even further usage of vehicles. It would be necessary to sacrifice accessibility to some extent, and the parking facilities could be partly concetrated on the periphery of the central area and within walking distance, or means of public transportation are to be introduced to connect the parking terminals with the core.

PHILADELPHIA, U.S.A. : Philadelphia City Planning Commission +5

The city of Philadelphia has been a leading city in the movement for central area redevelopment. For the last two or three decades, with the help of prominent planners and architects, it has achieved its various objectives of redevelopment. In the past, it placed emphasis on the introduction of a greenway system, revitalisation of the old city and historic areas, slum clearance and the development of the water front. Presently the city is, primarily, dealing with the solution to its traffic problem and planning a large-scale development of its core, so as to achieve maximum accessibility and availibility for the future of the central area. It is also taking a keen interest in creating a strong visual image of the central area and in achieving unity in the overall plan. With this redevelopment, the principal streets, such as Market Street and Chestnut Street, will get a different character and will have the environment that will mainly cater to pedestrian needs and comforts.

1944 - Historical Parks and Independence Mall

Architect Roy F. Larson's designs for setting for Independence Mall led to the first major surgical operation in downtown Philadelphia since the 1909 Greber parkway. Independence

+5 Philadelphia City Planning Commission "Centre City Philadelphia"

mall was introduced and gave formal foreground to the old Historic Shrine that had been lost in the urban tissues. The mall gave a practical link with the downtown expressway loop and a transition from automobile to pedestrian scale was achieved. The mall provided the distinct character to the old historic area and gave break to the straight, monotonous length of the longer streets.

Larson's proposal for a modest interior block extension to the east of Independence hall, linking it with three important and several minor historical buildings, was adopted. All non-historical buildings in these three blocks were demolished to free the important structures from other unfit buildings. The simple "L" shaped open space plan, with Independence Hall in the pivotal position, provided the design framework from which grew all of the later designs for this part of the city.

Along with major "L" shaped open spaces, Edmund Bacon proposed a scheme for a series of inner-block park and footpath extensions centering upon and connecting together the principal historic structures scattered through the vulnerable but blighted Society Hill area. It turned the streets into greenways and brough pedestrian scale to the historic area. Deliberately joggled to be in scale with pedestrian movement and to pull the vistas of the church spires, this greenway system became the determinant for the placing of new apartment towers, in the Society Hill area in 1958. (Fig.42)

1958 - Society Hill Project

After the preservation and the introduction of the green spaces, the Society Hill project came to revitalize the historic area. The re-development project of three tall structures and their grouping with a horizontal line of row-houses was designed by I.M, Pei, the competition winner. The design took consideration of the existing character of the structure and streets and greenway system.

1960 - The Waterfront

The two bordering riverbanks, essential elements in Penn's original plan, have changed over the years from aesthetic assets to eyesores. Rpbert L. Geddes prepared the waterfront scheme to recreate the Delaware River edge as a design element and join it with the Penn's Market street axis. The scheme receives the thrust of the Society Hill greenway system and deflects it northward above Market Street to complete a ring of greenways around the historic area. (Fig.42)

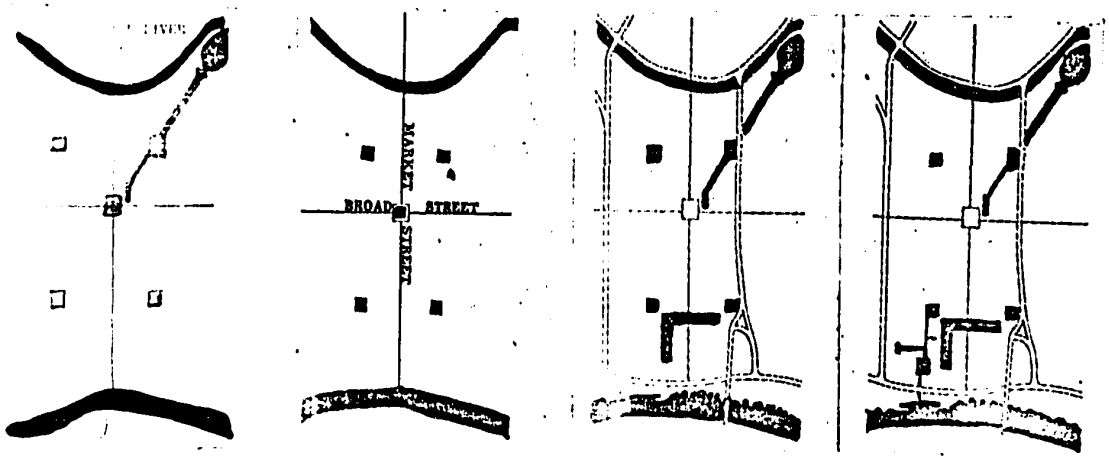


Fig. 42

THE OVERALL PLAN

The mature form of the centre city has been clear in both a functional and an architectural sense. The decision was made not to try and fight the automobile but to treat it as an honored guest and cater to its needs. (Fig.43)

The system has been adopted to achieve a system of total unity which connects together all of the modes of transportation and provide means of circulation from one system to the other and all related to the land uses in the area. The interest of reducing congestion is best served by encouraging very dense development within walking distance of the longitudinal transportation system.

The pattern of land use has been determined by the study of existing and past trends inland use and modified to accord with projected land use demands, and is designed in relation to the regional transportation network. Certain amounts of mixed use of compatible activities is allowed. Thus various environmental areas were defined, and their characteristics of traffic demands and pedestrian needs studied, to devise transportation and pedestrian circulations systems.

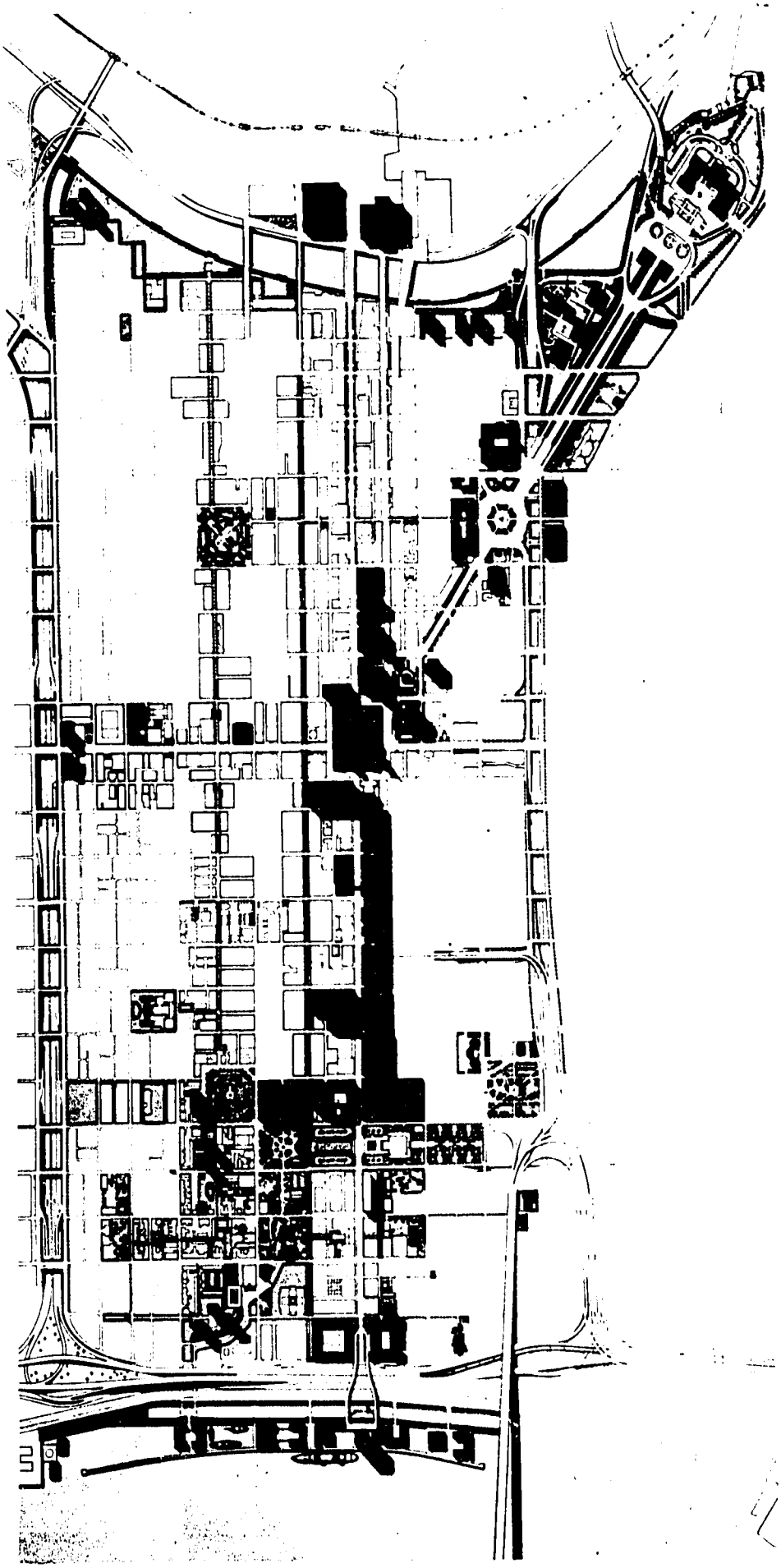


Fig.43 The overall plan :Philadelphia

(1) Transportation system:

(a) Expressway system was devised to form a ring around the centre and circulate the traffic around it; its level was taken lower than the cross streets, thus achieving free circulation;

(b) From this system, feeders reach the core and turn around in a loop form at their end, giving access to various parking terminals;

(c) A subway system was arranged to reach the centre and pass through the central area;

(d) The underground terminals of this subway system have been located between the retail and business core of the city, and will be developed above it;

(e) Above the subway terminals, parking terminals, and bus terminals will be built to form a huge transportational structure;

(f) Major parking terminals have been located on the fringes of the central area and will have direct connection with the expressway system. Also, there will be an underground parking garage on the south side of Broad Street, the north-south axis.+7

+7 Philadelphia City Planning Commission p.14

((11) Pedestrian Circulation System

(a) It achieves three levels of systems of pedestrian distribution and forms a linear distribution pattern along the length of the core.

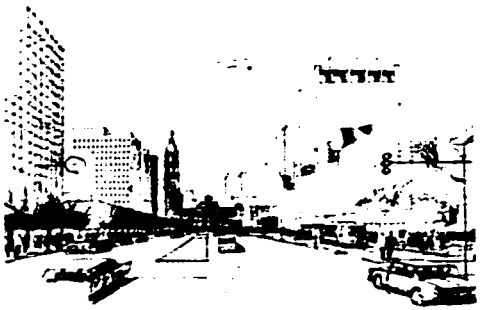
(b) Pedestrian circulation placed below the street level acts as an extension of the existing underground concourses in Penn Centre, and also gives connections with the parking terminal underground. The conjunction of these several systems provides a complete distribution for pedestrians, one level below the street, undisturbed by cross traffic connecting several modes of transportation. These lower level pedestrian concourses extend into plazas and are provided with green spaces in open court fashion.

(c) The pedestrian distribution at street level is based on the proposal for eliminating surface traffic and replacing it with a light electric trolley moving in both directions, directly into the terminal garages on the east and west. (Figs. 44, 45, 46, & 47)

(d) The elevated pedestrian shopping promenade proposed for east Market Street, connecting directly with the second floors of the five great department stores, and further to bind the two centres of economic activity.

(e) The system achieves a generalized system of three dimensional movement of pedestrian that will link the transportation and economic activity. This will act as a physical link to various developments and make the central areas a complex structure ("Traffic Architecture") in which the existing streets act as part of the complex. (Fig.48)

MARKET STREET

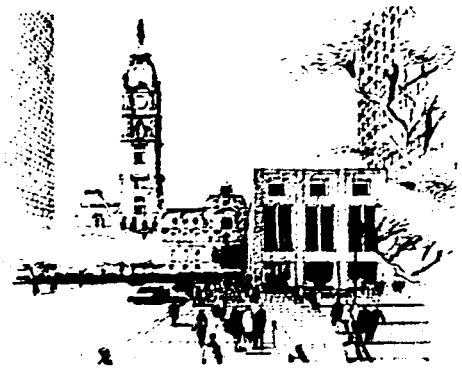


Market Street, one of the two intersecting William Penn axes, forms the backbone of the longitudinal core area extending from the Delaware to the Schuylkill Rivers.

At the western end, development of the Schuylkill River Park in combination with new residential building and residential rehabilitation north and south will encourage residential construction along Market Street, and further development of institutions, office, and commercial facilities compatible with residential use.

It is proposed to be lined with street trees.

On Market Street at 18th Street, the intense core begins. Here is the start of Penn Center, developed by the Pennsylvania Railroad. Here are being provided many of the shops, restaurants, and recreational facilities for the rapidly developing residential areas to the west. Penn Center is developing gradually over a period of time which will give a richness not achieved in one-shot projects. As further embellishments are added to its fine broad open esplanades, centering on the vista of City Hall Tower, it will increasingly assume its proper role as a focal point in Center City.



On the south side of Market Street, the building of West Plaza and the rebuilding of the block between 15th and 16th Streets will set into motion vitalizing forces that will extend westward. The large amount of open land between West Plaza and the edge of the core at 18th Street will provide for long-range expansion of Center City activities. The design of the newly developing areas will carry forward many of the principles of Penn Center, open pedestrian esplanades at the street level, sunken courts, and pleasant connections with subway stations and concourses.

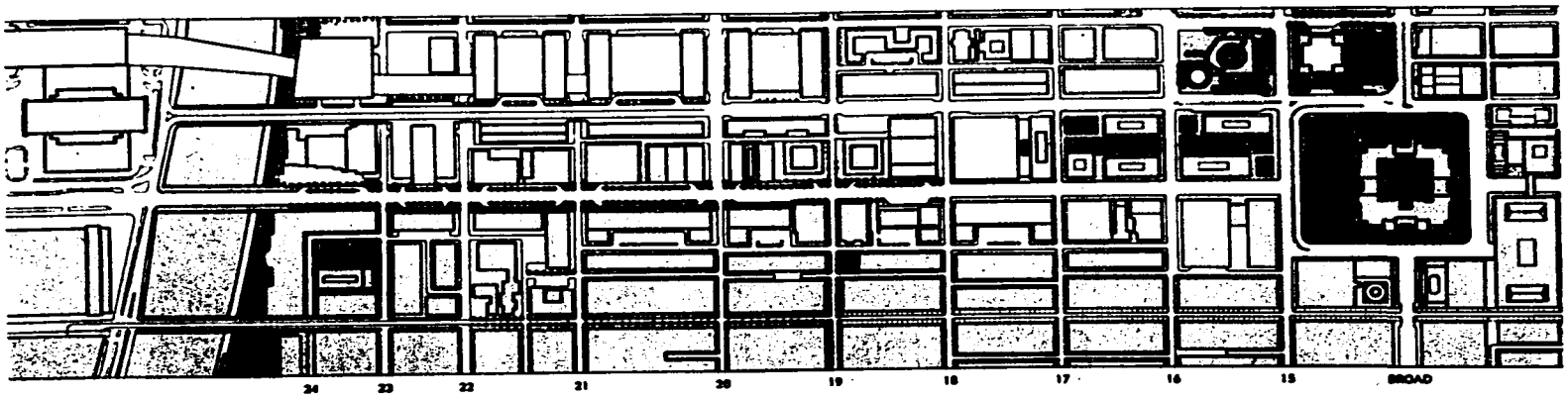
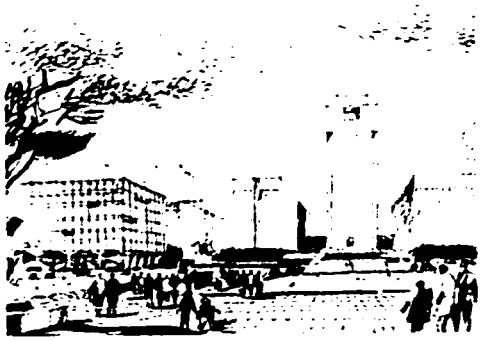


Fig.44

East of Broad Street, the Market East project will provide the visual excitement necessary to expunge the rather dreary image now existing of parts of this area. It will provide a fine visual setting for the many handsome buildings and substantial institutions which now exist in the area, including the five department stores, the office building at Penn Square, the world-famous Philadelphia Saving Fund Society Building, and the Federal Building. It will enrich the "point of arrival" and will bring East Market Street into a better relationship with the western suburbs.



The green open cross axis of Independence Mall, embellished by fountains and flowers, offers rhythmic punctuation to progress along Market Street. It delineates the eastern edge of the core, and is in process of developing a "hard edge" of new large-scale office development which, in time, will generate subsidiary activities and provide customers for Downtown department stores. The Mall and its adjacent development carries the prestige and dignity of Independence Hall through to Market Street and contributes to up-grading the area.

At the eastern end, the termination of Market Street at the Delaware River is marked by the multi-story Port Tower, an important part of the Penn's Landing development. This constitutes a major new visual symbol and will serve to emphasize the importance to the City of its port commerce and to mark the point of beginning of the City. Between the Mall and the Port Tower, Market Street will gradually take on activities related to the ever-growing tourist trade and serves as a facade for the Delaware River waterfront development.

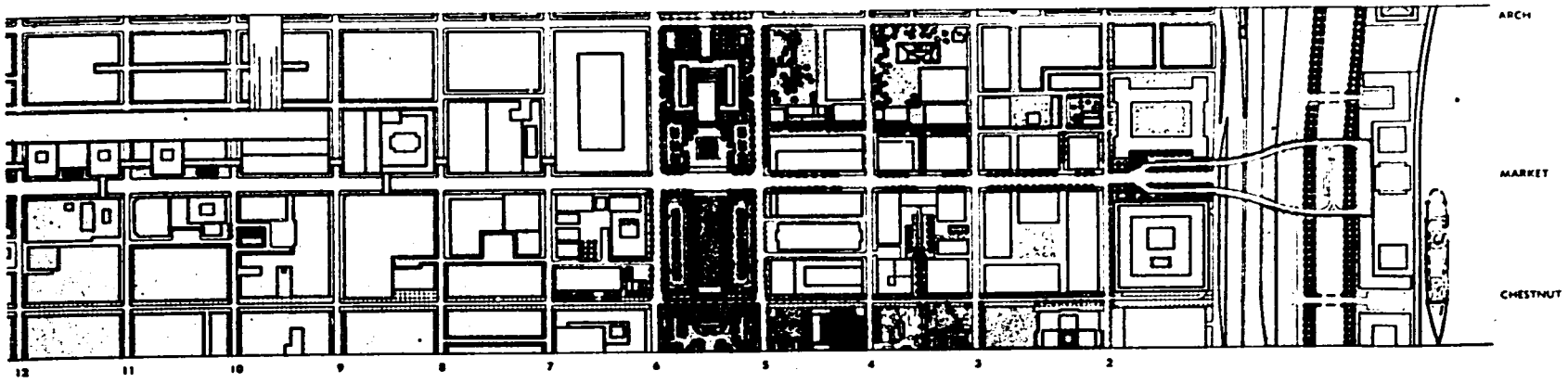


Fig:45 Market Street

CHESTNUT STREET

The Pedestrian Spine

Chestnut Street, one block south of Market Street and parallel to it, is the sensitive center of much of the City's life. Along it are many of the City's principal banks, major office buildings, and finest shops. Most important, it includes the nation's most revered and beloved historic shrine, Independence Hall. It could become one of the great streets of the world.

The plan proposes the removal of all vehicular traffic from the street and its replacement by a light two-way electric trolley, moving directly into the parking garages at the Delaware and Schuylkill Expressways. The north-south streets would continue to cross Chestnut Street at one block intervals, letting off passengers a maximum of one-half block from any destination. The electric trolleys, being freed of interference from parallel traffic, especially the delays caused by turning movements, would move promptly to each intersection and permit embarkation and discharge of passengers during a single traffic light. Rapid and efficient surface transportation along the entire length of the core in both directions is a necessary element to tie together the various commercial and residential parts of the core area.

The width of Chestnut Street, 60 feet, is ideal for a pedestrian street of this sort. Progress along it has a continually changing aspect, including the park at the Schuylkill River, the residential section in the Rittenhouse Square area, the commercial center punctuated by the view of City Hall to the north, Independence Hall, Independence National Historical Park, and finally the termination at Science Park in Penn's Landing at the Delaware River.

Chestnut Street should be embellished with flags, potted plants, outdoor cafes in summer, and every sort of activity to make it urbane and enjoyable.

In addition to attracting as many people as possible from the Delaware Valley region, Chestnut Street should change the habits of millions of visitors who, each year, go to Independence Hall. The attraction of the trolley should inspire many of them to take a ride the length of Chestnut Street, and in the process spend some money sampling the facilities.

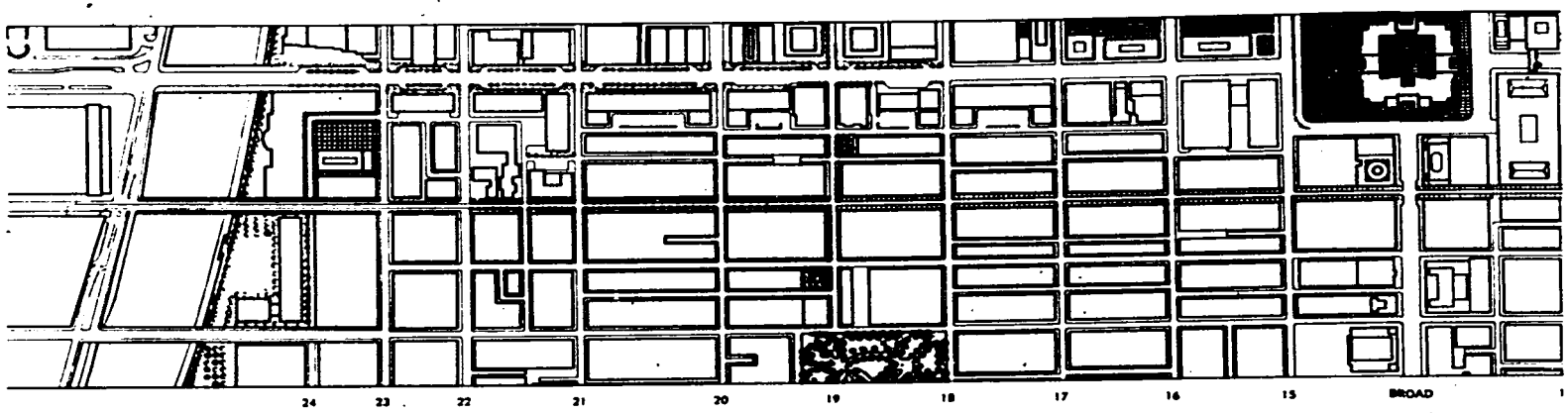
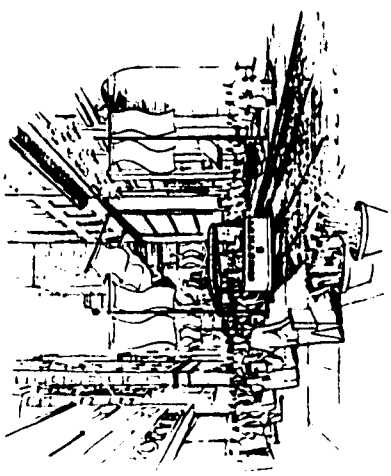
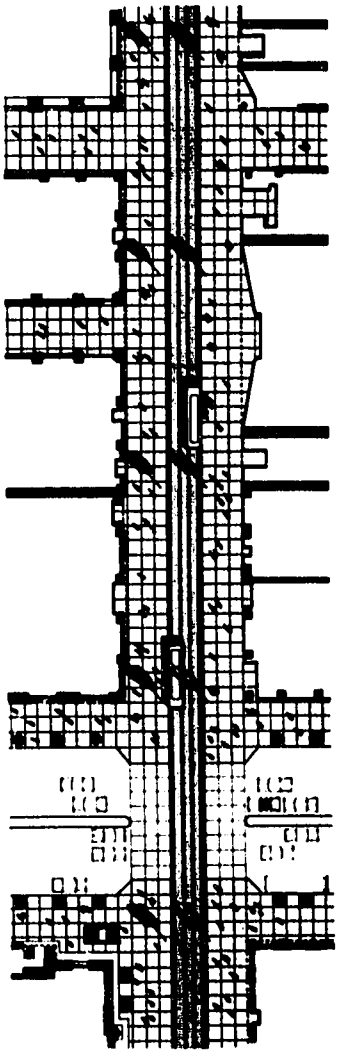


Fig.46





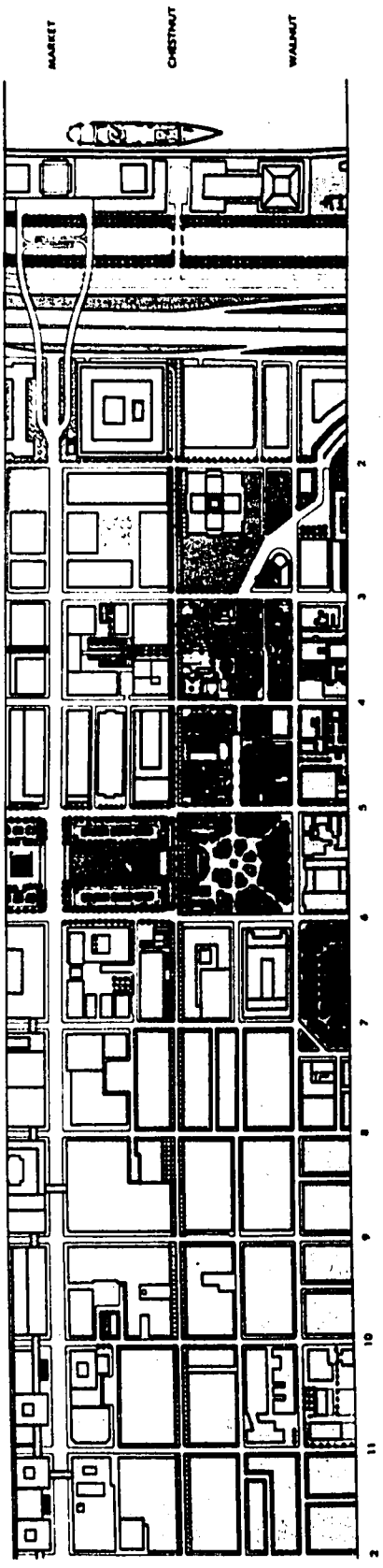


Fig.47 Chestnut Street.

