ABSTRACT

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TITLE OF THESIS	"The Development of Air Rights and the Search for Building Space".
DEPARTMENT	Architecture
DEGREE	Master of Architecture

The object of this study is to examine Urban land in public ownership, especially the one-third now used as roads, and to suggest means of using the Air Space over this land for the revitalisation of decaying areas.

It is suggested that by employing the legal device of Condominium, air rights can become real property, to be occupied, bought and sold by a diversity of interests, spreading over both public and private sectors of our urban economy the costs of redevelopment, and allowing a new flexibility in urban design that does not exist if the road system continues to sharply define the city block.

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PINE, MICHAEL.

"THE DEVELOPMENT OF AIR RIGHTS."

THE DEVELOPMENT OF AIR RIGHTS AND THE SEARCH FOR BUILDING SPACE.

MICHAEL PINE.

Department of Architecture.
McGill University, Montreal.
March, 1970.

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SECTION 1

ORIGIN AND INTENT OF THE STUDY

There has been a growing interest in the commercial use of Air-Rights for the last decade, although the enormous potential of this space in the resolution of our present urban difficulties has not been fully stated.

In the last few years many proposals have been made for the development of Air-Rights. This has been called "The Big Air Grab"[1], and of course, it is.

The development of Air-Rights along major transportation routes is an expensive and involved undertaking, but it is no longer possible to speculate on the viability of the process, as this has been clearly established in many studies in Europe and the U.S.A., however, the injection of this previously unused building space into existing Urban situations remains to be examined in all its aspects. Not the least of these is the use of this space in the provision of family housing and in the Urban Renewal process.

The rôle of public and private interests in the assembly of sites and in the construction process needs to be clarified, and since the magnitude and cost of what is often called Megastructure may preclude the involvement of a single owner or corporation, means of multiple-ownership need to be examined to produce partnership situations.

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1. Time. May 7, 1968.

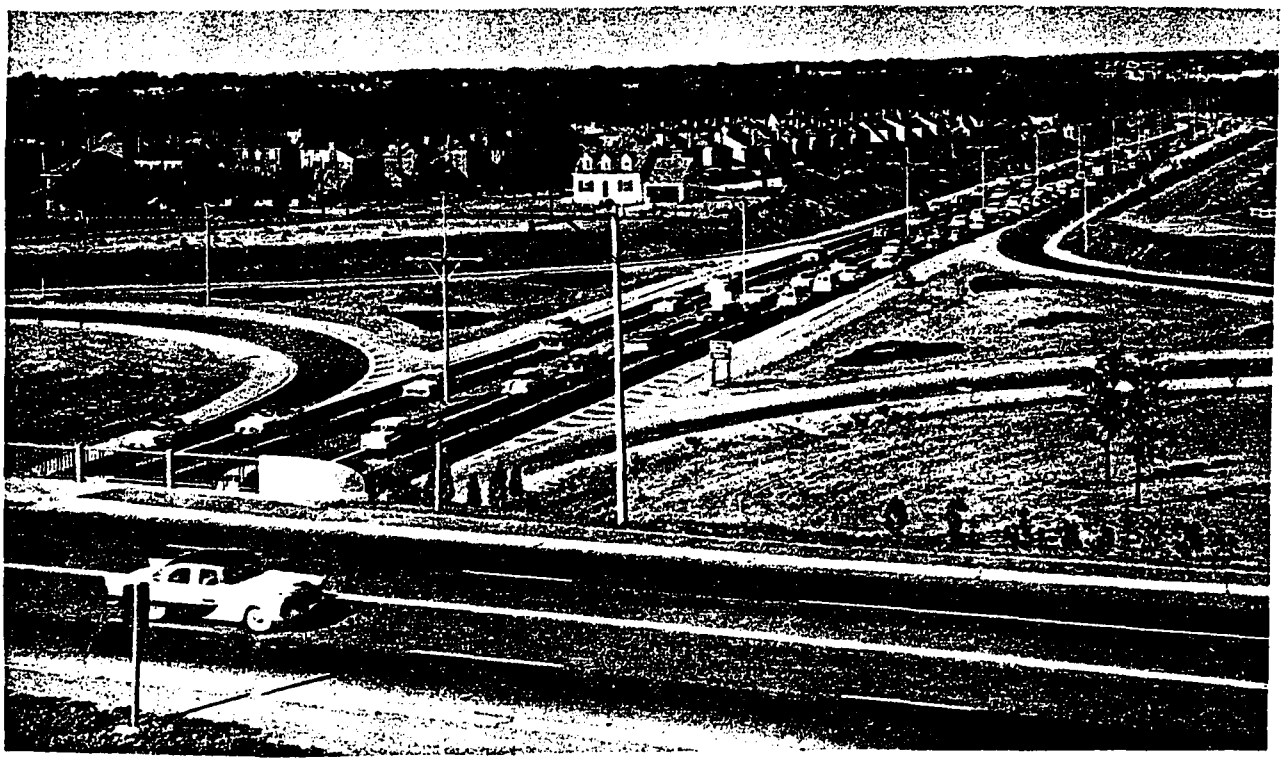
The object of this study is to examine the significance of the reintroduction of Air-Rights as space for further urban development, the legal means for permitting this development, and the consequences of this action.

There is a growing realisation that urban land is a scarce commodity and that"low-profile" uses such as roads, canals, schools, parking lots and so on, are not compatable with new urban activity. Improper uses of land in the urban centres restricts development, blocking rational growth and forcing it into limited patterns. The continuing growth of our cities in low density suburban settlement patterns not only aggrevates the mechanical problems of waste disposal, transportation and communication of all sorts, but is limiting the enjoyment of our own environment by establishing the paradoxical situation where people are attracted to the Urban Centres, but must live outside them.

The value of urban land to the community is not necessarily related to its cost, but to its relative scarcity at any cost.

This study proposes to examine ways of encouraging the more effective development of central areas by utilising Air-Rights, and avoiding the necessity for massive purchase or expropriation, clearance and relocation of citizens and enterprises that is a characteristic of present

Urban Renewal [1], both public and private, by studing the <u>one third or more of the area of our cities that is at present in Public Ownership, used at ground level only and which is evenly distributed throughout the urban fabric - the road system</u>.



1. During the preparation of this study, the findings of the (Federal) Task Force on Housing and Urban Development were published (Queen's Printer, January 1969). While their findings are not necessarily those of this author, they had access to a great deal of relevant material, and will be quoted where facts, rather than opinions are given.

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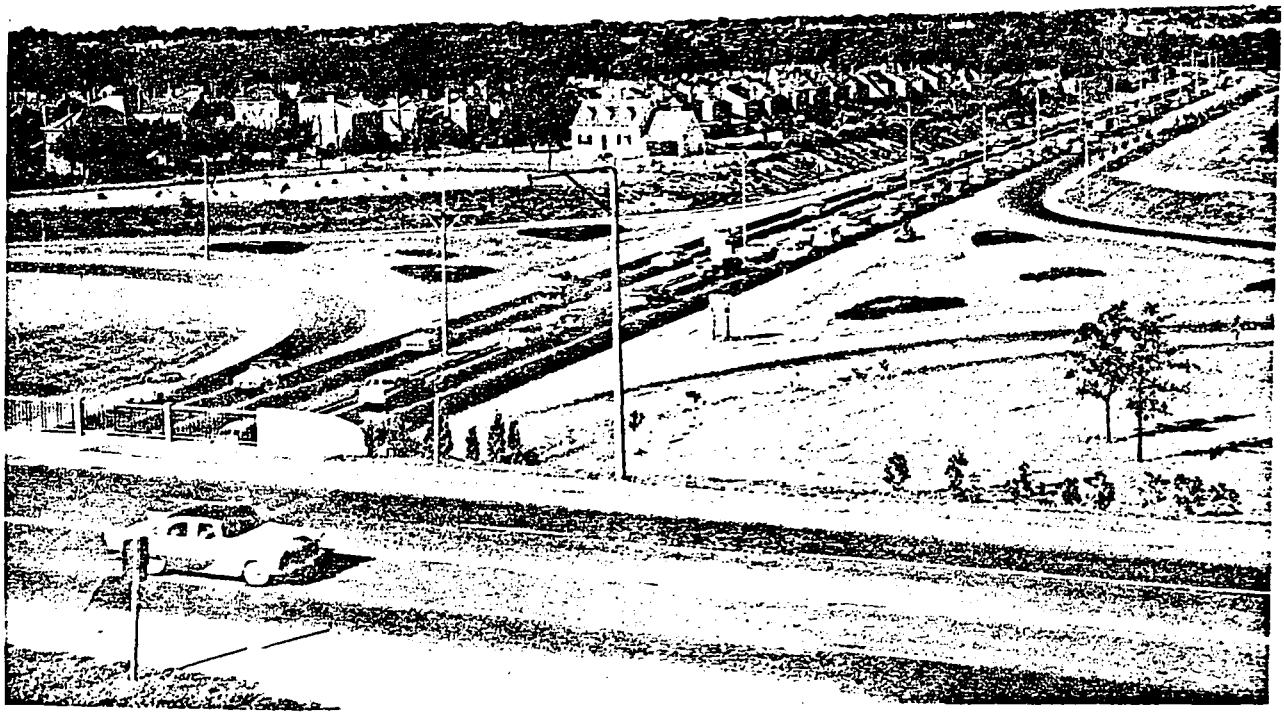

1. During the preparation of this study, the findings of the (Federal) Task Force on Housing and Urban Development were published (Queen's Printer, January 1969). While their findings are not necessarily those of this author, they had access to a great deal of relevant material, and will be quoted where facts, rather than opinions are given.

SECTION 2

The City and the Nature of Change

> 'We must imagine the first human beings
> as having been born in Asia of Orang-Utans
> and in Africa of Chimpanzees, not being
> born as apes but as full-fledged human beings'.
>
> A. Schopenhauer
> Parerage and Paralipomena

The idea that man adapted to the changing conditions of his environment, working his way through successive ice-ages and natural catastrophes, slowly changing over prolonged periods was long held to be true.

This notion was being discounted even before Darwin, and both Kant and later Schopenhauer tentatively discussed the probability of mutative leaps in animal development which we now accept. Where these accidents of nature were better suited to the environment than the parent species they survived, bred and finally dominated.

Between these quantum bursts of activity, new species developed in an evolutionary way until a new mutation introduced a further species.

What applies to the species appears also to apply to their habitat, and human settlements are no exception. Cities have historically undergone long periods of peace terminated by revolt, external attack, the rise of tyrants, or other spectacular modification.

This is not an evolutionary process but mutation, with a new species of city suddenly emerging to dominate and ultimately replace the old.

Our last major quantum leap was probably the invention of mechanical transportation which broke down the limitations of animal propulsion. Whether the machanical engine was powered by steam, electricity or petroleum is of little consequence, as these are evolutionary developments of the idea. The aberrant germ was the concept of non-animal locomotion.

The evolutionary sequence of mechanical transportation systems may be stated briefly as:

a) Steam power Fast, long distance transportation of goods and people by railway broke down the traditional isolation of cities, and made movement between widely separated communities common place. Production of goods could be economically concentrated at favourable locations and dispatched to outlying consumer areas.

b) Electrical power The electric streetcar and train were the mechanisms for handling the new concentrations of population, and permitted the development of dormitory suburbs separated from the workplace and factory.

c) Oil power The economic concentration of industry and production, and a growing technological ability gave rise to relatively wealthy urban populations and a personal transportation facility in the automobile.

Although this means of transportation is designed for operation without rails or external sources of power which restrict its free movement, it is normally tied to specially prepared linear surfaces, and in high concentrations it is denied lateral flexibility by limited access routes which maintain an overall efficiency for the system.

d) Mixed power sources Extreme concentration of people and vehicles has resulted in expensive and unwealdy compromise solutions to keep our society mobile. New transportation systems appear to be based on an examination of all available power sources and better application of technological abilities.

A recent study of transportation systems now under development[1] analyses the needs of large communities and indicates the potential of competing proposals.

These vary from the use of computerised buses to the increased use of VTOL aircraft. Suggestions are made for personal taxi and automobile vehicles which would operate automatically when on certain roads or tracks, but would be driver controlled at other times, and for high speed tracked systems of all kinds.

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1. Irwin N.A. Public transity and the Quality of Urban Living. Ekistics Vol 29 Number 170 Jan. 1970 Pg 47

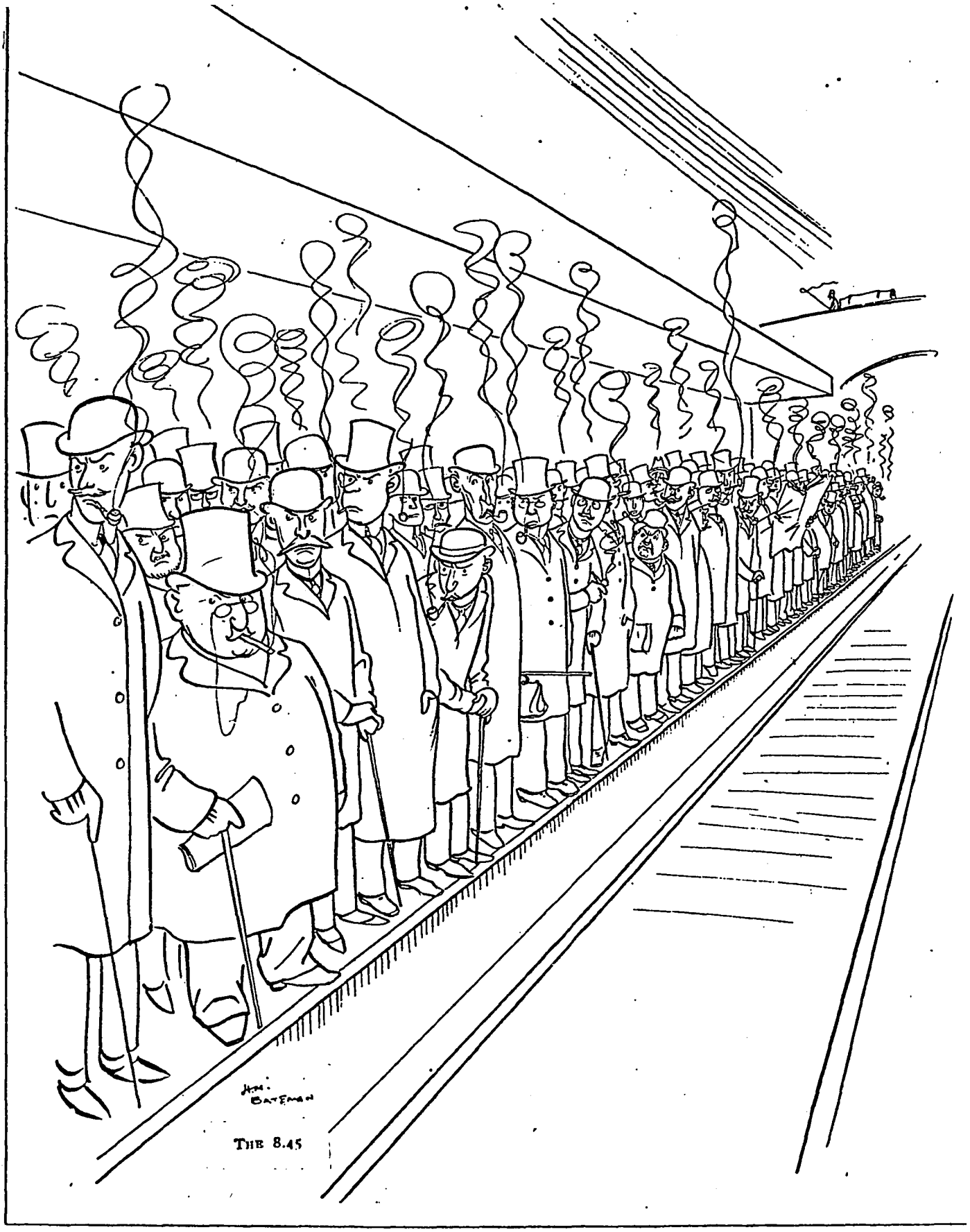
The extreme dependence of growing urban concentrations on fast transportation is self-evident, and the fabric of our cities reflects this by the dominance of vehicles over the last hold out of animal locomotion, the pedestrian.

Since mechanical transportation has been a predominant factor in the growth and physical ordering of existing urban concentrations, it is important to isolate the family characteristics of this phenomonon whatever the power source. These may be broadly stated as follows:

1. They are linear in nature and require predetermined and specially prepared tracks or roadbeds.
2. They operate at speeds significantly higher than possible with animal (including human) transportation.
3. They require transfer facilities for travellers to enter and leave safely, and in places convenient for their needs.
4. They are generators of noise and fumes.
5. Trackage or roadbeds require a high degree of maintenance, and are expected to be available at all times and in all weather conditions.
6. They require storage for vehicles at terminal and transfer points.

SUBURBIA, CARICATURED BY H.M.BATEMAN. METHUEN & CO LTD. LONDON 1922.

THE EXTREME DEPENDENCE OF GROWING URBAN CONCENTRATIONS ON FAST TRANSPORTATION IS SELF-EVIDENT.



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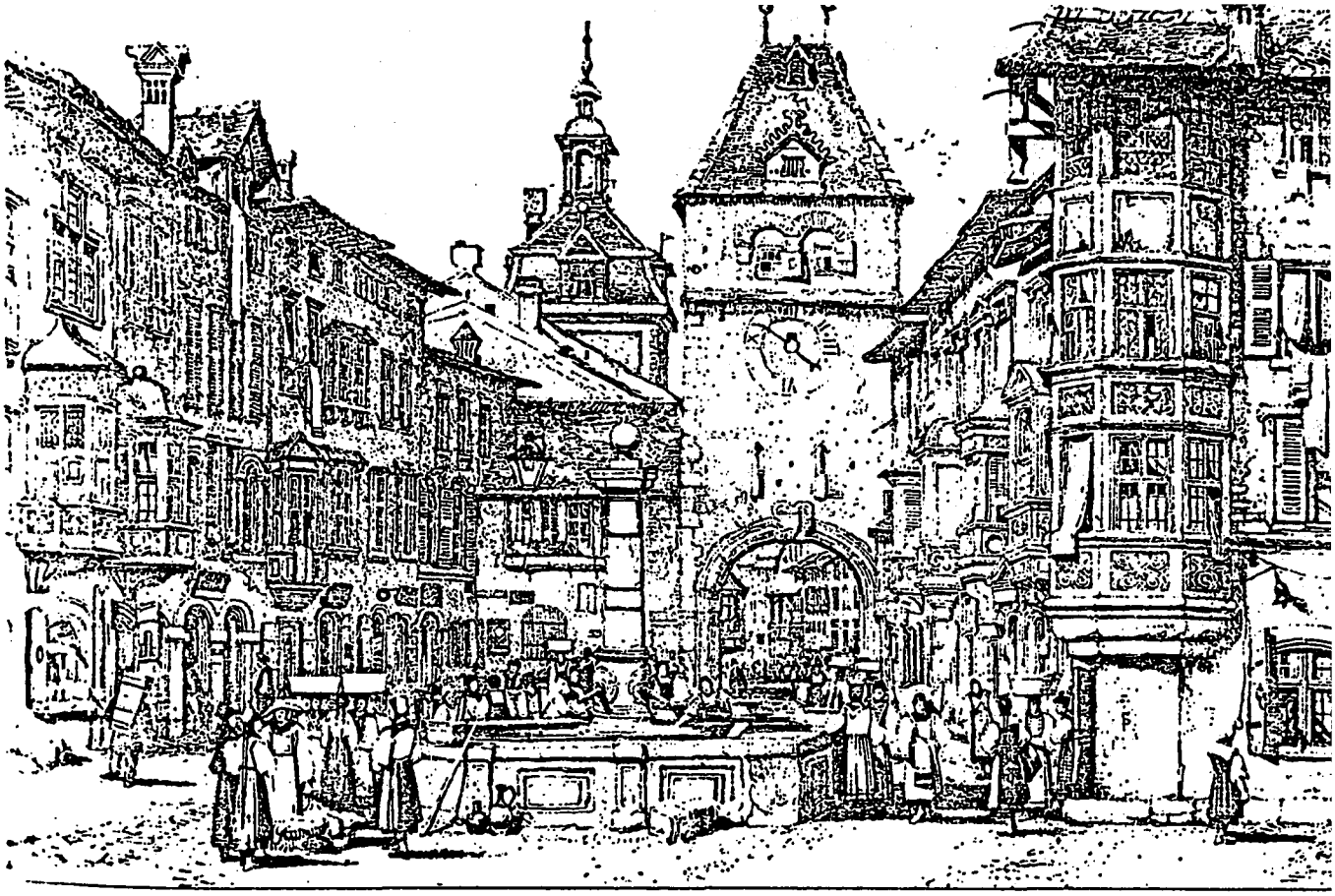
THE EXTREME DEPENDENCE OF GROWING URBAN CONCENTRATIONS ON FAST TRANSPORTATION IS SELF-EVIDENT.

The physical result of these characteristics has been that the urban land area required for transportation has greatly increased, not only for travelled widths, but to provide separate space for pedestrians and also to allow physical separation between fast and noisy vehicles and other activities. The highly specialised requirements of fast transportation makes secondary use of the roadbed impossible, and the street has ceased to be a place of social intercourse.

The physical separation of the urban area into compartments, isolated from each other by fast traffic arteries has long been a source of social discontent, and to be born on the wrong side of the tracks is a viable expression of social status in terms of a substantial physical barrier. Transportation routes have also been responsible for massive class separation by allowing more fortunate groups to settle in suburban communities and commute to central work areas, by-passing the intervening settlements which have deteriorated into the so-called grey residential areas, and concentrations of less favoured ethnic and social groups.

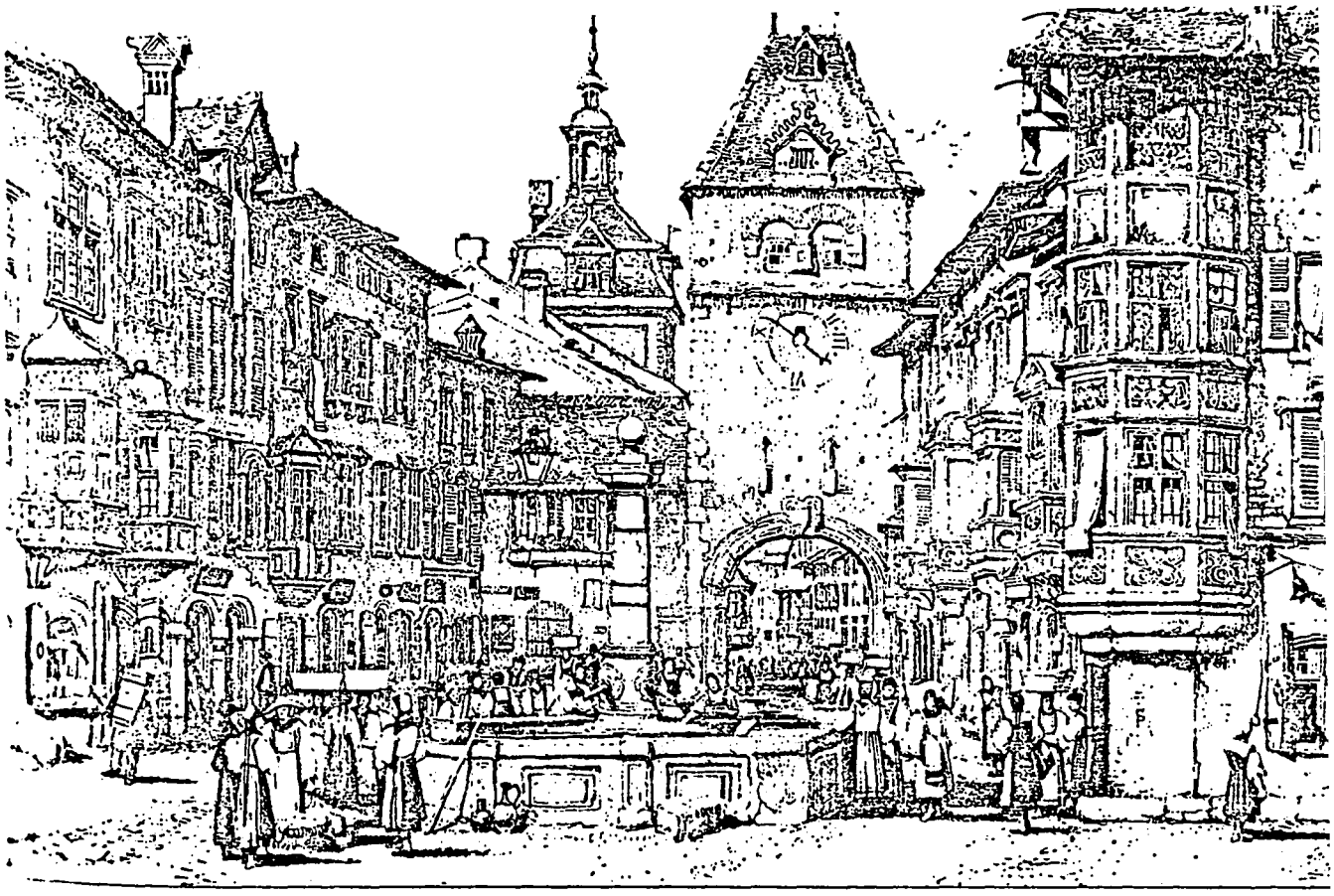
The next mutative jump in urban development must allow rapid communication and transportation, but must overcome the adverse social consequences of former systems. Urban renewal policies have recently concentrated on the demolition and reconstruction of worn out districts, but this has normally been undertaken in conjunction with massive freeway development, and the result has too often been an amplification of social tensions, and further physical segregation.



STREET IN SCHAFFHAUSEN

The Architect & Building News, 1 January 197

THE STREET IS NO LONGER A PLACE OF SOCIAL INTERCOURSE.



STREET IN SCHAFFHAUSEN

The Architect & Building News, 1 January 1

THE STREET IS NO LONGER A PLACE OF SOCIAL INTERCOURSE.

In spite of the segregating tendencies of present transportation systems there is one characteristic that has been badly neglected and which could be a powerful unifying factor in the process of urbanisation.

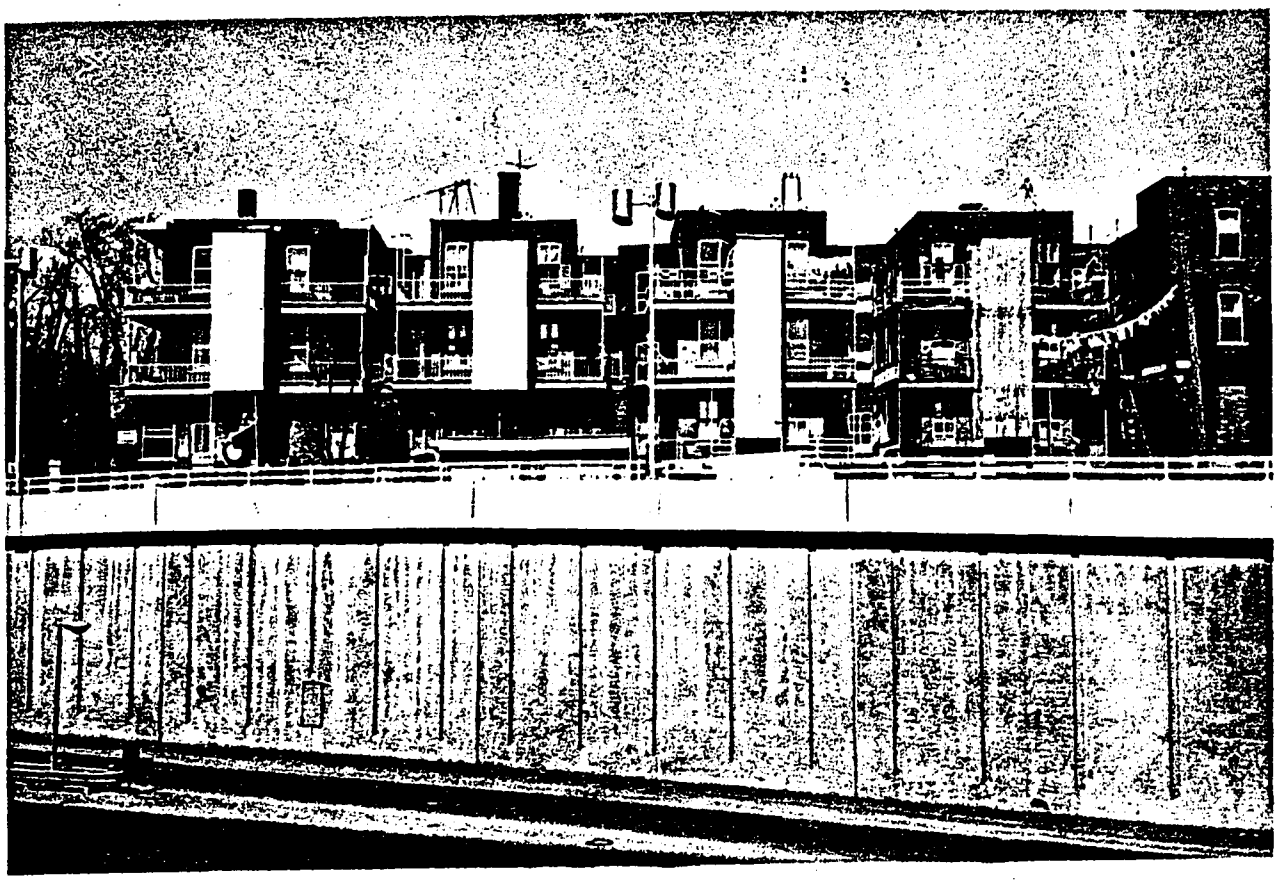
New forms of transportation have given rise to new forms of intersection. The crossroads has always been a place of importance because of the traffic generated, and because it is a recognisable point at which to pause in the course of a journey.

The new intersection has recognisable qualities which give it equal importance in an era of very fast ground transportation.

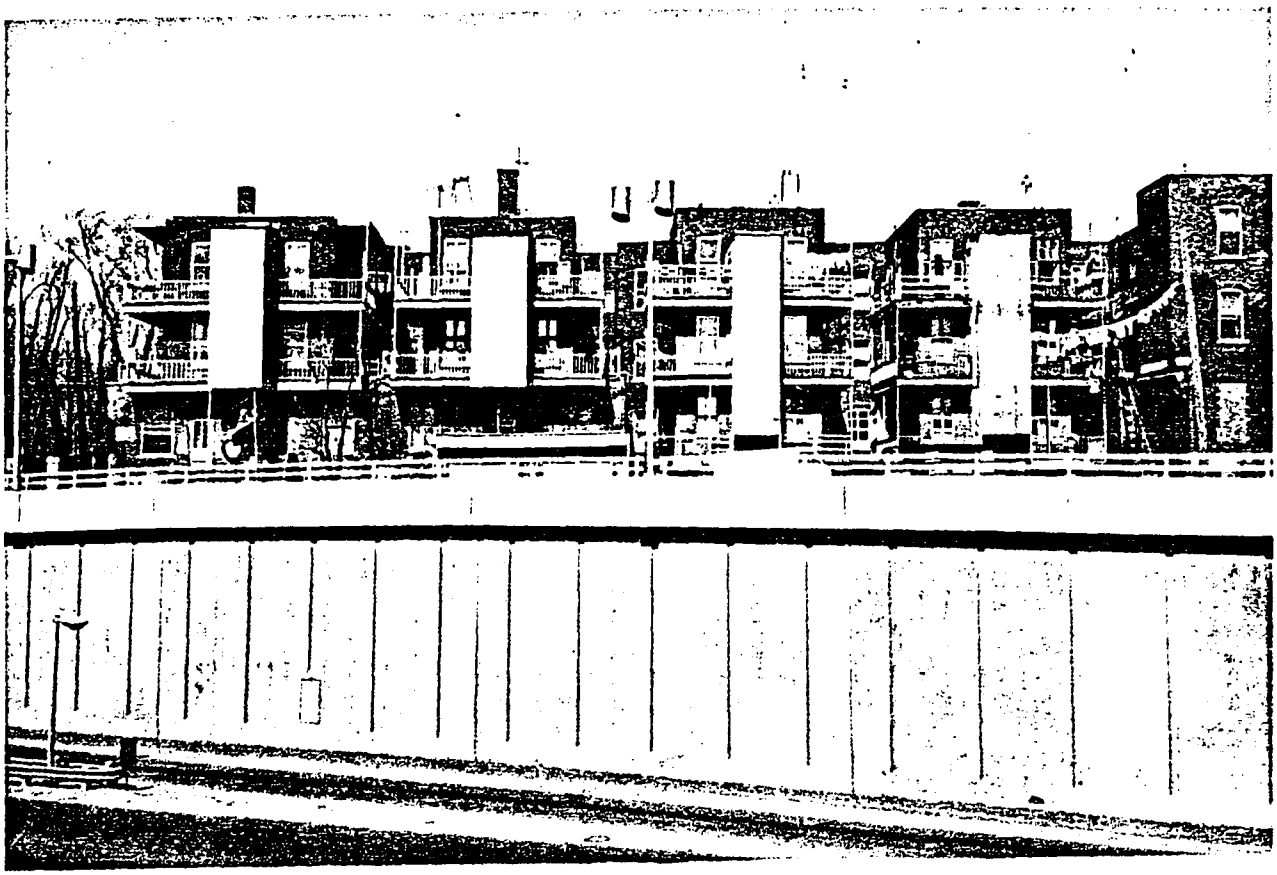
Intersections have the following characteristics;

1. There is a confluence of traffic.
2. They occupy considerable areas of ground.
3. They are constructed, that is the crossing or point of contact is on two or more levels and requires complicated engineering solutions.
4. They have enormous visual impact, and
5. are readily acessible.

Of all new construction, particularly in the areas away from the core of the city the intersection is the most significant, and it has the greatest potential of all forms of development to serve as the focus for the social centralisation of districts.



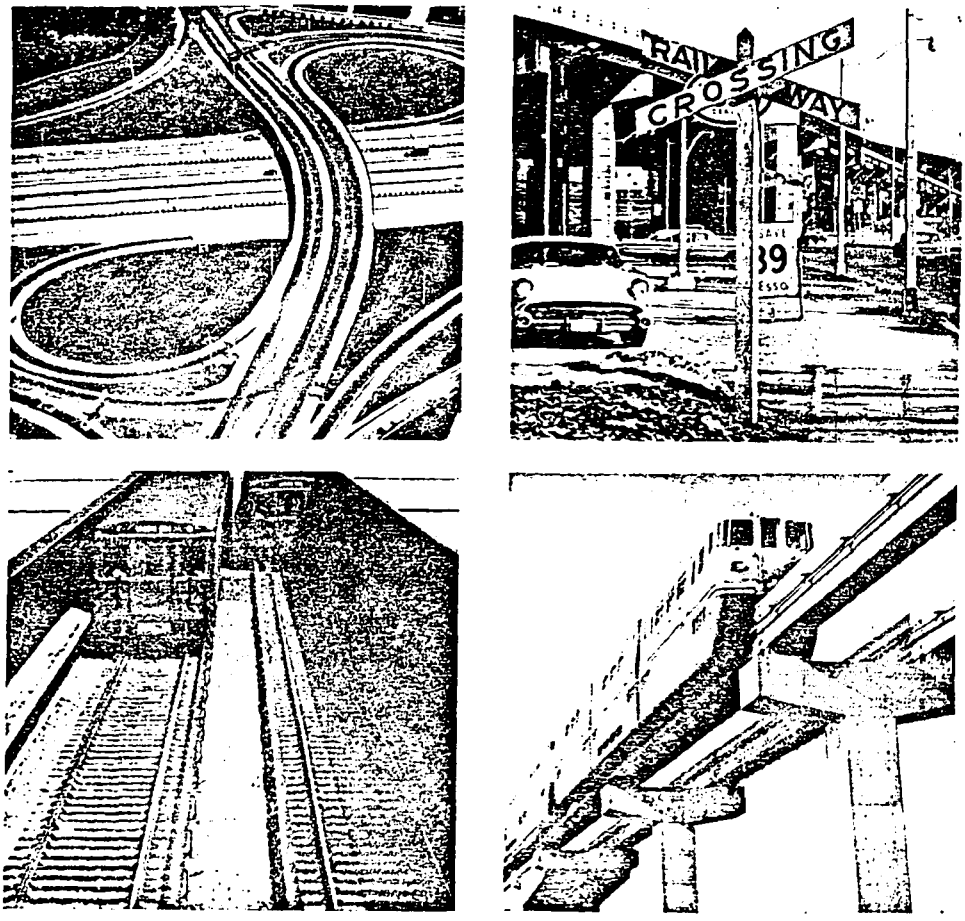
Major traffic arteries isolate adjoining communities, one from the other, and allow commuters to pass decaying sections of the city without being aware of their difficulties or even of their existance.



Major traffic arteries isolate adjoining communities, one from the other, and allow commuters to pass decaying sections of the city without being aware of their difficulties or even of their existance.

One characteristic of a mutant is that it does not destroy what exists, but by being better suited existing to environmental factors than the parent species, it adapts, whereas the parent species looses ground.

Rather than renewing our cities, new ways of utilising and repairing existing facilities may be necessary. Ideas which have been ignored or rejected as impractical need to be re-examined, as survival is now the issue rather than expediency.



NEW FORMS OF TRANSPORTATION, NEW FORMS OF INTERSECTION.

SECTION 3

Opportunity. A theory of Urban Repair

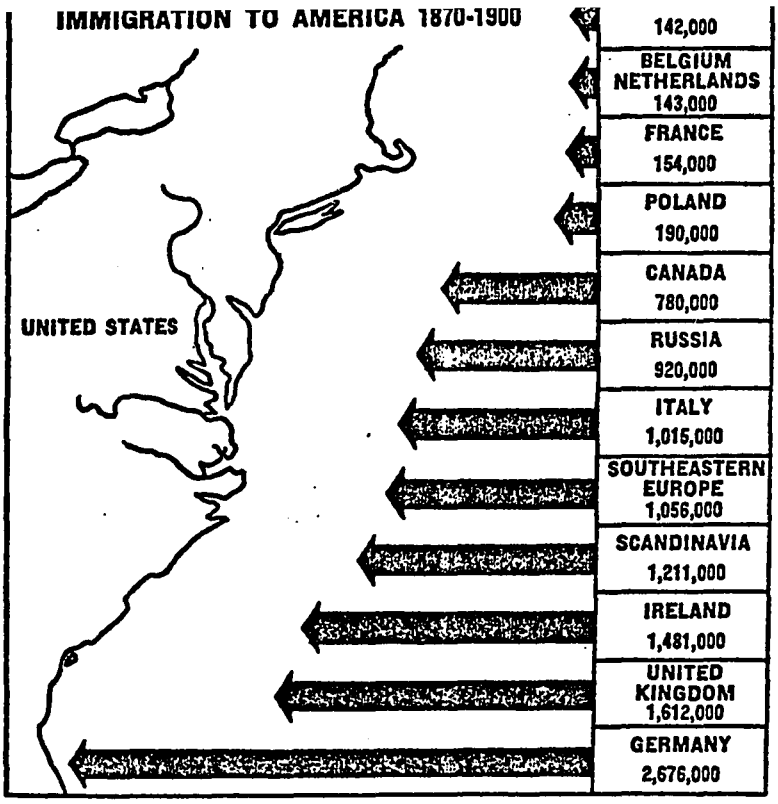
The structure of the city has been based on transportation and communication systems, but where did the people come from who caused the need for expansion, what was their background and why did they fail to control their environment?

A cursory examination of most western cities indicates that they have not expanded with the sophistication and charm which in the past was a characteristic of urban settlements; urbanity is a term which is no longer used as either a planning term or to describe a human attribute.

Urban growth over the last fifty years has the appearance of a mad hatter's tea party where everyone moves on one space, with one end of the line gaining and the other end dealing with the debris of those who were there before them.

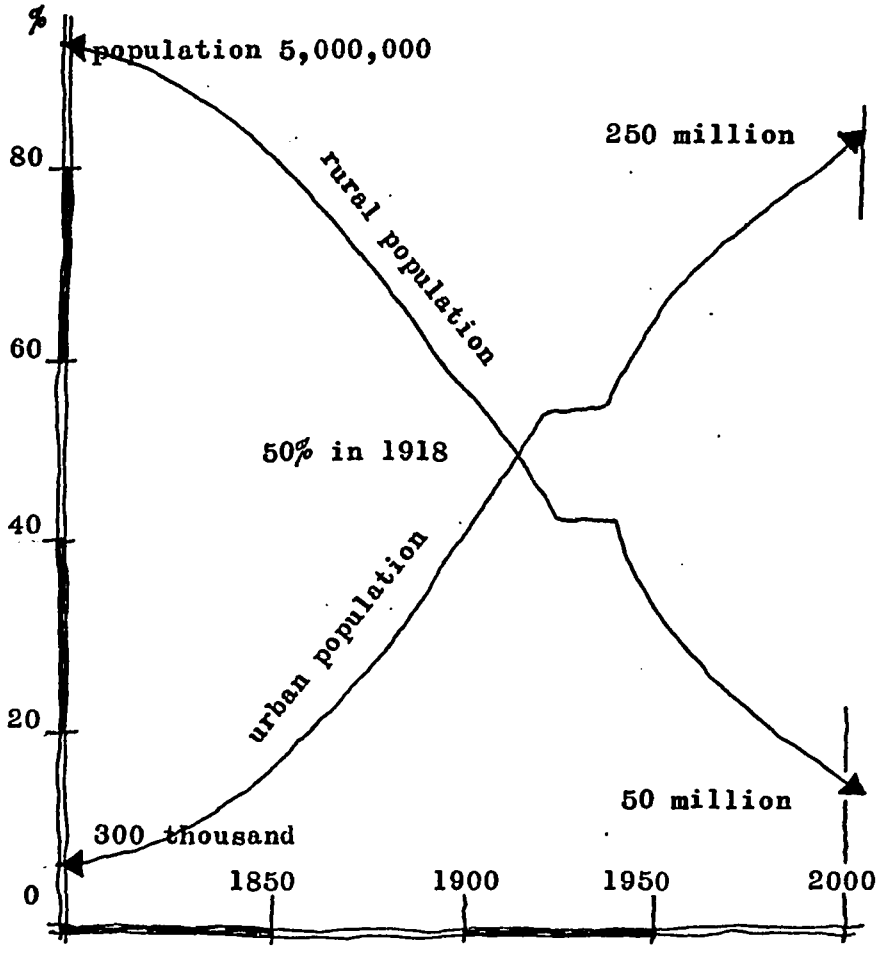
Unless our failure to be urban and our constant movement to perpheral urban areas can be explained, there is little hope that rational town planning solutions can be developed which will result in more than expedient solutions to immediate difficulties.

The urbanisation of North America by migration from small towns, rural districts and by natural increase is a familiar process that has been going on since 1800, except for a period from 1928 to 1945 when despression and war temporarily halted population movement.



Immigration from Europe represented a flight from hunger, poverty and persecution, and was perhaps the basis for the North American tendancy to accumulate private wealth and property.
As immigrants arrived, the urbanisation of the continent continued steadily, as the sources of wealth concentrated in the towns.

Figures for the United States.



One possible result of this transition has been that the planning and management of cities has been in the hands of people with rural values, or raised by parents with a rural background, and a characteristic of this last century of urban progress has been the attempt to duplicate small town conditions in urban settings.

The annular growth of simulated rural conditions increased around the core, with railways, streetcars and highways constructed so that the reluctant city worker could quickly escape to the outside. The inner rings decayed with time because of mortgage conditions that favoured new construction, change in social attitudes and the obvious fact that to get semi-rural conditions in an expanding community it is necessary to keep moving out to find them, and land cheap enough to build.

The real tragedy of this rural romanticism is that the city has not been loved, and like any other growing body, a city needs love to stay healthy.

It is possible that of all human qualities, two can be utilised to develop a lovable city. Neither of them appeals to man's finer instincts, and neither of them is rational.

First, it seems unlikely that the North American will easily give up his notions of private ownership, an idea that is firmly imbedded in his human make-up, in his culture and in his individual and romantic outlook. Socialism and communal, a society may eventually come through pressures of population on limited resources but they may be expected to develop through multiple ownership contracts rather than by means of violent action.

Secondly, love of the childhood environment is not unusual in stable societies. Once the flow of small town migrants to cities is reduced, a more stable community should result, born in cities of city bred parents, loving the city for the arbitrary, though valid reason, that it is their birthplace. It is probable that they will want to make the city into a better place to raise their children and to live, with the country looked on as a place to grow food and to visit, as we now visit the sea.

If these propositions are valid, development of cities will be the adaption of a sprawling, unsuitable but expensive conglomerate to more sophisticated needs with individual ownership being complimentary to a new pride in the urban complex.

If we link our continuing desire for home ownership with the trend to concentration of population, it is clear that ownership can no longer relate to land which is becoming increasingly scarce and expensive, and if urban land is both

scarce, expensive, and already occupied, how can a new form of city emerge? What quantum leap can be made which will transform the city without social and economic disruption of the people who live there?

In the circumstances, it is fortunate that the builders of our cities gave us our present road system. Roads are publicly owned and are rarely used above ground level except for an occasional bridge. Consequently, they offer a vast reserve of inexpensive space which is available for manipulation by enlightened authority. There are many recent examples of the use of airspace for construction from restaurants in Coventry to convention halls in Detroit, but the real significance is in the possibilities for comprehensive repair of the city.

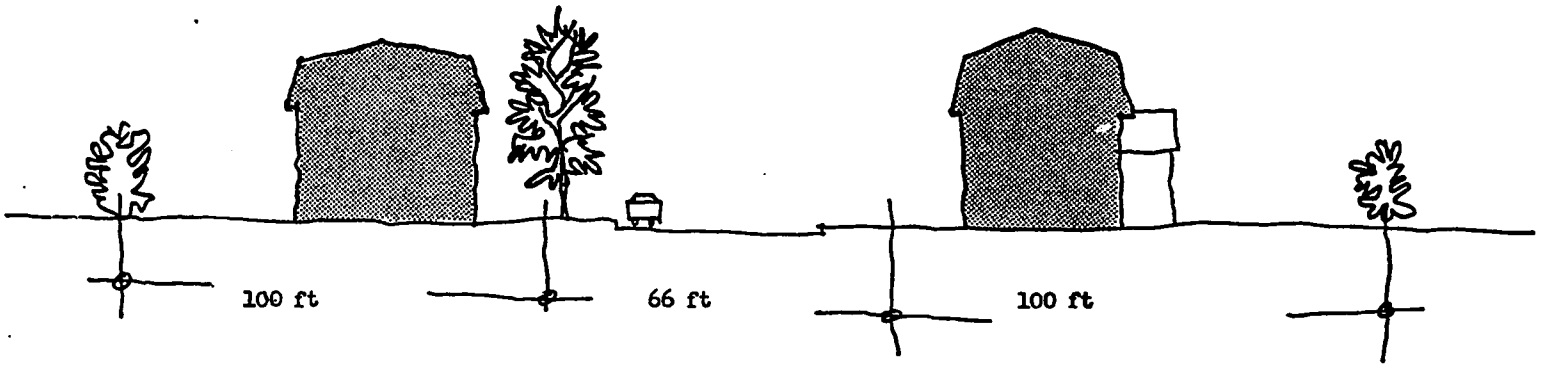
The value of the air space over all public lands is enormous, and there is already strong economic pressure on municipalities to dispose of air rights over freeways as a means of recovering money spent in their construction. In New York and other major cities, such projects are planned. The danger is that immediate pressures will force expedient solutions, and the opportunity for major city wide repair will be lost.

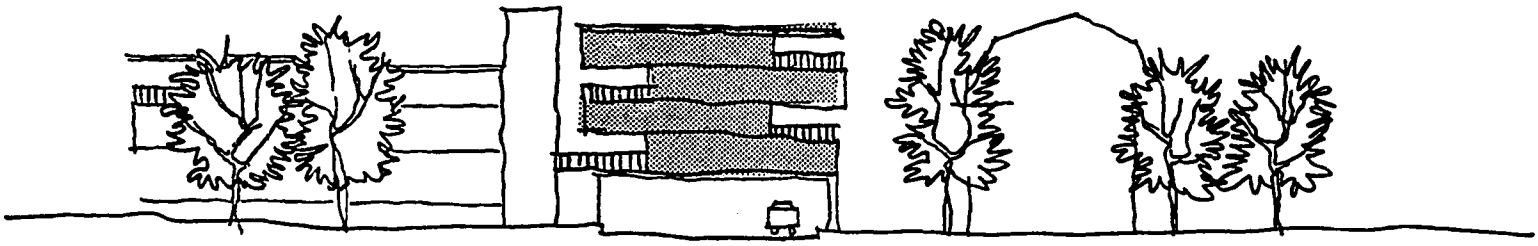
Assuming that air space over roads and public lands is made available for controlled development and that there exists the means for a company or person to buy into large and multi-purpose structures, and assuming the anticipated love of city develops, what could be the result?

As areas reach a period of decay or obsolescence, replacement construction could be developed in the air space above the adjoining roads, and since the site is public, the cost to developers could be low. Under condominium legislation the road could remain public property, while the superadjacent construction is subdivided, rented or sold. As the old accommodation is abandoned, it can be purchased or acquired by the municipality for rehabilitation in exchange for the new and used for construction or for development into squares, parks or recreation space.

Without much expropriation, demolition or social reorientation, the city would be gently reversed, and activity transferred above the roads, reducing the dominance of the automobile and looking outwards to city blocks remodelled to suit the needs of the locality. Perhaps not a solution for all the city, but certainly a less costly means of repair for decayed sections than wholesale demolition, rehabilitation, or the creation of thorny relocation problems.

The mechanisms by which this dramatic change to a city structure can be made are obviously uncertain. If the general demand for an improved city strengthens and communities realise that urbanisation is not an abstract idea but directly effects their health and happiness, and that in high concentrations of people, personal independence must be modified by communal responsibility, then it becomes necessary to examine means of undertaking communal development within the social restraints of North American society.



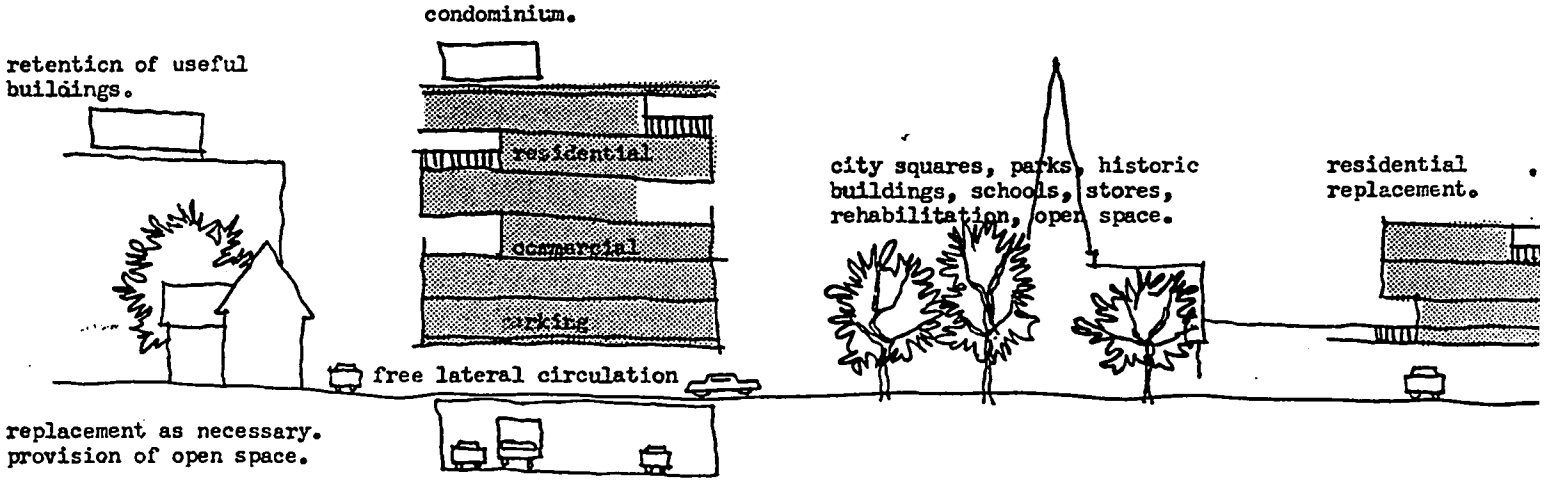


clearance of decay, infill, provision of open space.

replacement construction over public right of way.

rehabilitation, conservation, provision of public open space.

REPLACEMENT CONSTRUCTION OVER ROADS IN DECAYING RESIDENTIAL DISTRICTS.

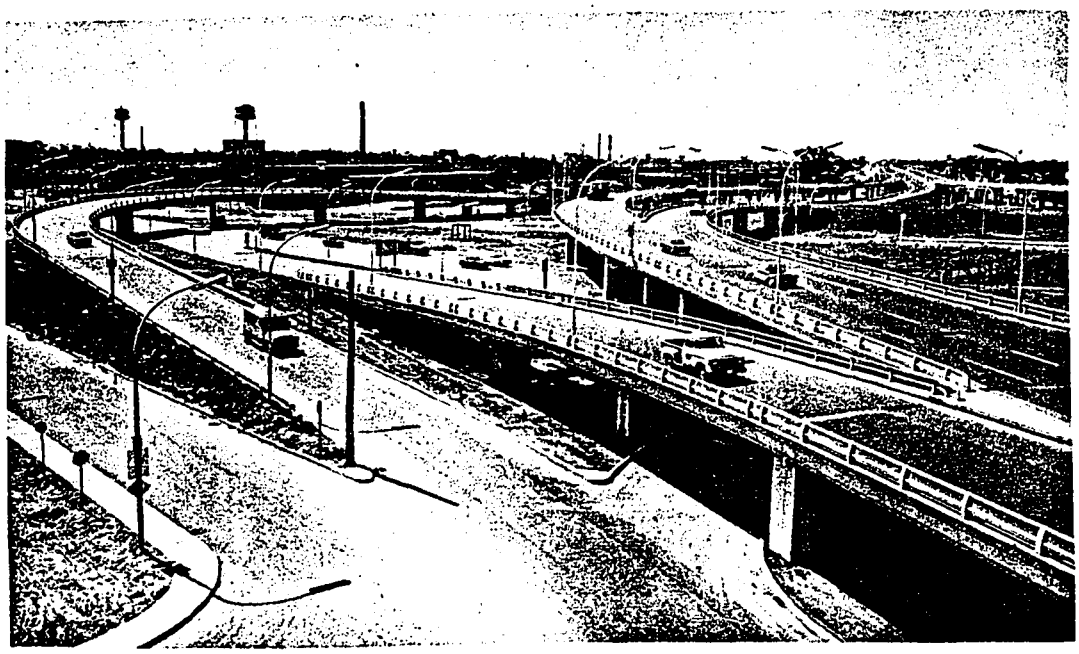


CONSTRUCTION OVER MAJOR TRAFFIC ARTERIES.