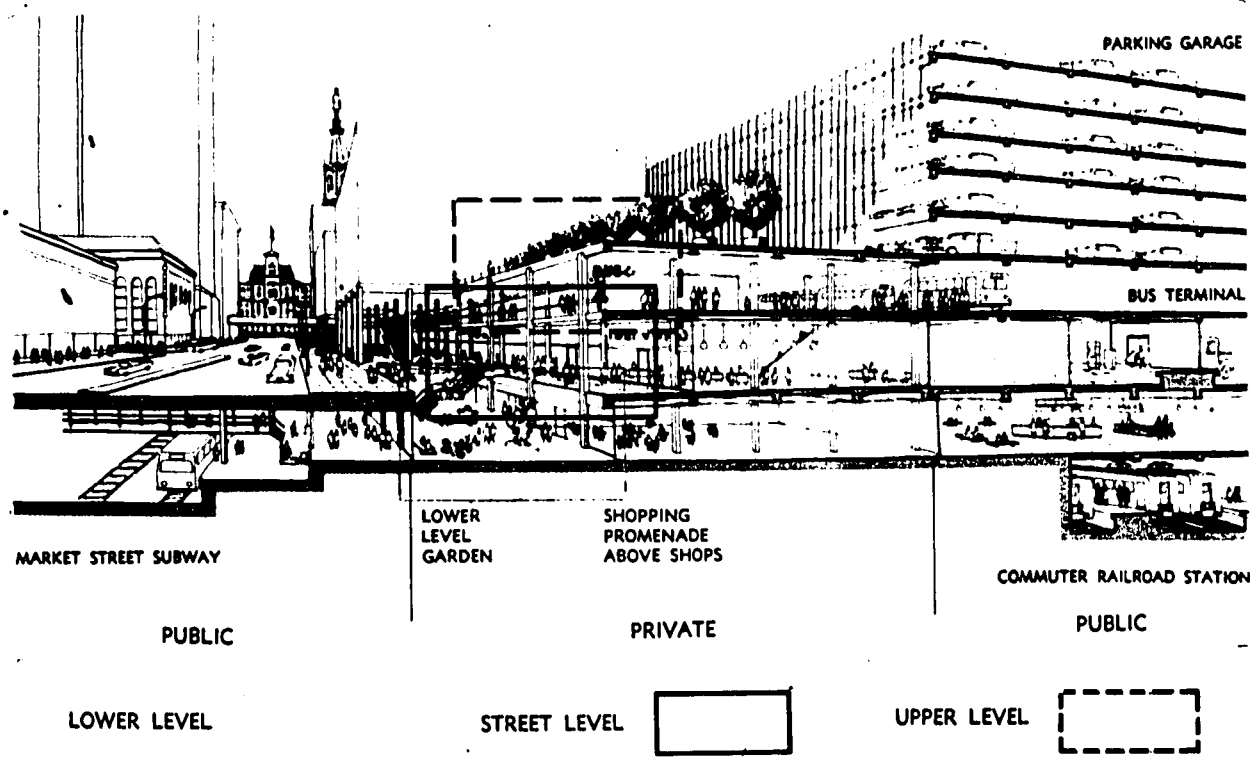


Fig.48 "Traffic Architecture".

Conclusion:

In this study, we realise how various concepts of central area redevelopment can be practically applied to existing conditions, and how the principal streets that serve the pedestrians can be restored for pedestrian needs and comforts - physical and visual. Here traffic problems have been solved not by discouraging the vehicular movement, but rather by achieving a proper order for its functioning by the ring of expressways feeding into well-located terminals of parking. This reduces excessive traffic movement within the centre and elininates the conflict that is created by traffic. It has, in a way, some similarity to the Coventry scheme. At the same time, the ambitious proposals of the central block in the London development scheme have been applied for the most intense part of the centre-core.

The core is a complex of economic activities, transportation and pedestrians, and is called "Projectite", or, in the terms of the Buchanan Commiteee, "Traffic Architecture". It is interesting to see how the redevelopment of the centre of Philadelphia can ultimately get the character that the new towns - Hook and Cumbernauld - have. Here we find how the outlook towards different parts of a street changes in the scheme of overall redevelopment according to the environment it is passing through, whether it is a historical, commercial, or residential area.

The classification of various movements in various modes has been well defined and distinctly separated vertically and laterally. Landscape and visual image have been given equal importance so as not only to solve the problems on a street, but also enhance its good character.

THE CHANGING CHARACTER OF STREETS IN CENTRAL AREAS

PART FOUR

SHERBROOKE STREET, MONTREAL

This final part of the thesis deals with a specific principal street in the central area of Montreal: Sherbrooke street, between Atwater and St. Laurent streets. It is considered as a unique example because of the great changes that have occurred, and are presently operative, along its length.

With these considerations in mind, a study has been made of the basic elements such as land use, buildings and traffic, that help us to define the changing character of the street. Firstly, (Chapter 7) we deal with the evolution of the central area of Montreal, since it will be shown that Sherbrooke street is intimately related to the latter, forces producing changes on Sherbrooke street. Changes in time and in place are focussed in the final chapter, which deals specifically with Sherbrooke Street.

CHAPTER 7

EVOLUTION OF THE CENTRAL AREA OF MONTREAL

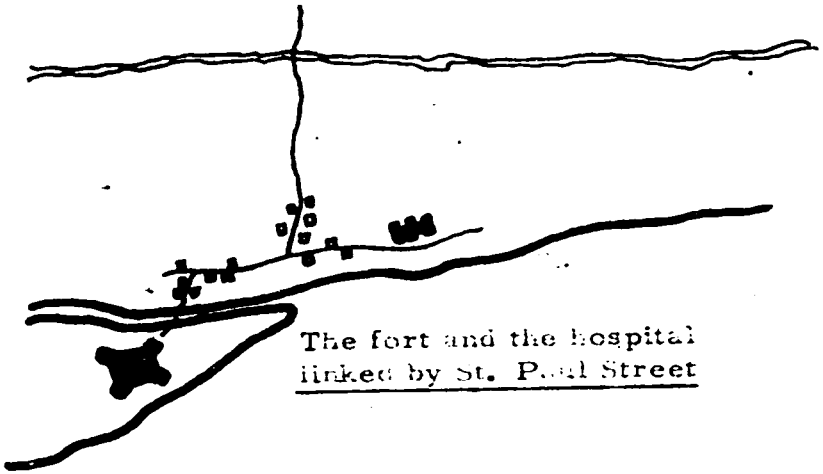
Montreal is one of the largest cities of the New World, and the largest city in Canada. It is located in an area where the St. Lawrence and Ottawa Rivers flow together through an 'island archipelago'. Rising seven hundred feet above the river plain, Mount Royal brings an added attraction to the area. Its very character attracted the early explorers to this site.

Jacques Cartier spotted the land in 1535. It was then called "Hochelega" and was a capital city of Indian tribes. Under the leadership of Champlain, a trading post was established on the spot where the little river St. Pierre met the river St. Lawrence. A fort was established in the area. With the passage of time, colonisation was stimulated. Many important religious and institutional buildings were built around the hilly site, and linked with the fort by muddy tracks. Along these foot tracks houses grouped. The fort acted as a focal point for the growth of the settlement. This steady growth of population necessitated the subdivision of the land among

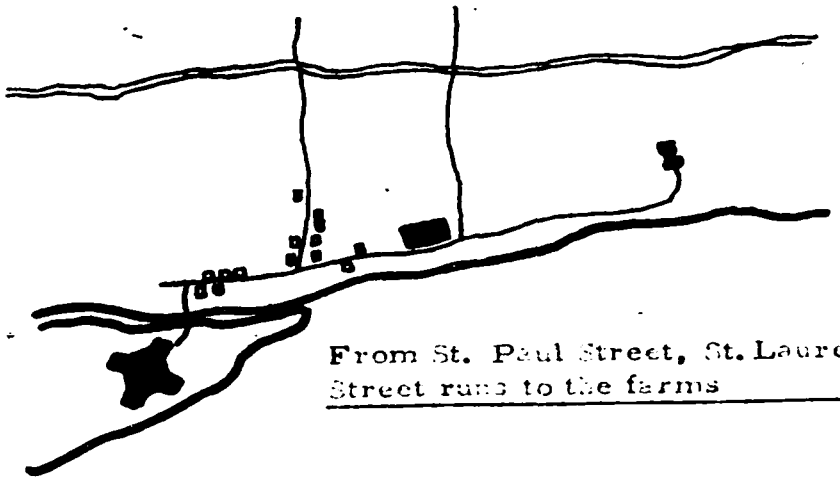
the settlers and institutions. The grouping of the buildings gave rise to an irregular pattern of subdivisions.+1 Except for the main streets, most of the streets were laid on the lot lines and took an irregular pattern. These narrow streets were influenced by the site variations and were steep in gradient. This early street pattern handicapped the sound functioning of central activities, and led to the decentralisation of these activities. (Fig.49)

As the population grew at the periphery, the whole area of 930 acres of the hill was enclosed by fortifications to protect the settlers from the attack of Indians. The rectangular shape of the wall bore relation to the shape of the hill, and was defined by the little river that encircled it.

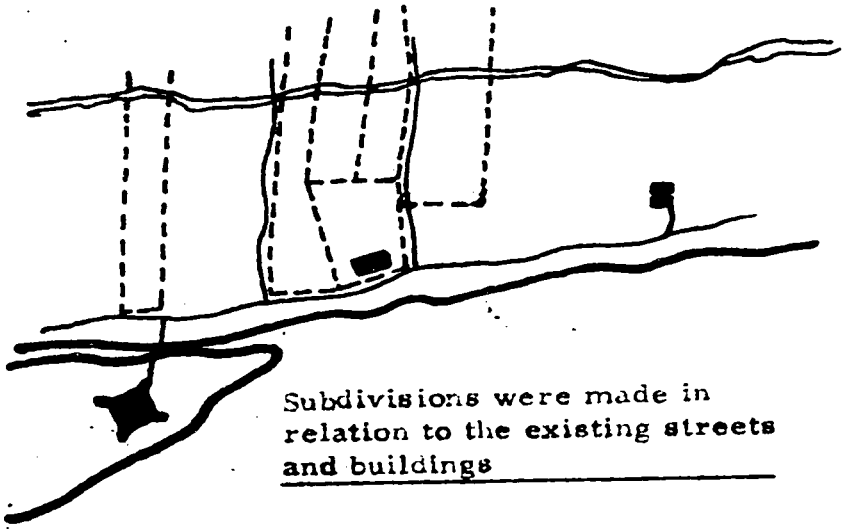
+1 Personal communication: Miss Patricia Ling, City Planning Department, Montreal.



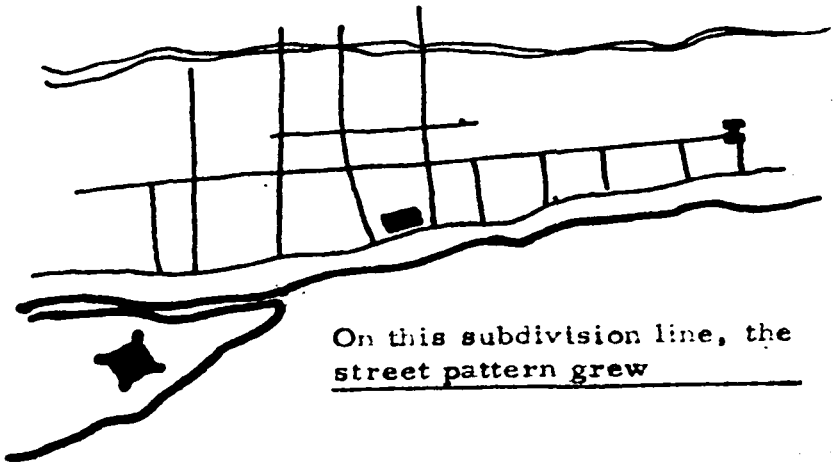
The fort and the hospital linked by St. Paul Street



From St. Paul Street, St. Laurent Street runs to the farms



Subdivisions were made in relation to the existing streets and buildings



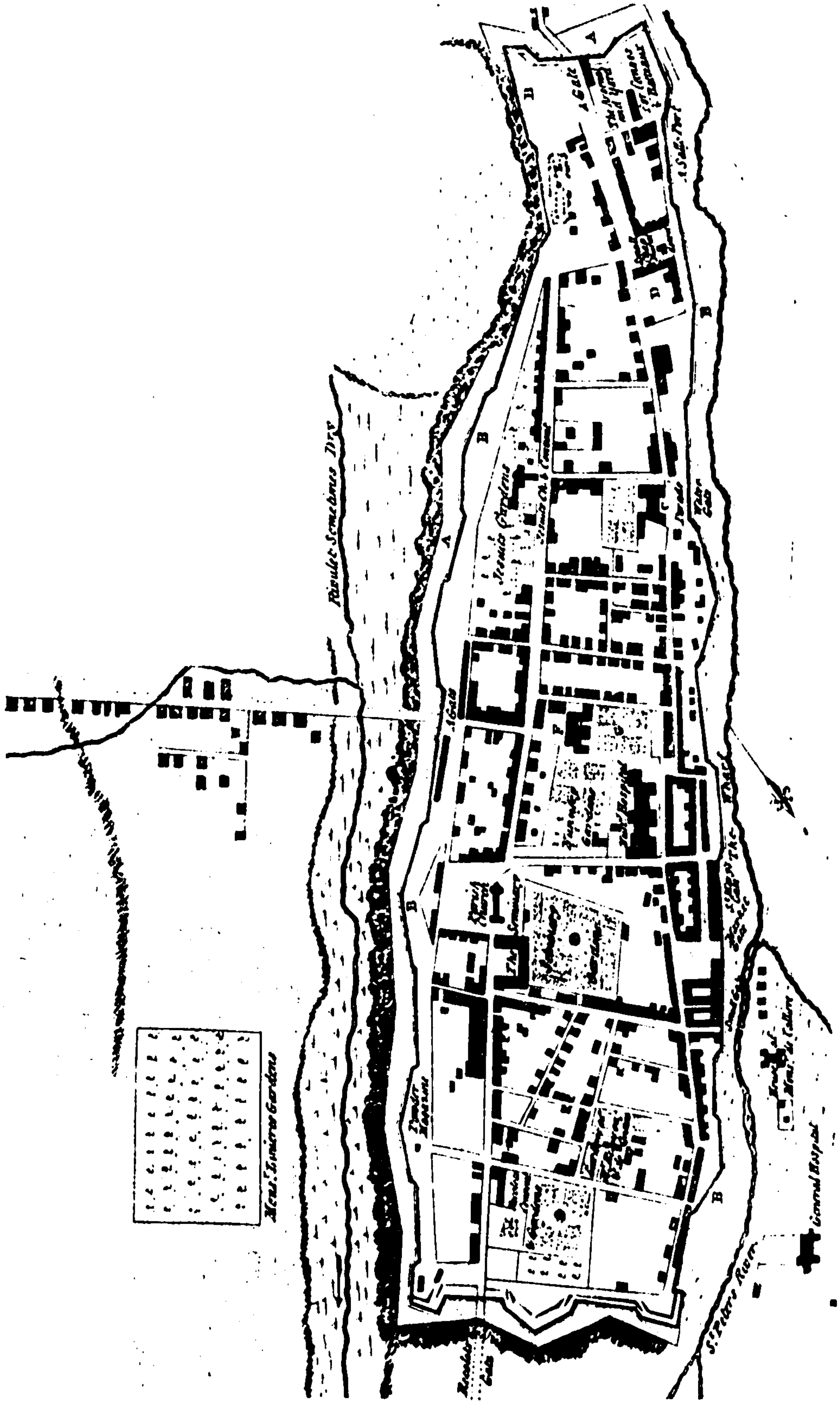
On this subdivision line, the street pattern grew

FIG. 49

Within the fortification, population grew to create a compact development on the narrow and winding streets. The whole town grew with enclosures and variation in the streets, bringing the pleasing character of the Medieval street. The institutions occupied a large area within the city. In 1759, the strong tide of immigrants stimulated trade. St. Paul Street was the principal street for shopping, and the "old market" square on it was the most popular place for the city's social and economic activities. (Fig.50)

In 1803, the fortifications were removed and the waterfront became a physical part of the city. In the meantime, it was thought necessary to decongest the core - the "market square" - and to establish a new core of retail and governmental activities. On the site of the governor's palace, a square was laid out: "Jacques Cartier Square". The square was occupied by retail activities of an "open market" form. As commerce grew, the activities within Jacques Cartier Square spread along Notre Dame street. The other activities in the town had not changed much. Institutions still occupied a large part of the city, and residential development mainly took place along the main arteries - Ndre Dame and St. Laurent Streets (present names). In the vacant spaces that were left around the bastions of the old walls, new squares were laid.

These squares played an important role in attracting central activities. During this period pedestrians played an important role, and amenities and embellishments were provided within the city for the visual and physical needs of the community. (Fig.51) The area around present-day Sherbrooke Street was farmland, surrounding the city. (Fig.52)


Rivulet Sometimes Dry
Jesuits Gardens
General Hospital
St. Peters River

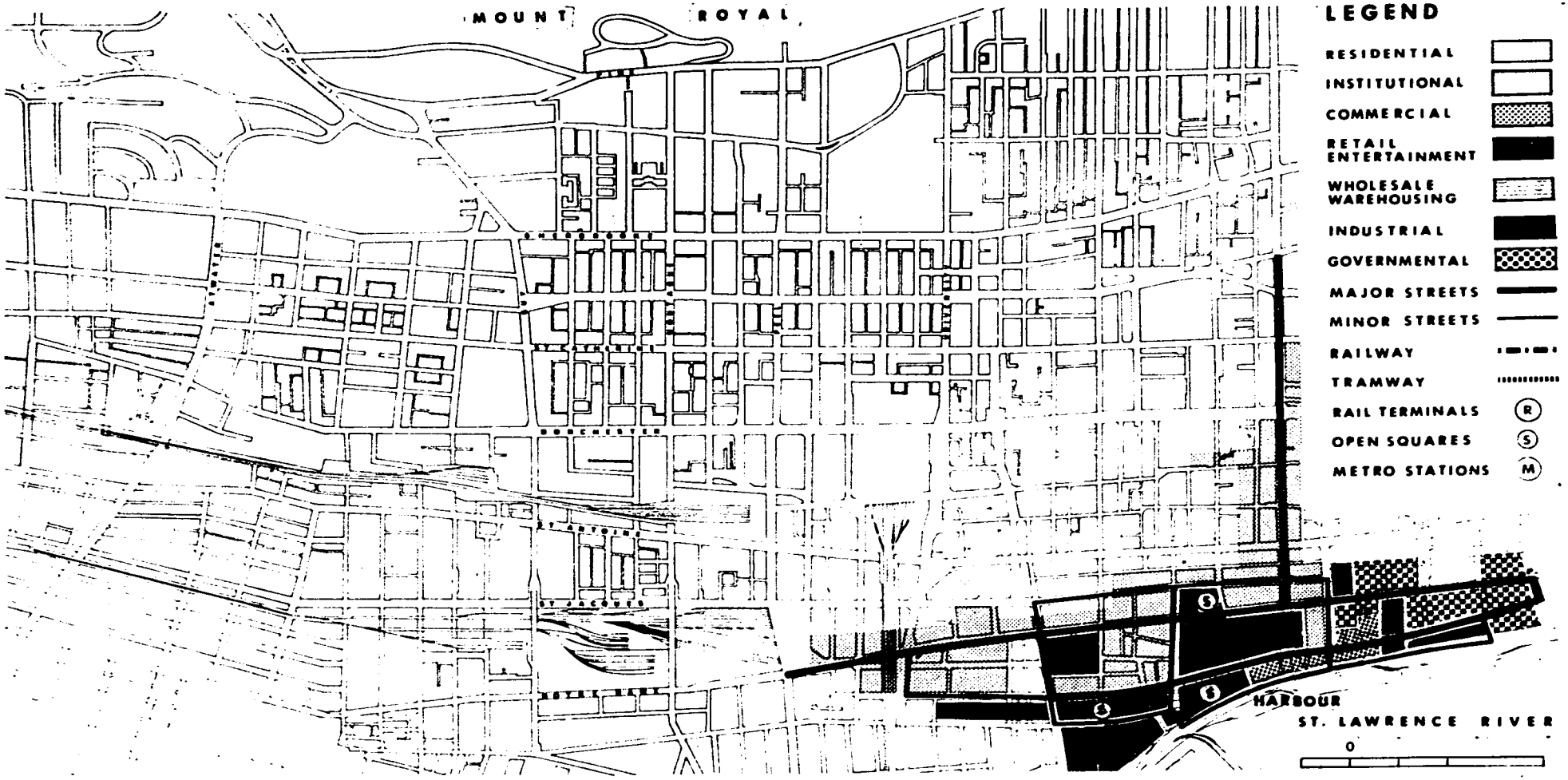
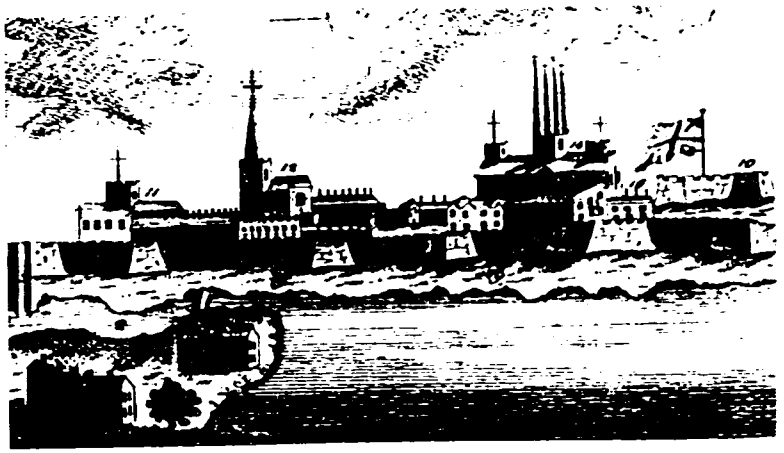


FIG. 51 THE PRINCIPAL STREETS AND THE LAND USE IN 1820

THE PEDESTRIAN ERA

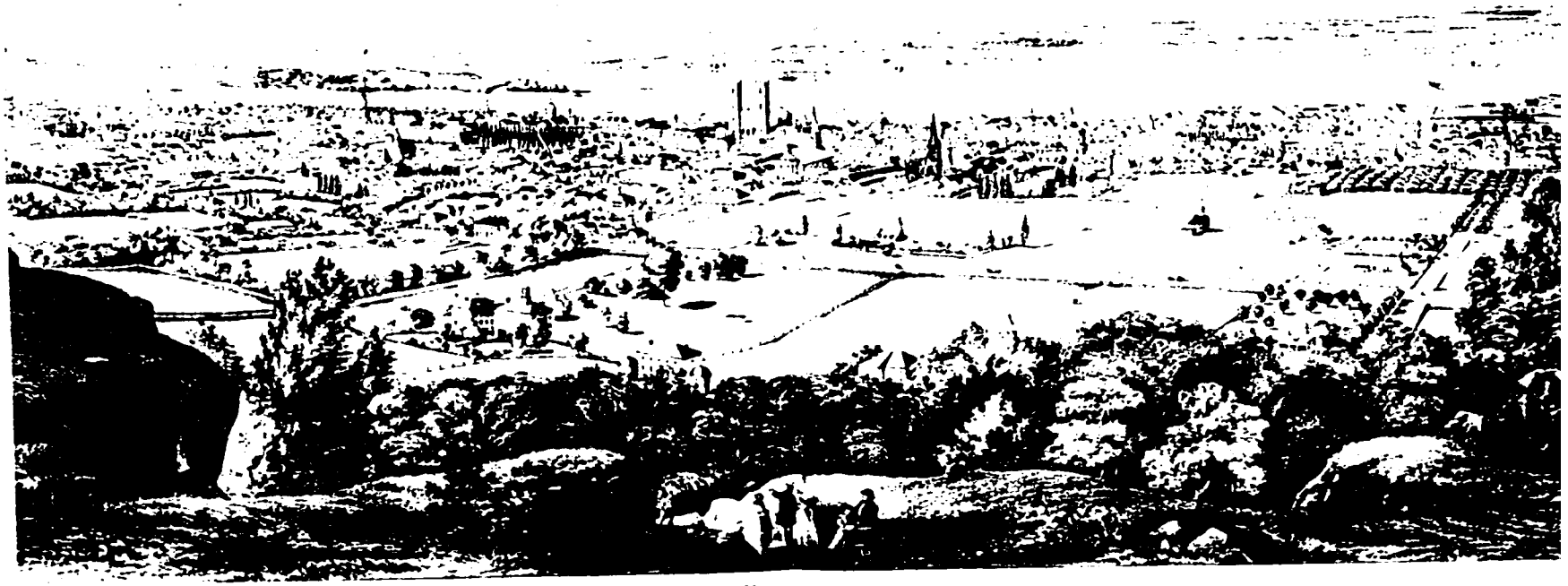


< FORTIFIED MONTREAL

MONTREAL IN - 1820

V

Fig.32



The Horse-cart Era: The Central area in 1869 (Fig.53)

The growth of the city was checked by the steepness of the terrain until 1860, and development took place in the form of linear residential belts along the main arteries. But with the introduction of horse-carts, the steepness gained a new value and led to the growth of high-class residences and institutions in the farmland around Sherbrooke Street. (Fig.54) The central activities showed a tendancy for westward growth towards the newly developed residential areas.