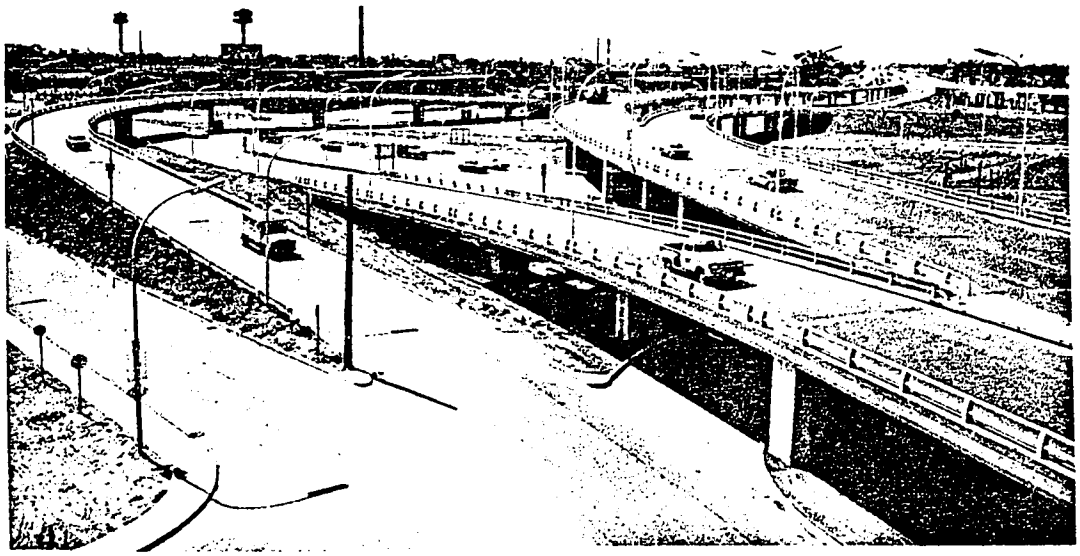
One means of developing this desirable sense of place for scattered urban populations would be the conscious utilisation of the new transportation intersections as district focal points.

It is already obvious that intersections, or interchange points account for the expenditure of huge sums of money, and with some manipulation of these extravagant constructions they could be expanded to become social, as well as transportation nucleations.

In order to fully exploit these situations, it is important to examine the method of separating ownerships sharing common structures. Without this being clearly stated there can be no meaningful discussion of the use of air rights or the search for new urban building space.



INTERCHANGE POINTS ACCOUNT FOR THE EXPENDITURES OF HUGE SUMS OF MONEY.



INTERCHANGE POINTS ACCOUNT FOR THE EXPENDITURES OF HUGE SUMS OF MONEY.

SECTION 4

LEGAL CONSIDERATIONS AND THE OWNERSHIP OF SPACE

TRADITIONAL AND EXISTING MEANS OF JOINT OWNERSHIP OF PROPERTY

Common law in the United States, by general agreement, does allow the ownership of space above the land to which it is attached, and the lease or sale of this space separately from the land if adequately described. Rohan and Reskin list existing methods of developing separate space rights.

1) A lease of space above various inclined and horizontal planes at varying elevations, plus a grant of an easement for supporting columns and foundations.

2) A conveyance of the fee simple above certain inclined and horizontal planes, plus an easement for supporting columns and foundations.

3) A conveyance in reference to a three-dimensional plan of a subdivision showing individual lot numbers not only of the air space but also for the areas in which caissons and columns for the support of the building and to be located.

4) A conveyance of the complete parcel of land, but reserving a permanent easement below certain planes for the construction, operation, and maintenance of various facilities and improvements, and granting also a permanent and perpetual right for the supports and foundations of buildings and structures through the reserved easement.

A fifth method of three-dimensional subdivision is described, where "the subdivision (is) extended not only upward in space but also downward toward the centre of the earth".

The authors quote an appraisal of this technique[1] which indicates that it is cumbersome in application but "It is ..... an added step in the creative law of real property, prompted by the economic pressure to provide more growing space in the congested commercial areas of our large cities".

Until the invention of the aeroplane it was reasonable to legislate that the owner of the soil owned both the sky above it and whatever was below, since there was little reason to expect legal conflict over the ownership in these places. There were special laws relating to mineral rights which could be assigned separately although this was never a general threat to the property owner. Even recent legislation, in Ontario, places no upper limits on ownership, ".... the ownership of land includes the ownership of space" and one assumes that the sky is the limit.

Legislation for aircraft is oriented to public safety rather than to the protection of private property, and as buildings or other structures get higher they are required to conform to the rules applying to aircraft and must carry warning lights as if they were intruders.[2]

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1. Brennan "Lots of Air - Subdivision in the Sky", 12 Title News 1 (Jan-Feb 1957). Rowan and Reskin, 4.01.

2. Rohan and Reskin. Pg. 4-10 in a footnote points out that "The taking of an easement by low flying airplanes supports, by analogy, the ability to own and convey a separate estate in a layer of superimposed air-space" (Cases in the U.S. are indicated). Do these decisions imply the sale of airspace, or agreement by owners not to expand vertically?

For all practical purposes there appear to be no limits to the amount of space that is attached to the soil, or situations where you can build up and out of your property, but it is obvious that unless space is occupied by a structure, the claims of the owner of the soil to the space above are not as secure as present legislation implies.

Joint ownership normally takes the form of a corporation with stock holding owners. For single use buildings, this is a reasonable undertaking, but when occupied by a variety of uses, there is perhaps less security for lenders if one use fails.

> "The concept of converting title to land to title in condominium was conceived as an alternative to the Corporate Co-operative in the hope that legislation would satisfy the lenders as to security of title." [2]

The withdrawal of one owner from a Corporate Co-operative is also complicated by the necessity to become free of partnership legalities whereas in a condominium, disposal is without reference to other owners.

As means were generally found to allow the disposal of air rights in the few instances that this was desirable, there appear to be no insurmountable legal difficulties in the way of more sophisticated sub-divison of space.

Because of the absence of established legal procedures for enabling the separate purchase and use of space, a satisfactory method must be devised.

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1. "Recommendations to the Task Force on Housing and Urban Development". John A. Geisler (Barrister and Solicitor, Toronto).

The five current techniques described above are cumbersome and do nothing to stipulate the joint responsibilities of owners of superimposed properties. It is clear that problems such as those of maintenance, servicing, and type of occupancy must be of common, and lasting concern to the participants, and the owner of land must retain some control over the use of the space above his property as much as the purchaser of the air rights must retain the right to support.

The need for constant dialogue between owners of superadjacent properties must be written into any legislation, and the rights of all owners to elements held in common clearly established.

From this need the concept of condominium has evolved. In the past, deficiencies in common law have made".... condominium type ownership an awkard, if not impossible real property device".[1] In most countries, legislation is now in existance to remedy this deficiency.

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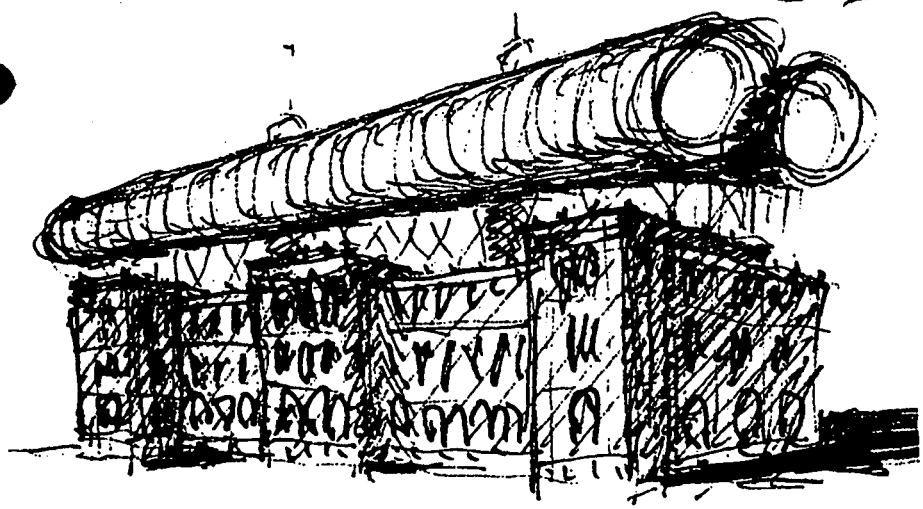
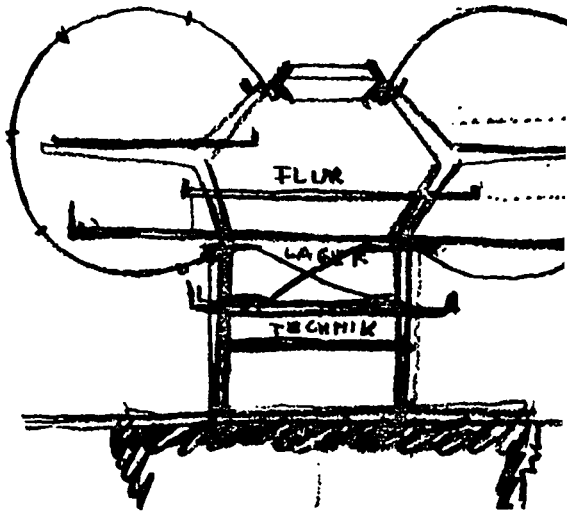
1. H. Allan Leal, Housing, "Condominium and other forms of tenure". Paper given at 15th annual Housing Conference, Ottawa, 1967.





Ce projet a malheureusement été abandonné pour des raisons juridiques.

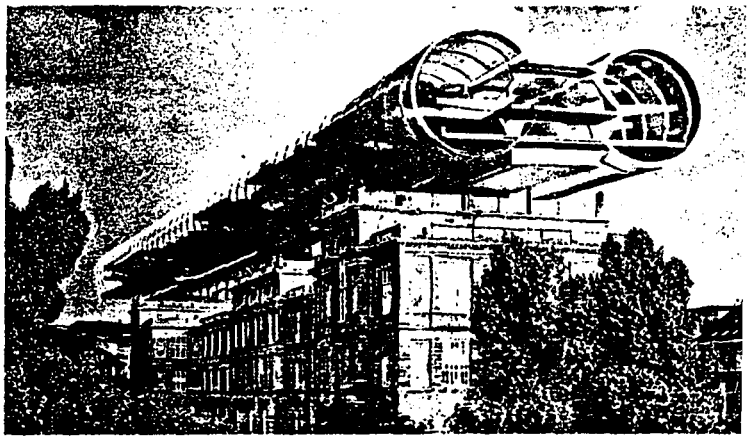
Afin d'obtenir une bonne répartition des pressions sur les fondations, la structure a la même trame que les murs de refend de la construction ancienne, soit 6,60 m.

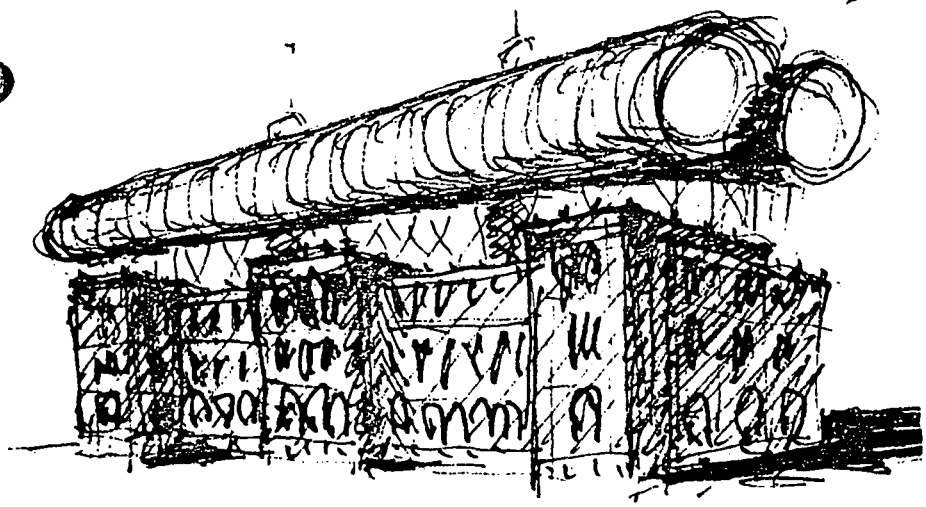
Le bâtiment actuel est totalement utilisé, bien que respecté comme monument, ainsi que son environnement.

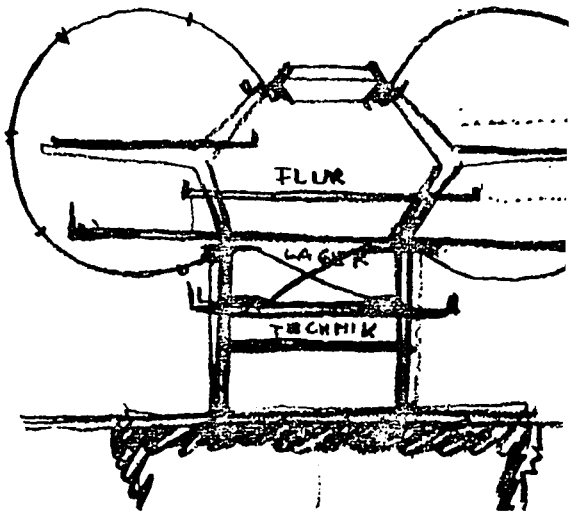
Il ne pouvait être question d'une surélévation du bâtiment actuel qui serait comparable à une modification de la silhouette. Les corps ancien et nouveau sont isolés l'un de l'autre par un élément ajouré.

Cette nouvelle pensée de l'acte de construire peut se répéter à partir de cet exemple : des quartiers entiers peuvent être rénovés par une ville piétonnière superposée à un fondement historique.

La structure doit être, pour des raisons de statique, montée au sol et levée d'un seul bloc.







Ce projet a malheureusement été abandonné pour des raisons juridiques.

Afin d'obtenir une bonne répartition des pressions sur les fondations, la structure a la même trame que les murs de refend de la construction ancienne, soit 6,60 m.

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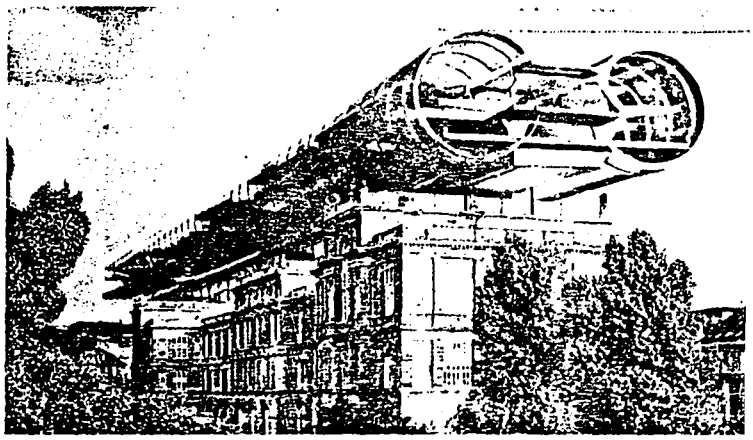

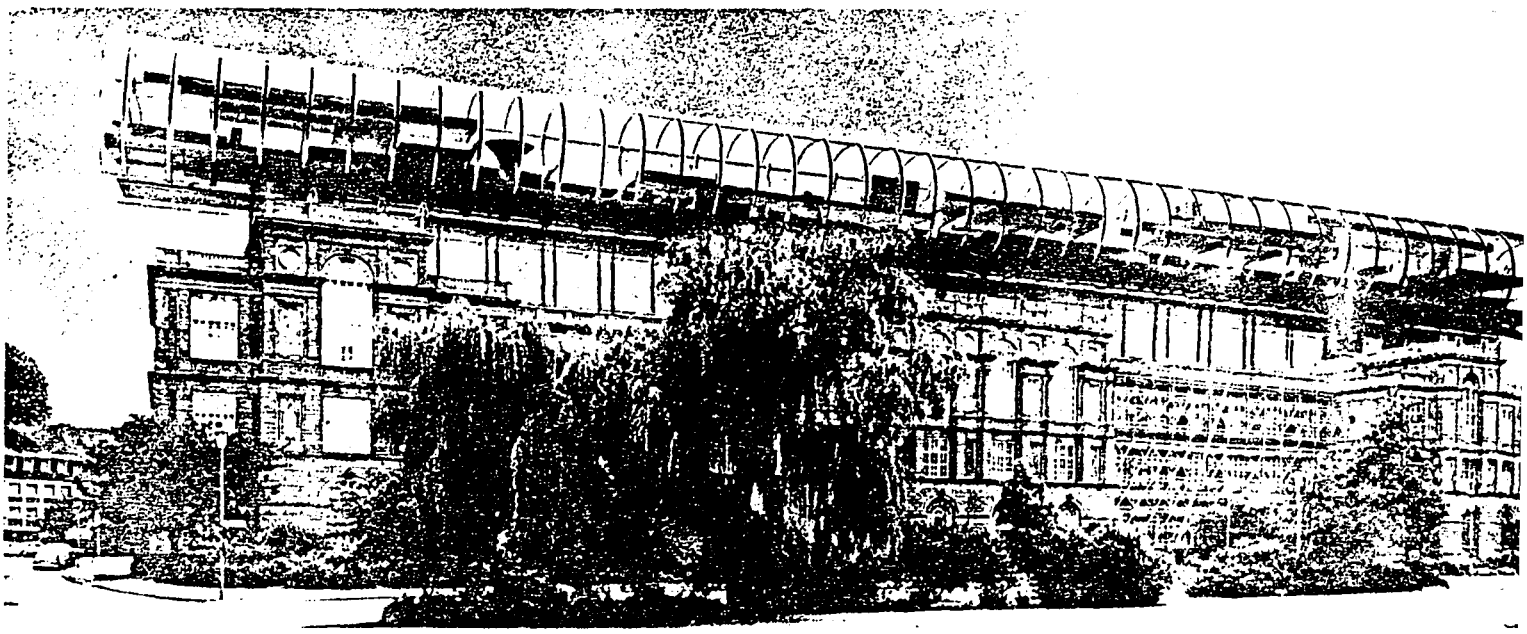

THE MEANING OF CONDOMINIUM

It is clear from a recent definition of the word 'Condominium' that its use in describing the ownership of real property is not of long standing.[1]

As exact definition of the term in the adopted sense must be deduced from legal definitions and common usage, since there are at present almost as many explanations of the term as there are statutes dealing with the matter.

The proliferation of terms dealing with multiple ownership are often misleading, or have derivations not suitable in a North American context.[2] For the purpose of this study the term 'Condominium' will be used, and where quotations using alternative expressions occur, this will be noted in the text. The term 'Condominium' is preferred above other expressions because:

1. It is concise.
2. It is already widely accepted.
3. A new term is desirable to reflect a new concept.

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1. The Concise Oxford Dictionary. 5th Edit. 1964. CONDOMINIUM, n. (diplom.) Joint control of a state's affairs vested in two or more other states. (con. L dominium. DOMINION.)

2. Britain. 'Ownership of Flats.
   British Columbia. 'Stata Titles'.
   Argentine. 'Horizontal Property'.
   Connecticut. 'Unit Ownership'.
   etc.

The legal definition of the word 'Unit' is often taken to mean 'Apartment Unit' and subsequent legislation is oriented to residential situations. This may be due to the early preoccupation of developers with the apartment condominium but the wider application of the concept to commercial, industrial, institutional, recreational and other facilities has a potential importance that cannot be ignored.

A recent definition of Condominium states the aims of the participants and comes close to a fair summary of the idea[1],

> Condominium defines the method for separating the ownership of individually occupied units in an apartment or office building. This separation of ownership makes possible the individual financing, buying and insuring and taxing of each unit, and establishes separate responsibility for liabilities individually incurred ....

But this definition limits the scope of Condominium to apartments and office buildings and does not specify who is responsible for the elements that are shared by all the participants. Legislation in California is based on the following definition[2],

> A Condominium is an estate in real property consisting of an undivided interest in common in a portion of a parcel of real property together with a separate interest in space in a residential, industrial, or commercial building on such real property, such as an apartment, office or store.

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1. Inscription in the lobby of the first Condominium in Salt Lake City. Quoted Page 1.01 (1) Rohan and Reskin.

2. Cal., Civ. Code No. 783

While the California definition takes out the editorial comment and with it the expression of human aspiration that is evident in the first declaration, it does state clearly the essential elements of Condominium, but again with implied limitations, and no provisions for the management of the property.

The most economical definition, and the one that appears to offer wide freedom of application is that suggested by the Ontario Law Reform Commission, and it is this definition that has been adopted for the purposes of this report, but with 'units' defined as 'separate interests in space'[1].

> The two essential elements of the Condominium concept are: first, the division of property into units to be individually owned, with common elements to be owned in common by owners of the units; and second, an administrative framework to enable the owners to manage the property.

The legal problems encountered may have no precedent in law. In fact the term "Air-Rights" itself may be suspect as a legal concept unless these Rights are defined.

A summary of existing laws relating to Condominium results in the emergence of the following principal elements of the operation, all subject to regional variants.

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1. Leal H. Allan. 'Housing - Condominium and Other Forms of Tenure' Paper given at the 15th annual Housing Conference, Ottawa, 1967.

1) Property is divided into units to be individually owned, with common elements to be owned in common by the owners of the units.

2) An administrative framework is required to enable the owners to manage the property.

3) Ownership of the unit cannot be separated from ownership of the common interest.

4) Leasing of individual units, and joint ownership of units is regulated by laws applying to conventional ownership.

5) Positive covenants running with the land and relating to the use made of property and assessments for common expenses, must be enforceable.

6) Land must be owned in fee simple. (Not required by all legislation but simplifies legal aspects.)

THE ORIGIN OF CONDOMINIUM

The ownership in fee simple of units of a single building has not been a significant factor in the history of the ownership of property and examples of this form are few. The previous absence of condominium may be due to several factors which combined to make it unworkable, and include;

(i) In social systems that divided populations into the rich and the poor, the landlord and tenant relationship dominated. The ownership of small properties grew in significance only with the rise of the middle class in the nineteenth century.

(ii) Home ownership became the objective of the middle class, and development of inexpensive land, together with technical development of mass servicing and transportation encouraged suburban growth. With cheap land and services available on the city outskirts, there was no inducement to concentrate dwellings except in central areas where a need for rental accommodation continued.

(iii) The legal framework was not geared to multiple ownership, and means of describing property limits and apportioning common responsibility did not exist.

(iv) Condominium may be said to result from high land and construction costs, which induce concentration of people and effort. These trends have been significant for a relatively short time.

In Western Europe, pressures on available land and services have raised the cost and reduced the desirability of continued suburban growth, and planning legislation has been enacted controlling the use of land and governing expansion. Between 1930 and 1955 most major European countries enacted legislation enabling the formation of condominia to meet the growing demand for more sophisticated means of home ownership as a viable alternative to the single family house.

In continental Europe it has been possible for many years to offer for sale apartments in older buildings that were formerly rented to the occupants, and now this is not uncommon, for example in Paris, and the attraction of ownership of newly constructed condominium units has become obvious in many countries.

> In Belgium it is significant that in recent years some 90% of the total residential development which has been completed has consisted of blocks of flats which have been disposed of in individual units to the flat dwellers. 1.

In the State of New South Wales, Australia, a law allowing Condominium was passed in 1961. The motivation for the adoption of the Law is given, although possibly not officially, as the following:

1. The real desire of Australians to be owners; a renter is a second-class citizen;
2. The unattractiveness of being a landlord because of Government restrictions on rents;
3. The necessity of stopping the territorial expansion of Sydney because the costs of giving public services were becoming prohibitive. 2

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1. Scamell, "Legal Aspects of Flat Schemes", 14 current legal problems 161, at 162 (London 1961) quoted in Rohan and Reskin, p. 2.01).
2. Condominium, Claude Morin, CMHC, Ottawa, 1967.

As a result, from June 30th, 1964 to June 30th, 1965, two Condominium units were built for every three houses.

The concept of Condominium appears to have been introduced into North America from South America, by way of Puerto Rico where a large population located in a few urban centres created an ideal situation for this type of development.

In 1961, an amendment to the National Housing Act in the U.S.A. authorized F.H.A. to insure mortgages on, among other things, Condominium apartments. With the passage of Section 23A of the National Housing Act, the States could enact enabling legislation, and in fact did so in most instances.

The Canadian Provinces followed suit, and by 1969 most Provinces have enabling legislation in some form or another with one of the latest and most sophisticated Acts being that passed in Ontario, being:

> 'An Act to facilitate the Division into parts that are to be owned individually and parts that are to be owned in common, and to provide for the use and management of such properties. 1

This Bill is relatively sophisticated, particularly since 'unit' is defined as a unit of space, and deliberately does not define what use the unit must serve. The Ontario Condominium is not limited to residential use only, as it is in many other jurisdictions, but may be freely applied to commercial, industrial or mixed use.

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1. Bill 65 5th Session, 27th Legislation, Ontario 15-16 Elizabeth II, 1967. Frank Fogg, Queen's Printer. First Reading March 22nd, 1967. Including explantory notes on the intent of individual clauses.

THE ADVANTAGES OF CONDOMINIUM

It has been said that "it is not presumptions to suppose that the Condominium form and its varients will shortly make other forms of Multiple Ownership obsolete"[1], and the advantages of this form of legislation appear to suit present needs very well.

Former techniques permitting joint use of structures either by leasehold agreement or participation in some form of stock company are well understood.

The particular attraction of condominium development is that it introduces the advantages (and disadvantages) of private ownership into areas now associated with renting and other forms of tenure.

1) The enjoyment and flexibility of use that is traditionally attached to ownership is an undoubted attraction for people wishing to own their home. When the growth of urban areas and resultant land speculation increases the cost of land and services to a point where the acquisition of a single family house absorbs the major part of the income of a family, the prospect of owning a home where these costs are

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1. Ellm "Foundamentals of Condominium and Some Insurance Problems", December 1963, Ins. L.J. 733. (Quoted in Rohan and Reskin).

Shared in a condominium apartment or multiple development is a welcome alternative to renting.
Buying, renting, and selling a Condominium unit is normally direct, and under most legislation does not require approval by the management group. A growing equity in the unit has obvious financial attractions, and the financial involvement of the owner in the unit and the development as a whole, undoubtedly improves the care taken of the property. The possibility of providing home ownership for lower income groups is discussed below. If home ownership is to be a visable alternative to rental or either public or private accommodation, the policing of children and vandals and the prevention of damage to the property must be expected from the residents to protect their financial interests, and the joint action of the residents necessary to manage the common areas must develop social cohesion that is uncommon in most rental schemes.

2) Individual owners have the opportunity to finance their own property and obtain favourable, interest rates, down payments, insurance and repayment terms to suit their income and circumstances.

Although present trends indicate that mortgage companies are not anxious to take on the piece-meal financing of apartment units in a condominium, it is likely that the partnership of large-scale developers for major, mixed condominium development may attract money from a variety of sources.

3) The purchase of condominium housing units by small investors is likely to be a significant source of money for additional construction. The return on the purchase of these units should be comparable with investment in other forms of real estate, and the statutory requirement that a management group must be formed to handle the common interest, relieves the individual of maintenance responsibilities other than the interior of the units. With a reduced amount of old property available on the market and construction of very small apartment blocks no longer popular, the small investor can buy into large condominia without difficulty, and since the laws applying to any private property apply to condominium units, the investor is free to sell the property at any time and is not normally tied to restrictive covenants that as has are often a feature of stock company arrangements, and he can command whatever rents his circumstances or the markets dictates, as can the individual owner.

4) <u>The formation of a group to construct apartments or houses in a condominium development would improve the availability of credit</u> from conventional and public sources as does joint action of the stock company, co-operative or self-help type. The availability of credit to groups is generally based on the improved security of grouped action over individual enterprise, and although it is not limited to condominium, it is an important attribute as it does point out a way that this technique can be utilised by lower income groups to acquire their own homes.
One method of achieving credit, based on the "Lifetime Family Budget" concept, is discussed in Appendix 'C'.

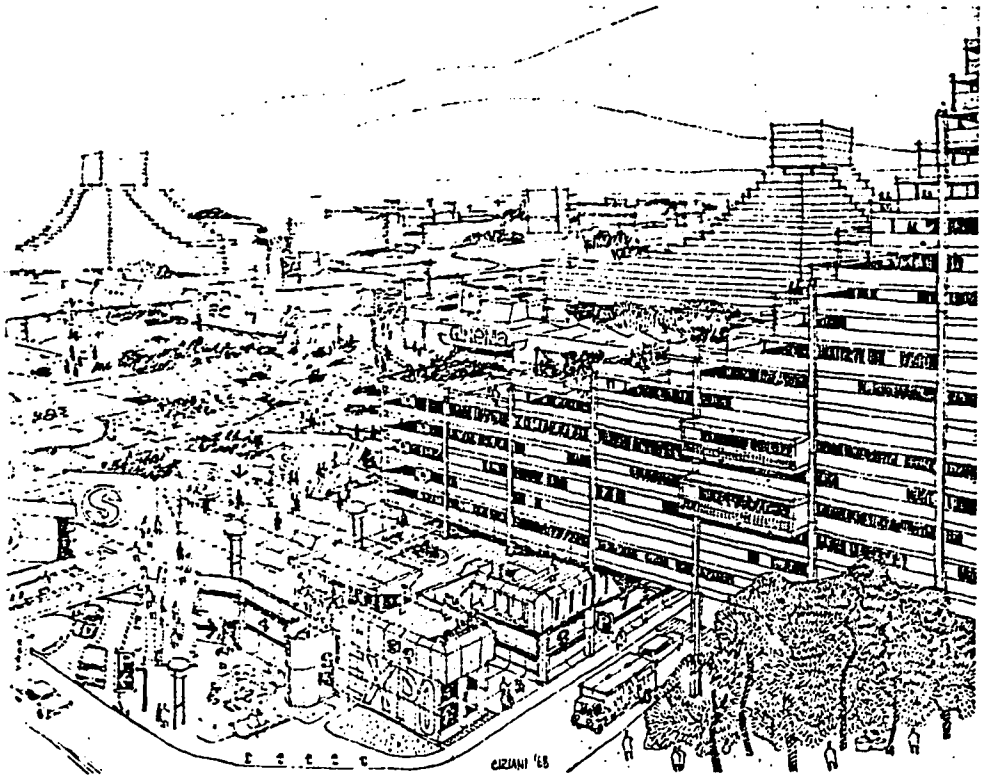
5) <u>For practical purposes, it may be assumed that a Condominium is under single ownership</u>, although individual units are owned in fee simple, the common elements and the need to register a declaration and description of the Condominium make it possible to consider the condominium as being under single ownership, i.e. the owner or owners management body. Since it is an invariable requirement that a Condominium Unit may not be detached from the Common interest it is clear that the above view is sound; individual owners cannot separate from the Condominium, therefore, the condominium as registered must remain a single functioning body.

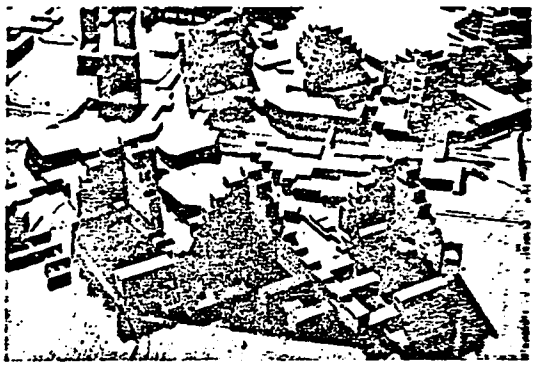
This fact is of great importance in the physical design. For example, required parking space, fire escape routes, services and so on, may safely (and legally) be provided for the whole Condominium, and need not be broken down and attached to individual onwerships as would be necessary if individuals could separate their property from the Condominium.
In order to achieve the most advantage from Condominium development, the essential unity and interdependence of private interest must be acknowledged.

6) It is a form of ownership that allows the easy development of mixed use,multiple-ownership complexes. The scarcity and high cost of land not only suggests the employment of higher residential densities, but increases competition for scarce land between those wishing to build roads, schools, shops, offices, and so on.
Where interests do not directly conflict, it is obvious that the advantages of owners joining together to make the best use of available space are considerable. The type of condominium envisaged here is of developing residential accommodation over supermarkets or schools, parking garages or commercial buildings over freeways or highly complex developments such as Montreal's Place Bonaventure or the Skyline development in Ottawa where hotel, convention space, stores, offices, combine to form a viable balance of uses.

ENOBLE - ÉCHIROLLES

F. Parent, M. Steinebach, G. Loiseau, J. Tribel, M. Corajoud, E. Ciriani





La ville neuve s'intègre dans le schéma futur de l'agglomération dont elle représente un élément majeur avec son centre secondaire à l'usage de toute la zone Sud, le centre principal demeurant celui de Grenoble. C'est, en fait, une « ville » puisqu'elle comporte pour 50 000 habitants : habitat, équipements, emplois industriels et de bureaux.

Le centre (20 ha) groupe, sans ségrégation : bureaux, commerces, logements, équipements sociaux et culturels, foire-exposition, etc.

Les 14 000 logements de tout standing sont répartis en quartiers de 2 000 logements, ayant chacun leur caractère et disposant, à proximité immédiate, d'espaces verts ou sportifs de grandes dimensions.

Les zones industrielles couvrent 60 ha.

A partir du centre, le milieu urbain vivant se prolonge directement vers les quartiers par des rues couvertes, parfois à plusieurs niveaux, aménagées aux rez-de-chaussées des immeubles d'habitation et ouvertes sur le parc ; la promenade peut se poursuivre sur les terrasses-jardins ; ainsi l'habitat domine cette vie grouillante face aux montagnes... Les piétons disposent, en outre, du pont commerçant qui franchit la voie d'accès reliant les parties nord et sud de la ville neuve (galerie couverte bordée de boutiques) et des places principales situées à + 6 m avec parking, boutiques, cinéma, etc., sous la dalle.

A ce parking, en plein centre, on parviendra par la voie principale reliée aux grandes artères grenobloises et aux autoroutes. Un métro aérien suspendu reliera le centre de Grenoble au centre de la ville neuve.

A Grenoble les quartiers nord forment une continuité bâtie bordée par le parc et composée d'immeubles d'architecture et de hauteurs différentes, mais articulée en une ligne continue et souple, de l'autre par les dessertes automobiles et les parkings.

A Echirolles, les immeubles courbes ouvrent sur les espaces libres et le paysage. Ils sont reliés par les équipements collectifs disposés le long des chemins de piétons.

Un parc urbain de 15 ha, large de 400 m, se glisse jusqu'au centre d'où l'on atteint la grande place par des rampes et des escaliers. Un parc des sports de 15 ha également se développe en partie sur Grenoble, en partie sur Echirolles.

En dehors de ces deux parcs, ont été prévus des jardins publics suspendus sur les terrasses de silo à voiture et des unités commerciales du centre.

CONDOMINIUM IS A FORM OF OWNERSHIP THAT ALLOWS THE EASY DEVELOPMENT OF MIXED USE, MULTIPLE-OWNERSHIP COMPLEXES.

NEW PARTNERSHIP PATTERNS

The requirement of Condominium legislation for the formation of an administrative body enabling owners to manage the common property implies that a prerequisite of Condominium is the formation of partnerships, people or uses brought together not only through common need, but because of compatability.

The growing involvement of all levels of Government in the development and redevelopment of our urban centres appears to be breaking down the traditional role of public authorities as controlling bodies.

In a recent article, Roger Starr suggests:

> "..... that one of our activities must be the development of a new form of entrepreneurial engine -- a form that will combine the permanence of government ownership and identity with some of the flexibility of private involvement on a continuing basis".

Of all possible partnerships, that between public and private areas of enterprise would appear to be the most rewarding; in a situation of growing land scarcity in the prime urban areas the powers of the government are necessary to provide land for public needs and for the continued growth and expansion of commercial institutions.

For example, the routing and construction of underground transit systems to connect the outlying districts to the central commercial districts is both a public service for the community in allowing improved access to central facilities, but also serves a public need in keeping the central commercial facilities alive.

New partnership patterns, together with an indication of the complexity that may be expected in future urban developments can be observed in the centre of many cities, and perhaps typically in Montreal. Here the introduction of Zeckendorf's Place Ville Marie set a pattern that has been followed by a series of similar structures, all multi-purpose and with space occupied vertically by what is the highest and best commercial use as anticipated by the developers. Through the centre of the city, connecting the transit routes and shopping centres, the major office buildings, hotels, cinemas, restaurants and other centres of activity, runs an underground pedestrian street, not the result of any particular single planning exercise, but the physical manifestation of the growing awareness of the large private developers that commercial enterprise does not exclude public responsibility. The increasing flexibility of governments involvement in private renewal reciprocates this attitude.

Commercial pressures for joint action arise, at least in part, from the need to attract customers.

Development of cities over the last century has seen a deployment of free enterprise to compete fiercely for available land. The virtual disappearance of available central area land has made competition too expensive for most public and private sectors of society, and further competition will do little more than to increase land price to where the cost of land is an uneconomic proportion of the final development. This is already noticeable in the private housing market, where a serviced lot in an urban area may cost up to 50% of the selling price of the completed house. The rising cost of housing reflects the increasing cost of land not improved living conditions. Many people now consider that speculative dealing in land and property has passed the stage of legitimate commerical activity, and it seems unlikely that growing concentrations of people looking for accommodation will tolerate situations where they are denied the benefits of urban life by speculative interests. To offset the one-sided operations of private enterprise, a concept of public enterprise is needed to mobilise public reaction to adverse private activity and to utilise in an agressive way the vast public land holdings the extent of which are described in the next section. Only by establishing the strong land ownership position of the public sector will public enterprise be in a position to form partnerships on equal terms with strong private interests.

The aims of these new partnerships, must be a return to sane land use economics, with the basis of these partnerships clearly defined.

Partnership requirements are:

1. Concentration

The high cost of land and construction, and the relative scarcity of desirable sites is perhaps the prime motivation in bringing together developers of all kinds. The enjoyment that people traditionally look for in the mixed activity of urban centres has caused a crisis that requires new solutions if the population increase is to be successfully absorbed.

2. Compatibility

If the requirements of any owner of space are, or become a burden on the finances and the goodwill of other owners, the benefit of coming together is lost. Whereas it may not be of much interest to a developer that the stores next to him along a street require certain types of structural performance from their buildings, or special access to their warehouse, or dust free atmosphere, or complicated insurance, it is extremely important to him if they are located above him in a Condominium relationship.

3. Complimentary Uses

People attracted by the operations of one participant become potential customers for the rest. Partnerships that are formed must offer more permanent advantages than initial capital savings on land and construction. The grouping of activities that have common requirements can avoid costly duplication.

These common elements may be anything from services and foundations to data handling equipment, swimming or typist pools, tenants from residential spaces that use commercial facilities or a transit terminal. Joint use of land and buildings by commercial interests are already common, although still isolated in dispersed groups. The traditional grouping of farmers gives rise to street markets, cinemas and night clubs locate together to form tourist traps. The clothing trade workshops are close to the retail outlets - an example of commercial symbosis which is not common between manufacturerer and retailer, but is often the life-blood of the retail trade in its relationship to the consumer.

The new form of "entrepreneurial engine" that Mr. Starr suggests can only be viable if the public authorities accept as being in the best public interest, the three principles set out above. This would undoubtedly imply that public authorities must recognise the generally unpalatable fact that before action is taken, extended discussion with private enterprise is necessary to arrive at mutually beneficial solutions to urban development, including financial benefits to the municipality.[1]

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1 See Appendix 'B'

A balance of these benefits must be made, so that while allowing benefits accrue to the private developer involved, public benefits are spread over the community at large. It is obviously undesirable that a Municipality, with its wide powers to purchase or expropriate land, and with built-in tax support, should operate on a strictly commercial basis. Although cities have run restaurants, health clinics, day care centres, public housing projects, transportation services, and other near-commercial enterprises, they have normally assumed these responsibilities in non-competitive situations when private enterprise failed to provide or maintain essential services. Some method of allowing public bodies to operate on an acceptable commercial level will be necessary. The institution of city managers indicates an awareness of the growing notion of public enterprise and the complexity of public management. It is possible that this office needs re-examination to allow a city to become a viable candidate for commercial partnership with private interests.

To enter into partnership relationship with private enterprise, public authorities must re-define their role. As custodians of public wealth, and as the largest landowners in any urban situation [1], it may be necessary to examine the way they have handled their public trust.

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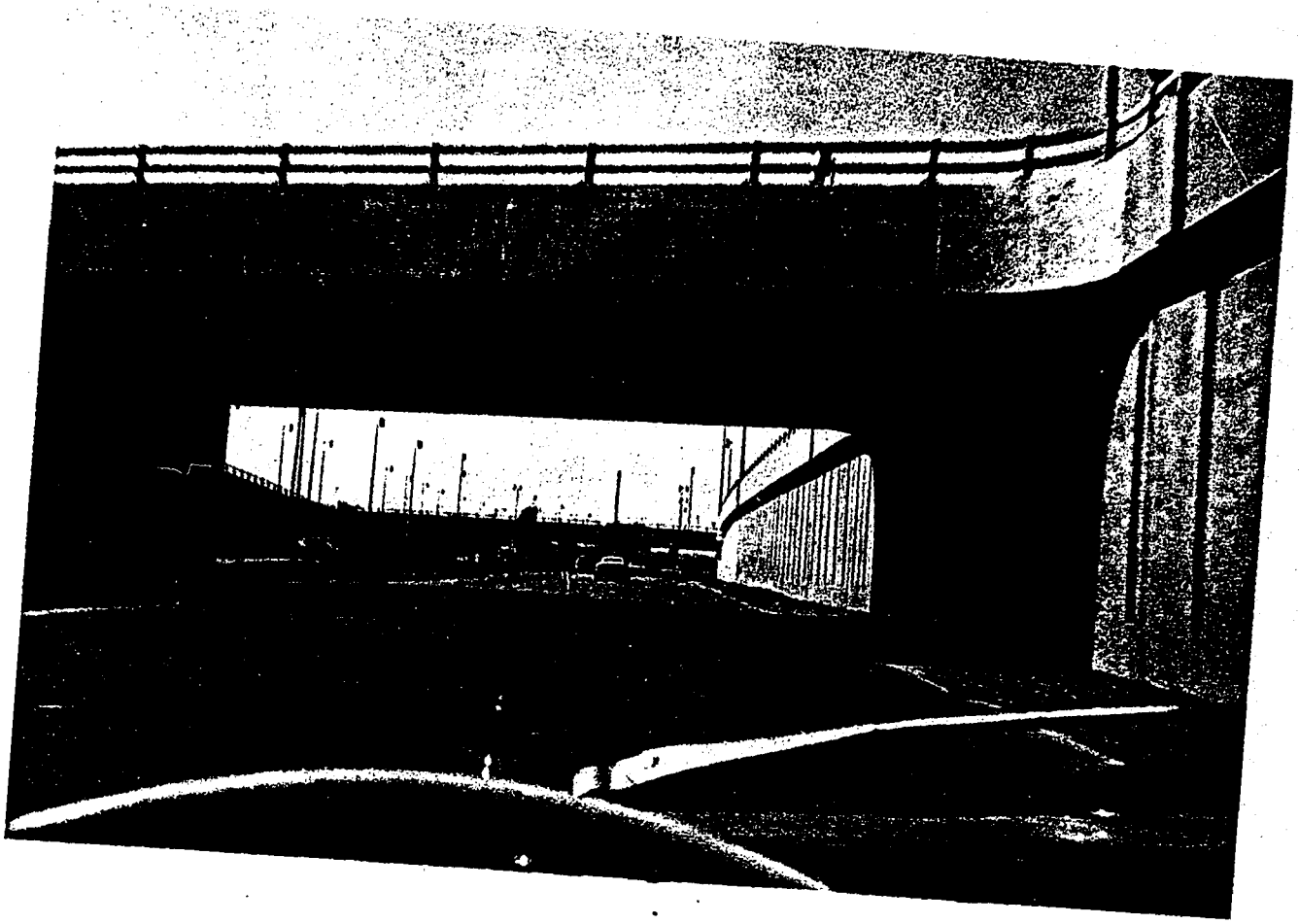
1. The public investment of Urban areas is examined in the next chapter, as is the enormous potential of the unused Air-Rights.

Has the traditional public withdrawal from commercial activity been in the public interest? Has the property owners right to public access and service to his property blinded the municipal government to its own obligation to manage public money in a business like way and to develop public land, including freeways, access roads, school, park, and other lands for the good of the Community.

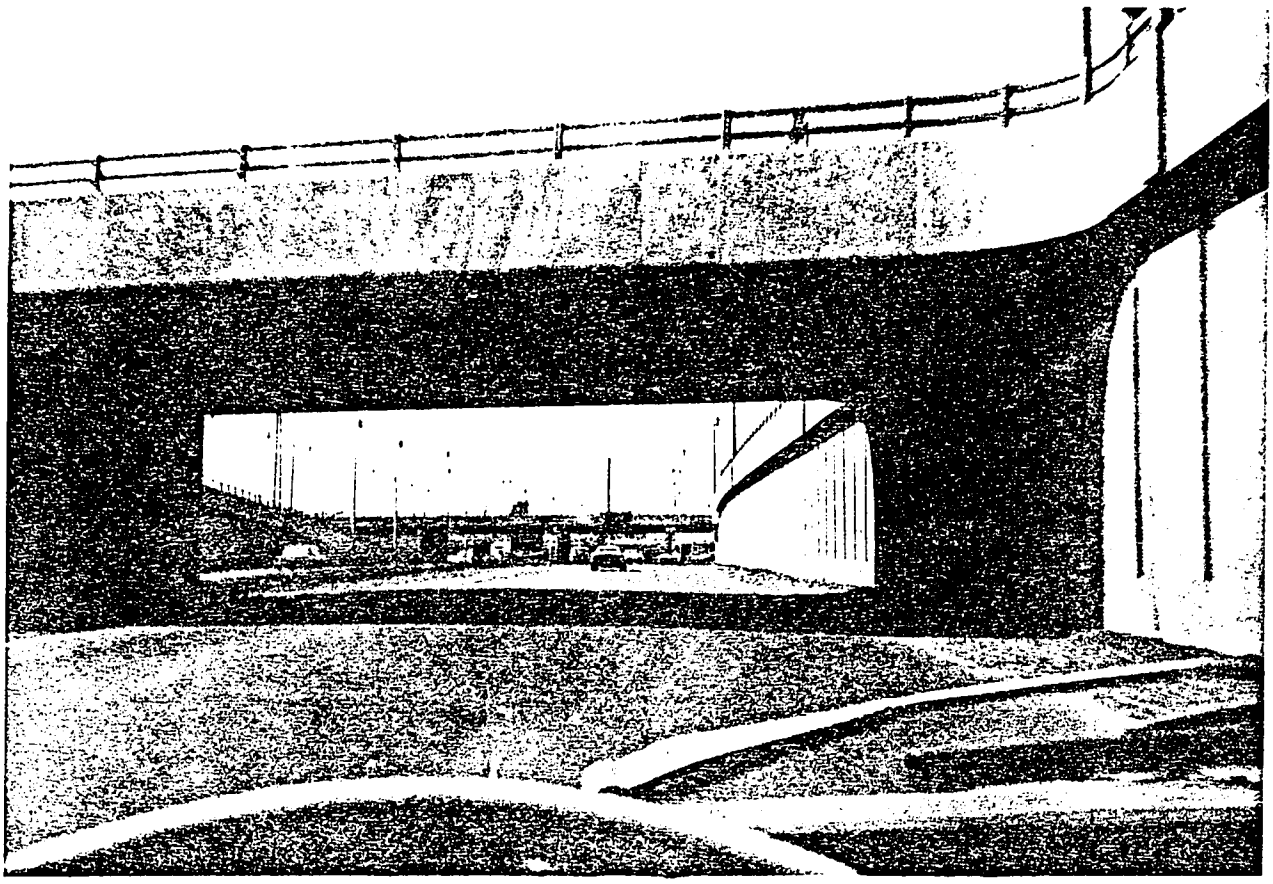
As the owners of massive amounts of developable space in the form of air rights over roads, with much of it being in the most desirable areas of cities, the municipality is in a remarkably good bargaining position. Because of this, it is most likely that co-operation can be achieved with private interests without difficulty. The basis of a workable public/ private partnership might well be the unexplored space bank that exists over land that is held and used by public bodies, and in the possibilities of sale, lease, exchange, or joint use of this existing space as an available commodity which may be utilised to achieve good planning.

Condominium is the legal device that could make this space available for partnership development.



DECARIE BOULEVARD, MONTREAL.

AS OWNERS OF MASSIVE AMOUNTS OF DEVELOPABLE SPACE IN THE FORM OF AIR RIGHTS OVER ROADS, THE MUNICIPALITY IS IN A REMARKABLY GOOD BARGAINING POSITION.



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SECTION 5

THE SPACE BANK

Valuation of Air Rights

Putting a dollar value on air rights is complicated by the absence of any established market for this commodity, and the comparatively recent introduction of legislation dealing with the sale of space and the management of properties in multiple ownership. In order to put a price on air rights it is necessary to isolate factors that influence their value, and form this attempt to construct models from which a developer may make a reasonable assessment of cost.

Studies have indicated that 75% of the total land value may lie in the air rights where the cost of land is high and the prime use is low slung and does not itself occupy significant portions of air rights. As the cost of land decreases, this percentage will drop until it reaches a point where the cost of air rights approaches the cost of land and does not become an attractive investment, or where no other economic advantage is gained by the acquisition of air space.

The development of air rights may be feasible even where there is no economic advantage, for instance when there is a scarcity of available sites. This could be the situation that Governments face in the provision of housing in urban areas, where the alternative to the development of air rights is the acquisition and clearance of existing structures with the consequent problems of relocation of people and activities, or in business where the proponent of some commercial enterprise is attempting to locate in a central area where convention sites are unobtainable even at very high prices.

Amerikanischen Bürgern wird vermehrte Einflußnahme auf Autobahnentscheide gewährt

von Ueli Roth

1
Die sechsspurige Central Artery durchbricht historisch und sozial wichtige Gebiete von Boston und trennt das Wohngebiet der Italiener von der übrigen Altstadt ab

1
La Central Artery, grand axe à six voies, traverse des régions bostonniennes d'importance historique et sociale et sépare la zone d'habitation italienne de la vieille ville

1
The six-lane Central Artery slashes through districts of Boston that are important from the standpoint of both history and social structure, and cuts off the Italian quarter from the rest of the old town

Amerikanischen Bürgern wird vermehrte Einflußnahme auf Autobahnentscheide gewährt

von Ueli Roth

1
Die (sechs)spurige Central Artery durchbricht historisch und sozial wichtige Gebiete von Boston und trennt das Wohngebiet der Italiener von der übrigen Altstadt ab

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La Central Artery, grand axe à six voies, traverse des régions bostonniennes d'importance historique et sociale et sépare la zone d'habitation italienne de la vieille ville

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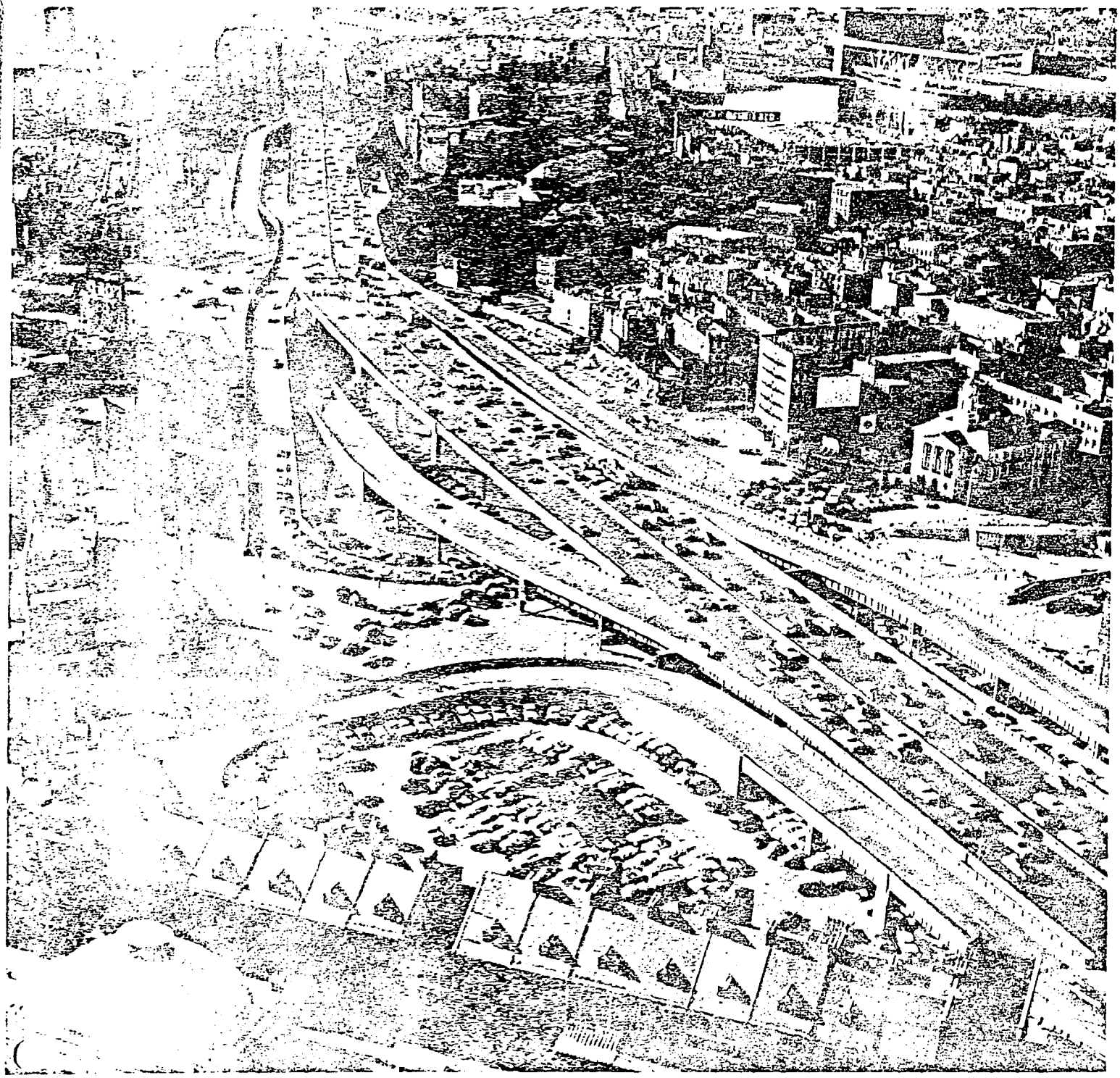
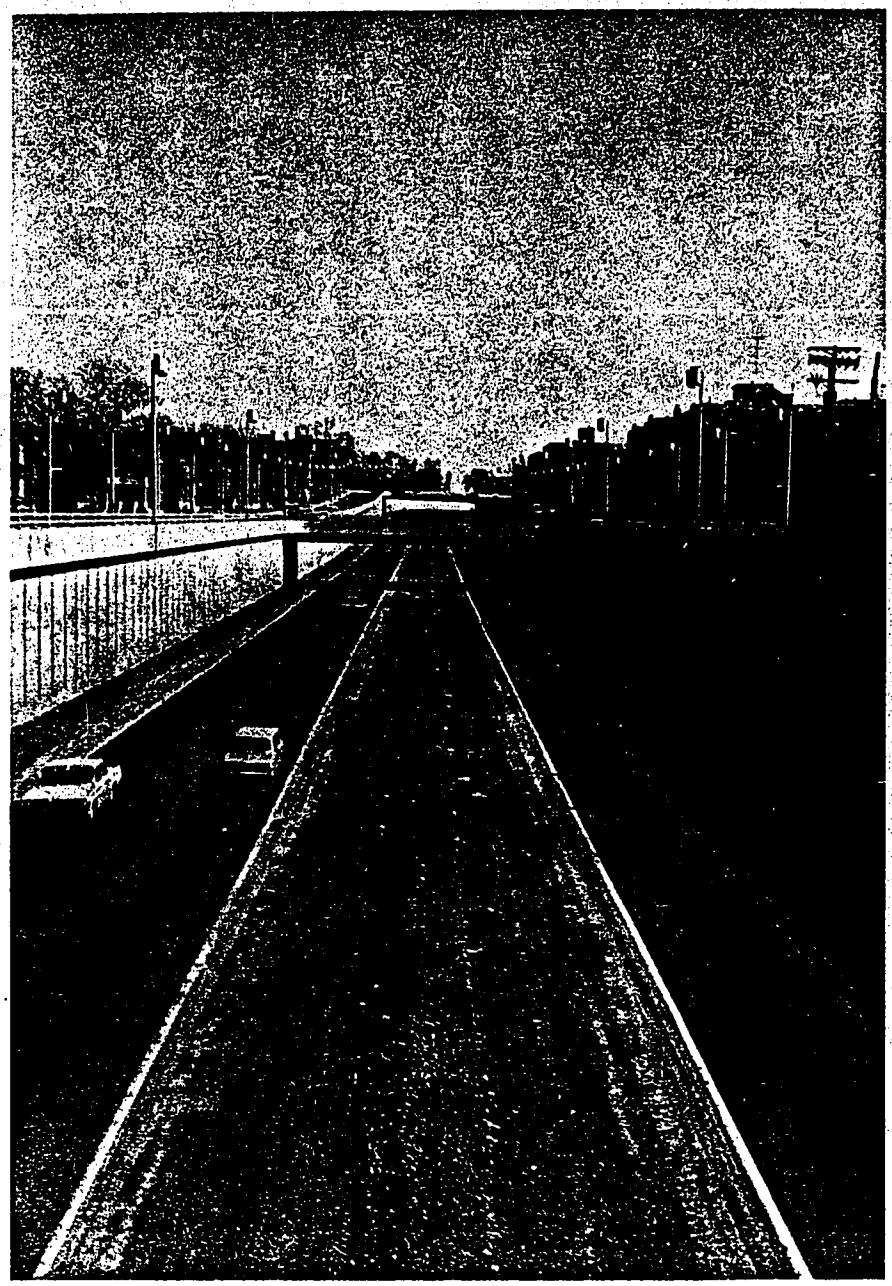
The six-lane Central Artery slashes through districts of Boston that are important from the standpoint of both history and social structure, and cuts off the Italian quarter from the rest of the old town