Within the central area, governmental activities were established at the north of the Jacques Cartier axis; while at the south end a new structure of market and entertainment - Bonsecours Market was established. In the meantime, with the growth of commerce and population, financial activities established their core around "Place des Armes" Square. In the west, the area surrounding "Victoria Square" was occupied by religious institutions. Various other institutional activities showed the greatest growth in this period, due to the depression that followed the hazards of cholera and various fires within the city. An institutional belt grew along Dorchester Boulevard, and this type of land use also showed the tendancy towards decentralisation: various institutions were established along Sherbrooke Street.

With the coming of the Grand Trunk railway and the deepening of Lachine Canal, industrial activities were established in the district between the railway and the canal. The spread of industrial activities, and the obliteration of the waterfront by

the construction of massive graneries, led to residential activities taking flight up the slopes of Mount Royal, and mainly in the area around Sherbrooke Street.

Street pattern grew, due largely to accretion. It was rectilinear in character since streets were mainly laid out on the narrow rectangular lots. The main east-west streets were laid out on the topographical terraces of the;mountain.

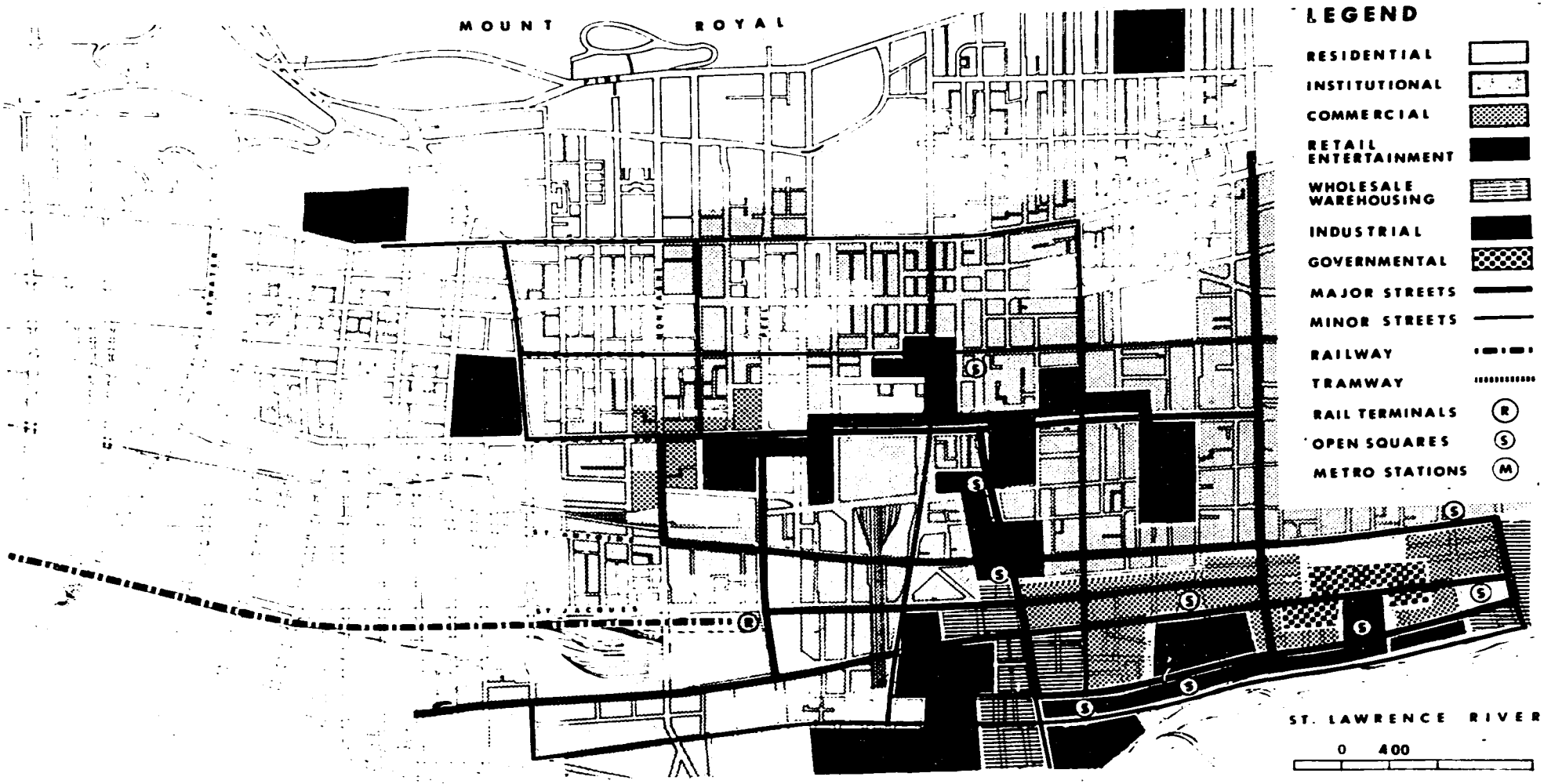


FIG. 53 THE PRINCIPAL STREETS AND THE LAND USE IN — 1860 —
THE HORSECART ERA

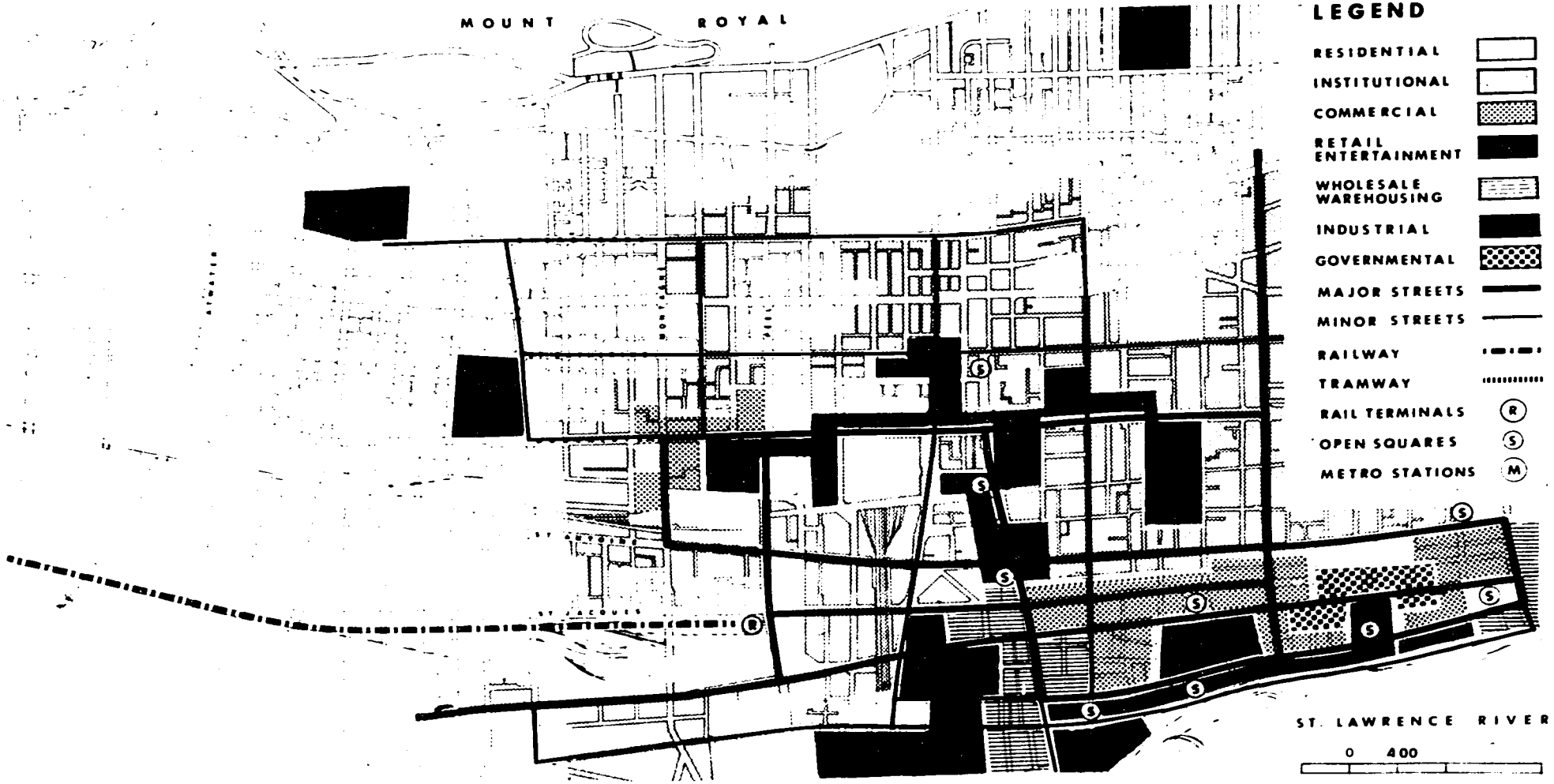


FIG. 53 THE PRINCIPAL STREETS AND THE LAND USE IN — 1860 —
THE HORSECART ERA

The Tramway Era: The Central area in 1900 (Fig.55)

The tramway entered the street scene to change the pattern of growth. The rigid lines of tramways occupied the principal streets of the city and added to the existing congestion. From the central area, the tramways ran upward along St. Laurent, Park and Guy Streets. Residential areas grew in a linear fashion along these tramway lines, and thus formed clusters of residences where they crossed Sherbrooke Street.

With the upward shift of residential areas, retail activities were again decentralised and a new core was created around Philips Square, on Ste. Catherine Street. These activities were mainly in the form of large department stores, such as Morgans and Birks. Commercial activities were also decentralised to group around this new retail core. The old central area of the city lost vitality as a result.

The Canadian Pacific Railway penetrated the city to establish its terminal at Peel and St. Antoine Streets. The Canadian Pacific and Grand Trunk railways formed a barrier to the development of the principal streets. The central activities continued to grow in a northerly direction towards Sherbrooke Street. The C.P. railway brought in a large number of tourists, leading to the growth of hotel activities around its terminal and along Peel Street, soon reaching the vicinity of Sherbrooke Street.

In this period, light and service industries showed a tremendous growth along Bleury and St. Laurent Streets, independantly of the existing heavy industrial areas. Within the old part of the city the physical structure grew obsolete with the constant changes in central activities. The growth of industrial activities, traffic and pedestrian congestion deteriorated the environment, and often caused the decentralisation of residential, institutional, and retail activities.

As the central activities and buildings concentrated within the outdated physical structures, the streets could no longer serve the new functions, and they became obsolete. The situation of traffic and pedestrian congestion was worsened as the central area continued to grow without having any alterations in the physical structure of streets. Further, land values were increased to a great extent by the rapid growth of central activities and their concentration in the core. This led to the development of tall buildings right on the property lines and narrowing the streets. Embellishments such as trees began disapearing from the streets.

In the newly developed areas, the street pattern continued to be determined by the process of accretion. The pattern remained rectilinear but it primarily served residential activities. Sherbrooke Street was not much affected by the growth of central activities and traffic and maintained its residential and institutional character of a high-class residential avenue; prestigious houses, mansions and institutions. Further, there

were no tramway lines on Sherbrooke Street. Sherbrooke Street extended far into the suburbs since it was not impeded by the railway lines or escarpments like other principal streets in the central area, such as Ste. Catherine or Dorchester Streets.

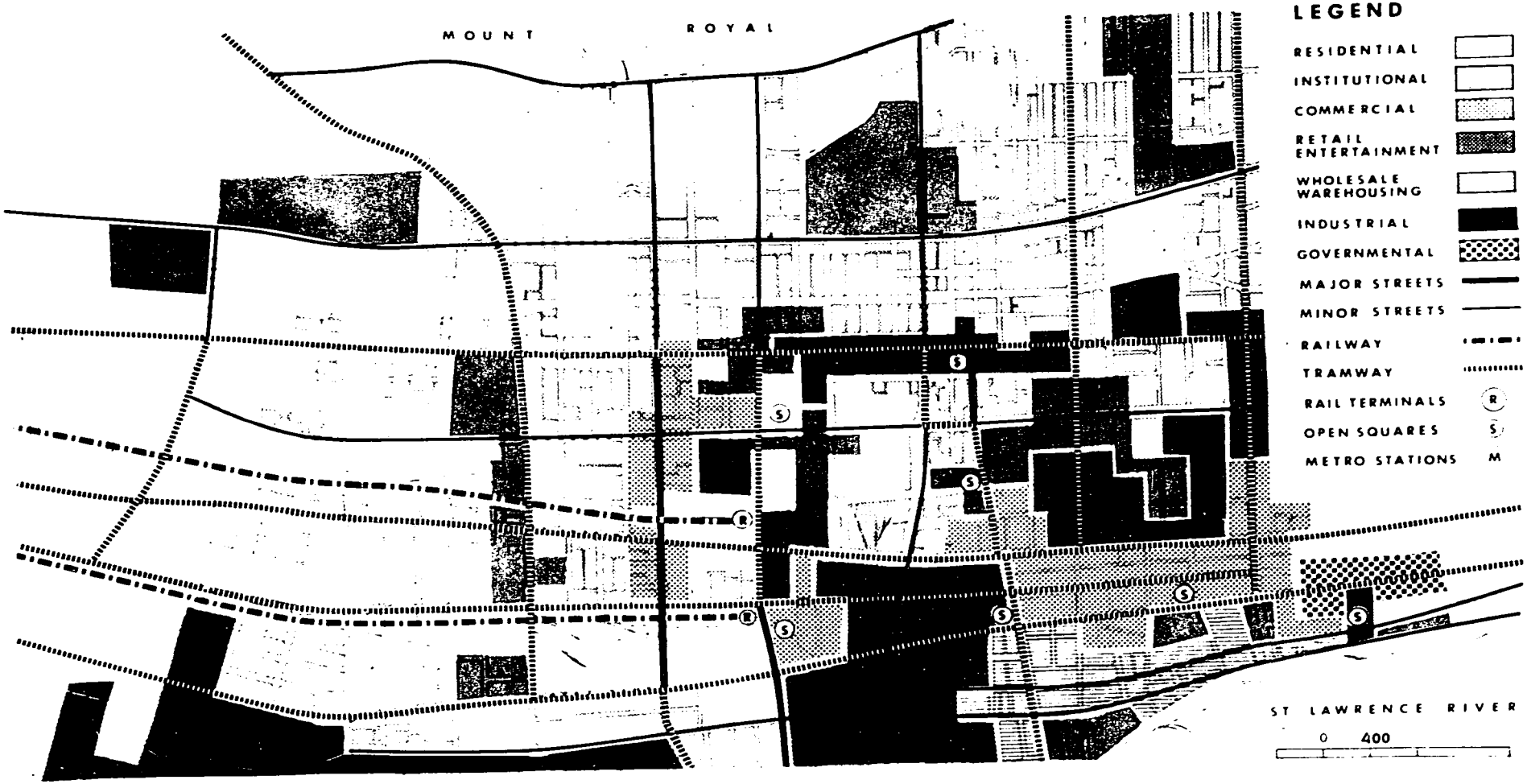


FIG 55 THE PRINCIPAL STREETS AND THE LAND USE IN — 1900 —
THE TRAM ERA

The Motor Era: The Central Area in 1950 (Fig.56)

The automobile revolutionized the rigid and slow transportation system, and broke the linear form of the settlement that was created by the tramway routes. On Sherbrooke Street, the vacant spaces that were left between the old linear routes were filled by residential dwellings. The automobile accelerated the growth of various functions. Commercial activities were affected in their growth patterns in two different ways. From Victoria Square, financial activities grew up the slope along Beaver Hall Hill and University Streets, to be established on Sherbrooke Street. On the other hand, hotels and related activities grew in a linear fashion along Peel Street, to locate on Sherbrooke Street.

Retail trades and their auxillary activities grew upward from Ste. Catherines Street, along Mountain and St. Laurent Streets to Sherbrooke Street. The retail activities along Mountain Street primarily catered for artistic and luxurious commodities, and spread out along Sherbrooke Street to make it a street of high-class shopping activities ("boutiques").

Industrial activities had also expanded by this time: large industries spread along the Lachine Canal; small industries spread linearly along St. Laurent Street. An important event of this period was the building of the Canadian National Railway that penetrated from the south to enter the core of the city

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central area. The location of its terminal influenced the development of the commercial core.

In the evolution of the central area, Sherbrooke Street received various activities that gave it extra diversity. These activities were of a refined nature, and of cosmopolitan elegance. Further the institutional activities that were established on Sherbrooke Street grew up in their extent, and attracted related activities to make in the main institutional spine of the city.

The automobile created parking as a new form of land use that occupied a large portion of the central area. The concentration of activities and their floor space led to the development of tall structures on the outdated physical structure of the streets. It created intense traffic and pedestrian congestion and handicapped the sound functioning of central activities. The retail and industrial activities showed a tendancy to decentralise. The obsolescence spread within the central area and conversions of buildings deteriorated the physical structure. This tendency of obsolescence and conversion was pronounced in the residential areas around Sherbrooke Street. In comparison, redevelopment was very minor in nature.

Obsolete buildings and streets have hindered the natural adjustment of central activities, andpublic improvement and control was ineffective in solving these problems. In later years, street widening was carried out, influencing to a great deal, the form of the city.

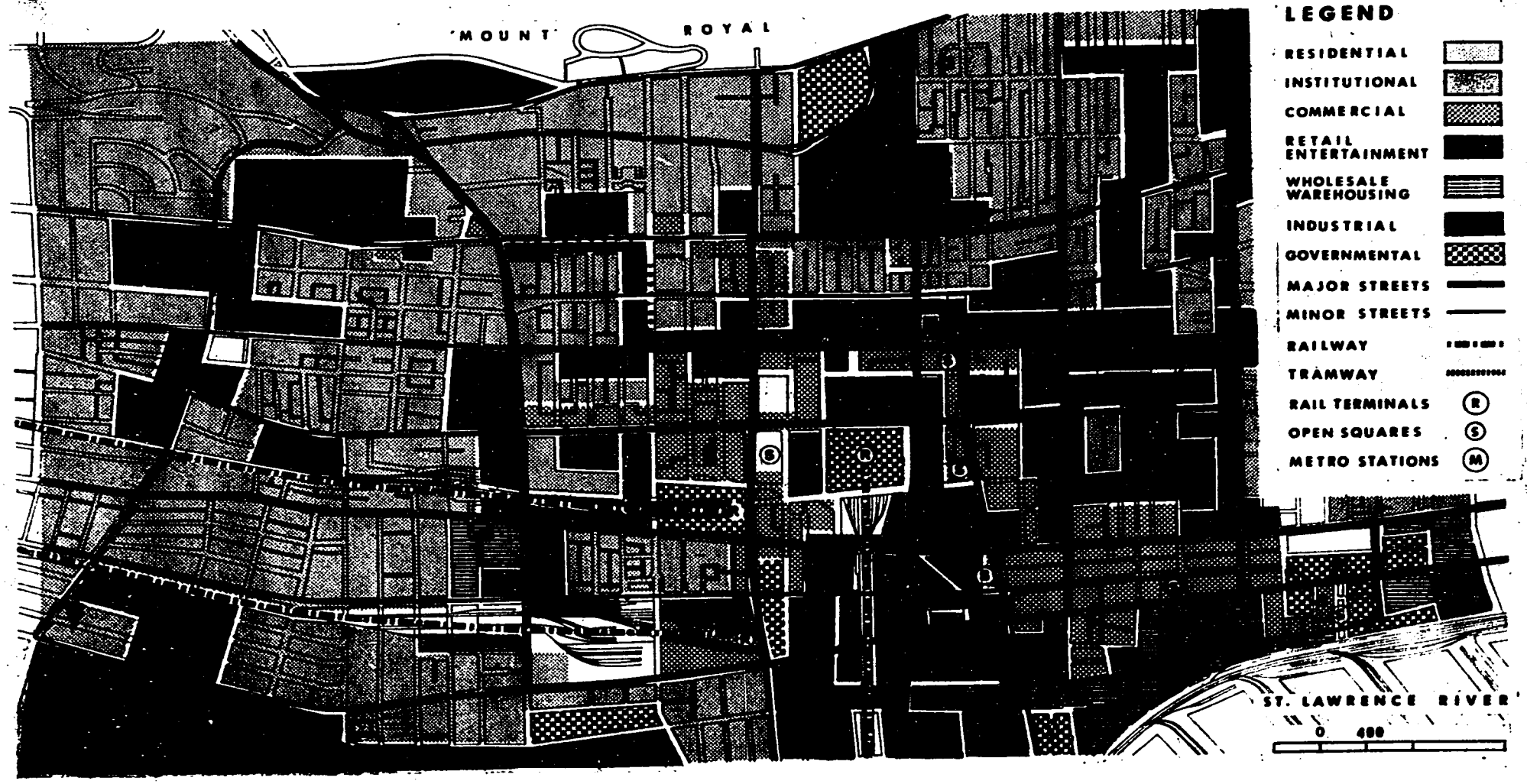


FIG 56 THE PRINCIPAL STREETS AND THE LAND USE IN — 1950 —
THE MOTOR ERA

The Pre-Metro Era: The Central Area in 1964 (Fig.57)

The concentration of commercial activities and an increase in land values led to the development of tall buildings within the outdated pattern of streets, and further increased the traffic and pedestrian congestion.. Dorchester street was widened to act as an arterial road to the central area, stimulating more changes. The development of large complexes and skyscrapers took place and generated heavy traffic and pedestrian flows in the central area. (Fig.58) The through traffic has led to traffic congestion and has deteriorated the environment of Sherbrooke Street.