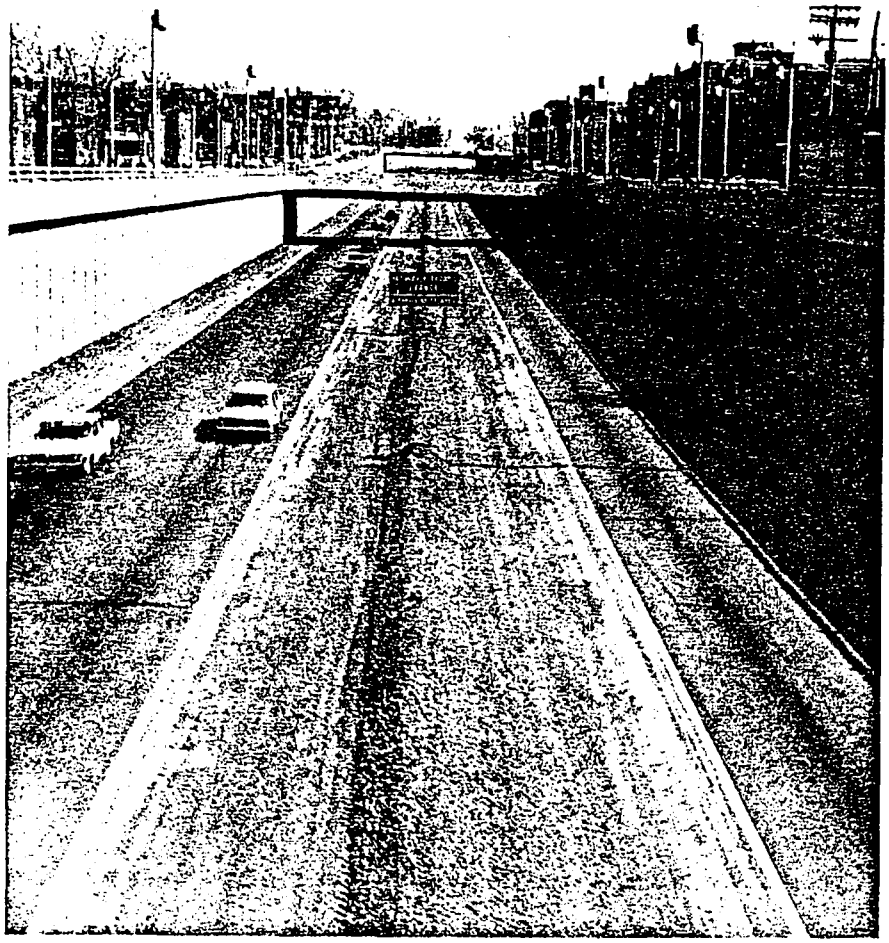
These may be values that cannot be conveniently stated in real estate terms, but could be of great importance for example to agencies concerned with the welfare of the city.

It is clear that if 75% of the total land value lies in the air rights this percentage of the outlay on the site is normally lost if it is not utilised by the purchaser. The method of utilization will vary, the space may be held against future needs of the prime owner who may be reluctant to limit his future vertical expansion, or his ability to demolish and clear the site for rebuilding. Certain uses may not find compatable partners, and they might only be viable with the air rights acting as the buffer necessary for their acceptance in an urban location. However, if the concept of complimentary uses discussed in the last Chapter is valid, and if zoning restrictions are revised, to allow the horizontal division of types of occupancy, the sale of this space will be an obvious economic benefit to both the primary and secondary owners.

Further savings may be expected with the construction of buildings, and in spite of the increase in the capacity of the necessary services, the probable strengthening of the foundations and sub-structure, the compromise situations that would need to be accepted to provide suitable support and access to differing uses, it is certain that the savings from the joint use of facilities would be substantial.



IT IS UNLIKELY THAT MUNICIPALITIES WILL BE ABLE TO BUY LAND FOR SUCH LIMITED USES IN THE FUTURE.



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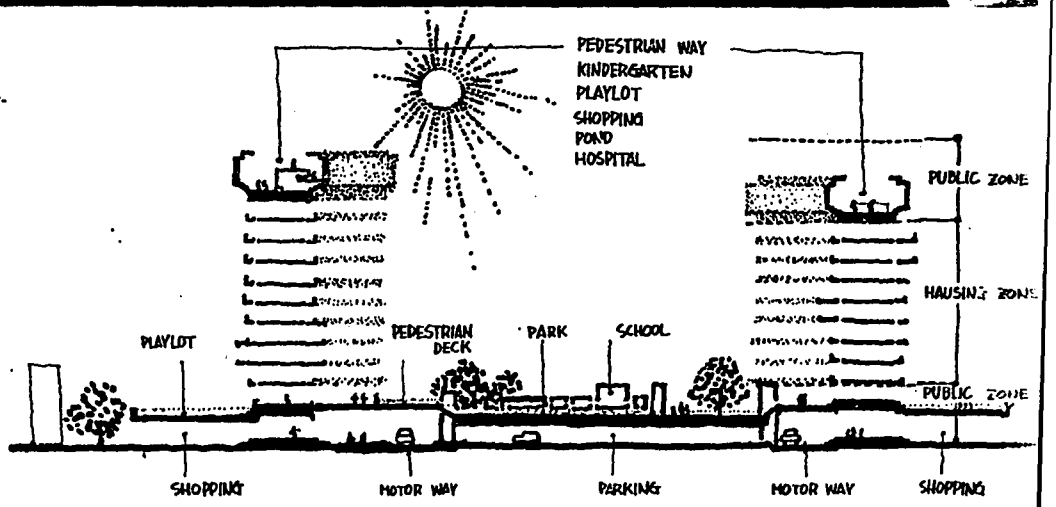
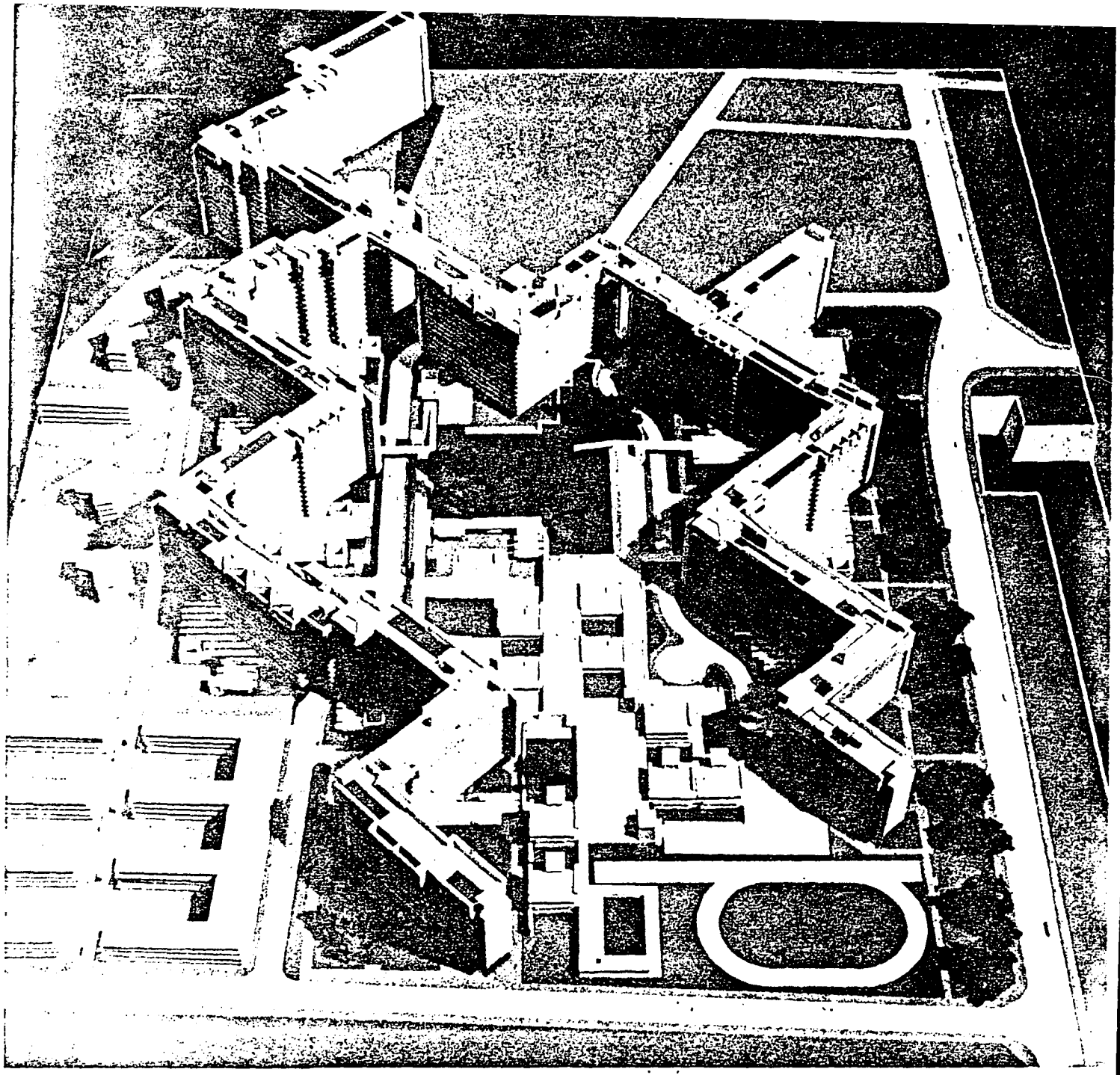
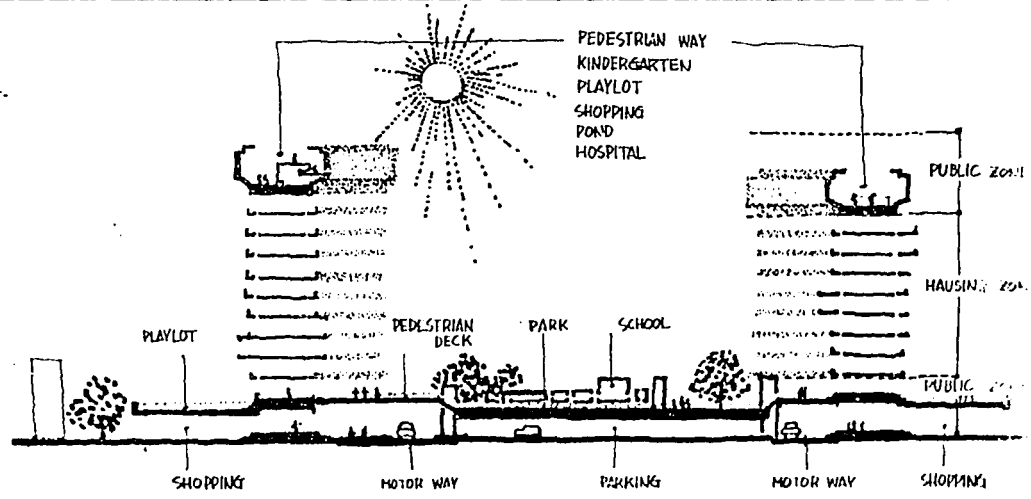
(*above*) *Model of housing in Hiroshima.*
(*right*) *Hiroshima housing buildings section.*







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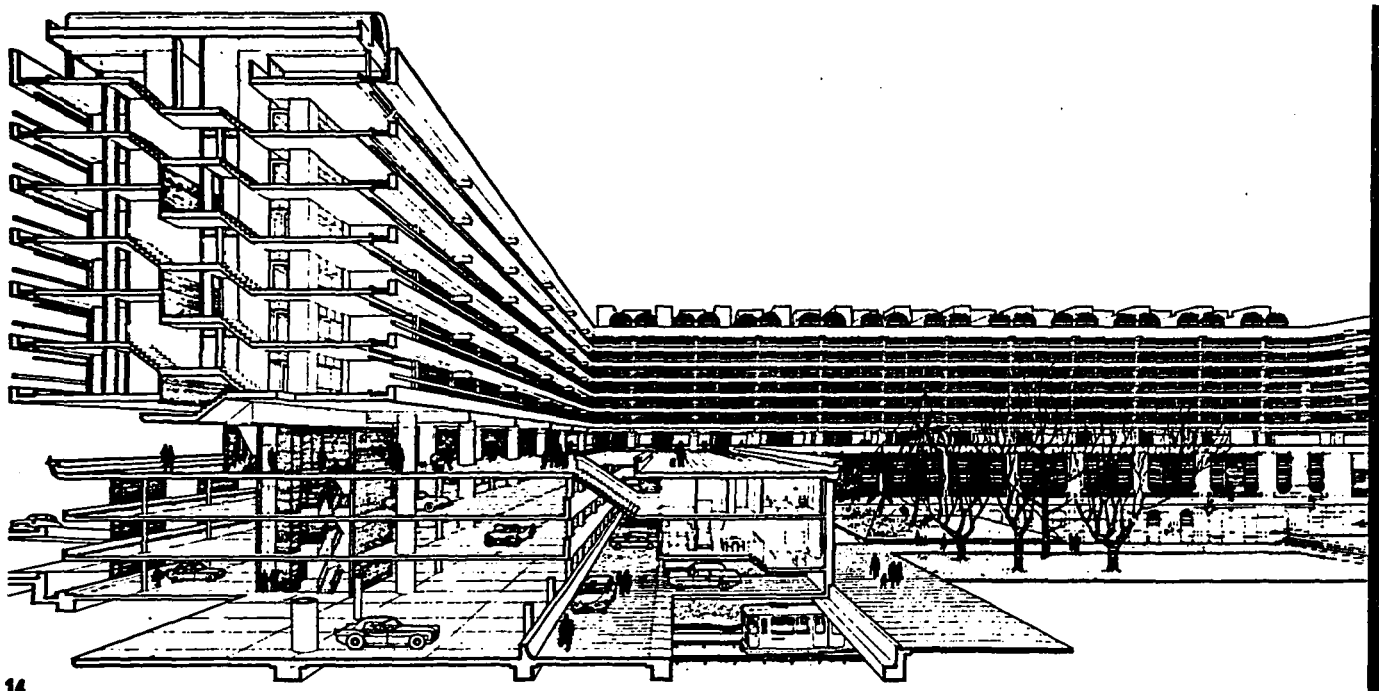

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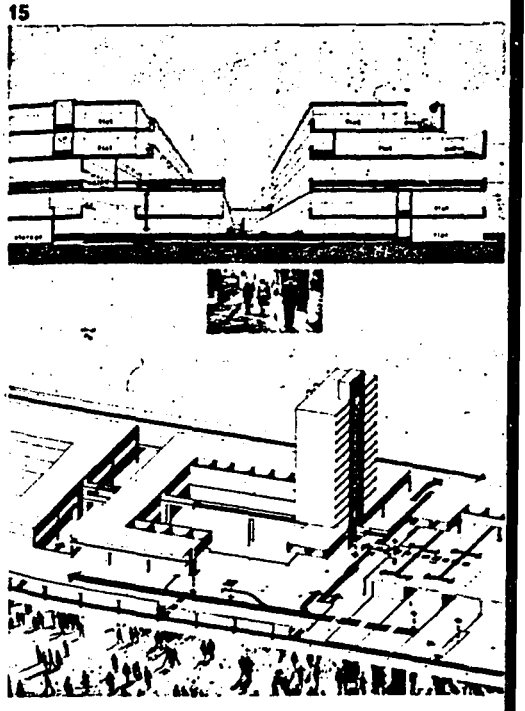
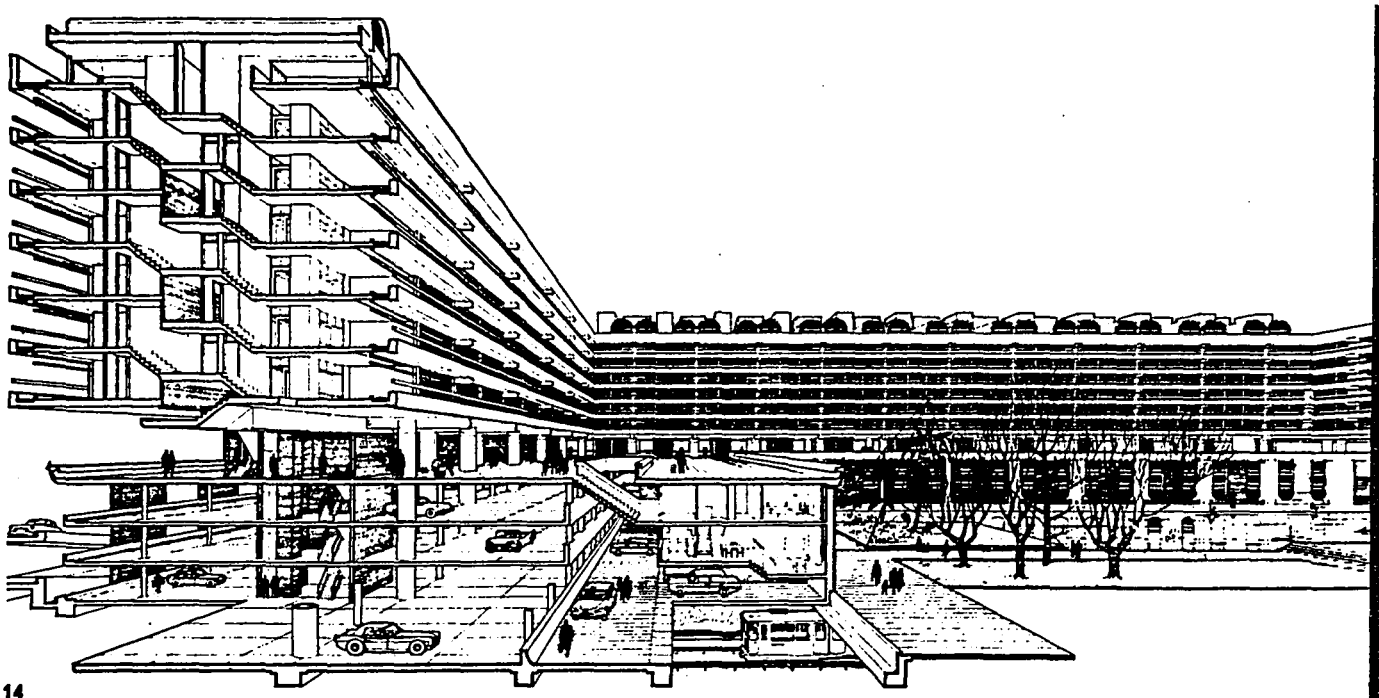


12 In the Barbican feasibility study, the approach was to provide as many dwelling as possible with a sense of privacy. The bulk of the scheme was therefore planned in the form of four-storey buildings rising from the ground level, which was planned as a pedestrian precinct. All the service roads and garages were located at basement level. The four-storey flats and maisonettes were planned round small courts. The courts providing approach to the entrances to the buildings were linked to each other by pedestrian alleys, and were flanked by vertical elevations

13 Elevation of a portion of a typical terrace clock with the open podium in the middle, the flats and penthouses above and the maisonettes below

14 This sectional perspective illustrates the relationship between the planting in the large courts within the scheme, the podium circulation level and the flats above

15 Peterborough feasibility study. At first floor level is shown a road, and a drive-in car parking and service delivery area, sandwiched between the shops below and flats above. Road bridges link the different sections of development so that cars can move easily from one part of the city centre to another. Low flats are indicated approached by covered ways, some of them planned with private patio gardens. This form of horizontal residential development can be economic to construct, avoids the need to include lifts and, being spread out, provides shelter for the car parking areas. Further flexibility is indicated on the right-hand side of the sketch where flats are shown behind the shops and below the traffic level facing across a ground level court. The lower sectional isometric drawing illustrates the principles of segregated circulation with those walking on foot at ground level while traffic circulates and parks at first floor level



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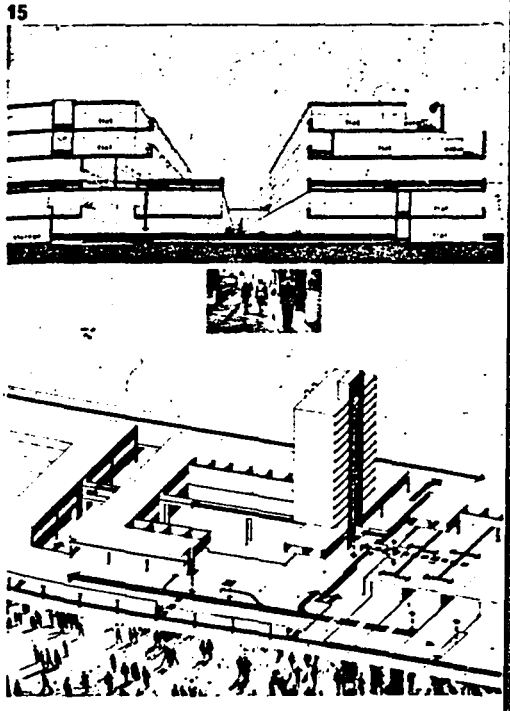


As with all partnerships, the possible savings in upkeep and in maintenance costs, in tax remissions, insurance premiums, policing and in similar operational outlays will depend on the degree of agreement and ingenuity displayed by the partners, but is an element that must be considered in any assessment of values.

A model developed by Walter R. Kuehnle, M.A.I. for the estimation of an air rights interest over a right-of-way indicates how an assessment of cost can be made for a straight forward situation where the original value of the land is known before taking the three-dimensional interest, and it is given here, together with his comments on some of the design aspects.[1]

KUEHNLE MODEL FOR COMPUTING THE VALUE OF AIR RIGHTS[2]

$v - (x + y) - I = a \quad \therefore v - a = r$

Where:

V = Value of the land before taking three dimensional interest.

X = Economic value lost due to reduction of functional utility (net income) in modifying building for construction on the "A" interest.

Y = Additional cost of constructing the building under the terms of the conveyances creating the "A" and "R" interests,

I = Interest on investment for the additional period of construction as a result of the divided vertical interests.

---

1. See appendix 'A' for means of assessing the route/mile cost of a highway.

2. American institute of Real Estate Appraisers. 'Case studies in air rights and subsurface tunnel road easements.' 1965 Section I. Page 1.

A = Value of air rights after taking of three-dimensional interest.

R = Remainder three-dimensional interest.

PRIMARY FACTORS IN VARIANCE OF "A" AND "R"

The terms of the rights and obligations of the two interest under the conveyances will vary. As seen above, A + R = V. Therefore, the value of the three-dimensional interest for a roadway is, in addition to the loss in value due to reduced net income, the additional cost of constructing the building over the roadway.

Accordingly, as the burden of construction cost, interference with efficient utility and cost of maintenance of the building that can be built on the "A" interest, the burden of the "R" interest increases and the value of the "A" interest decreases. This reduction in value of "A" may be minimized:

1. By the highway engineer in the design and planning of highway in:
    a. Avoiding unnecessarily long spans without supporting columns.
    b. Conforming the location of supporting bridge columns to bay modules suitable to the highest and best air-right structure.
    c. Limiting protective clauses in favour of the "R" interest to practical necessity.

2. By the highway attorney by:

   a. Avoiding excessively protective clauses in favour improvement on the "A" interest.

   b. Eliminating excessive protection clauses in favour of "R" against unlikely contingencies after completion of the "A" improvement.

What Mr. Kuhule is saying is that success of an air-rights development depends heavily on good-will and co-operation between all parties.

A cautionary word is probably needed here, since the value of land is always unstable. The limited exploitation of air rights is not likely to have resulted in noticeable fluctuation in land values, but an important consideration is the possible reduction in the cost of surrounding land as the result of large scale proposal to utilise air rights over roads. The injection of these air rights for building purposes into an area that was previously considered fully developed would tend to ease the demand on conventional sites and to reduce the cost of both the conventional site and the air rights, factors which should be reflected in the construction of the model.

Neither can the valuation of air rights be based on direct application of a model without careful consideration of the use to which the space is to be put, the effect on surrounding property and the revenue that it may be expected to produce.

Demand on both conventional sites and on air rights will effect the potential value, but the demands on the latter may be significantly different from other market trends since the increased need for compatability of uses will limit the size of market available to the vendor, and exclude many uses that could conventionally exist side by side, for example, it is doubtful that a department store would locate above another department store, although they could be complimentary neighbours along a street.

COMMERCIAL DEVELOPMENT OF AIR RIGHTS

Before the development of air rights can be commercially viable and an estimate made of their value, three conditions must exist:

1. Present or anticipated high land costs create a demand for development space.
2. Proposed uses are compatable and complimentary.
3. A partnership situation where each use would be modified to mutual advantage.

It has been stated that the use of air rights should not be considered an activity that would be open over all streets. Assuming that the three conditions given above exist, where would air rights developments be of particular use?

As a gemeral rule air rights development as a commercially viable activity should only be expected where land costs are higher than the construction in the air, of an equal site. It is clear that no one would construct a site if he could buy adjoining land more cheaply.

However, this must be qualified; construction costs must include the loss to the developers of basements and cheap space, and the need to supply this in high level, and more expensive parts of the building. To offset this, it is possible that by using air-rights a site can be made available where no land is up for sale, and the change to locate in a commercially desirable, but hitherto unavailable area, may make some initial financial loss worthwhile in the long run.

For purely commercial activity, viability could be expressed broadly as:

$$Cl=(Car + Cp + Cb + Loc)$$

Where Cl is Cost of adjoining land.

Car is cost of air rights.

Cp is cost of a constructed platform.

Cb is cost of providing basement facilities at a higher level (storage, heating, parking, etc.).

Loc is the financial advantage of the location over an extended period.