Commercial activities also grew laterally and occupied the south side of Sherbrooke Street. New buildings were built by demolishing old houses, and various existing apartment buildings were occupied by the professional activities. Retail activities grew linearly along Sherbrooke Street and converted the old row-houses for their purposes. This redevelopment and conversion are two important features of Sherbrooke Street. Also, financial and hotel activities built their tall structures on Sherbrooke Street.

Although residential and institutional activities declined within the central business district, they showed a great increase in floor space on the fringes, and mainly on the north of Sherbrooke Street. Residential activities reappeared in the form of apartment houses, whilst existing educational institutions, such as McGill University, continued to expand.

Another problem related to traffic is the provision for car parking. The land occupied for parking has increased to a great extent in thelast decade and it is mainly in the form of scattered parcels all over the fringe area. Many properties above Sherbrooke Street and its cross streets are main parking places for people working in the central area. This character of parking has not only caused disturbance to the traffic flow, but also caused physical and visual annoyance.

Within the central area, governmental, financial and commercial cores merged into each other. This tendancey towards centralisation has created a compact structure. The growth of the commercial core is mainly taking place towards the south side of Sherbrooke Street. With the projects that have been proposed, Sherbrooke Street will soon be part of a compact structure extending from McGill University to the old part of the city.

The joint complex of Place Ville Marie and C.N.R. station has been an admirable example of the new projects to come. The project stimulated the growth of underground shopping promenades seperated from traffic. In the future, various new projects on Sherbrooke Street, including the development of McGill University, will be integrated by this underground circulation system.

The compactness of the central area has worsened the traffic problems, but steps have been taken to solve the traffic problems by the introduction of the Metro Subway System and the construction of the east-west expressway. Further various public controls have been devised to guide and shape the future land use pattern and form of the central area.

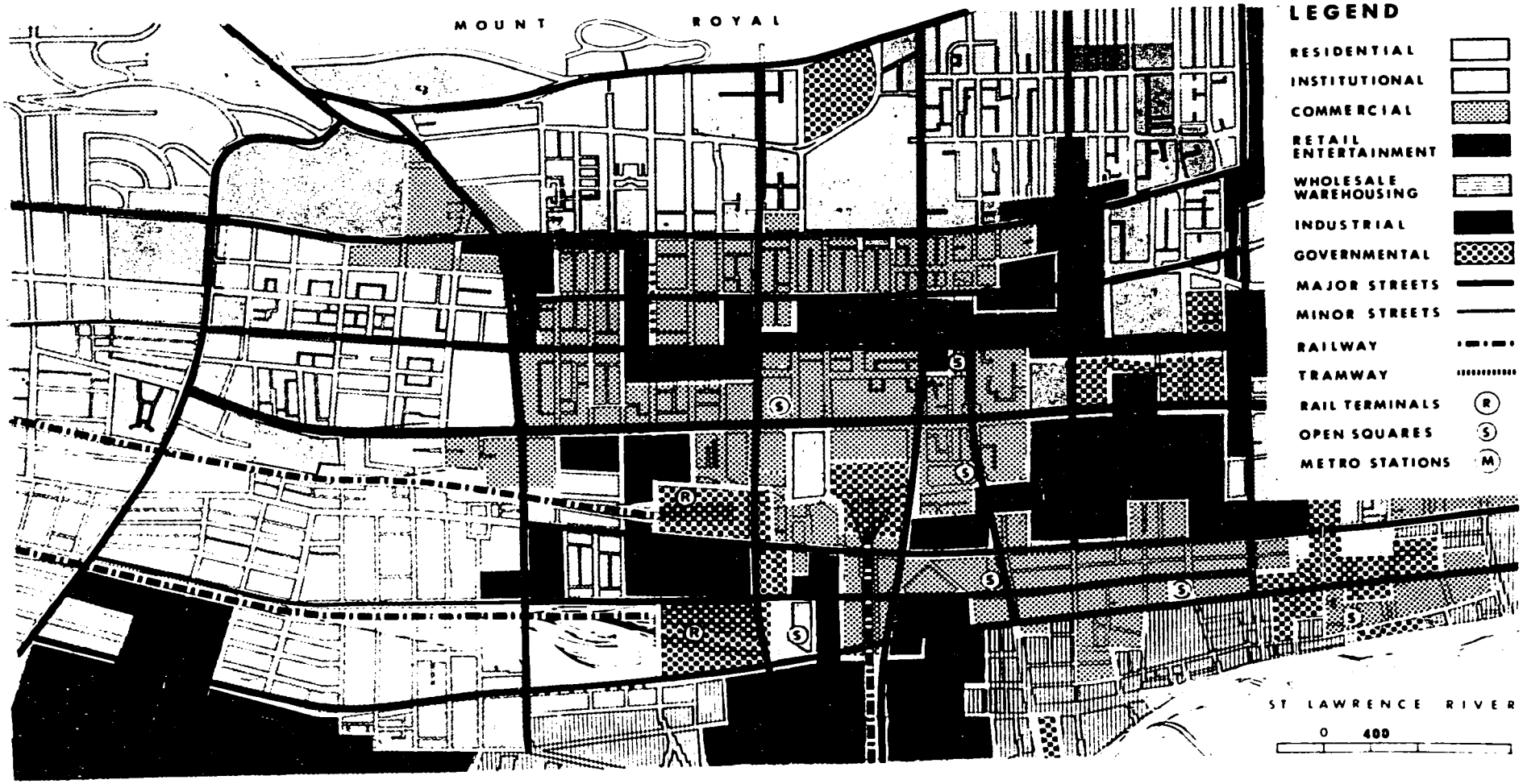
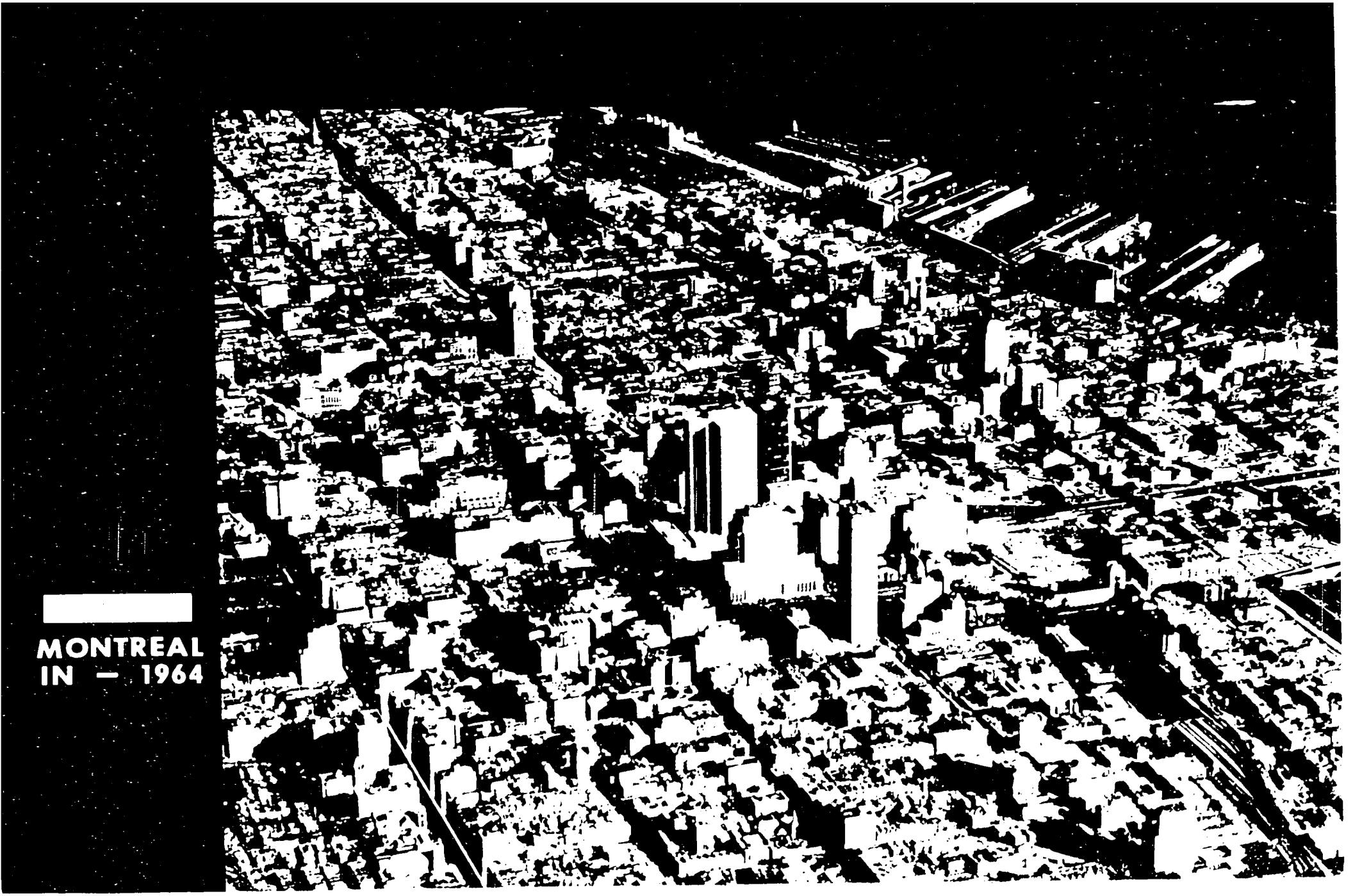


FIG. 57 THE PRINCIPAL STREETS AND THE LAND USE IN — 1964 —

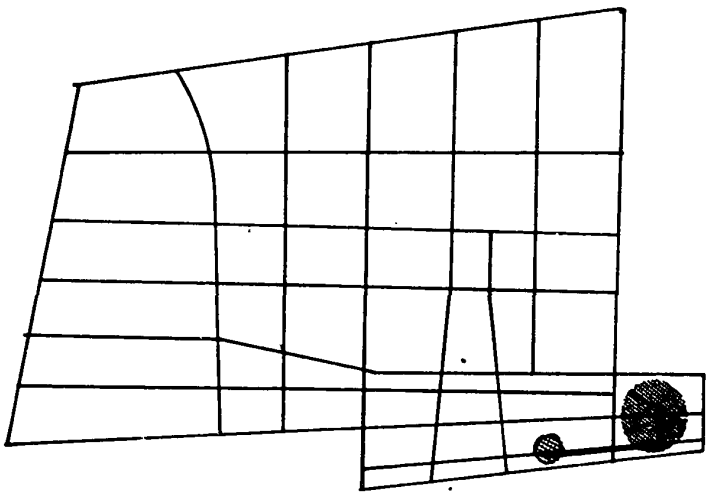
THE PRE METRO ERA


MONTREAL
IN — 1964

CONCLUSIONS:

This account of the evolution of the central area of Montreal is summerized by a series of diagrams, (Fig.59-64) which point out the evolutions of patterns of central activities and streets, and a final table (Table Two) which describes the forces affecting the various elements in the periods studied.

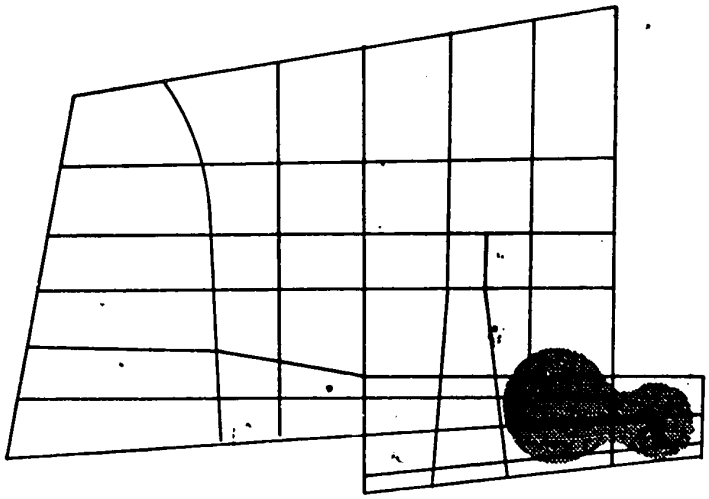
FIG.59



The central area in the pedestrian era

The central activities in the "Old Market Square" were decentralized and formed a new core on the axis of "Jacques Cartier Square". St. Paul Street, as the main spine of the city, linked the two cores. The cores held the elimentary form of governmental and marketing activities.

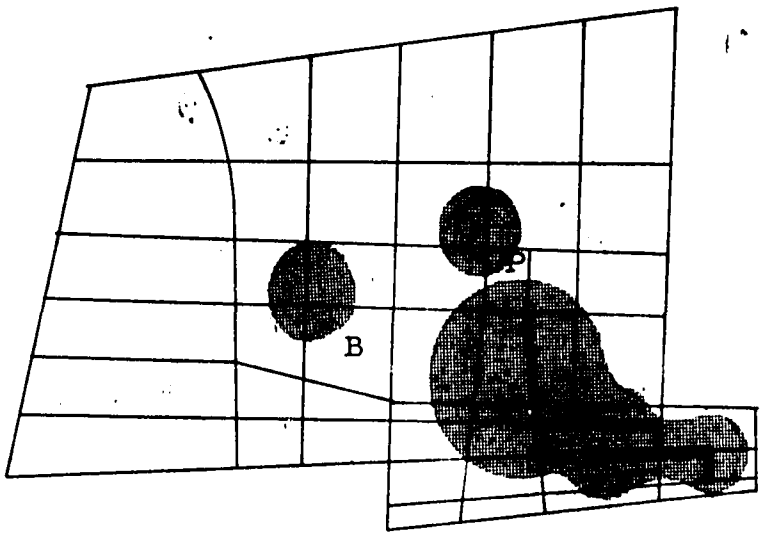
FIG. 60



The central area in the horsecart era

As the city grew westward towards Beauver Hall Hill, the central area turned towards it and occupied the complete area of the fortified town. From the "Jacques Cartier Square" axis, central activities spread along Notre-Dame Street. The development of financial activities gave importance to St. James Street.

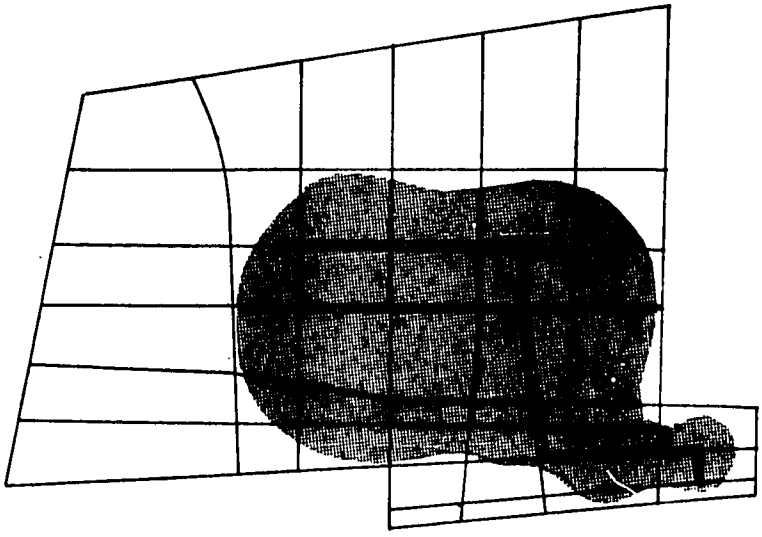
FIG. 61



The central area in the Tram era

The growth of the financial and commercial activities expanded the limit of the central area. The activities mainly grew along McGill street to occupy Beaver Hall Hill. Some of the central activities de-centralized and established themselves around Philips Square (P) and Bonaventure Station (B).

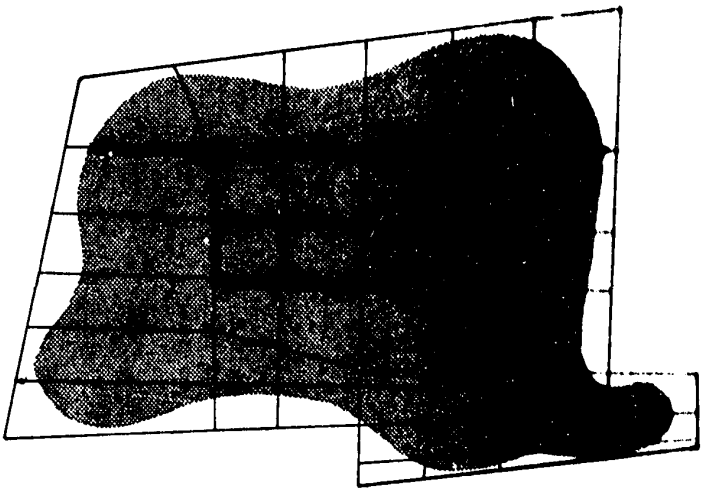
FIG. 62



The central area in the motor era

The central area in this period showed a great expansion to reach up to Guy and Sherbrooke streets. Specialized and interrelated activities developed. From McGill Street, the activities lined along Dorchester and St. Catherine streets and spread along the cross streets., to reach Sherbrooke Street.

FIG. 63



The central area in the Premetro period

The central area extended up to Pine Street in the north and Atwater Street in the west. Interrelations between the functions developed the large complexes, and consolidated many of the street blocks. The conversion deteriorated many parts and redevelopment accelerated the growth of the central activities along the cross streets vertically to occupy Sherbrooke Street. The growth of apartments and educational activities were mixed with retail, hotel and financial activities, to make Sherbrooke Street the important street. It is presently a growing stem of the central area.

In the growth and development of central area, the final form has been achieved in an inorganic way and, since the decentralisation of central activities at various stages affected it, the central area has lost the social and the visual meaning of its pattern.

TABLE TWO

Period	Influencing Factors	Street Pattern	Central Activities	Street Form
THE PEDESTRIAN ERA	Harbour, Fortifications, Topography. Shifting of residential areas affects retail trade; open squares as magnates for central activities.	Streets linked the important buildings and took irregular patterns; cadastral divisions also an influence.	Decentralised cores of retail trade, governmental and religious activity. Religious activities played important part. Retail activities decentralised. Governmental activities established.	The main streets were wide and long. They were related to squares and important buildings. Streets, buildings, created a variety of enclosures and focal points. Pedestrians played a dominant part in the environment of the streets, and consideration was given to human scale.
THE HORSECART ERA	Horsecart as private and public means of transportation. Shifting of residential population. Open squares as magnets for central activities. Concentration of activities and increase in land values. G.T. Railway and the growth of industries.	Accretion of the existing street pattern. The main streets were laid on the topographical breaks of slope. The overall pattern took rectilinear pattern with narrow streets; blocks serving residential areas.	Retail activities spread in linear fashion towards growing residential districts. Other activities such as religious, governmental and institutional. Industrial activities and its components. Wholesale had begun to grow.	Buildings grew taller on the narrow streets. Traffic and pedestrian congestion. Relation of streets to squares and important buildings. Streets were taking more regular form. On the main traffic artery; a diversed character of retail shopping.

Period	Influencing Factors	Street Pattern	Central Activities	Street Form
THE TRAM ERA	Tramway as public transportation C.P. Railway and terminal. Open squares as magnets for central activities. Shifting of residential population and decentralisation of central activities. Increase in land values and concentration of activities.	Street pattern continued its rectilinear character for residential activities. New streets were laid on the narrow lot lines and the topographical stages. Some streets were widened.	Decentralisation Business, finance, hotel and distribution, manufacturing and wholesale were the main activities. Institutions and residential activities were established on Sherbrooke Street.	Tramways added to congestion on the street. Shopping spread linearly along the street and occupied the residential houses. The frequent conversions of forms caused obsolescence. Decentralisation worsened the blight: lowered environmental standards in the old areas. Form: buildings grew taller with the increased land values.
THE MOTOR ERA	Automobile as means of private transportation. Decentralisation of residential industrial and retail activities. C.N. Railway and its terminal. Open squares as magnets for central activities. Concentration of commercial activities and increase in land values. Street widening and zoning laws.	The physical structure of streets retained its character, but central activities and building floor space increased to make it obsolete. Some streets were widened to meet traffic demands.	Central activities crystallized to form a variety of activities. Cohesion between the like activities created clusters of activities. Retail trade grew in a linear manner along traffic arteries. Parking came as another land use to occupy a large part of the central area. Residential, institutional, and industrial continued to decline. Residential activities reappeared in the fringe area - Sherbrooke Street in the form of apartment buildings.	Tall structures on narrow streets. Spaces on the streets were lost. Trees disappeared. Human scale was lost. Street became a traffic corridor. Traffic and pedestrian congestion affected the environment Parking spaces and off-street parking created visual and physical annoyance. The chaotic arrangement of street furnishings and advertisements worsned conditions. Obsolete buildings impeded the sound development of form of the street.

Period	Influencing Factors	Street Pattern	Central Activities	Street Form
THE PRE-METRO ERA	Widening of Dorchester Boulevard, rail terminals, open squares, and main traffic arteries as magnets for central activities. Increase in land values and zoning laws controlled the function, forms and movement. Increase in automobile traffic.	Street pattern retained its rectilinear character that served the residential activities. Increased traffic and pedestrian movement has made it obsolete.	Central activities were further crystallized and grouped together in complexes and precincts of similar or related activities. Central area tended to be a compact structure of activities and pedestrian promenades separated from traffic. Institutional, residential activities grew in the fringes. Commercial financial and hotel activities grew and occupied the south side of Sherbrooke Street.	Traffic and pedestrian congestion. Parking places and off-street parking deteriorated the environment of the street. Piecemeal redevelopment of the properties on Sherbrooke Street has no regard to the relation of spaces and shopping activities scattered in the converted row-houses. Trees have already disappeared and other forms of embellishments and amenities that serve the physical and visual needs of the community have not been considered.

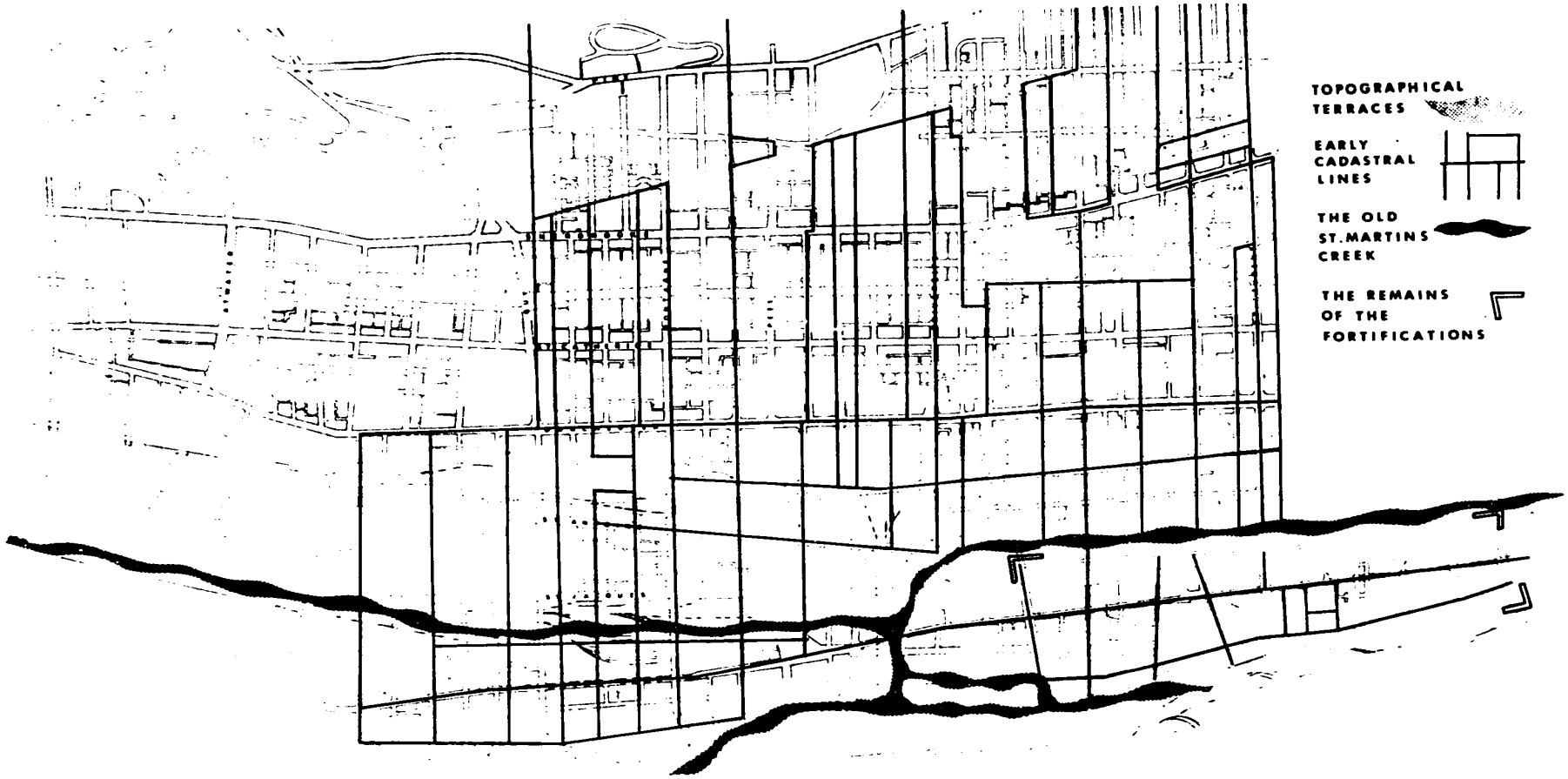


FIG.64 THE INFLUENCING FACTORS IN THE EVOLUTION OF THE STREETS

The study of the evolution of the central area of Montreal has been made with reference to the effects of changing land use patterns, buildings, and traffic on the principal streets. Some reference was made to Sherbrooke Street, since it is closely tied to the evolution of the central area. In the next chapter we focus on the changing character of Sherbrooke Street in more detail.

CHAPTER 8

SHERBROOKE STREET, MONTREAL

Sherbrooke Street is one of the longest streets in Canada. It runs along the length of the Island of Montreal and acts as a link to the national highways. It was not impeded in its run by the railway llnes and escapements like other principal streets such as Ste. Catherine or Dorchester. It runs along the high terrace of Mont Royal which because of its excellent location has attracted high class residences and institutions, giving prestige to the street. As a main artery through the central area, the growth of commercial activities has been accelerated along the street. Today, it is a street that is developing rapidly to become part of the complex structure of the central area.

A. Evolution of land use

The Indian village of "Hochelega" was situated on land that had been cleared along the terrace. Early foot-tracks reached Guy Street, which was then a gully between the two mountains, West Mount and Mount Royal, that was used by Indians as portage to carry their canoes from St. Lawrence River to the Riviere-des-Prairies.

In 1694, Sulpician priests established "Le Fort des Messieurs" at the corner of Guy and Sherbrooke Streets. The towers of the defensive walls still exist. In 1829 McGill University was established in the existing "Burnside House" on the McGill Estate. The house and its axis played an important part in the development of the McGill campus. The area of "Le Fort des Messieurs" was occupied by The Montreal College after the demolition of the fort in 1859. On the corner of Sherbrooke and Atwater, another important institution, "The Congregation of Notre Dame", was founded and added one more giant institution to Sherbrooke Street.

Sherbrooke Street in 1860

These three institutions played an important part in the life of the city and brought prestige to the street. The institutional importance and topographical advantages of the street

became attractive qualities which were admired by the merchant princes and prominant people: they built their fine mansions on the street to bring an additional beauty. (Fig.65). "The Prince of Wales" terrace was the first row of houses built on this street at the corner of Peel Street.

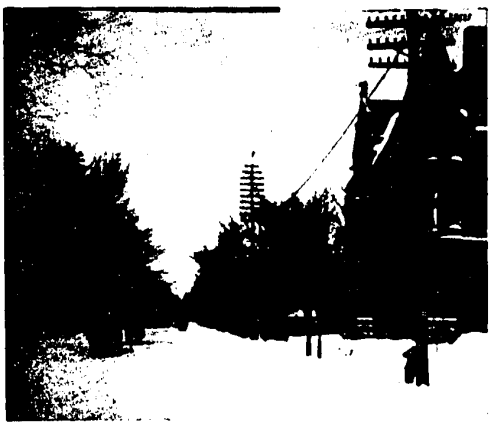


Fig. 65

The Old Sherbrooke Street (around McGill University)

As the city grew, row-houses were built along the cross streets, Drummond and University, and spread out on Sherbrooke Street. This created a small cluster of row houses and mansions around the nuclei of "Burnside House" in the McGill University area. To the east, around St. Lawrence Street, a similar trend was taking place. The area between these two residential clusters was farm land. Sherbrooke Street cut through these

farms to run from St. Denis street in the east, to Mountain Street in the west.

The Growth of Sherbrooke Street by 1900 (Fig.66

The street-cars ran from the centre of the city, crossing Sherbrooke Street at Guy, Bark,and St. Laurent Streets. A large residential development filled the whole area of farm land between Mountain and St. Laurent Streets. Prosperity in commerce brough wealth to many people, who built their fine mansions along and around Sherbrooke Street. (Fig.67)

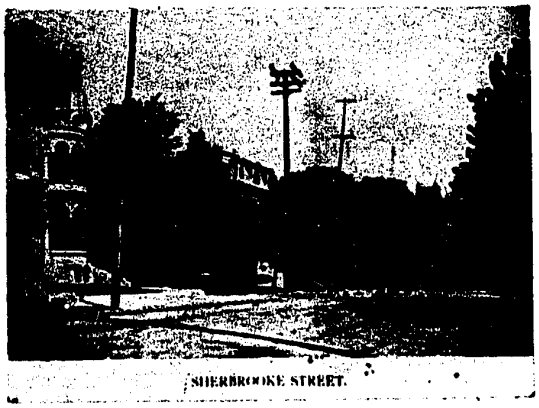


Fig. 67
Fine mansions along Sherbrooke Street.

These fine mansions and row-houses added vitality to the street. McGill University expanded to become a campus area.

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Many educational buildings also located along Sherbrooke and University Streets. Sherbrooke Street became a fine avenue lined with large maple trees, bordered with beautiful structures giving it a grand silouette. (Fig.68)

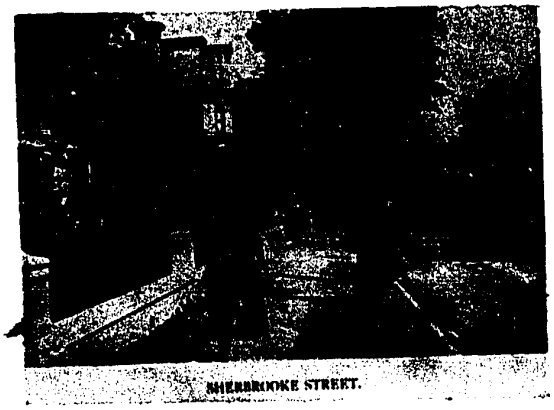
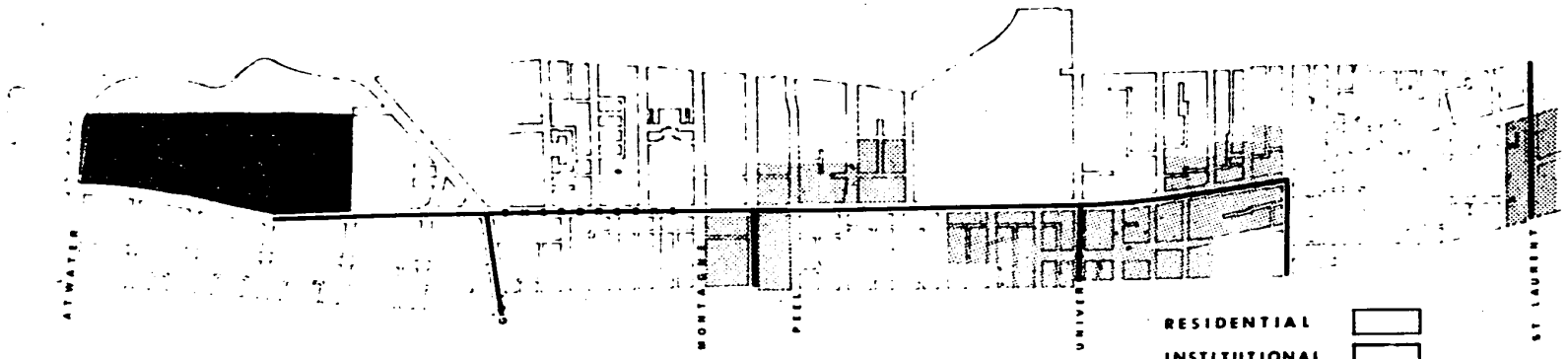


Fig. 68

Sherbrooke Street: a fine avenue

Since the street-cars did not invade the street, the character of the street was retained. Rather it became a favourite promenade for horse parades.

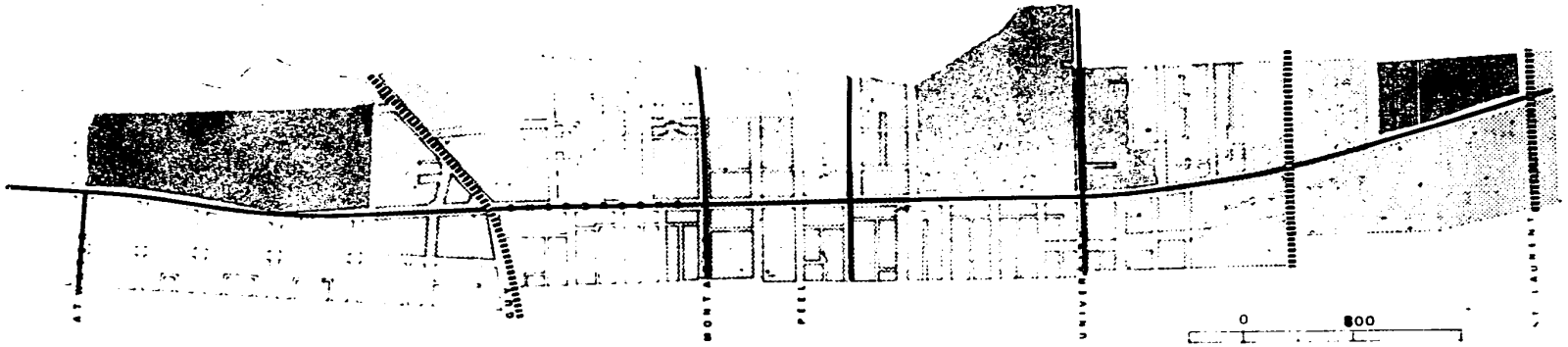
Although Sherbrooke Street was an aristocratic residential street, it was unpaved country road. In the eastern end, near St. Laurent Street, the "Ecole des Beaux Arts" and other institutional buildings were enveloping the street. In this period, Sherbrooke Street reached far in the country joining the growing suburbs of the city.



LAND USE IN 1860

RESIDENTIAL
INSTITUTIONAL
COMMERCIAL
RETAIL ENTERTAINMENT
INDUSTRIAL
MAJOR STREETS
MINOR STREETS

LAND USE IN 1900



SHERBROOKE STREET – MONTREAL

FIG. 66

The Growth of Sherbrooke Street by 1950 (Fig. 69)

The large spaces that had been left vacant due to linear growth prompted by the tramway lines, were soon occupied by residences, and Sherbrooke Street was fully built up.

Automobiles led to suburbanization; and since Sherbrooke Street extended in the suburbs, it acted as a regional artery joining the suburbs to the central area. Moreover, autobuses first started on Sherbrooke Street and emphasized its importance as the street with rapid public transportation. All these factors attracted various central activities to the Street.

From the main shopping spine, Ste. Catherine Street, retail activities turned upward along Mountain Street and spread along Sherbrooke towards Guy. The growth of high class residences in the neighbouring areas, such as Westmount, increased the demand for luxurious commodities and artistic goods. Holt Renfrew Co., on Mountain Street, was the first large store of this kind. It attracted various shops of high-class retail goods all along the west part of Sherbrooke Street. Many of the beautiful rowhouses were occupied to make a fine esplanade of shops.

Similarly, hotel activities grew along Peel Street and occupied the area between Peel and Mountain Streets. (Fig.70) The growth of high-class residences above Sherbrooke Street

and in the suburbs attracted financial activities, which moved from Beaver Hall Hill to be established on University Street. Alliance Nationale was the first financial structure that occupied the corner of University Street.

Fig. 70

Growth of tall structures on Sherbrooke Street.

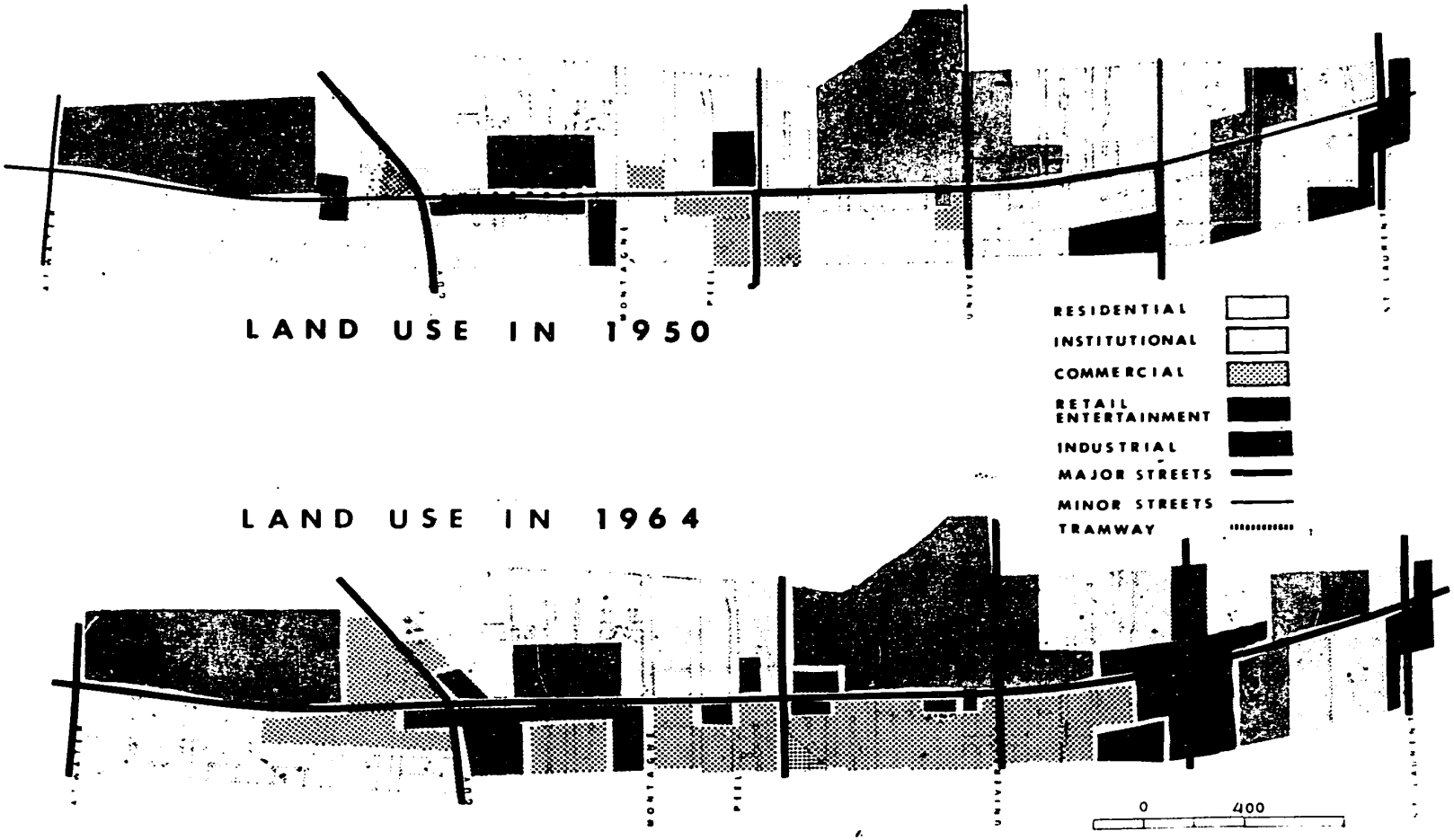
The real change on the skyline of Sherbrooke came with the growth of apartment buildings as a new kind of living. Sherbrooke Street became a popular site for these beautiful structures: "Sherbrooke", "Linton", "Acadia", and many others, lifted the skyline of the street. These tall structures, at certain intervals, grouped with low structures of mansions, rowhouses and institutions, brought an interesting character to the street, although many fine residences were demolished in the development. As hard surfaces penetrated the street, trees started to disappear from the street.

The Growth of Sherbrooke Street by 1964 (Fig.69)

The growth of central activities which were established on the street, played an important part in changing its character. Many of the old mansions and rowhouses were demolished to make place for tall structures carrying on various activities. The few houses and rowhouses that remained were converted to suit the new retail activities such as boutiques and art-galleries.

Financial activities grew from University Street to McGill Avenue. All the old rowhouses were taken by shops selling artistic and elegant commodities. Sherbrooke got its cosmopolitan flavour since these shops served the regional population of all ethnic groups. Clubs and restaurants grew along the cross streets. The apartment structures continued to be the most popular form of residential unit. Many tall apartment buildings rose on the slope of Mount Royal above Sherbrooke Street.

The educational activities grew to a great extent above Sherbrooke Street. The growth of McGill University, and many other institutions on the east, created an institutional belt. McGill University campus occupied the large area in the centre part and brought a very pleasant atmosphere with its landscape. These educational institutions and many others all along Sherbrooke Street, such as l'Ecole des Beaux-Arts, Sir George Williams University, Ecole de Polytechnique, and many others, have brought it a unique character.



SHERBROOKE STREET – MONTREAL

FIG. 69

The tendancy towards ecological segregation of functions and ethnic groups of similar or related nature is a notable feature of the present central area of Montreal. The groupings of various land use activities on Sherbrooke Street are part of these environmental areas within the central area, and create diversity in the character of the street. (Fig. 71) The establishments related to these activities on Sherbrooke Street,,in the course of their operations are engaged in several systems of activities and connected with other establishments in the central area, in each of their systems, by linkages. The changes in all these systems of linkages explain the changes in the activities on Sherbrooke Street.

Locational maladjustment of landuse activities that is observed on Sherbrooke Street is directly related to that of the central area, and is mainly the result of obsolete streets and buildings, heavy concentration of activities and traffic; and the imperfections, lags and obstacles to the free operation of the economic forces that established land use patterns in the central area.

In the evolution of the central area of Montreal, Sherbrooke Street has been an attraction for establishments of various types and this has led to the growth of tall structures all along its length. But the retail activities have tended to grow in a linear fashion occupying the lower part of buildings including the old mansions, row-houses, and apartments. (Fig 72)

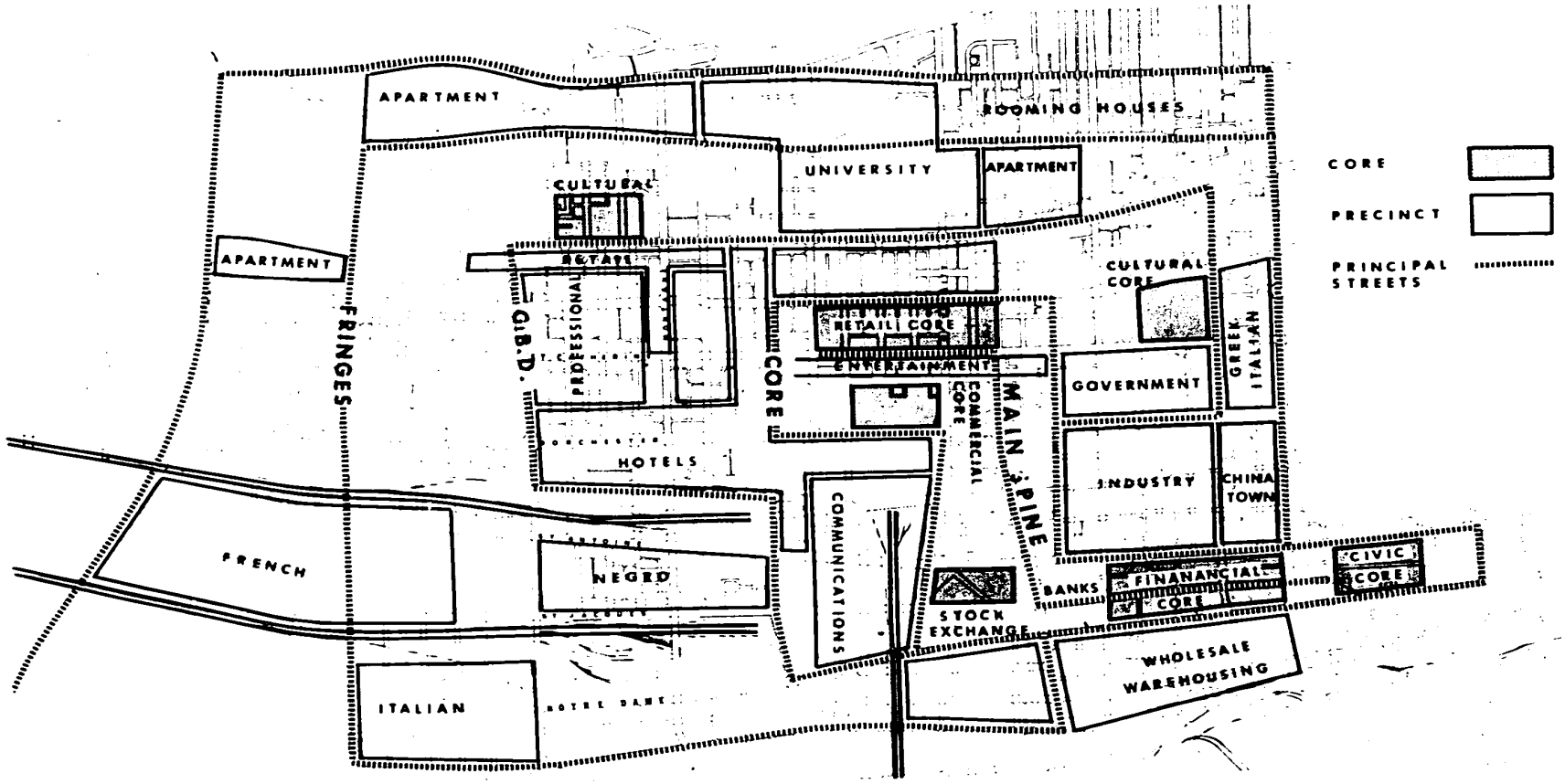
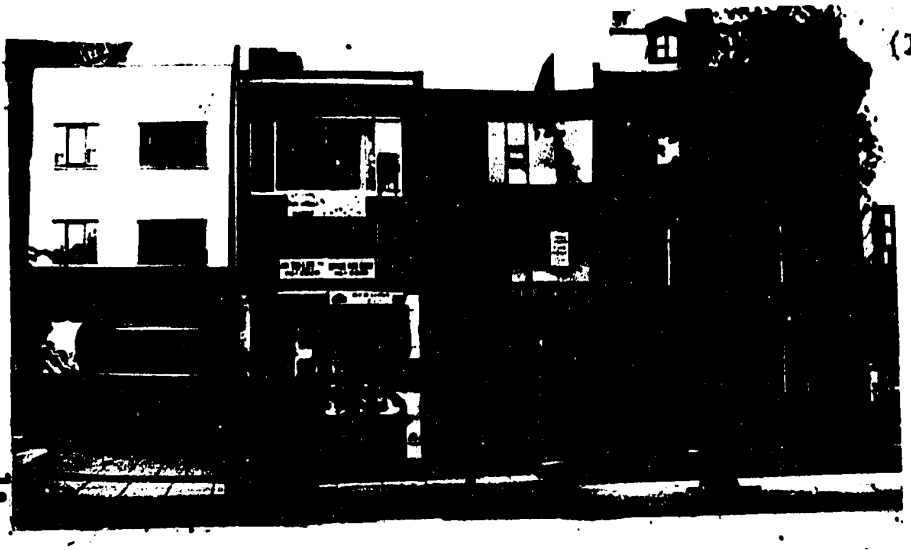
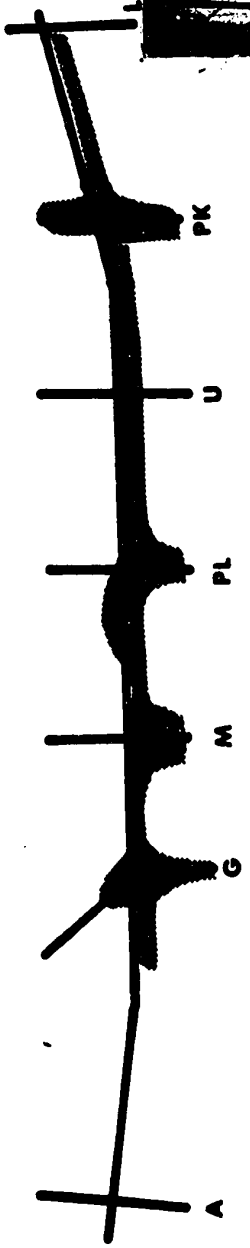


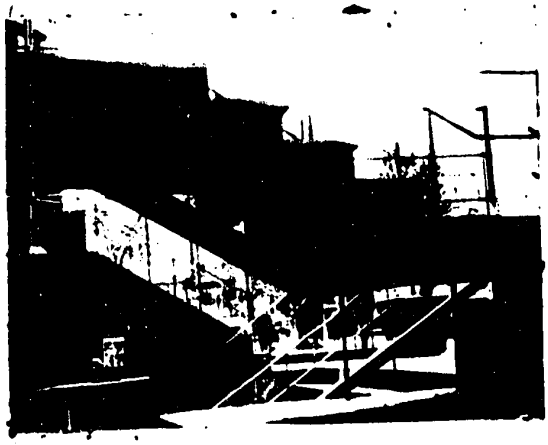
FIG. 71 THE PRINCIPAL STREETS AND THE CHANGES IN THE ECOLOGICAL PATTERN



A



Shopping activities have occupied the old rowhouses and partially or fully renovated them. This has created a new facade to hide the old look of the street block(A). These shopping activities are carried at different level from the sidewalks and create two level shoppings.(B,C)



B

C

SHOPPING

FIG. 72

B. FORM

An integral part of landuse activities on Sherbrooke Street is the physical accommodation of buildings. These buildings are visible manifestation of the systems of activities on the street. These buildings enclose Sherbrooke street, creating a variety of spaces within them. These two main factors define the form of the street. In Fig. 73 we have presented a schematic diagram of the buildings and spaces that are present on Sherbrooke street.