To make this model work, it is clear that the cost of constructing a platform and the necessity of putting basement facilities at a high level requires the air rights to be available at a nominal sum.

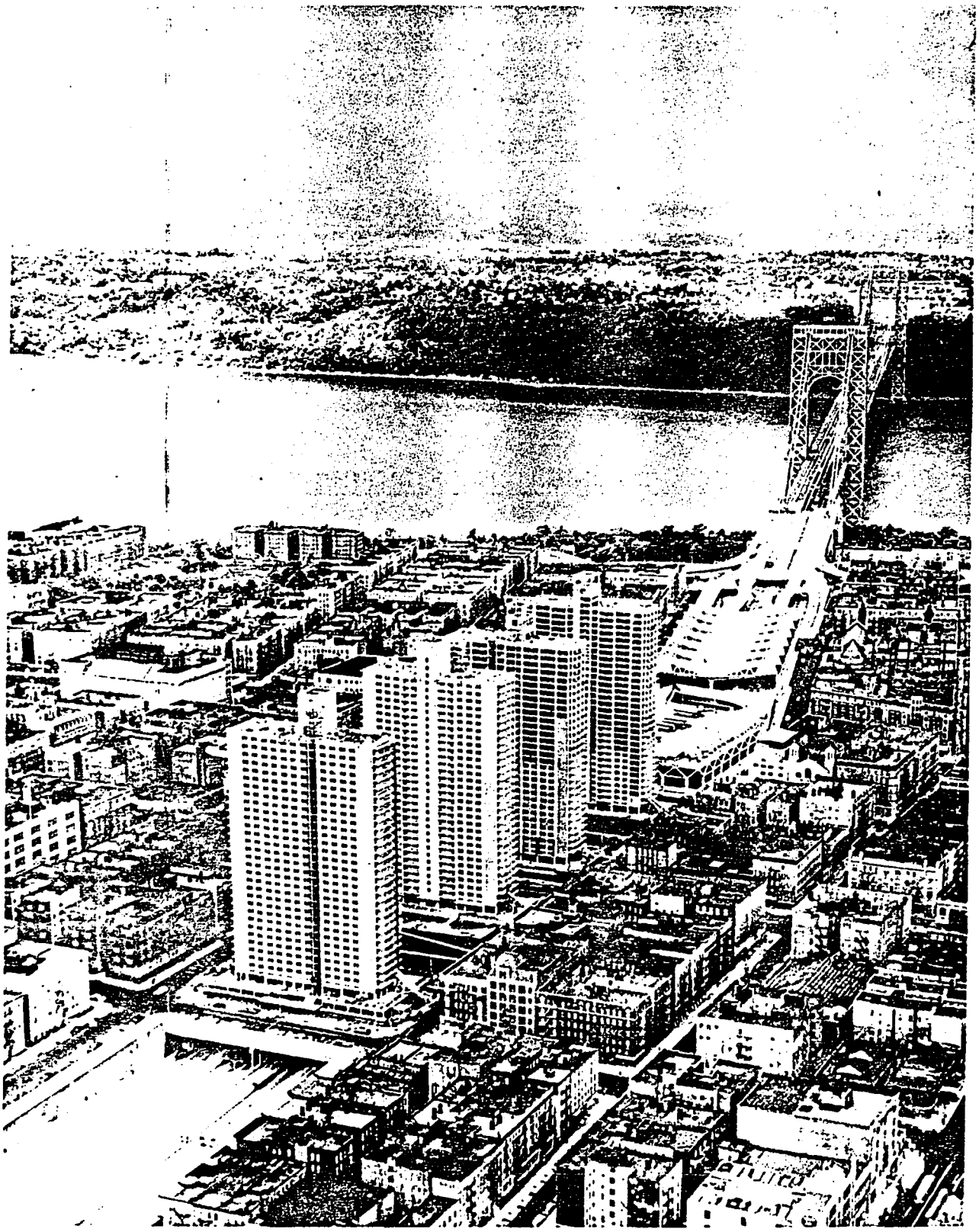
When apartments were built in a space over the approaches to the George Washington Bridge in New York, the air rights were not given a fixed price, but developers were required to bid for this space.

The Kratter Corporation was the winner, bidding $1,065,000. While this can hardly be considered nominal, it does represent a reduction in price of some $885,000 over a hypothetical adjoining piece of land, and resulted in an estimated saving of $1,110 per dwelling unit.

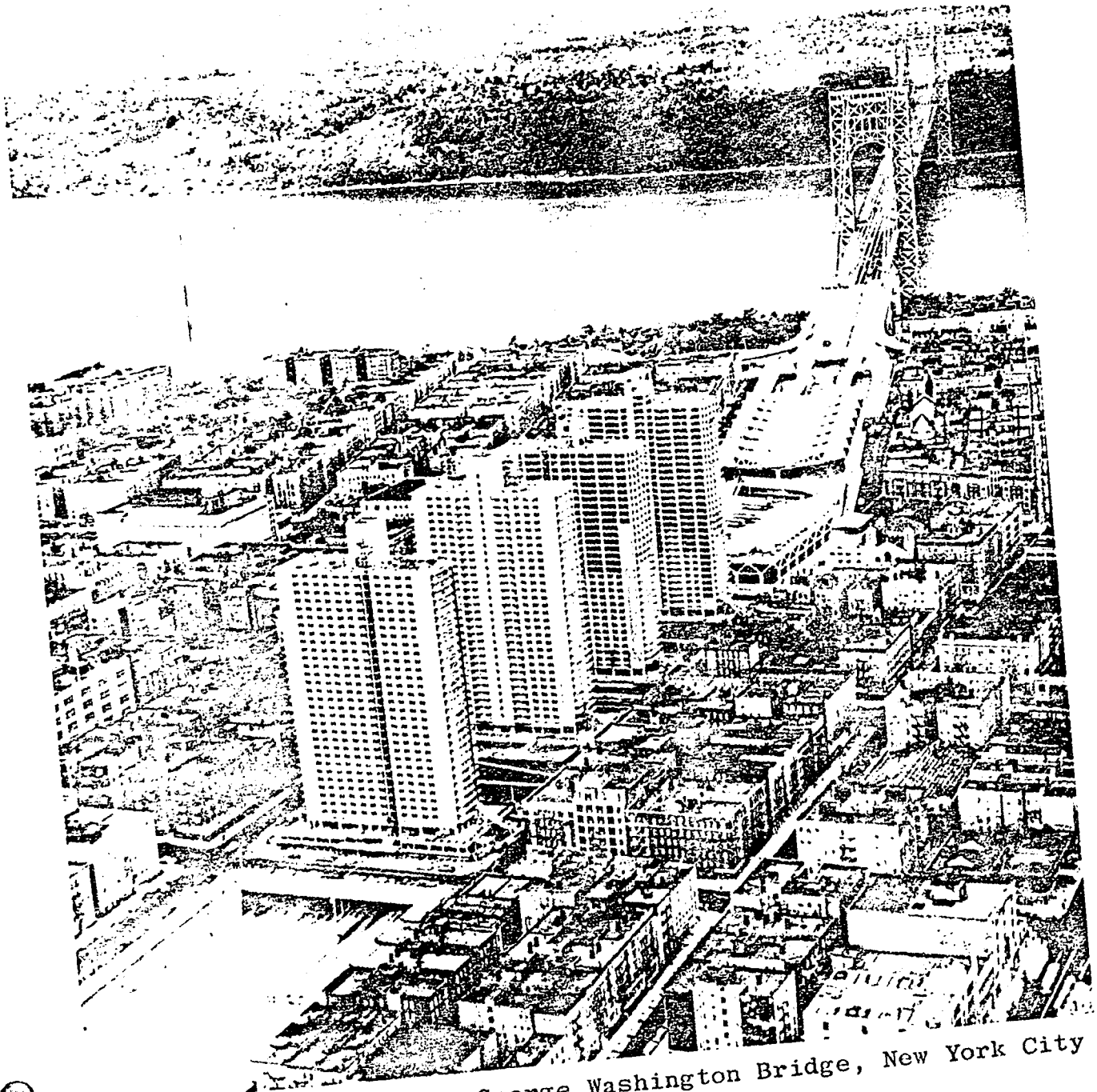
From this and other examples, it would appear that air rights must be available at not more than half the cost of adjoining land, and although it is dangerous to base a conclusion on so few instances of this type of transaction, it seems likely that this is a reasonable rule-of-thumb for commercial feasibility.

The method adopted by New York for disposing air space appears to overcome the difficulty of pricing this asset, and although it is quite reasonable to assume that many public bodies would sell or rent air rights at straw prices in exchange for tax and other accruing benefits, some type of auction would retain the competitive element that is the essence of North American commercial activity.

Naturally the use of air rights becomes increasingly feasable if support for superadjacent structures were built directly into the development of the prime user, rather than having to be installed later.



Highway tunnel approach, George Washington Bridge, New York City



Highway tunnel approach, George Washington Bridge, New York City

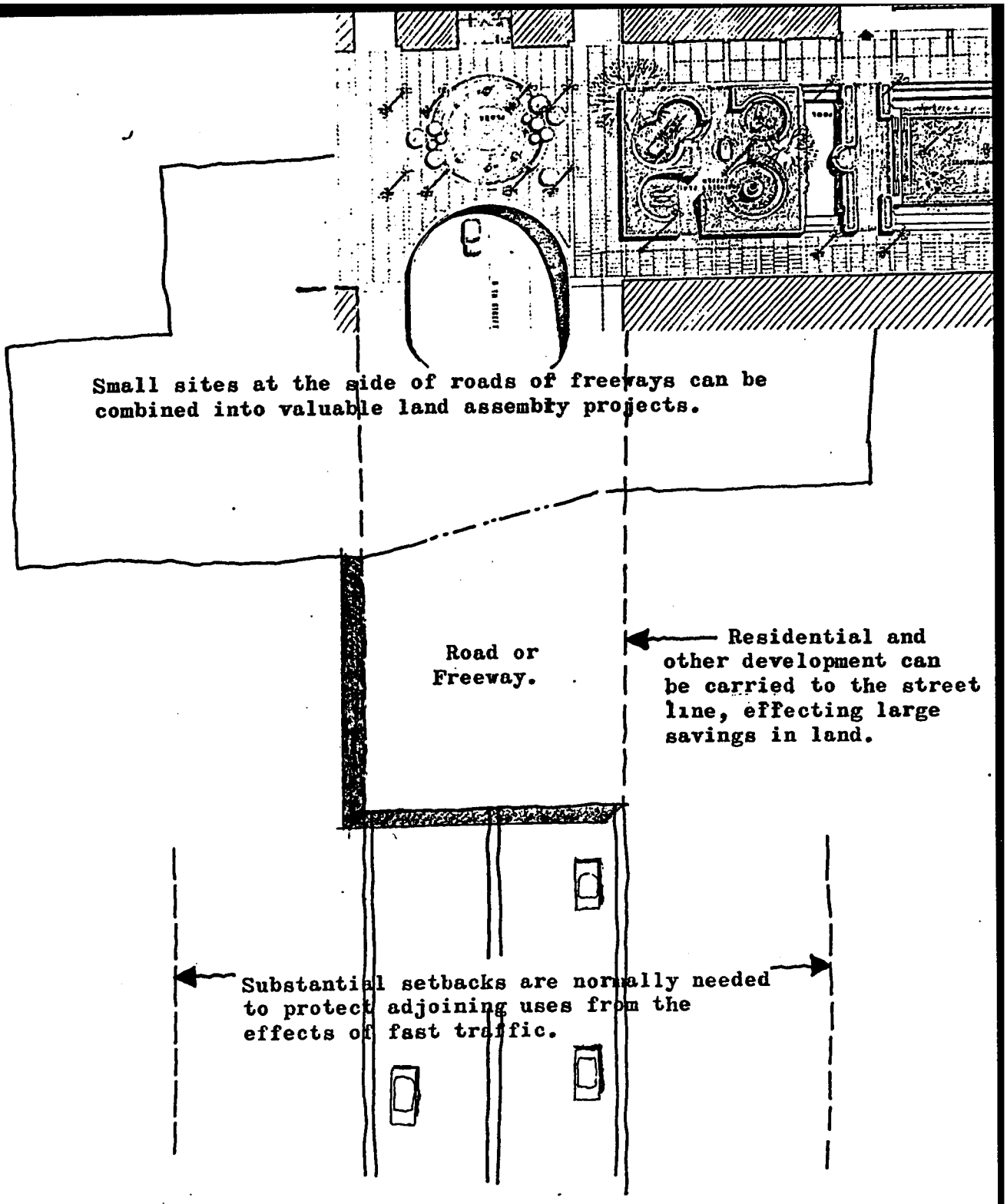
There are a number of additional benefits that can accrue from the use of air rights, or from the enclosure of key sections of major highways.

The requirements governing the provision of setbacks is normally based on the assumption that the road will constitute a source of noise, odour and visual disturbance. This can be ignored when the road is covered, and the value of the site is obviously increased since none is needed as a buffer strip.

The size of the setback is often considerable, in residential areas 90'-0" is not uncommon.

A second situation where the gain from using air rights over a road greatly increases the value of adjoining lots or residual lands left at the side of a major road is that where these parcels can be assembled into significant sites across the right-of-way.

In both instances there is an increased flexibility and convenience for the developer, and the gross waste of land now associated with major road construction can be largely avoided.



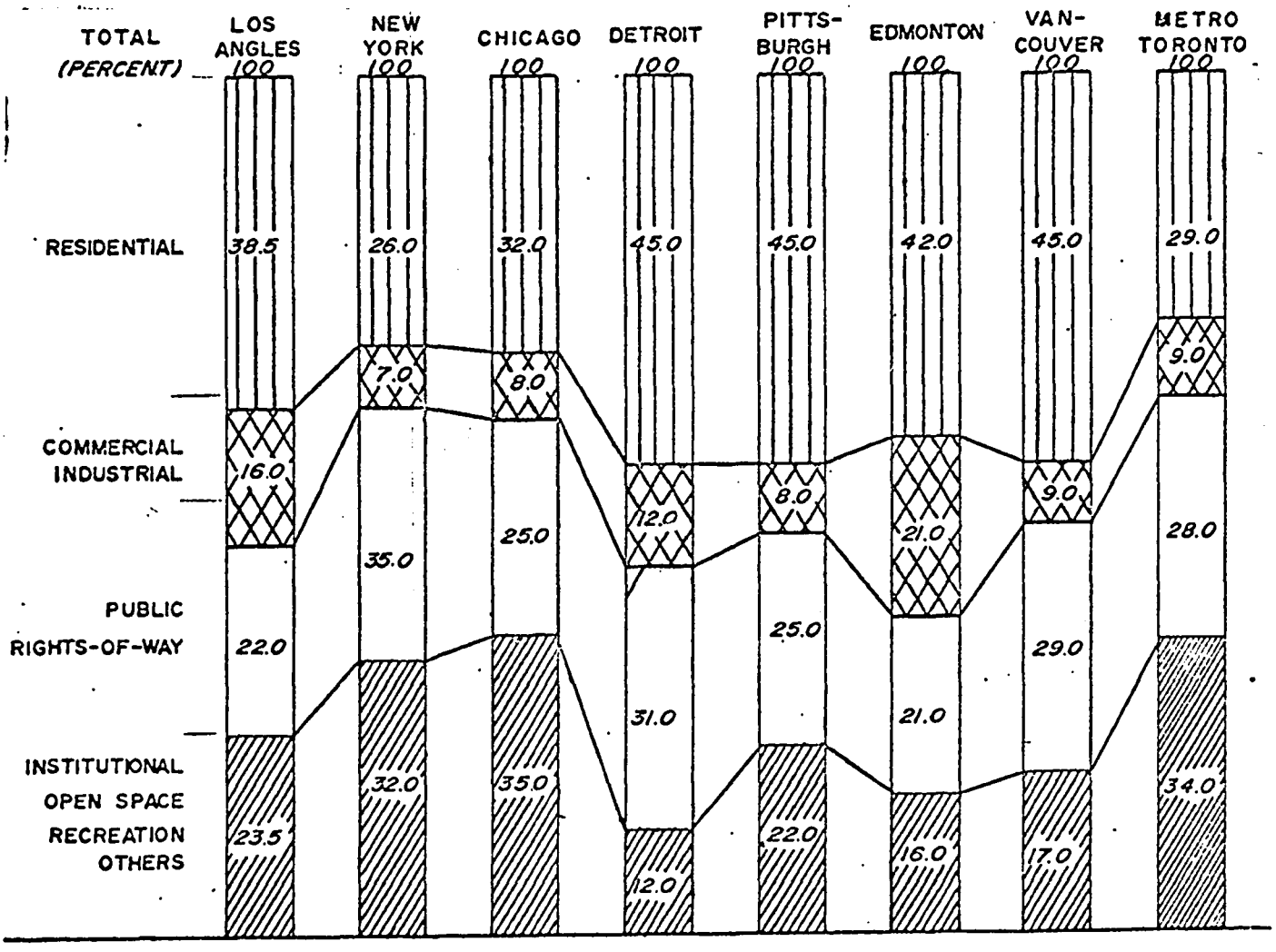
ENCLOSURE OF THE FREEWAYS CAN RESULT IN SIGNIFICANT IMPROVEMENT OF ADJOINING PROPERTY.

THE EXTENT OF THE PUBLIC INTEREST IN LAND AND AIR RIGHTS

The following graph indicates in broad classifications the percentage of urban land in use in a number of North American cities.

If it is assumed that residential, commercial, industrial and the group listed under institutional are all in private ownership, then it may also be assumed that the remaining 27% of the city land is in public hands as rights-of-way.

In fact the percentage of public land will tend to be higher, as most cities have large holdings of open space and recreation areas, and often control significant areas of residential property.



The sobering fact that in our land hungry cities, a minimum of 27% of all developed areas, is taken up with surface transportation right-of-way is hard to justify, particularly when it applies to the developed area classed as Residential where the use of roads is minimal, and mainly related to access and servicing of houses.

If one supplies this figure to an area of (say) half a mile around the central business district where high land values might support the findings of past studies that 75% of the total land value may lie in the air rights, we obtain the following hypothetical figures:

Total area	21,896,160 sq. ft.
Assume average cost at $20.00 per sq. ft.	$ 437,923,200.00
27% of total cost (ie. R.O.W. lands)	$ 118,239,264.00
Value of prime use (ie. 25%)	$ 29,559,816.00
Value of air rights (ie. 75%)	$ 88,679.448.00

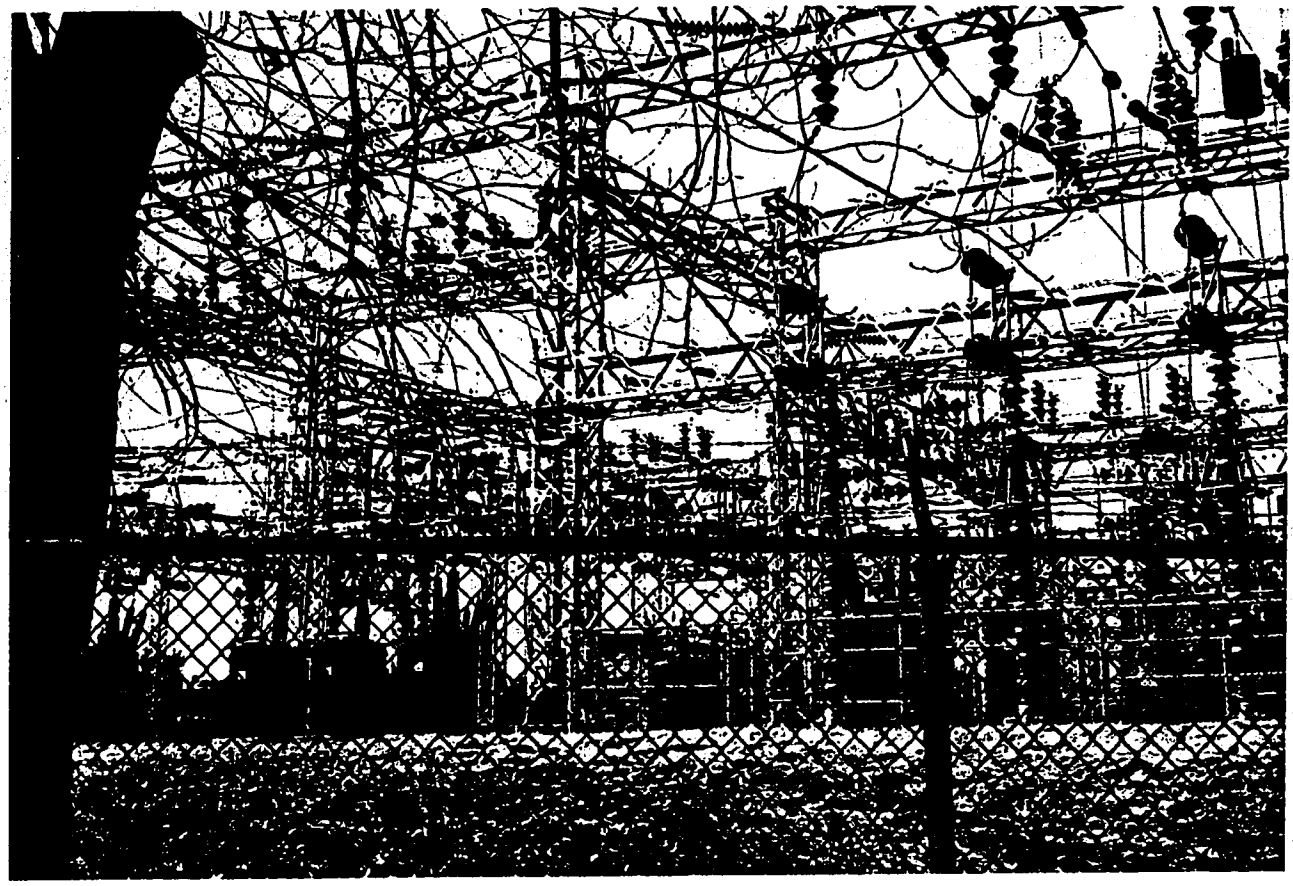
Although it is not the intention of this study to suggest that air rights over all roads and freeways should be leased or sold for development, it is clear that the municipalities control an investment of public money that is under-utilised, and which with further study could be the basis of a public space bank, available for the manipulation of public and private land transactions in the public interest.

The extent of this bank should not be limited to public rights-of-way as has been done in the previous illustration, but should be expanded to include all public holdings, for example,

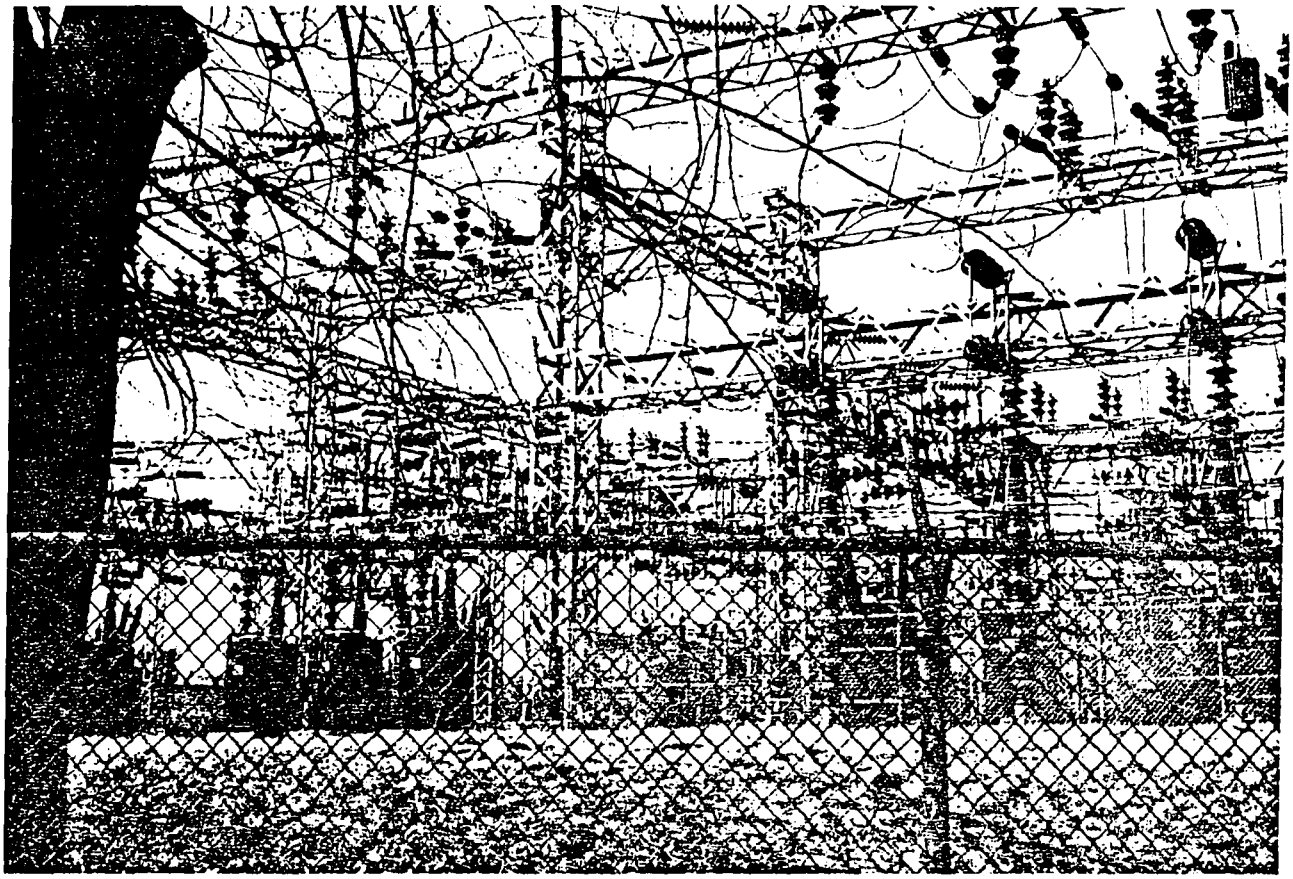
Rights-of-way	Roads, railways, canals, walks, bus routes, metro lines, terminal, parking.
Recreation	Parks, swimming pools, auditoria
Institutions	Schools, technical schools, hospitals, clinics, markets
Other public uses	Federal government property - national defence, post offices

The formation of an Air Space Bank is likely to give the Municipality two direct sources of revenue, the first from the sale or lease of air-rights and the second from the tax revenues that will accrue from the resulting construction.

But of greater importance than these is the impetus that the utilisation of this source of building space would give to the Municipal Planning Authority. This space, already in public ownership, would enable the city to bargain with private entrepreneurs from a position of strength as a land-owner with marketable space for disposal in prime areas of the city. With space available for exchange the planners could manipulate development patterns without the necessity of unpopular legislation and without massive expenditure of public funds.



THE IDEA OF A SPACE BANK SHOULD NOT BE LIMITED TO ROADS AND PUBLIC RIGHTS OF WAY, BUT SHOULD BE EXPANDED TO INCLUDE ALL PUBLIC LAND HOLDINGS.



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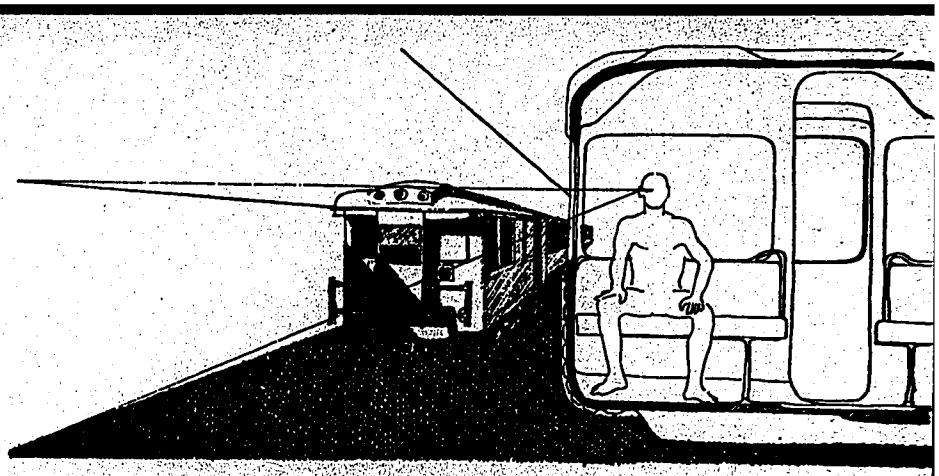
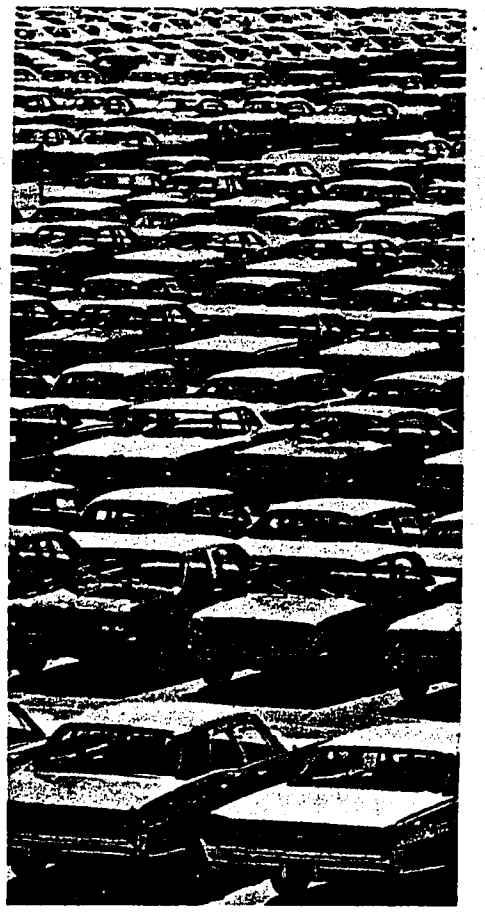
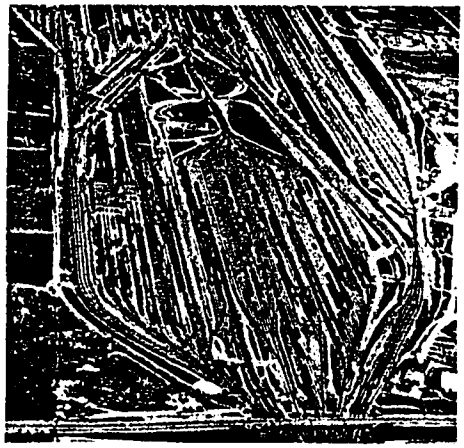
The subway is part of the message system. It also should be made into a less painful environment
Le Métro fait partie du système de messages. Il est temps que son ambiance devienne moins pénible





INCREASING TRAFFIC DEMANDS ON ALREADY CONGESTED CENTRAL URBAN AREAS ARE GREATER THAN THE FINANCIAL CAPACITY OF THE CITY.



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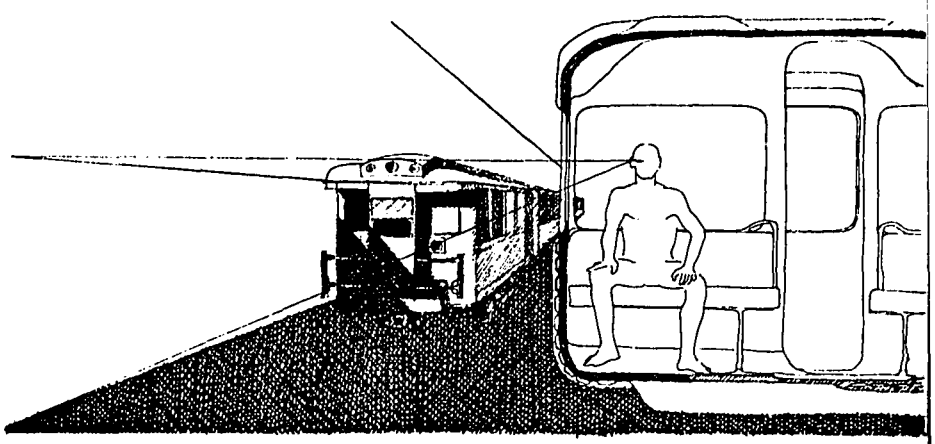
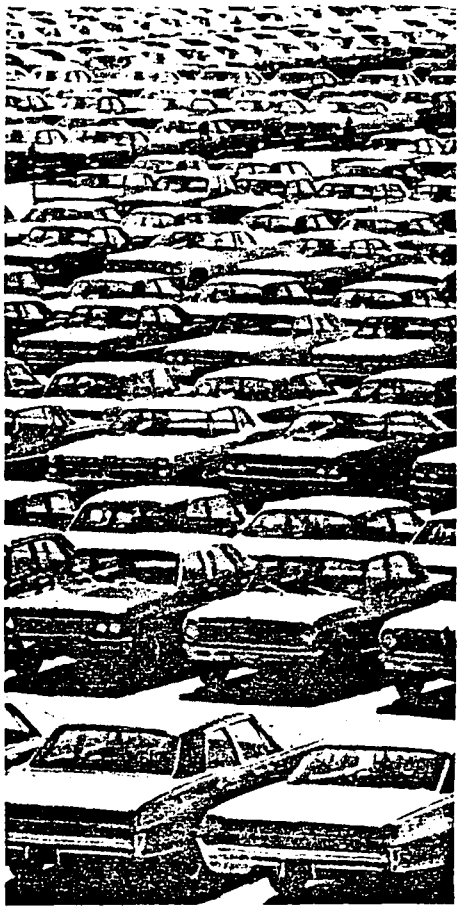




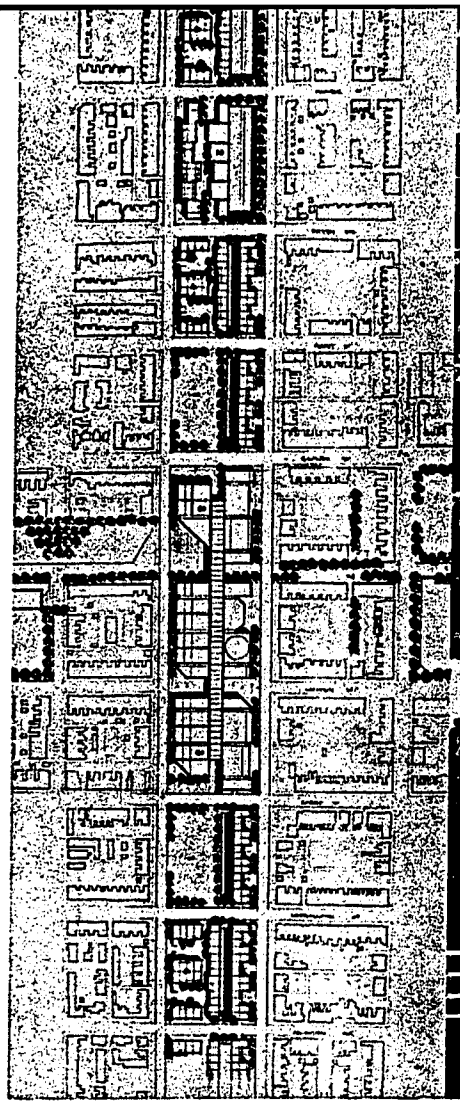
INCREASING TRAFFIC DEMANDS ON ALREADY CONGESTED CENTRAL URBAN AREAS ARE GREATER THAN THE FINANCIAL CAPACITY OF THE CITY.

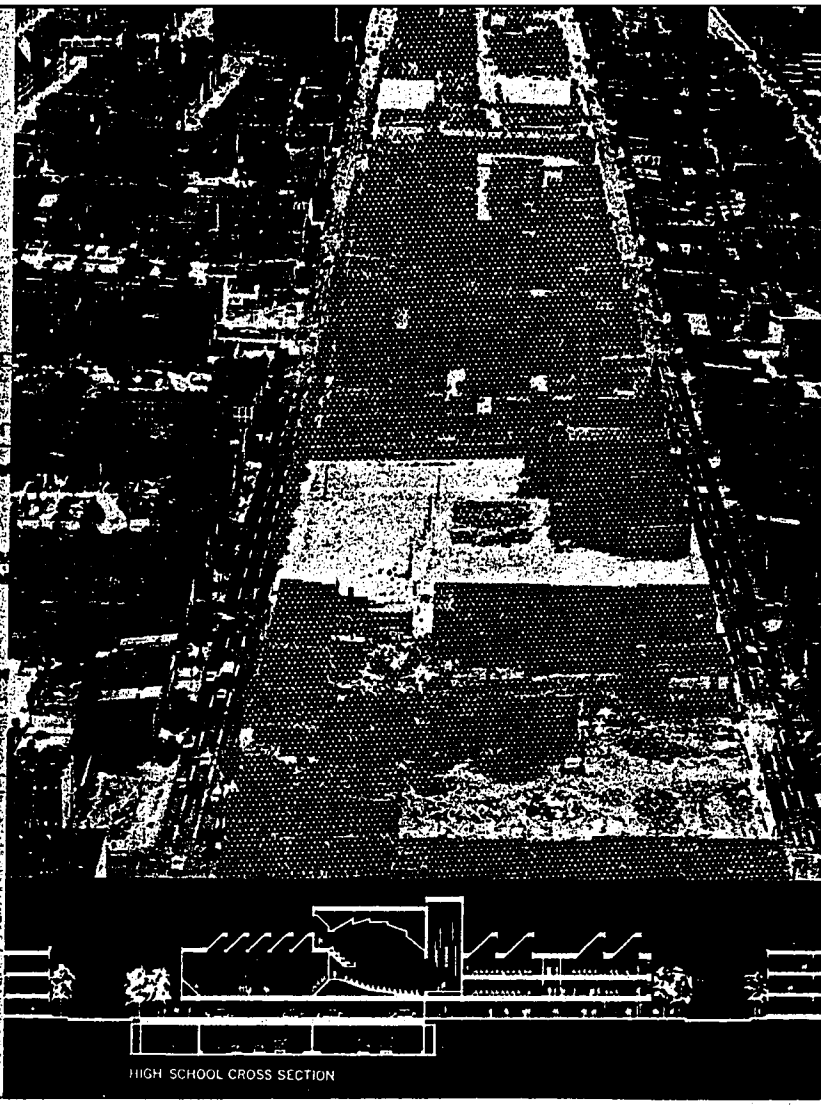
Increasing traffic demands in the already congested central urban areas make the construction of communication routes essential, and yet the expense of acquiring land which has already been developed is often greater than the financial capacity of the city. In addition there are the thorny problems of relocation of displaced residential and other uses.

If the sale or lease of air rights were made as soon as possible after the acquisition of land for the freeway, and joint development of the road and the air-space undertaken, costs to the city could be substantially reduced. Where the freeway is sunken in the more crowded sections of the city to allow grade crossing of lateral roads and avoid the distortion of the city life that results from the construction of transit routes on or above ground level, the construction of retaining walls capable of supporting a superstructure would permit the sale of the air-rights and the construction of buildings after the completion of the freeway, without disturbing the traffic flow.

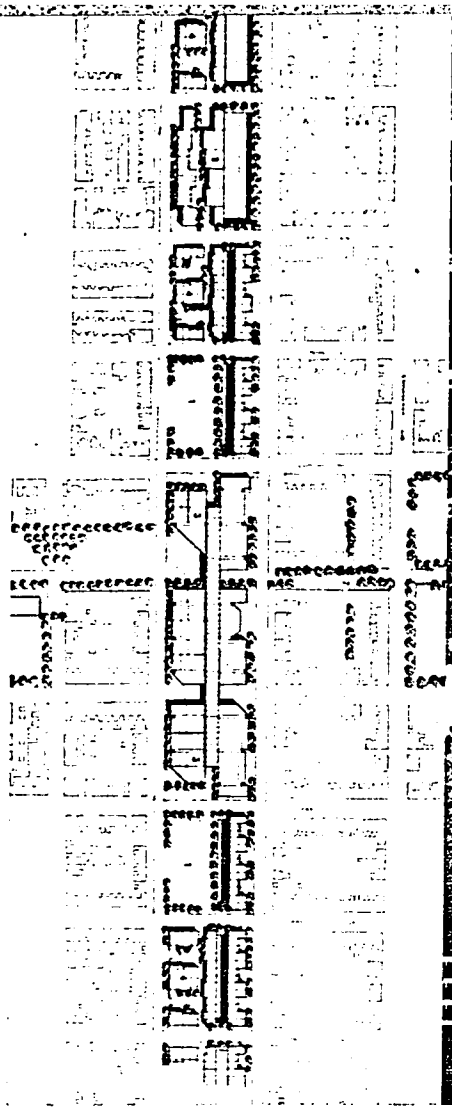
United States Federal Highway Administrator, Rex M. Whitton is quoted as saying:

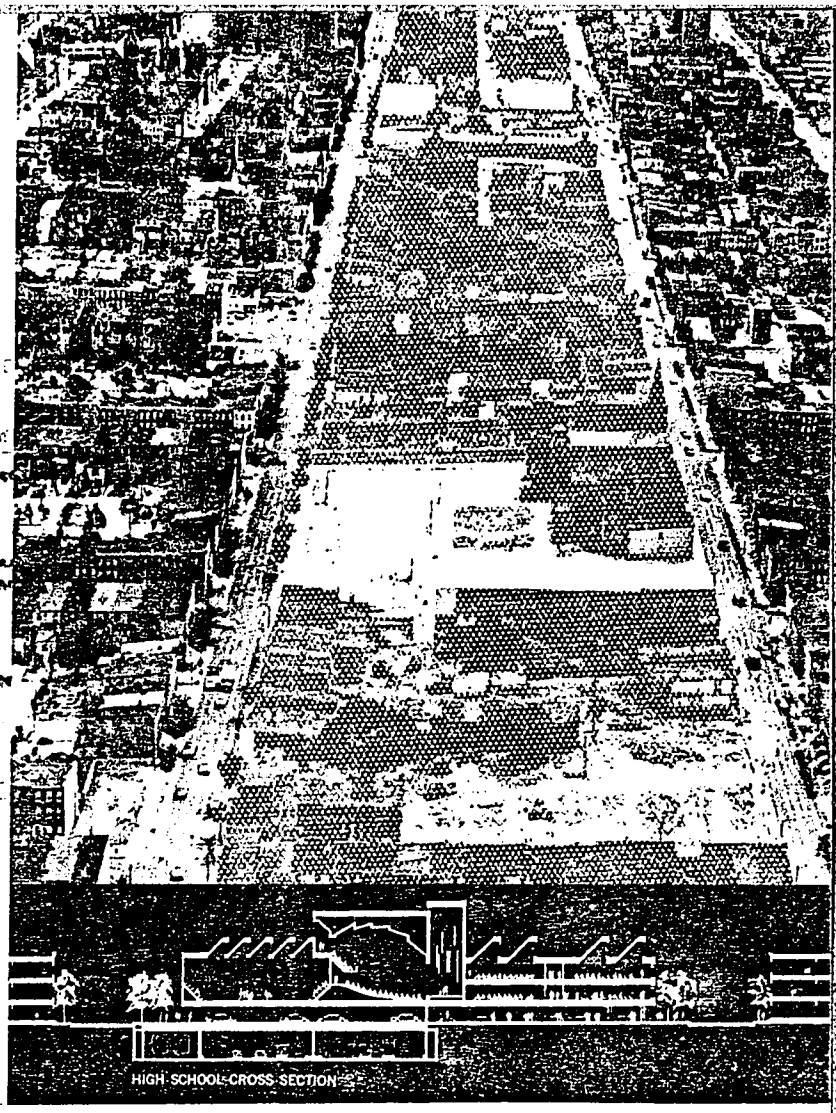
> "A city could acquire entire blocks or even wider areas on the route of a planned freeway, and have available for other development, valuable land at a fraction of the cost of acquiring land for the road alone.





THE FRANKLIN - MULBERRY area (right), a predominantly Negro slum, was less fortunate than Rosemont. The city had already vacated a corridor one block wide and 20 blocks long (aerial view) before the concept team was formed. However, the Federal Bureau of Public Roads has agreed to pay part of the cost of building a new high school on air rights above the depressed highway (see plan and section). The school is one of several "joint development" projects being explored by the concept team for areas along the path of the highway. As shown on the plan, one possibility is the development of new housing and community facilities atop the road.





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The idea of the block wide corridor puts the city squarely in the real estate market, and depends on the notion that savings can be made by buying more land than you want, the parcels of residual property remaining after the needs of the road-builders have been satisfied are collected into sizeable holdings by allowing development to span the freeway and are subsequently disposed of to the highest bidder, or for necessary public uses.

It is clear that this process is logical, but whether it is practical or desirable in the central areas is doubtful. In areas where there is an existing need for urban renewal, there is no doubt that development of this type would have tremendous advantages.

The greatest advantage to be gained from the use of air rights will probably be obtained where the construction of the prime use is very costly, as is the case where freeways are depressed or at intersections. It is at these locations that enormous advantage can be gained at relatively low cost by adding foundations or support for superadjacent structures during the construction of the works for the prime use. This is particularly true of intersections, which as has been indicated earlier could become important district focal points.

SECTION 6

Locational Factors

If the thesis outlined in the first section of this paper is valid, and if we may expect an awakening of an urban conscience, the use of constructed space in Condominium above roads and other low-profile development can materially assist in the repair of present city conditions. One must assume that in most western cities the repair must result in dramatic change since the evolutionary process of city development has proved incapable of dealing with the rapidity of population growth and their servicing requirements. It is also becoming obvious that solutions which ignore the present city fabric are unworkable if living standards are to be maintained. The cost of rebuilding is too great, even on the limited scale of urban renewal undertaken in the 1960's. We must attempt to inject new vitality into the existing framework.

There are basically six urban situations which could be radically changed by concentrated development of air rights, each situation having different needs and with resulting variation in physical expression.

1) Development over railways and canals

Railway companies have generally accepted development over rail tracks in special locations. The best example of

this is the construction of Park Avenue in New York, together with the buildings on both sides, over rail tracks a total of 817 feet wide. This was made possible by the change from steam to electic locomotion shortly before the first world war.

The surprising aspect of this development was the recognition at the time of the advantages of sunken transportation routes. Before conversion to electricity, the tracks were crossed at grade by eleven streets and one major avenue, with the result that:

> "the movements of the police and fire-fighting forces from one side to the other were greatly interferred with"[1].

The author quoted above then states the case for air rights development,

> "When this improvement was commended the full possibility of using the space above an electrically operated terminal was not realised. Several large and important buildings have already been erected over the tracks, and it is now apparent that all of this enormously valuable space over what was formerly a railway yard in the very heart of a great city will be available for profitable use, and that the revenue derived from it will go far toward meeting the interest on the immense cost of this undertaking."

The cost is quoted as being in excess of $50,000,000.

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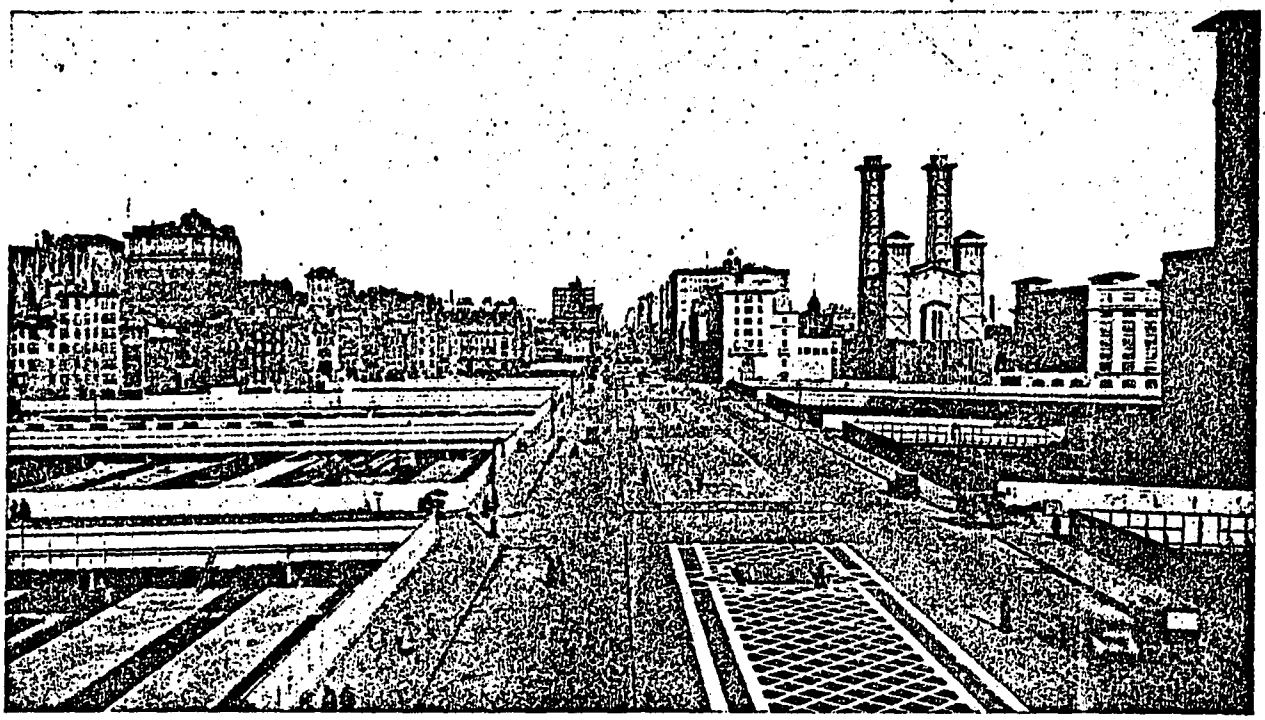
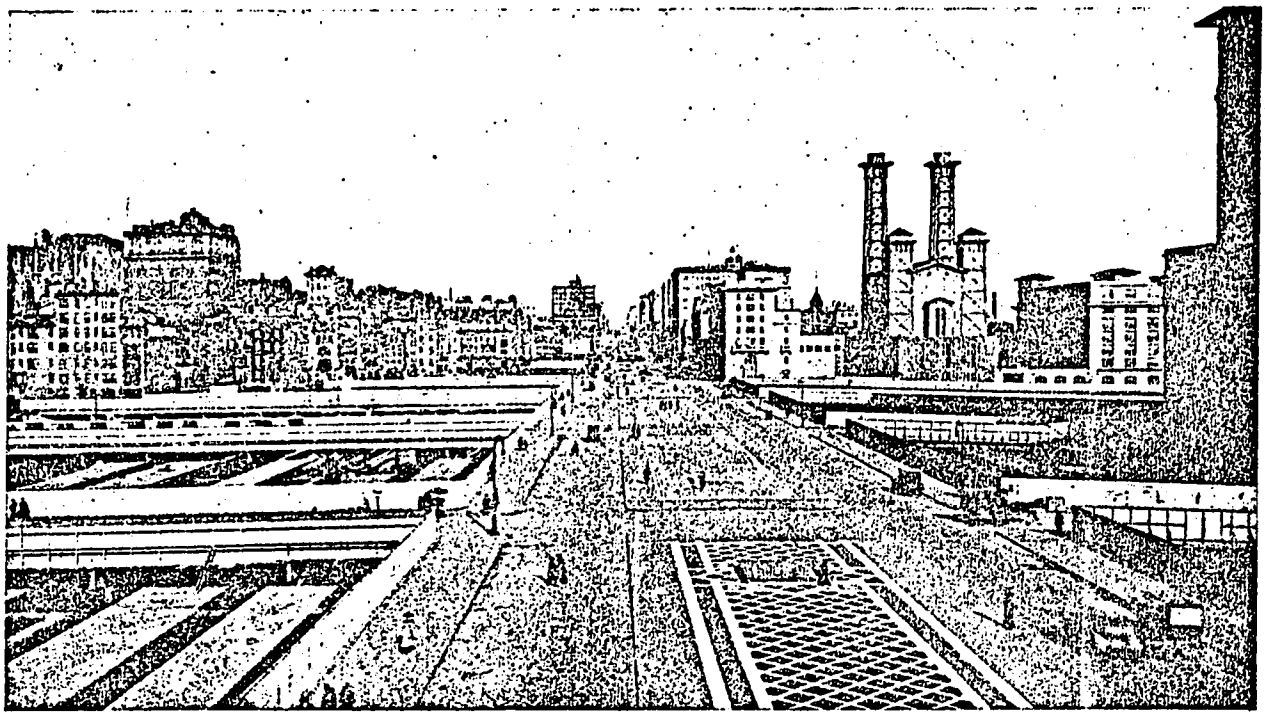
1. Lewis Nelson P.
The Planning of the Modern City, John Wiley and Sons Inc. 1916.



View looking north along Park avenue from the new Grand Central Station. The spaces above the tracks, now left open, will in a few years be covered with buildings (p. 155).



View looking north along Park avenue from the new Grand Central Station. The spaces above the tracks, now left open, will in a few years be covered with buildings (p. 155).

It is possible that the change from steam to electrically operated trains was not as complete or as early in other major cities, but it is hard to believe that this major experiment in the treatment of urban transportation systems was not repeated elsewhere on this scale.

Tunneling to provide for subway systems possibly reduced the need for open cut operation; but the principles expressed here could have justified the use of depressed transit routes long before today.

The construction of hotels and office buildings over railway terminii is now common. The High Paddington proposals in the 1950's and projects and proposals for development over terminus or marshalling yard trackage in Toronto, Montreal and other Canadian cities recognises the commercial value of this space.

The trouble is that this initiative is being taken by the Railway companies as a commercial activity, not as part of an overall development plan for the city. Even the massive linear development proposed in New York which has the appearance of sophistication does not attempt to marry in the surrounding areas, but is simply the injection of more construction into available space, and in common with all railway air-rights proposals this appears to be a means of companies capitalising on railway lands to compensate for their failing transportation function.

But the idea is valid, and long established precedents exist for the further development of raw air space over railways.

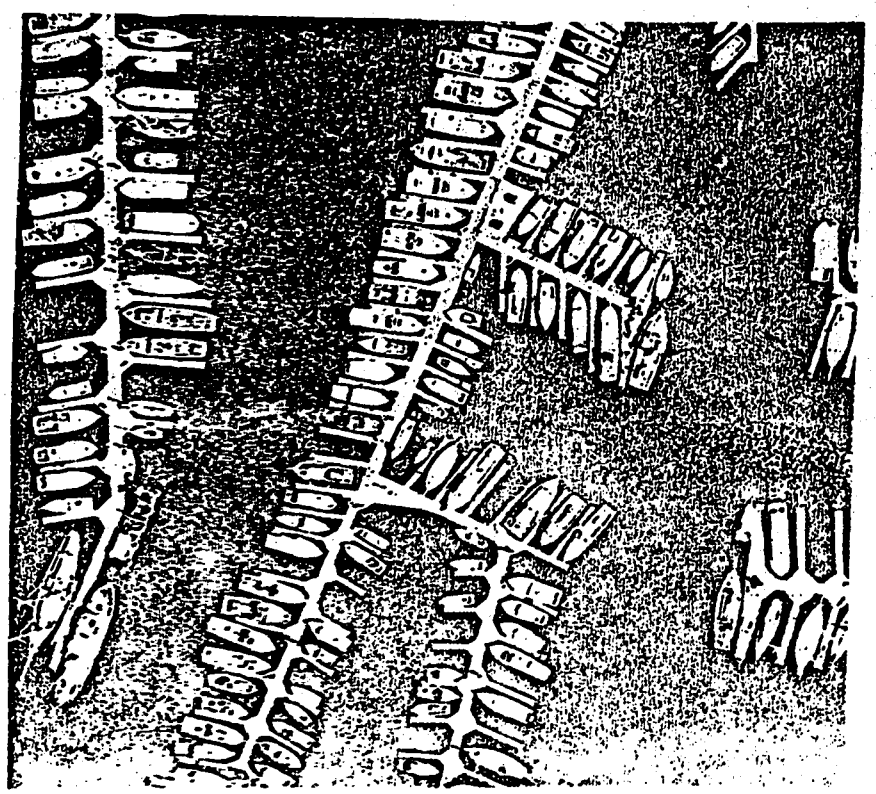
Extensive inland barge canal systems are not common in Canada. Where they do exist, their function has been superceded by strip canals or has been eroded by other forms of transportation.