The internal and external activities of each establishment determine the shape and location of the buildings. Both these requirements are imperfectly fulfilled at best, by the combination of buildings and locations which constitute the total supply of available accommodations in the existing buildings on Sherbrooke street. Each of these establishments differs in its internal and external activities, and this explains the change in the form of Sherbrooke street.

With the growth of commercial activities and the reappearance of residential activities in tall apartment structures, the form of Sherbrooke street has changed a great deal between University and Guy. Along the south side we have a monotonous and rigid growth of tall structures right to the property

lines, on the north side we have the combination of existing institutional and residential buildings and newly developed tall structures. This northern side of the street has been of special interest, considering its variety of forms and their architectural treatment, and has been presented in Fig. 74. It gives us an idea of the changes in land use activities and buildings in this part of Sherbrooke street.

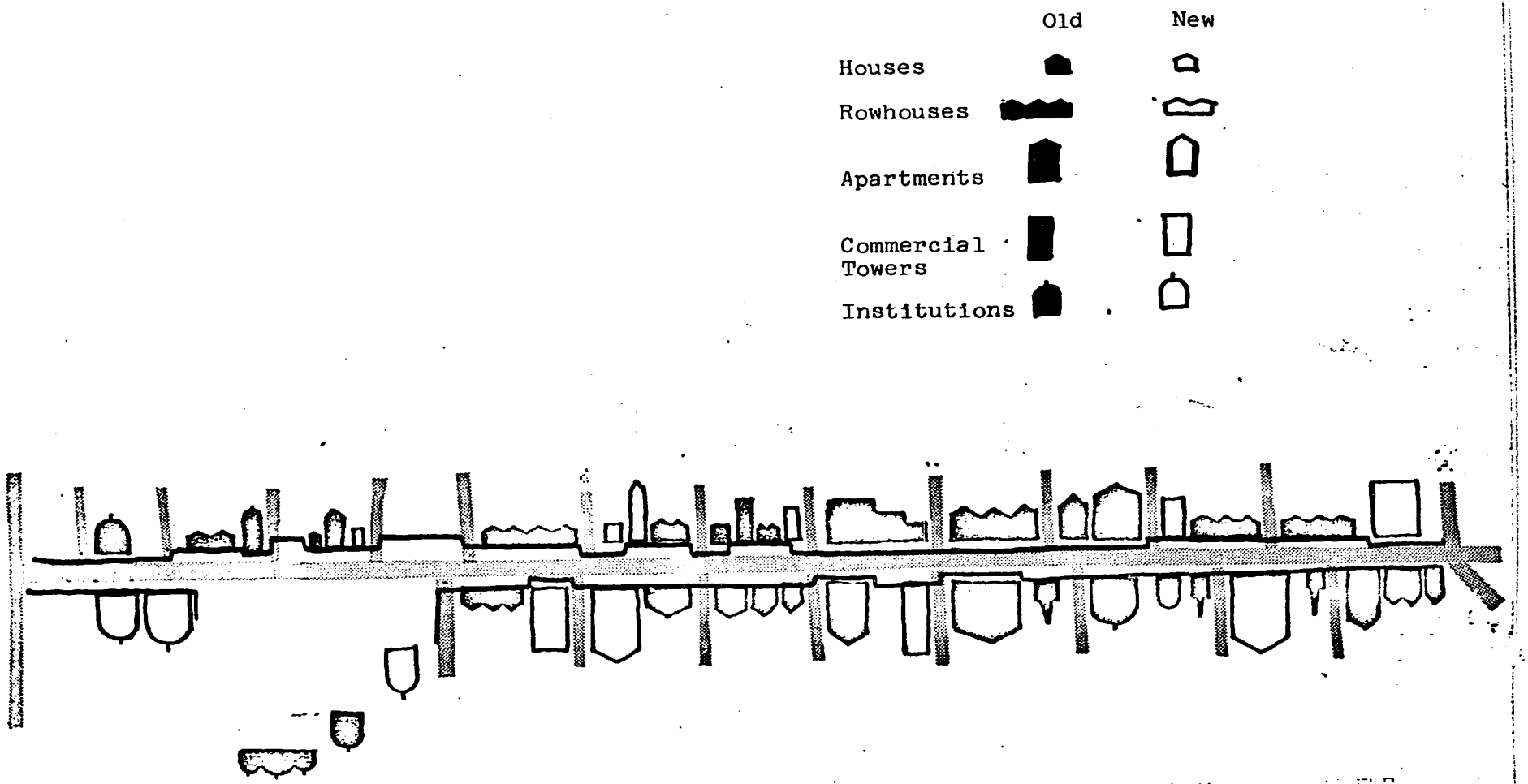


Fig.73 . Form of Sherbrooke Street from Guy to University Streets.

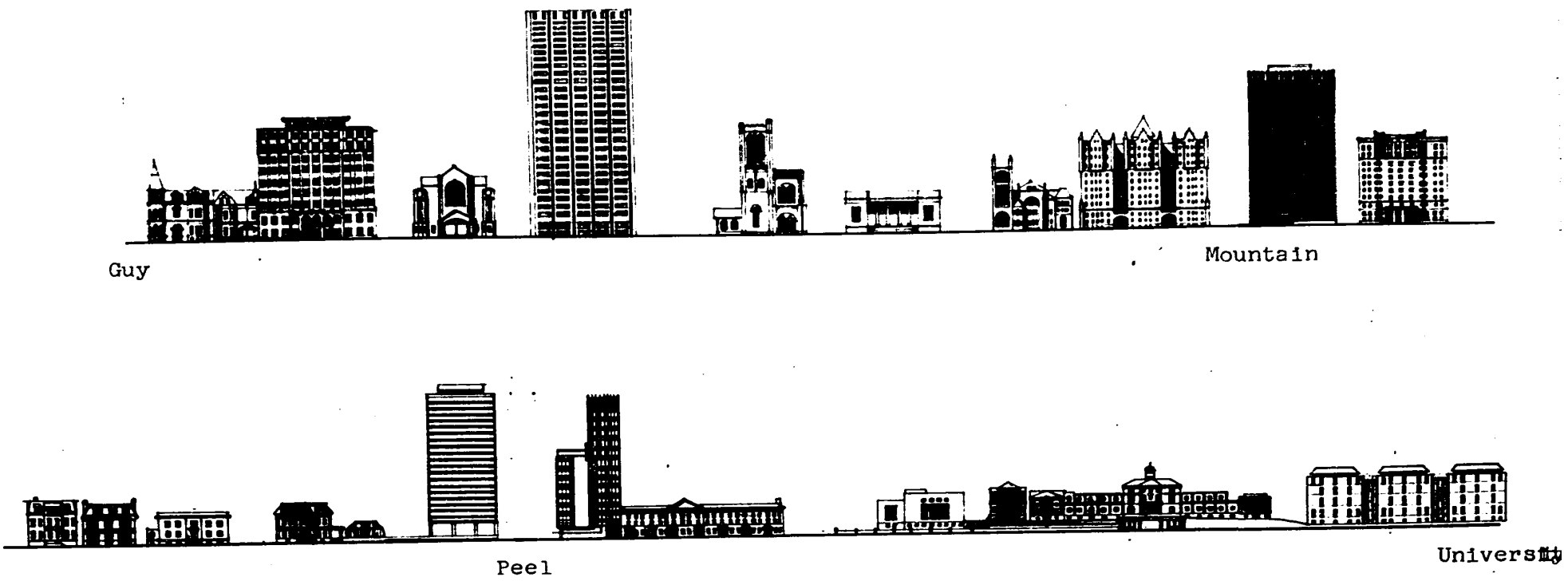


Fig.74 Form variety on the north side of Sherbrooke Street

Figure 74 also shows that when redevelopment of the street takes place in buildings that are large in their horizontal length, a rigid form is created, monotony of both forms and spaces destroys the existing character. In comparison when buildings are physically separated at short distances, with their individual form and architecture this allows space to flow freely with apertures all along the length of the street. It gives scope to achieving a pleasing combination of old and new buildings.

Although the development of buildings on Sherbrooke street has a pleasing variety, their growth has taken place in a linear fashion on the established building line. The set-back spaces that are created in the arrangement of buildings on the street has been presented in Fig. 75. The lack of variety in spaces is due to the linear growth of tall buildings without any relation to the spaces on which they front. The growth of tall structures on both sides of the street has narrowed it and created dark enclosures at various intervals. (Fig. 76)

We now realize that the future development of buildings should take place not linearly along the street, but rather in a cellular form. This could be possible by the consolidation of the lots, in which a comprehensive development

can be carried out in relation to the spaces that will be created and the existing buildings on Sherbrooke street. It will enable us to achieve a pleasing variety in the character of solids and voids.

The development of central activities grew on the south side of Sherbrooke street and built their structures right on the property line. This created the rigid wall all along the sidewalks and narrowed the street.
On the north, the old structures still preserved their front yards with the beautiful gardens giving setting to the buildings(A)

A

SETBACK SPACES

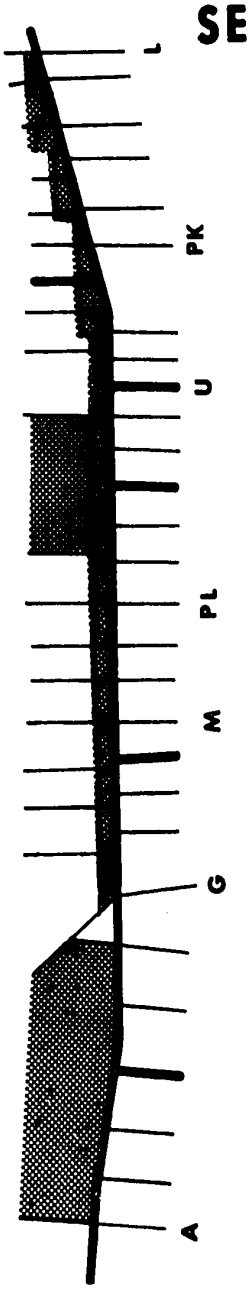
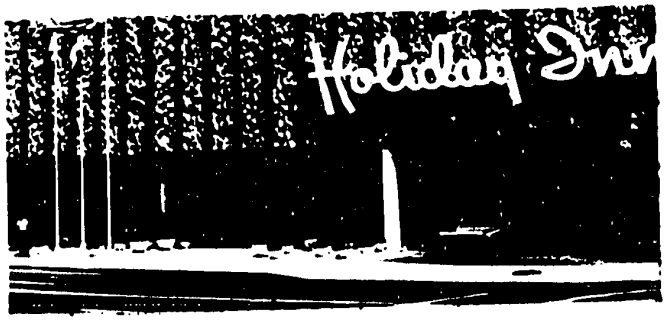


FIG. 75

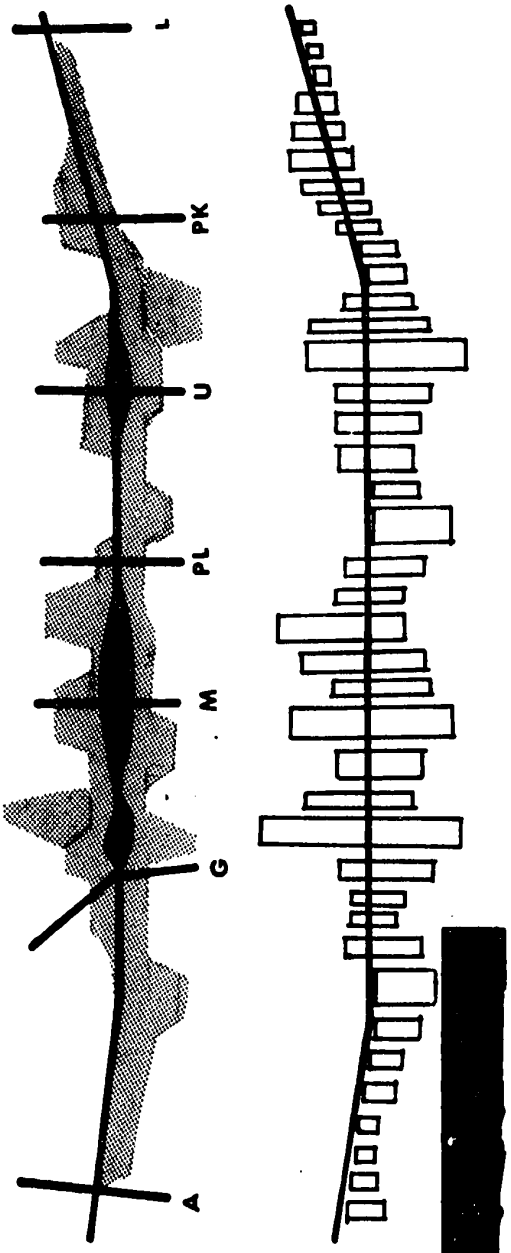
B

The present development has given consideration to front spaces facing Sherbrooke street. The buildings have been setbacked from the sidewalks and the front spaces merge into the sidewalks to give extra width .The structures lifted on Pillors give continuity to street as a space.(B,C)



C

TALL STRUCTURES AND LIGHT



The tentlike skyline created by the tall structures has darkened the street at certain intervals(A). Many tall structures are rising up to cover the sky from the street.(B)

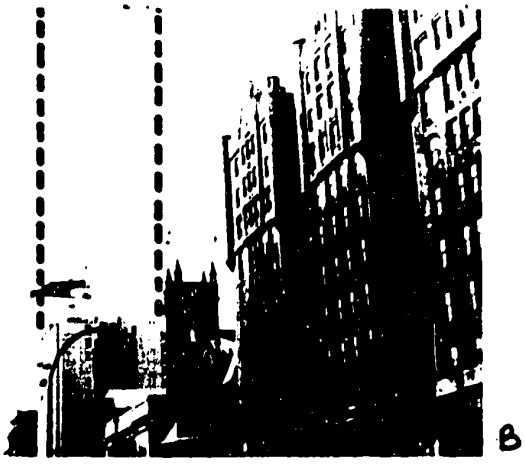


FIG. 76

In dealing ;with the visual aspects of the form of Sherbrooke street, the visual image of various elements on the street has been taken into consideration and a diagram has been prepared. This diagram considered the image of Sherbrooke street in relation to the central area. (Fig. 77)

Sherbrooke street acts as a predominant path in the definition of its visual form. The intersections of important cross streets are nodal points. The landmarks that are imageable are grouped around these nodes, and some other landmarks have no image qualities. On Sherbrooke street the image of McGill University Campus as a district is prominent, while the rest of the surroundings have no group forms and image qualities. Sherbrooke street beyond Guy and Park streets is vague in image since it is not an intensive zone of activities. Various new buildings, with their distinct form and architecture, have been able to improve the image quality of the street.

In considering the physical qualitits, the structure of elements around Peel street has a rigid character, while the part of the street between Guy and Mountain has free structure of the elements (but they are interrelated.)

The various elements that are closely related to the form of Sherbrooke street have been considered in a series of diagrams. (Figs. 78-81)

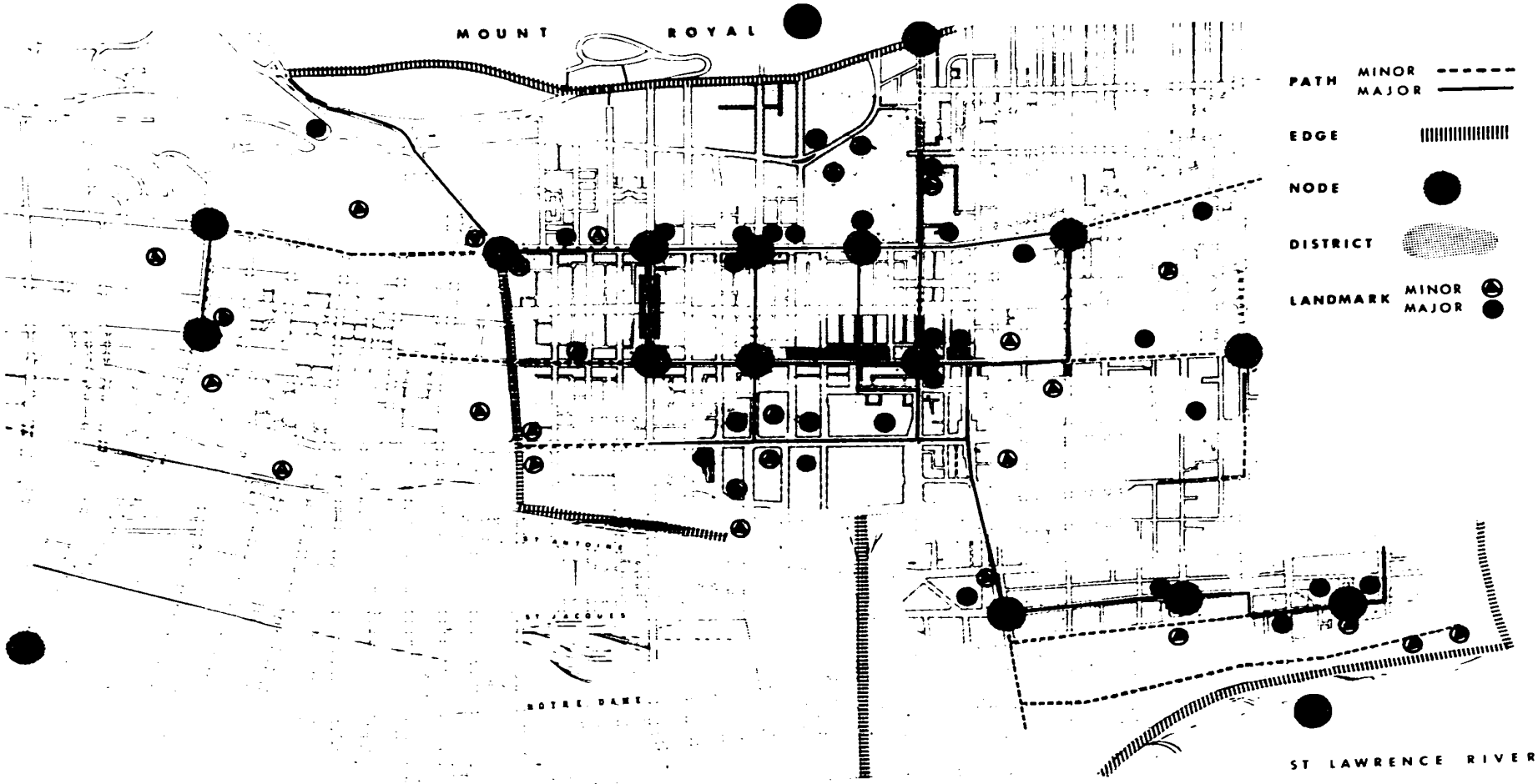
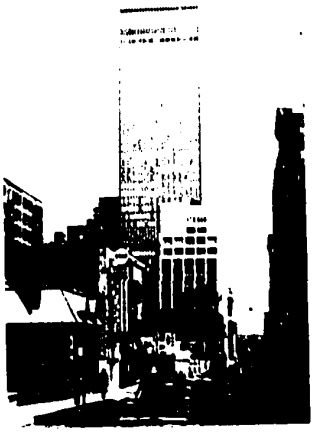


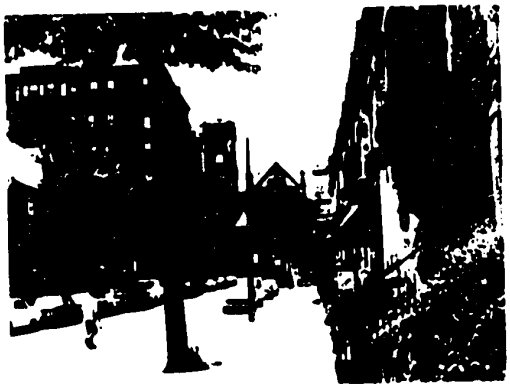
FIG. 77 VISUAL IMAGE OF THE STREETS IN CENTRAL AREA MONTREAL

A



B

Since Sherbrooke street runs on the undulations of Mount Royal, it obtains the vistas of the nature and other beautiful elements of the city. (A,B).



C

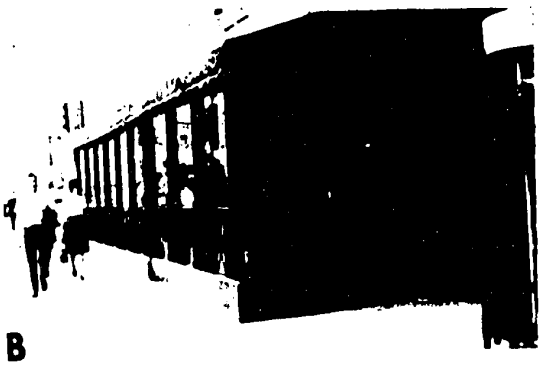
Many important structures on Sherbrooke street are facing the cross streets and become the object of vista for those streets, (C.D)

URBAN VISTAS

D

FIG 78

A



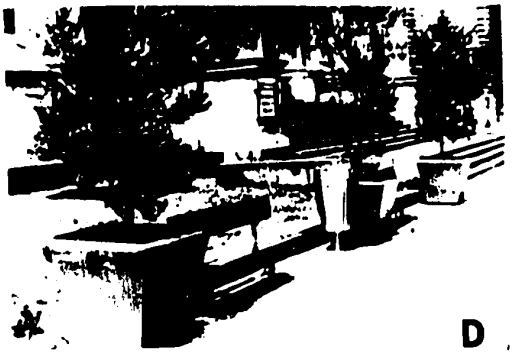
B

C

The variety of public and private activities have brought the ancient monumentality on Sherbrooke street.

The various elements such as sculptures (A,F),Kiosks (E),street furniture groups (D) and sidewalk cafes(B,C) have given it a pleasant character.

STREET FURNISHINGS AND ELEMENTS



D

E

F

FIG. 79

LANDSCAPE

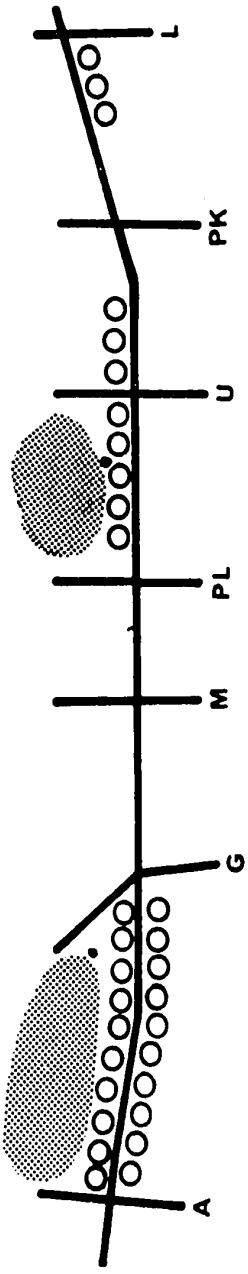
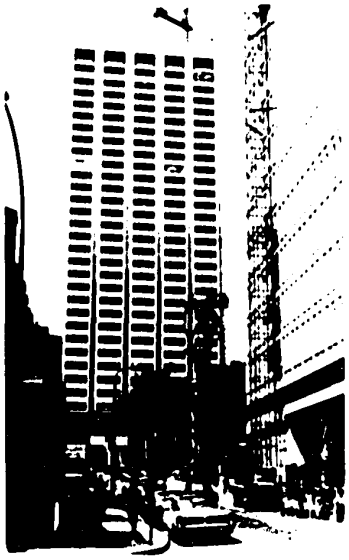


FIG. 80

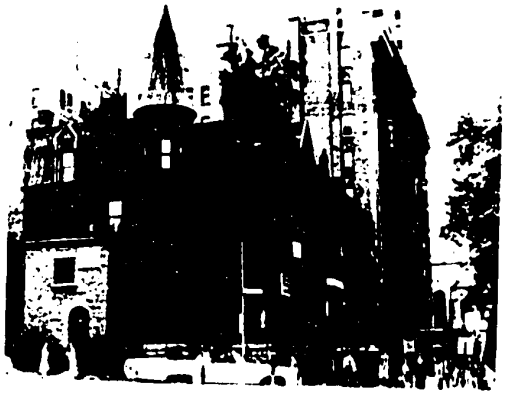
A



B

Sherbrooke street is the street of architectural collection. On it we find early French castle style stone houses(C), the Georgian style apartments(A) and various other styles. The stone and brick technichs of the old days, stand with the modern glass and steel structures(D) and prefabricated structures(B).

This gives Sherbrooke street variety of architectural styles, materials and constructions.



C

ARCHITECTURE

D

FIG. 81

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C. TRAFFIC

It has been observed that Sherbrooke is the only street in the central area that extends far into the suburbs. This characteristic has given it importance as a main artery for central area bound traffic, and also for through traffic. Figure 82 shows the regional location of Sherbrooke street, with its western extension as Highway No. 2.

Traffic volumes outside the central area are depicted in Figure 83. Various urban arteries, such as Pie IX Blvd. and Decarie, carry large volumes of traffic to and from the central area, crossing Sherbrooke street at frequent intervals. The street thus serves as one of the major east-west distributors in the Island traffic system.

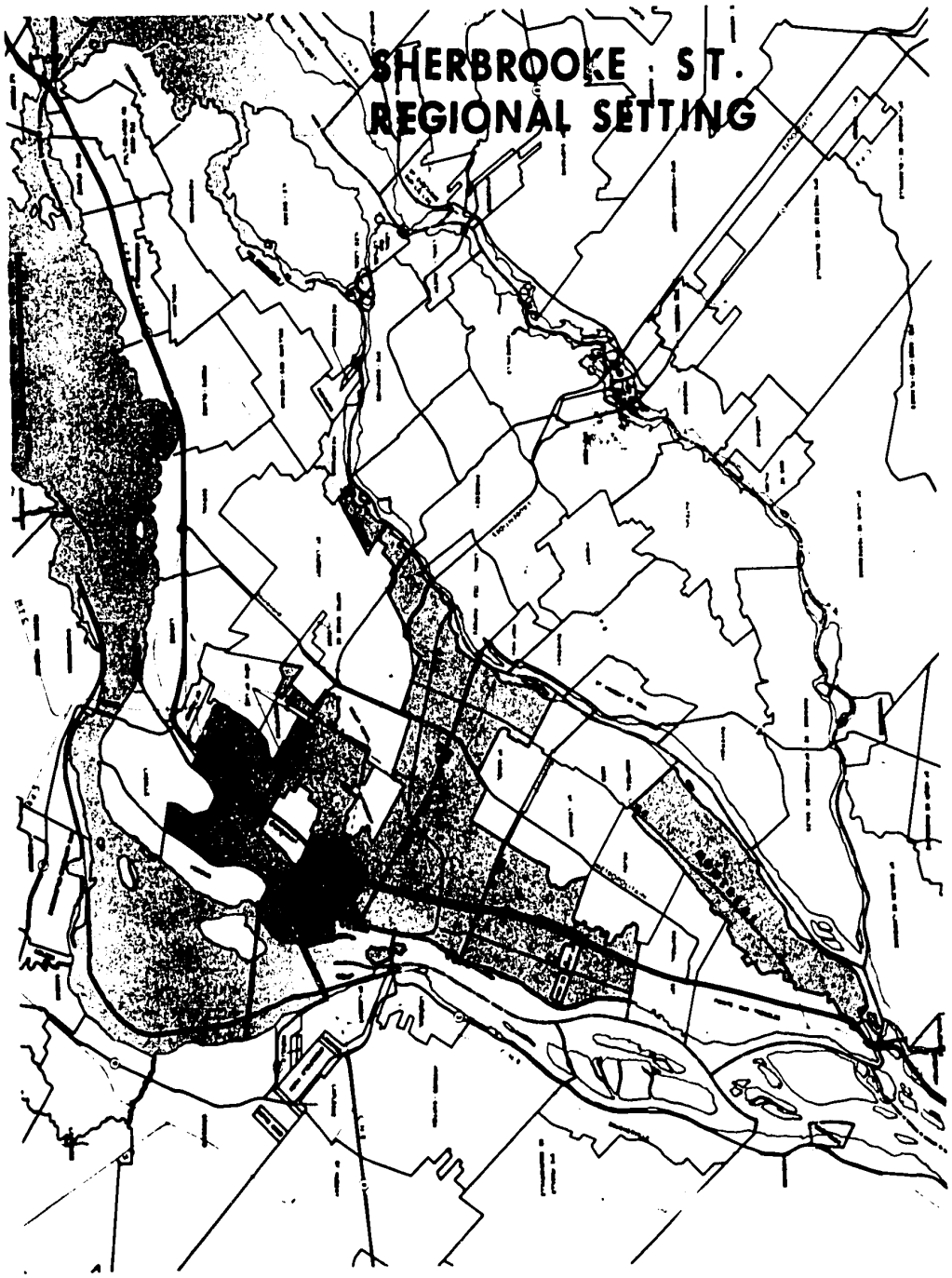


Fig.82

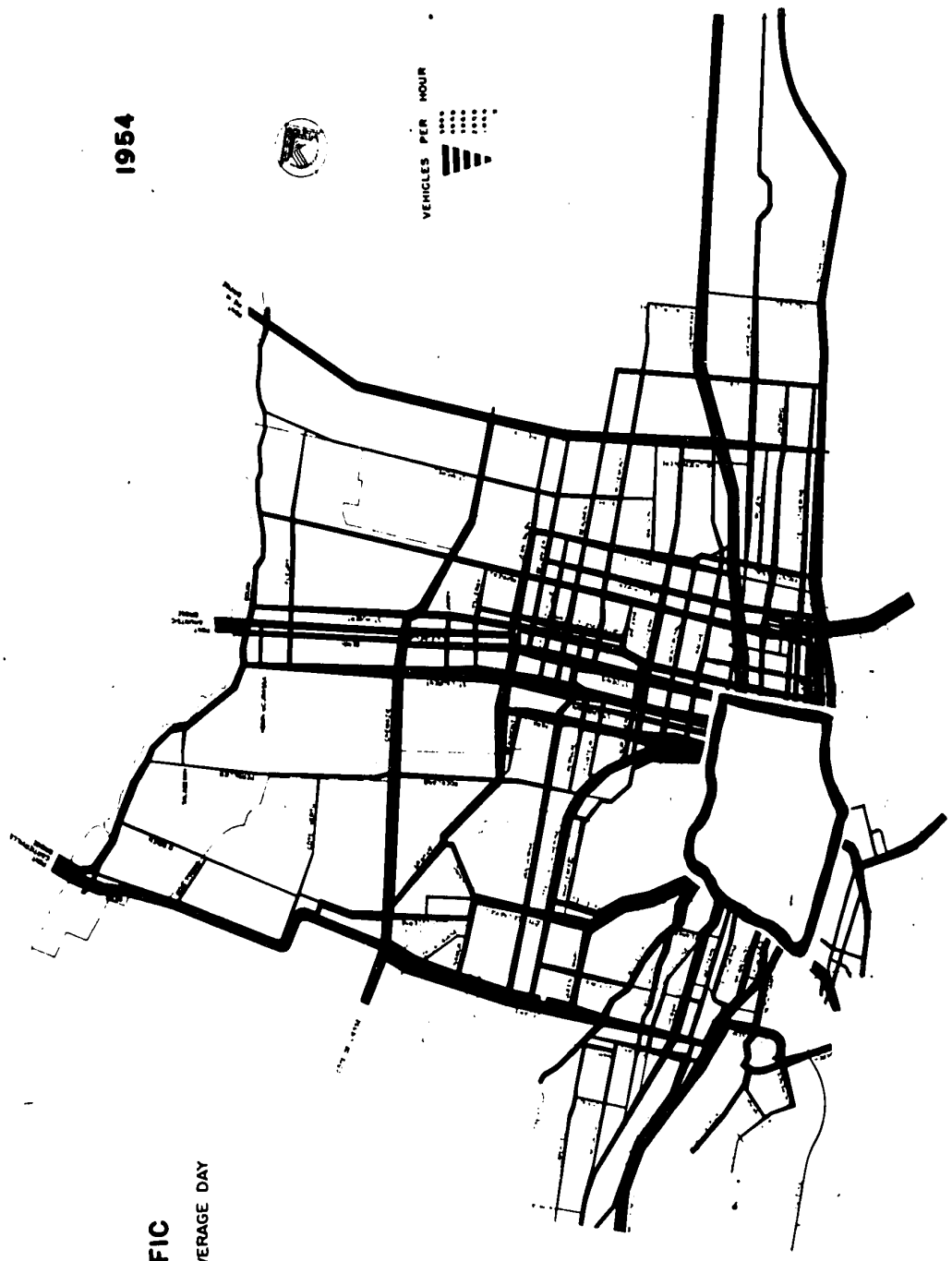
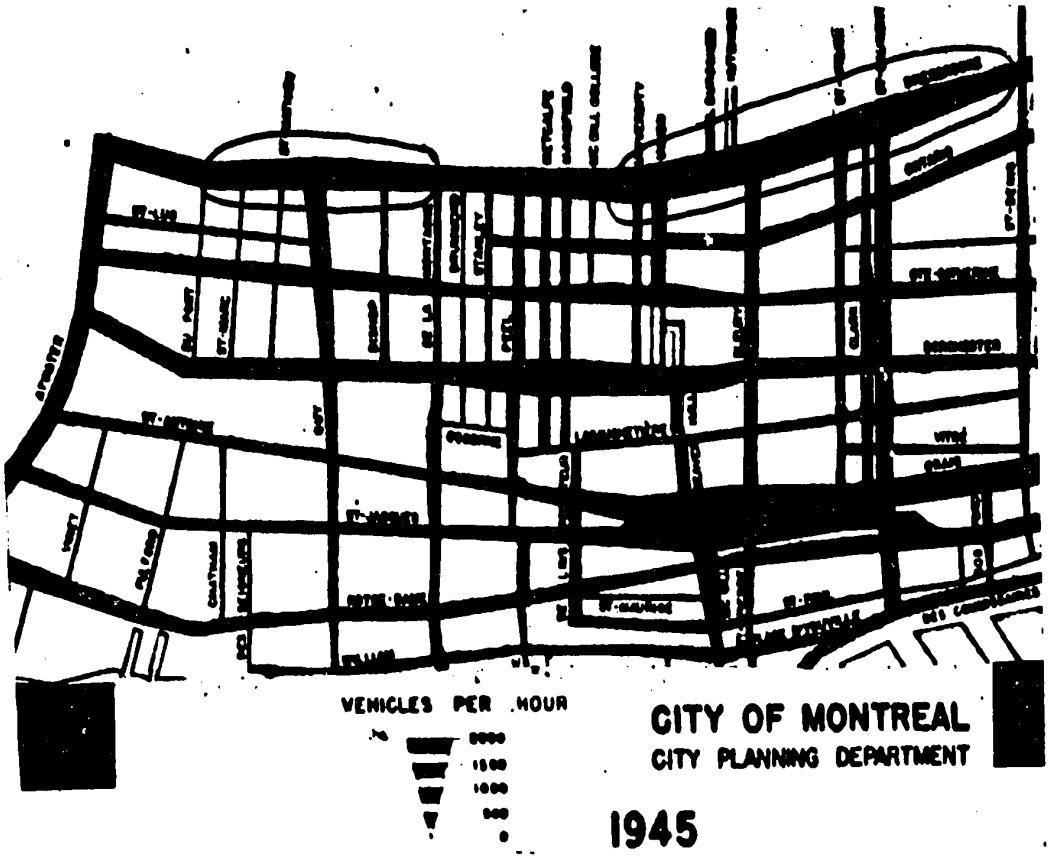

1954
VEHICLES PER HOUR
VOLUME OF TRAFFIC
OUTSIDE THE CENTER OF THE CITY
AT THE PEAK HOUR OF AN AVERAGE DAY
5:00 PM TO 6:00 PM

Fig.83

Within the central area (Fig. 84) there have been a great number of changes in the amount of traffic that Sherbrooke street has carried. When public transportation was introduced Sherbrooke street was the major artery for buses, carrying the largest volume of traffic. By 1945, with the increased demands of automoblies, Sherbrooke street still retained this character, carrying about 1000 to 1500 vehicles per hour. In the latest survey (1958) we notice a change: Dorchester Boulevard has become the main traffic artery in the central area, and even though Sherbrooke still carries over 2000 vehicles per hour, its proportionate share of total traffic has decreased. In spite of this, its character as a through traffic artery has been maintained.

On the street itself, however, we can observe an uneven distribution of traffic. Volumes are heaviest between Guy and University streets since Atwater and Cote des Neiges add their north-south streams to the east-west flow. Also within the central area, the large number of intersections created by the outdated physical structure, has caused hindrance to the smooth flow of traffic on Sherbrooke Street. Some results of the steepness of these cross streets are shown in Figure 85.


VEHICLES PER HOUR
CITY OF MONTREAL
CITY PLANNING DEPARTMENT
1945

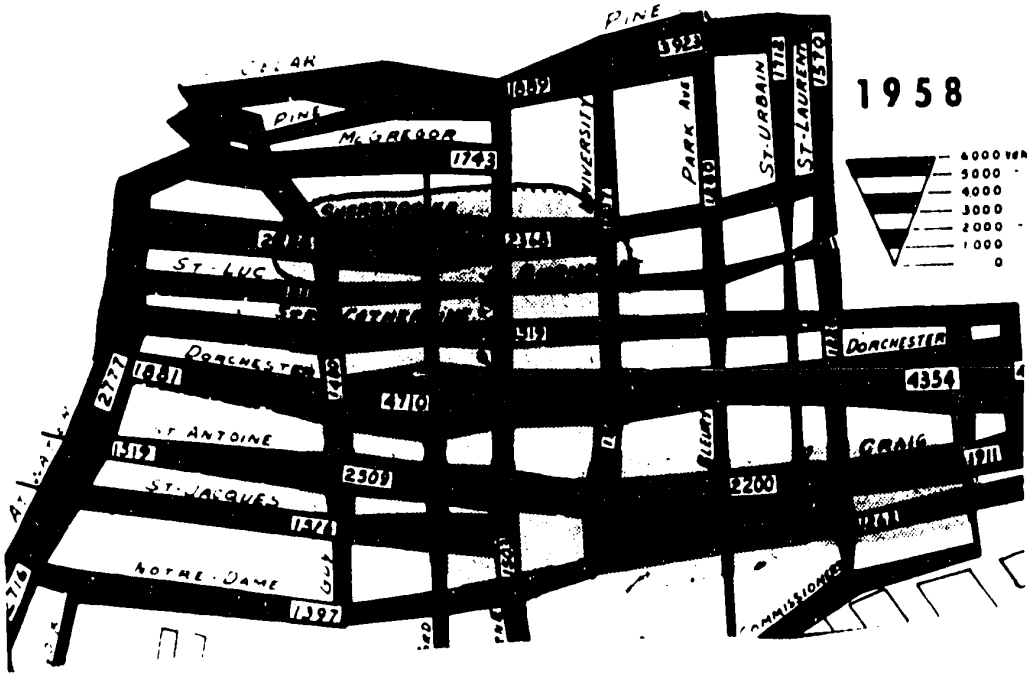
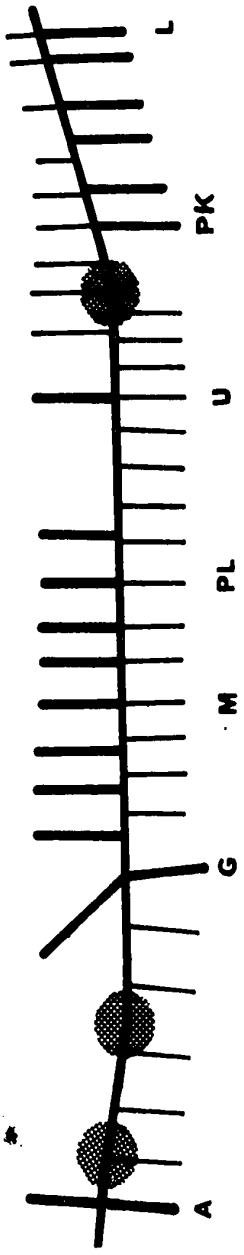

PINE
MCGREGOR
PARK AVE
ST-URBAIN
ST-LAURENT
ST. LUC
DORCHESTER
ST ANTOINE
ST-JACQUES
NOTRE-DAME
GRAIG
1958

Fig. 84

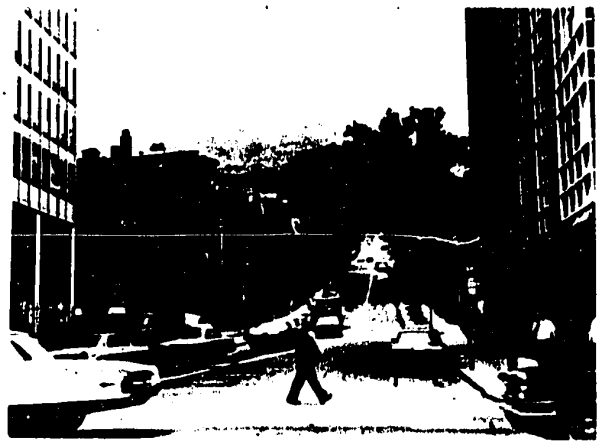
Sherbrooke street, in its run, takes winding form and creates enclosures at each turn. Enclosures reveal one phase of the street and conceals the other, and thus bring an excitement in the movement. Moreover, it breaks the monotony of the straight length (A)

A



Streets crossing Sherbrooke street run straight against the slope of Mount Royal. Their excessive steepness create difficulties to traffic and pedestrians, not only in winter(B) but also in summer (C). Sherbrooke street acts as landing to these steep streets and the junctions become spots of accidents.

B

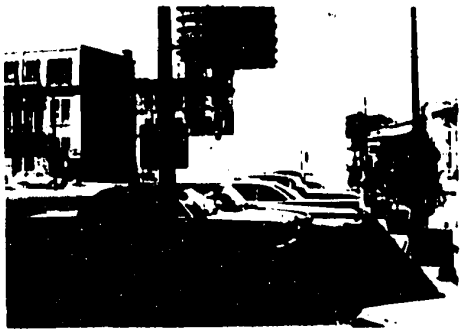


C

ENCLOSURE, STEEP STREETS FIG.85

The heaviest traffic volumes within the Central area are closely related to the distribution of traffic generators- the major land use activities such as retail, hotel, commercial activities. These are shown in Figure 86. We have also noted that most recent trends indicate a growth of these traffic generators on Sherbrooke Street. (Fig. 88) The response of parking places to the heavy traffic demands is shown in Figure 87. Note that in comparison to the concentrated pattern of the generators, we have a very dispersed pattern of the parking places. Sherbrooke street, occupying fringe location with respect to the central area, is surrounded by a large number of these parking places, and on-street parking facilities. (Fig. 88)

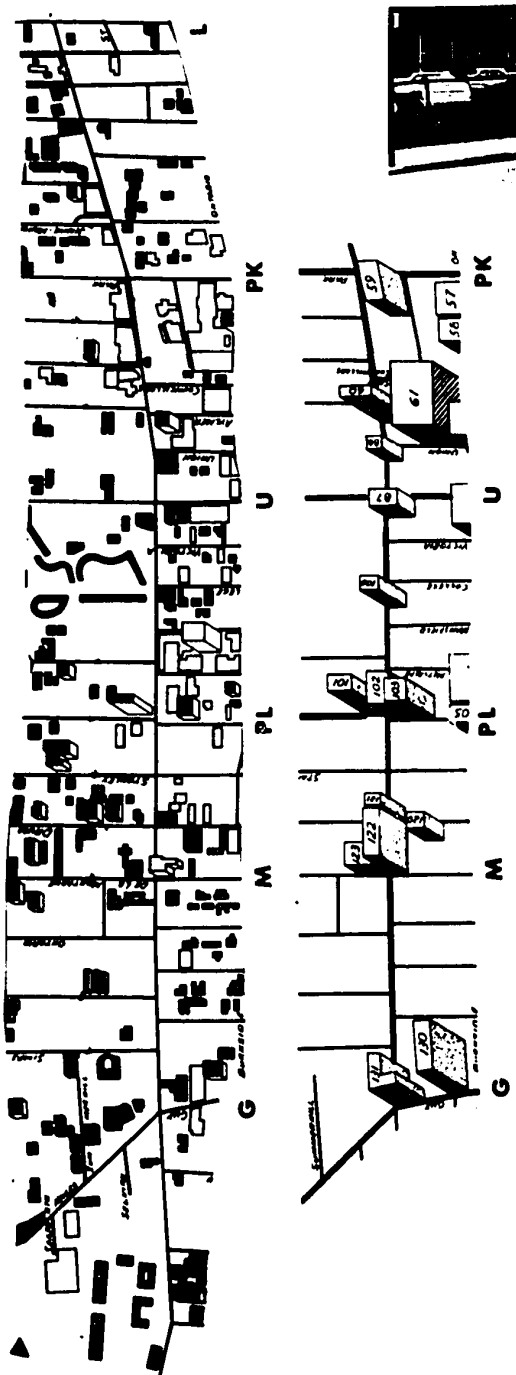
A



B

PARKING

The increase of traffic generators has created variety of car parking on and around Sherbrooke street(B). The north area of Sherbrooke street has most of the streets taken by streetparking (C). Too many crossings disturb the steady flow by too many signals (D). Car service stations interupt the pedestrian and traffic movement(A).



C

D

FIG .86

FIG. 87 TRAFFIC GENERATORS AND THE STREETS

FIG. 88 PARKING PLACES AND THE STREETS

VILLE DE
MONTRÉAL
SERVICE DE LA CIRCULATION

D. LAND VALUES

Data for land values was obtained for the most recent date available--1965--from the Assessor's Department of the city. These are expressed as dollars per square foot per lot. Since the lots vary greatly ; in size, we have not been able to draw up an index of value per square foot frontage, but we have expressed in an approximate way these values. (Figs. 89-91). Institutional areas have been exempted from this analysis, since land values are difficult to obtain for them and they refer, for example, to the value for the whole area of such an institution as McGill University. There is also an inherent difficulty in that there is a time lag in the adjustment of land values to actual buildings. On the three diagrams the building heights are also indicated, and in some cases the land values refer to lots before the new structures were built.

Figure 89 refers to the area between Atwater and Guy. We notice a feature that is common to all diagrams here: the land values increase significantly at intersections. In this area the values are highest near to Guy Street, and in general there is a decline towards Atwater. Similarly there is a more constant building height away from Guy, reflecting blocks that have all been developed with similar

building types; mainly older apartment houses.

The area between Guy and University streets is the most interesting one in this analysis. We have earlier noted that this is the area of heaviest traffic concentration along Sherbrooke, and in general the average land values are highest for this section. Figure 90 shows that the values increase at intersections again, and that they are highest at the intersection of Sherbrooke and Peel. The latter reflects the outgrowth of central area activities towards the west and along Sherbrooke, since the peak land value intersection for the city is at Peel and Ste. Catherine street ($90. per square foot.) On the south side the higher land values are reflected in the newer structures, often tall apartments such as Cantlie House, or in the established hotel buildings such as the Ritz Carlton. Low buildings are often associated with older properties that are still being held for gain by their owners. There is a noticeable drop in values east of Mansfield, and this may be associated with the proposed redevelopment of the area by Eatons. On the north side of the street land values are generally lower but high points are again associated with new apartment buildings such as Port-Royal or Le Cartier, or hotels such as the Royal Embassy, or older prestige structures such as the apartments near Mountain street. In general we may

notice that high land values at intersections create sequences of building bulks, resulting in the changing skyline of the street.

East of University (Fig. 91) we again notice a general decrease in land values towards St. Laurent street. The higher values are found near to University as far as Aylmer: this is reflected in the newer apartment buildings and motor inns found here. There is a greater difference noted in building heights in comparing north and south sides of the street. In general there are very low structures on the south, associated with obsolete rowhousing. On the ;north side there are a number of new apartments which have grown around the St. Urbain intersection. It does not seem that the degree of relationship between land values and building heights is as great in this section as in Figure 90, possibly because the area is undergoing some very rapid changes, and there are a greater number of parking spaces here. Also the average lot sizes are much smaller here, compared to the large lots in the central section.

From an examination of these three diagrams it seems that land values reflect many of the elements we have described earlier in trying to define the character of a street, but they are also themselves an important force in determining amoung other things, the form of buildings on a street.

24 18 12 6 0 0 6 12 18 24
Guy
Côte des Neiges
SHERBROOKE STREET
SHERBROOKE STREET
twaler
24 18 12 6 0 0 6 12 18 24

Fig.89

(225)
24 18 12 6 0 0 6 12 18
Guy
Mountain
Peel
McGill College
University
SHERBROOKE STREET
SHERBROOKE STREET
24 18 12 6 0 0 6 12 18 24

Fig.90

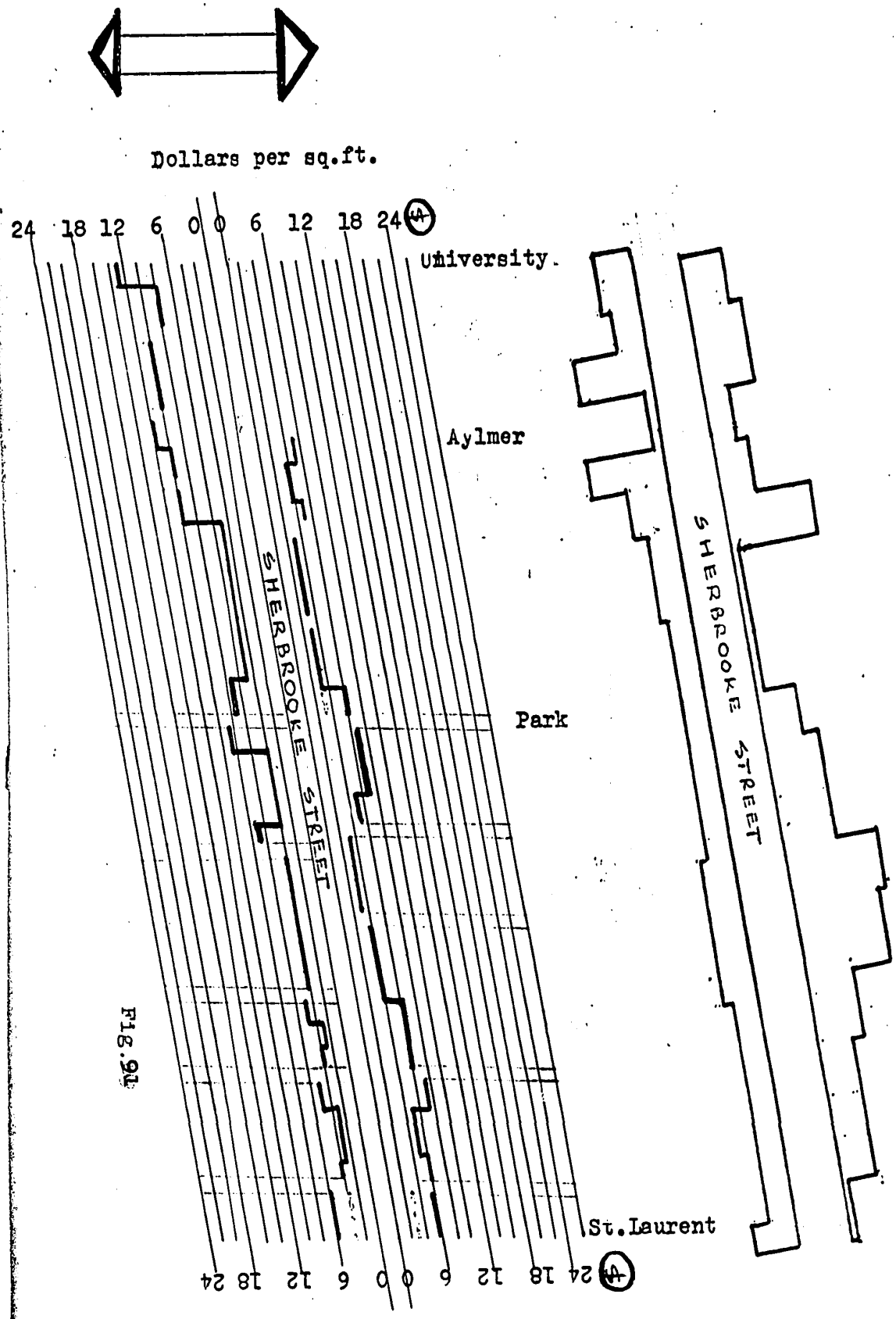

Dollars per sq.ft.
24 18 12 6 0 0 6 12 18 24
W
University
Aylmer
SHERBROOKE STREET
Park
St.Laurent
E
24 18 12 6 0 0 6 12 18 24
SHERBROOKE STREET

Fig.91

E. CHANGE

As a result of the many forces that affect the character of Sherbrooke street we have been able to designate the present stage of preservation, obsolescence and redevelopment observable in the buildings.

These observations are recorded in three diagrams (Fig.92-94) which show how these conditions change from place to place along the street.

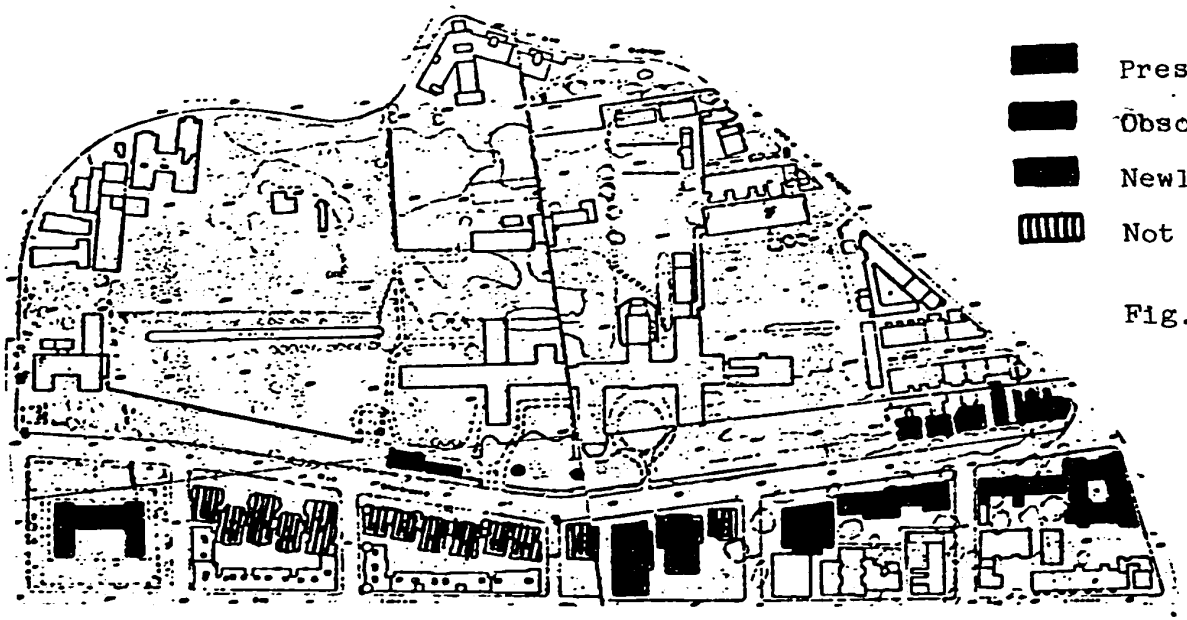


Fig.92

This part of Sherbrooke street between Atwater and Guy streets has not changed. Most of the buildings on the south side are old apartment houses that are still occupied for the same purposes. Other buildings that are preserved are of educational and religious character, The whole area on the north side is likely to change in the near future, since the zoning laws have recently been changed.

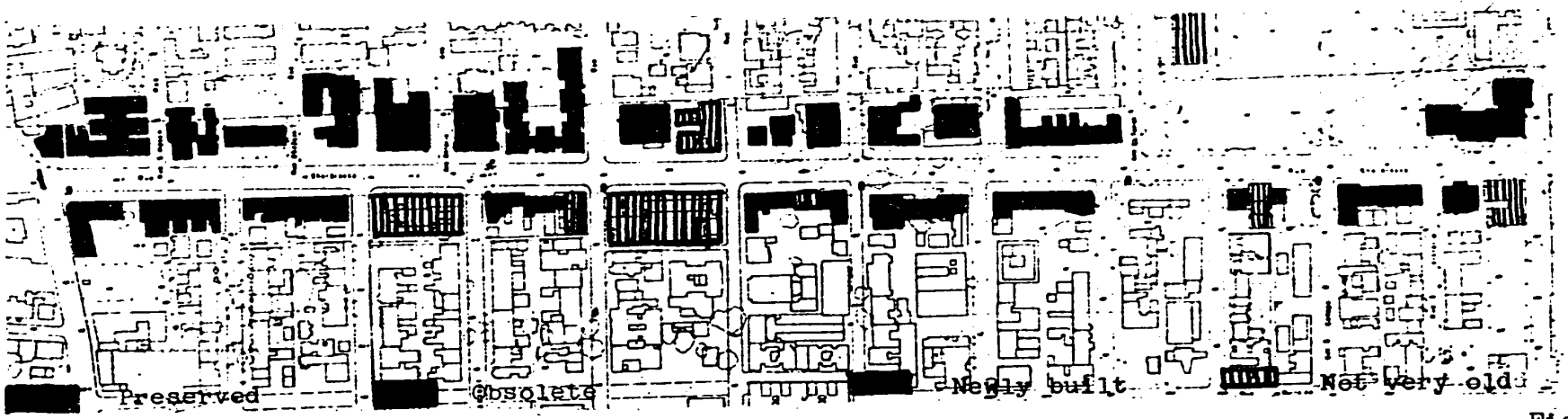


Fig.93

In this part of Sherbrooke street between Guy and University streets, we observe a great variety of old and new buildings standing side by side, Many of the old buildings that are preserved by private organizations have been clustered in groups. The buildings that belong to McGill University, churches and some beautiful apartment houses are the preserved buildings in this area.

Obsolete buildings are mainly existing on the south side, and are of the rowhouse variety that have been deteriorated by frequent conversions and remodelling. Many of these buildings have been held to gain extra profit when the site is ripe for large development. Redevelopment has taken place in piecemeal fashion on both sides of the street. These new buildings are of residential and commercial activities such as apartments, hotels, bank buildings, etc. The large area around McGill College Avenue has been cleared for the future redevelopment project of T. Eaton and Co. Ltd.

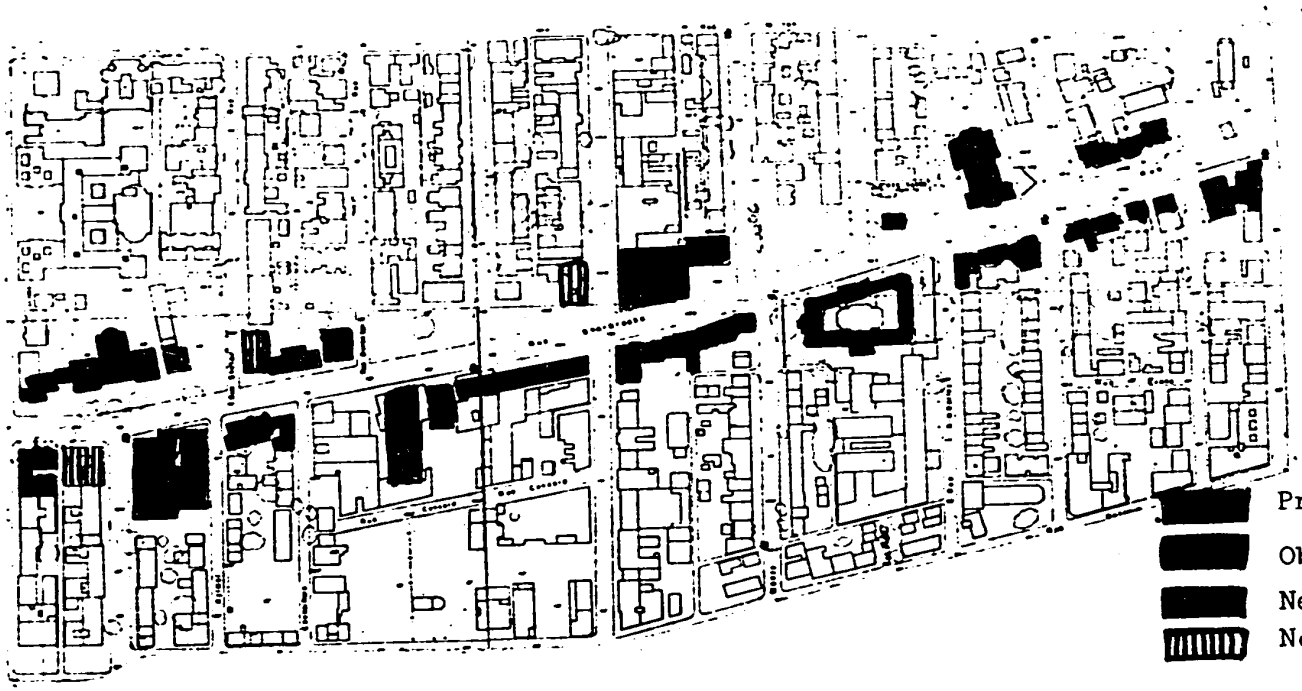


Fig.94

This part of Sherbrooke street between University and St. Laurent streets has not changed much to the east of Park Avenue. On the north side many properties have been cleared for parking purposes by the city. On the south side many of the row-houses have become obsolete by frequent conversions, but are still retained by the owners for economic reasons. On the north, the old mansions have been occupied by clubs and institutional societies, and thus have been preserved. Also on the north, tall apartment structures are growing, to change the skyline. In future this area might develop rapidly after the various projects around it, such as Place des Arts and Eatons, have been completed.

F. THE FUTURE

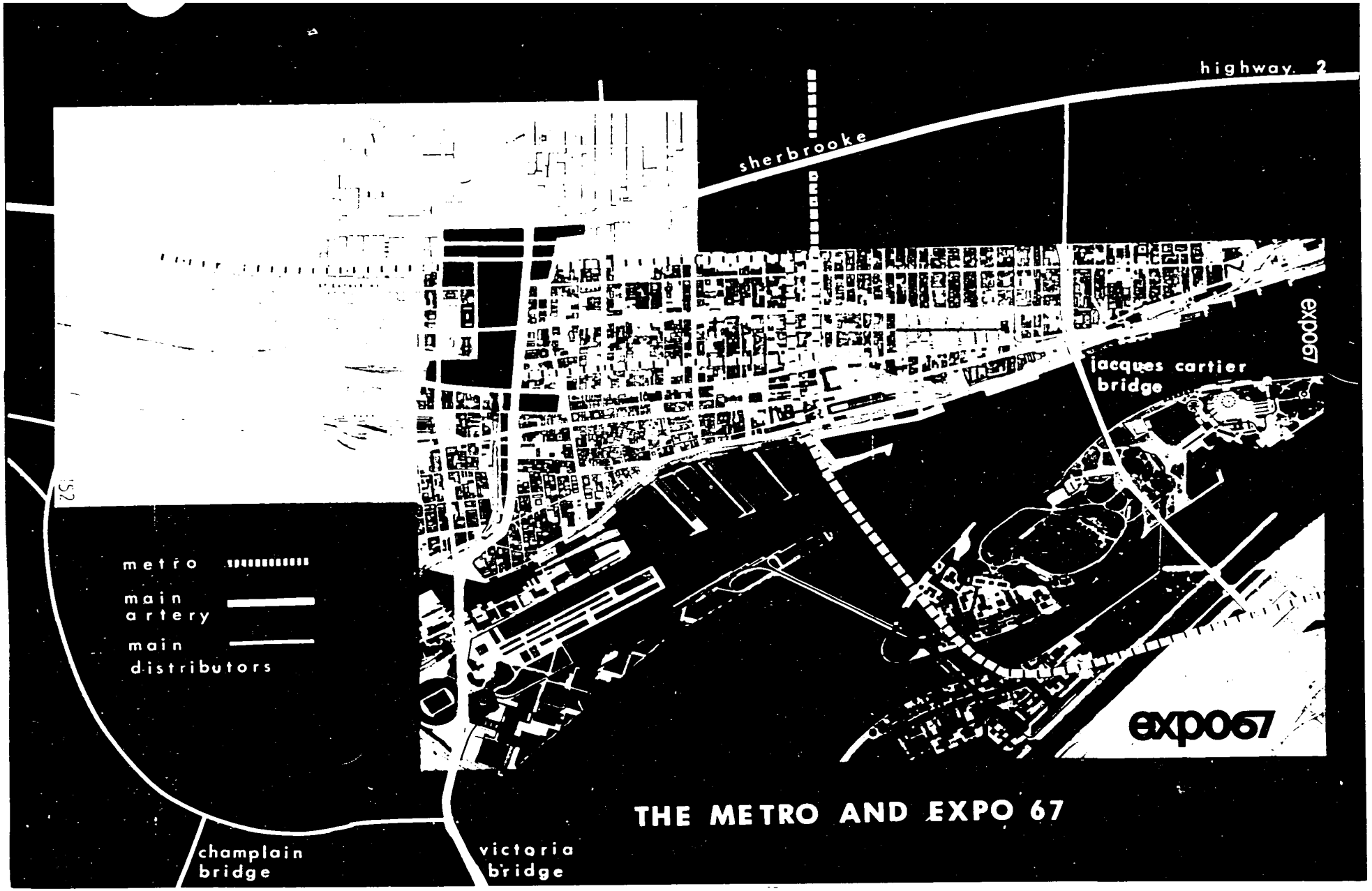
We have seen that many changes in the central area have affected the forces operating to produce the character of Sherbrooke Street. In the future there is likely to be an even greater pace of change with the introduction of the Metro Subway System, and be improvements to traffic flows as a result of Expo '67. (Fig. 95)

In Part Three, the concept of "traffic architecture" was described. The creation of large intograted complexes of retail and commercial activities, pedestrian malls as an expression of the separation of vehicles and shoppers, underground shopping malls (such as that proposed for this area stretching from Place Victoria to Sherbrooke street) connecting parking terminals, are all examples of "traffic architecture". Figure 96 shows some of the projects for Montreal's central area.

These improvements in the traffic system should result in less through-traffic in Sherbrooke street, since it would use the new east-west expressway; the subway should alleviate many congestion problems within the central area. Together with the effects of the McGill College pedestrian mall on Sherbrooke street, there should be a proportionate increase in the pedestrian element on the street. Possibly this

might lead to increased street furnishings and landscaping elements. Further tall structures on the street will also increase the levels of pedestrian movements.

Public controls should be well aware of the changes in the forces that affect the character of Sherbrooke street, and should aim to create an environment that reflects the best elements in the present character, and the future needs of increased pedestrian movements.



THE METRO AND EXPO 67

Fig. 96

THE CHANGING CHARACTER OF STREETS IN CENTRAL AREAS

SUMMARY AND CONCLUSIONS

SUMMARY AND CONCLUSIONS

In the growth and development of cities in the past, street patterns changed from a simple linear form to the grid iron and geometrical form, depending on the social, economic, political, and recently tecnological factors that operate at each period. These changes in the street pattern have influenced the organization of central activities and buildings in relation to the streets and spaces. This relationship defined the form of the street in each period, which changed from early processional avenues, to arcaded shopping streets and tree-lined avenues, to the present traffic arteries or highways. Also the function of the street changed from an access, and a public recreational space, to the present function of carrying vehicular traffic. These changes in character of streets in the past have mainly taken place in the basic elements: landuse, buildings and movement of pedestrians and vehicles. This change is more pronounced on the principal streets in central areas.

In the evolution of central areas there was both a modification of long-established functions and additions of new functions. Such functional development called for new forms, for modification of forms previously established. Form has an image quality: each form with its image quality identifies itself from the other forms, and the resulting changes from place to place defines the identity of the street. Forms and functions generate movement on the street. Traffic is directly related to the organization of land use activities and their physical accommodations in the buildings. The changes in the land use and building floor space explain the variation in traffic volume on the street. These three basic elements are influenced by some specific forces such as centripetal and fugal forces, land values and public control on private properties. The result of these forces is the change which manifested in the form by preservation, obsolescence and redevelopment.

Recently various concepts were developed in organizing the streets in central areas in relation to central activities and buildings, so as to solve future traffic problems and to achieve an environment mainly orientated towards pedestrian comforts, needs and safety. These concepts have been observed not only in the schemes of redevelopment in central areas, but also in the plans for new cities. In all these concepts we find that traffic has been accepted as a neces-

sity for the sound functioning of the central area, but the pedestrian environment has been separated from it.

In the evolution of the central area of Montreal we found that the central area activities have grown in a northerly direction to occupy land around Sherbrooke Street. Various factors that influenced the changes in the central area have also caused changes on Sherbrooke Street. The latter is simply one element in the city's grid, and has long been part of the physical structure of the street pattern of the central area. Centripetal forces within this area have operated to produce the heavy concentration of activities and their floor spaces. This has caused heavy traffic flow on Sherbrooke Street since it is the only artery that links the central area with the outlying suburbs.

Its significant character as a traffic artery has attracted various kinds of central activities to Sherbrooke Street. The existing institutions and the recent growth of apartment houses and commercial activities such as hotels, banks and professional firms have given it a diverse character. Shops have developed in a linear manner, often in the form of boutiques or art galleries, again creating a variety. This diversity has been explained in terms of the buildings that accommodate these activities, including old rowhouses that have been converted, etc. On the street the variety of old

and new elements has strengthened the form qualities.

With the increased use of automobiles Dorchester Boulevard has usurped Sherbrooke Street as the main traffic artery for the central area. Even so Sherbrooke carries a very large volume of through traffic, and we have observed the variations in intensity when major north-south routes crossed the street. Associated with this heavy traffic use and central area activities we find a large number of parking spaces in the area around the street. Land values are highest on average between Guy and University streets, and decrease to both the east and the west. At intersections we find peaks of land values and these are often associated with more intensive land uses and higher buildings. Such forces as unearned property incomes have been observed in the retention of obsolete rowhousing. As a result of the many forces acting together to produce changes in the character of Sherbrooke Street, there are a large number of buildings representative of the notions that we described as preservation, obsolescence and redevelopment.

Recent concepts of "traffic architecture" can be observed in an embryonic form on Sherbrooke Street. These are largely due to the increased growth of central area activities, especially underground shopping promenades, as a

result of the construction of the Metro subway system and the highway improvements related to Expo '67. These most recent changes indicate that Sherbrooke Street may be increasingly used as a pedestrian environment, and that public controls over the future character of the street should be aware of the necessary environmental standards. This may take the form of increased embellishments, landscaping, etc.

In a broader sense a better classification of environmental areas in the core of the city would lead to a classification of street of hierarchical order. The great frequency of crossings might be eliminated by building a ring road around the central area, with main parking terminals connected by an internal public transportation system. This would also tie in with the Metro system. With these safeguards Sherbrooke Street might fulfill its role in serving the needs of increased pedestrian use. Further, the street would be thought of as a design axis linking nodes in a reformulated system of groups of like activities, and preserved groups of significant buildings. New developments might be restricted to large groups of buildings on lots consolidated from present small property holdings. The resulting group image would add to the character of the street. This would enable us to create a variety of solids & voids by relating the group forms to the street.

Public control and a concern over the future environmental standards of the street should be oriented towards retaining one of the most important elements in the character of the street--its diversity. This diversity is a part of the vitality of Sherbrooke Street: undoubtedly making it one of the most interesting streets in the city.....

"Streets and their sidewalks, the main public places of a city, are its most vital organs. Think of a city and what comes to mind? Its streets. If a city's streets look interesting, the city lobks interesting; if they look dull, the city looks dull."

Jane Jacobs

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