The Rideau Canal, which bisects Ottawa is now entirely for recreation and has been developed from a military and commercial utility to a waterway of great beauty.

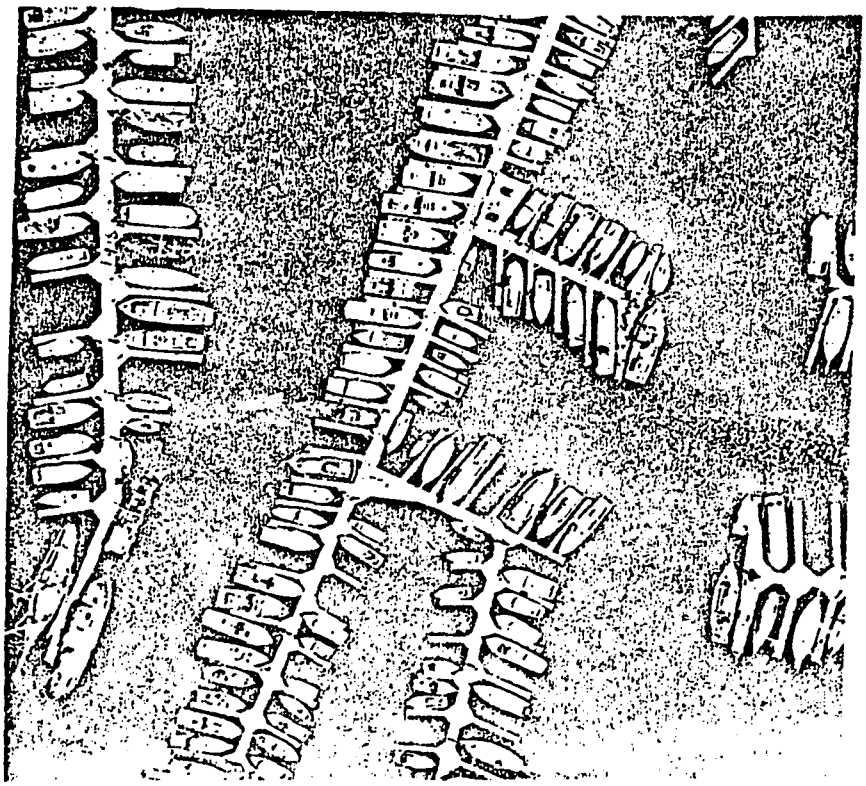
Many canals and commercial waterways penetrate into waterfront cities, and even if they cover small areas, they have significant development potential, particularly for residential uses. Marina City in Chicago is one example of a waterway being utilised to give city people direct access to boats, and abondoned waterways such as Montreal's Lachine Canal could form the nucleus of similar residential developments.

Railways and commercial canals are normally located on low lying flat land where they have attracted industry and housing for industrial workers. The significance of these routes should be that in the centre of these decayed and extensive districts they are open for immediate development and could become the focus for renewal of these areas without the prior disruption of present uses, or massive expenditures for expropriation, purchase or relocation.

NEXT PG 57



BOATS IN A MARINA. ANOTHER COMMUNICATIONS ROUTE THAT COULD BE AVAILABLE TO THE CITY MAN.



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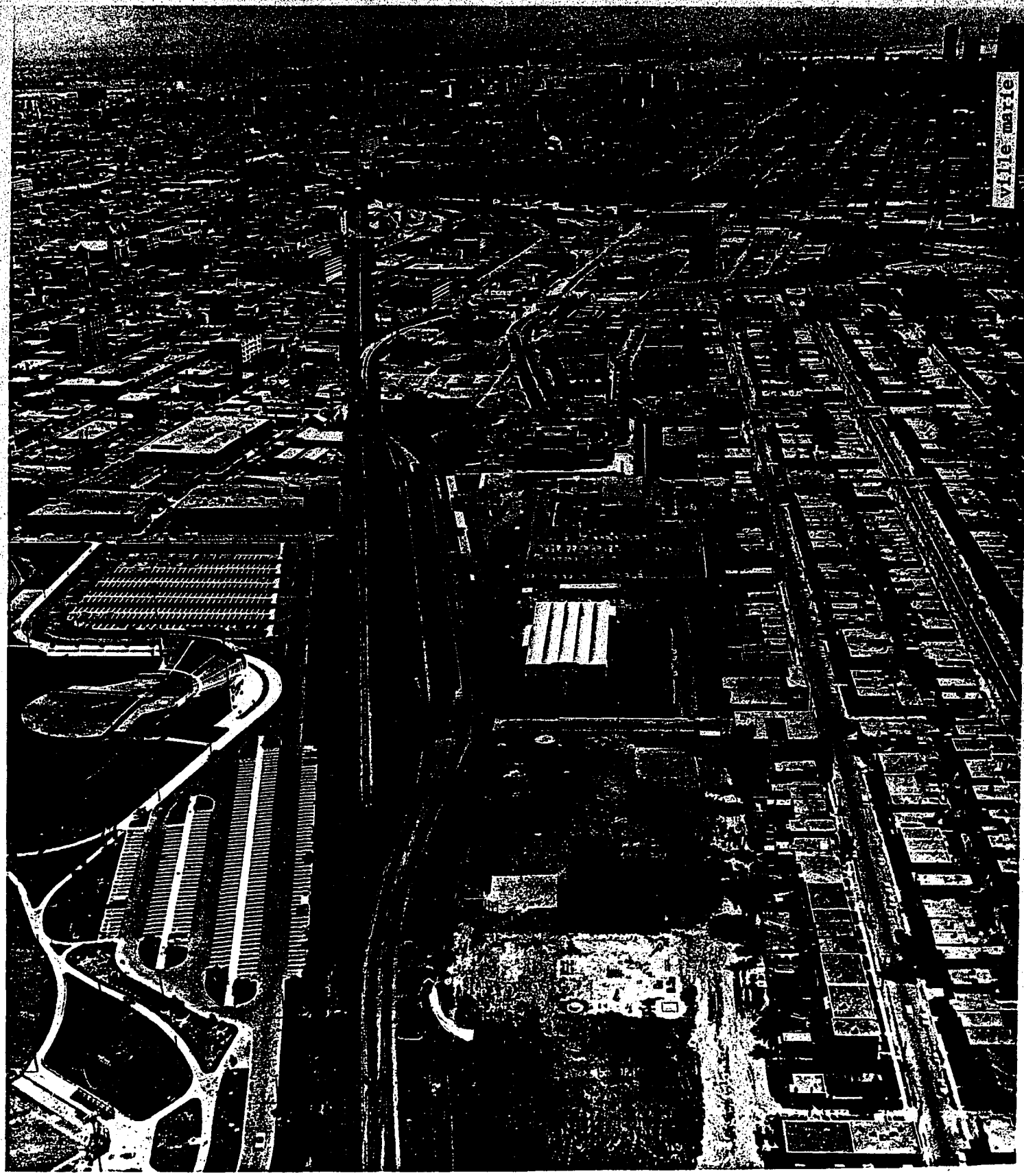
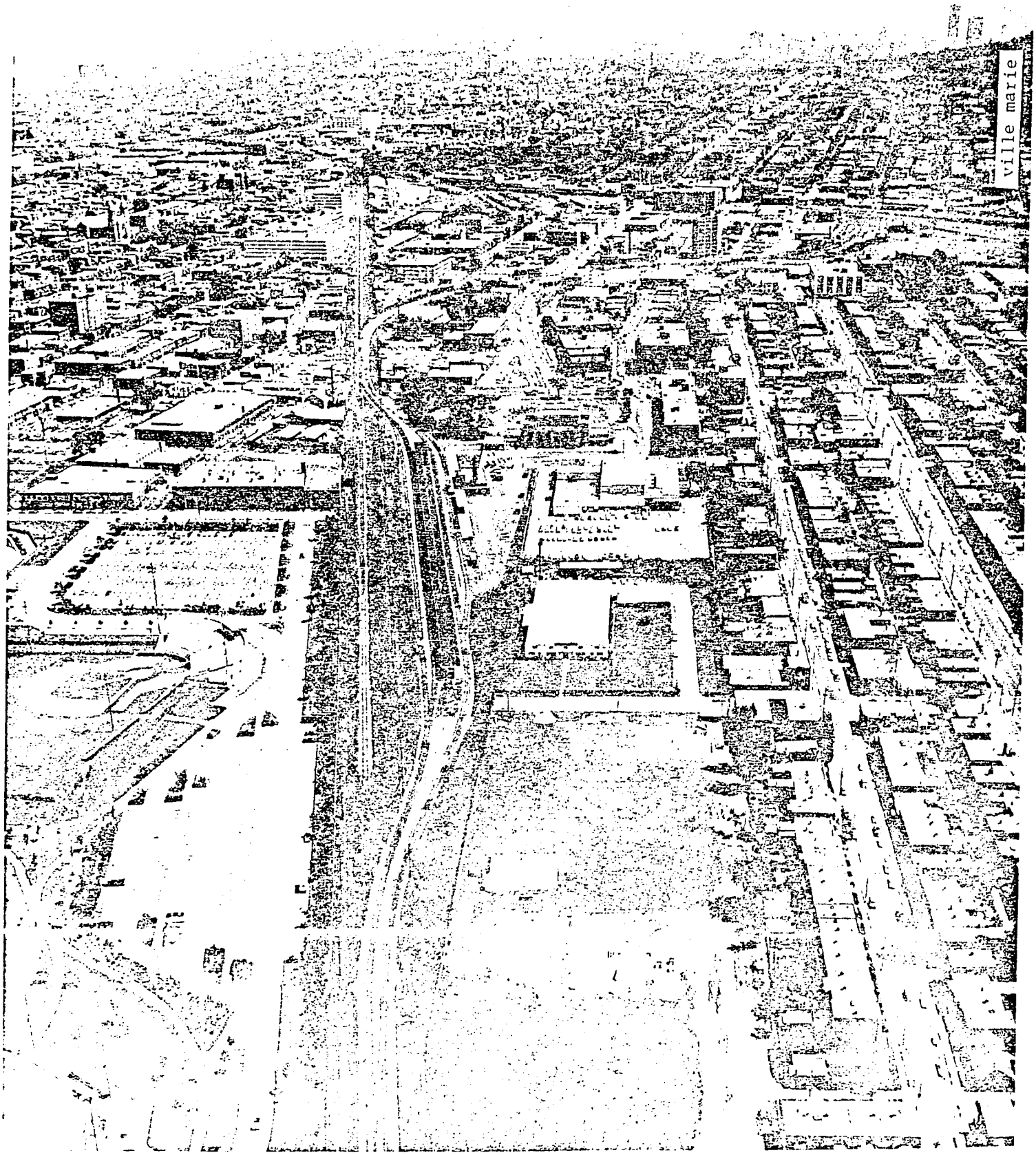


THIS VIEW OF MONTREAL CLEARLY SHOWS THE EXTENT AND EFFECT OF RAILWAY LINES PASSING THROUGH HEAVILY SETTLED AREAS OF THE CITY.



THIS VIEW OF MONTREAL CLEARLY SHOWS THE EXTENT AND EFFECT OF RAILWAY LINES PASSING THROUGH HEAVILY SETTLED AREAS OF THE CITY.

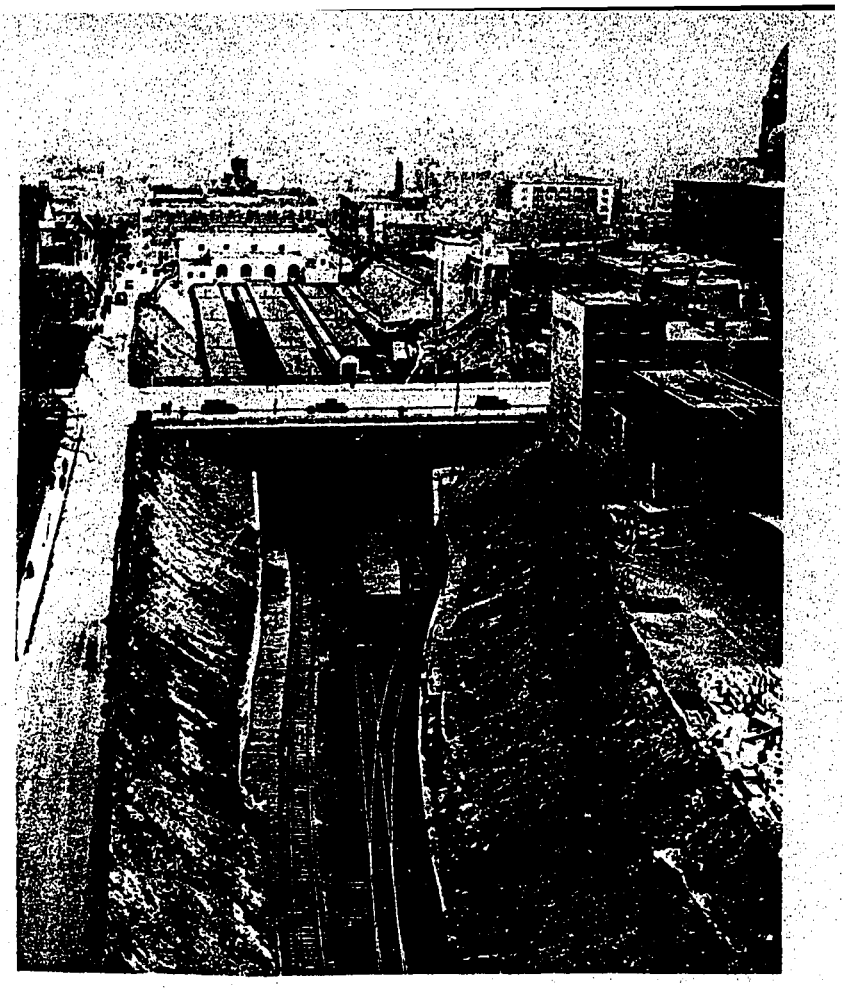
2. City Core Areas

In the core of most cities it is considerably cheaper to construct platforms than it is to purchase land, and it can be argued that here the earth's surface should be given over to what it does well, supporting heavy loads.

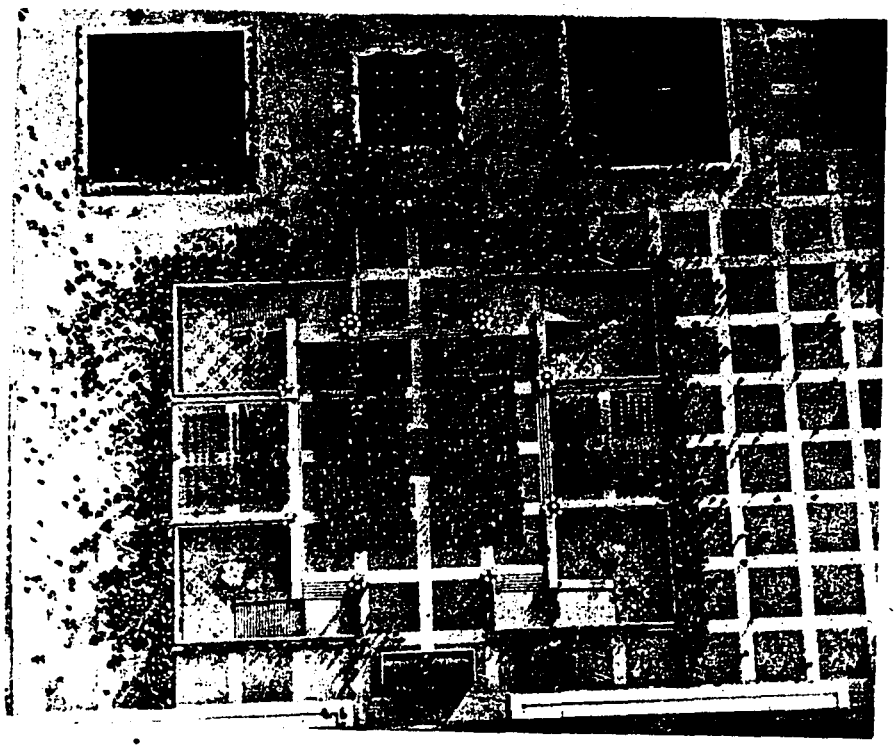
Proposals which suggest that pedestrians and retail commercial activity should be raised above the ground in central areas acknowledge the growing traffic problem which makes the limited surface area overcrowded, but also point out that this is the economic way to handle the growing downtown populations. Even if private cars were excluded from core areas, the number of public and service vehicles would be likely increased to make up for the loss of personal transportation.

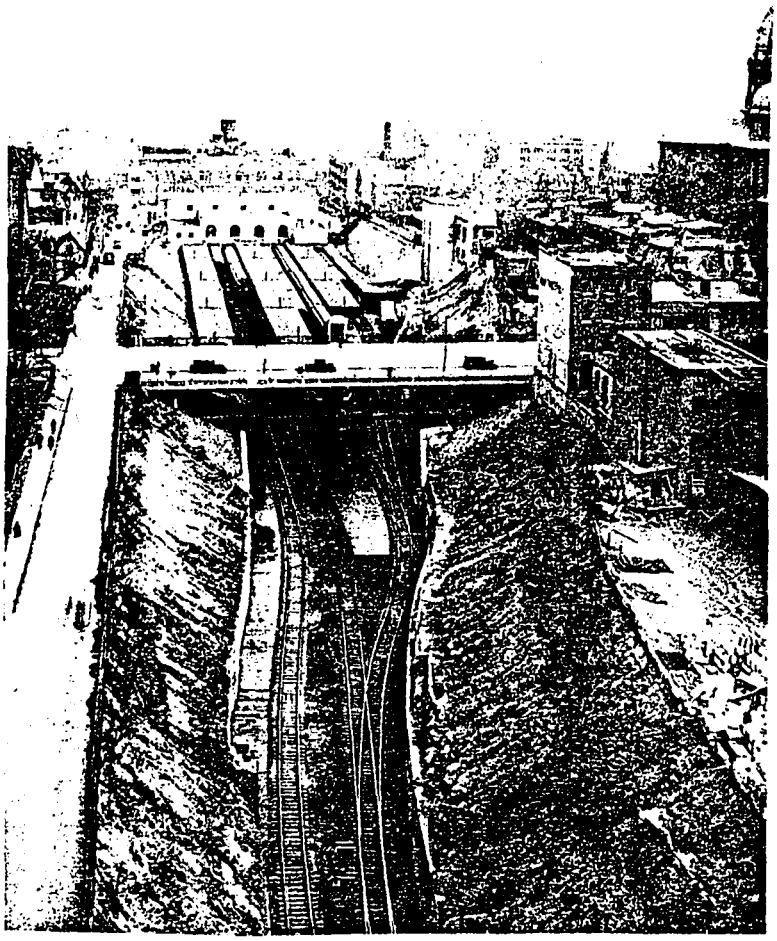
We know that a single building can accommodate many thousand office workers, and a proliferation of these buildings can create unimaginable overcrowding when all workers are discharged simultaneously at lunch times or in the evening. The result is an unpleasant and unnecessary suspension of reason.

The arguments put forward in 1906 for the depression of a central city railway line apply equally to major downtown traffic routes, except instead of depressing the route, other activities are raised freeing the load bearing surface for more efficient means of transportation, and for more flexible systems.



THE SITE OF PLACE VILLE MARIE WAS A RAILWAY CUTTING IN THE TWENTIES, AND BELOW, THE SAME AREA TODAY IS A PUBLIC SQUARE





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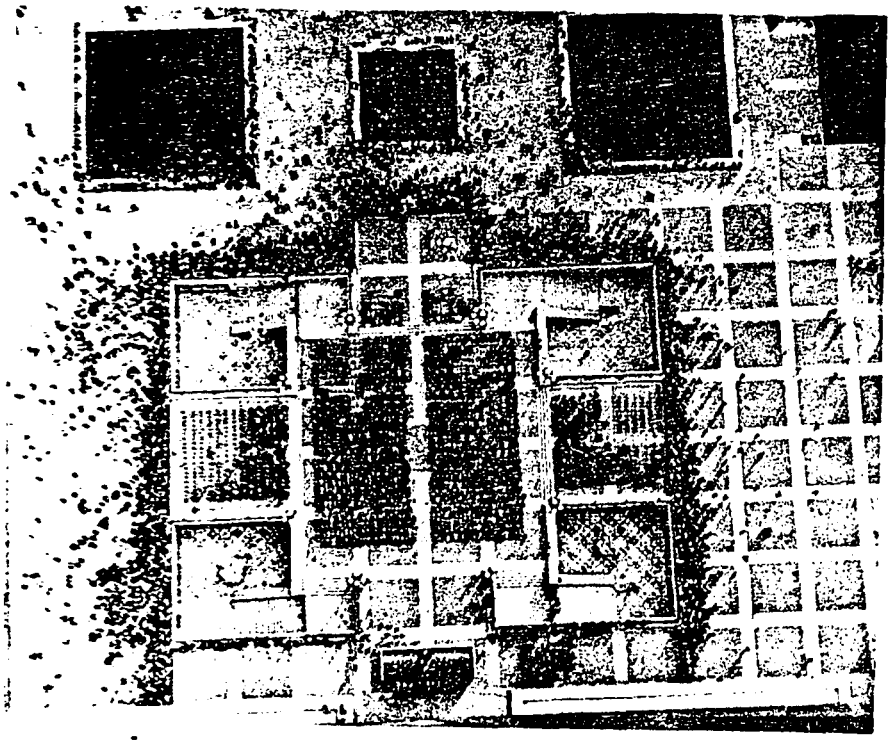
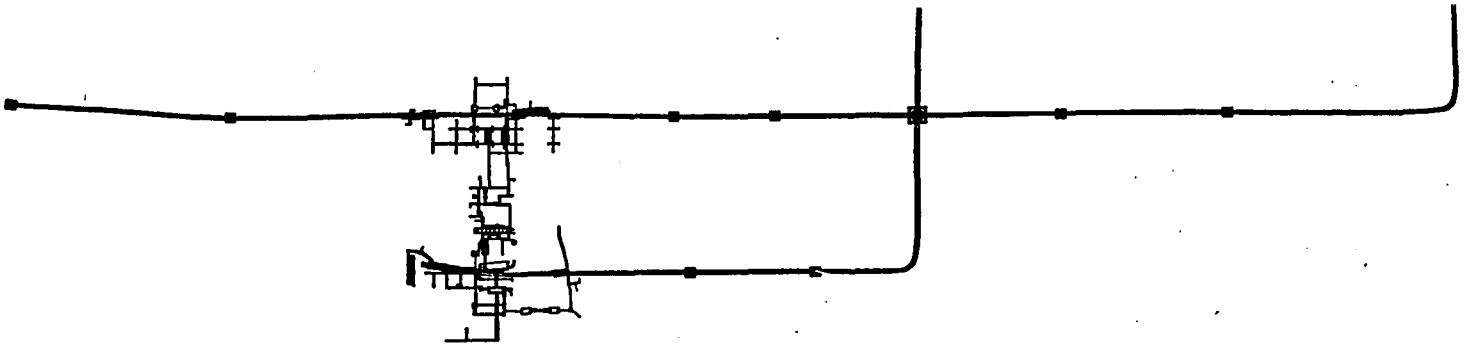


The development of air rights in core areas is under way in many major cities as a means of bringing new life to congested but expensive and well developed districts.

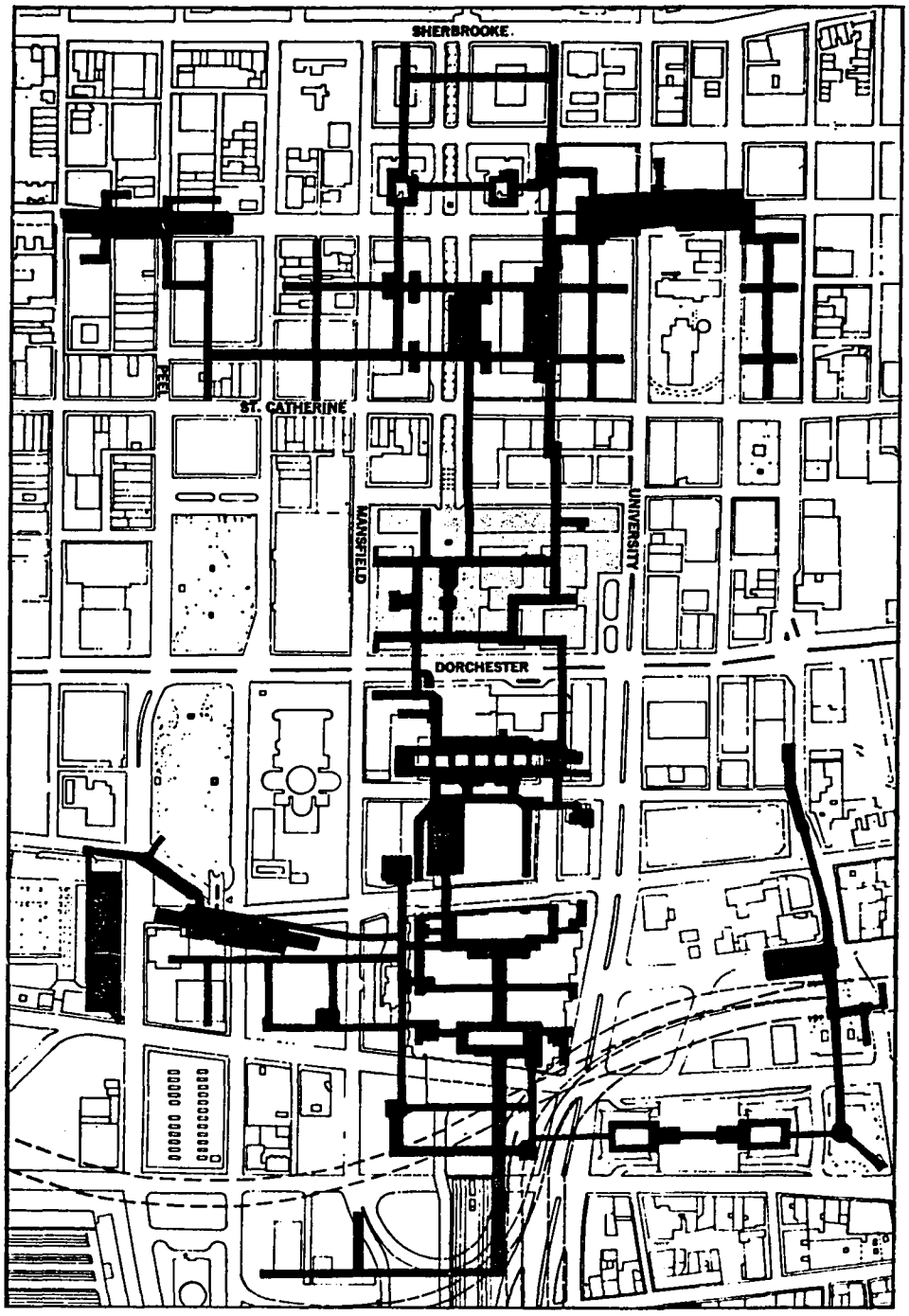
This process is most clearly illustrated by downtown repair undertaken by the City of Montreal. The same has happened elsewhere but without the dramatic sucess achieved here, where a void created by depressed railway tracks, freight yards and other trackage was replaced by a massive office complex, an underground shopping concourse, a transportation interchange of automobiles, railways, busses and pedestrian traffic, while at the same time providing a city square at grade which has now become the effective heart of the city.

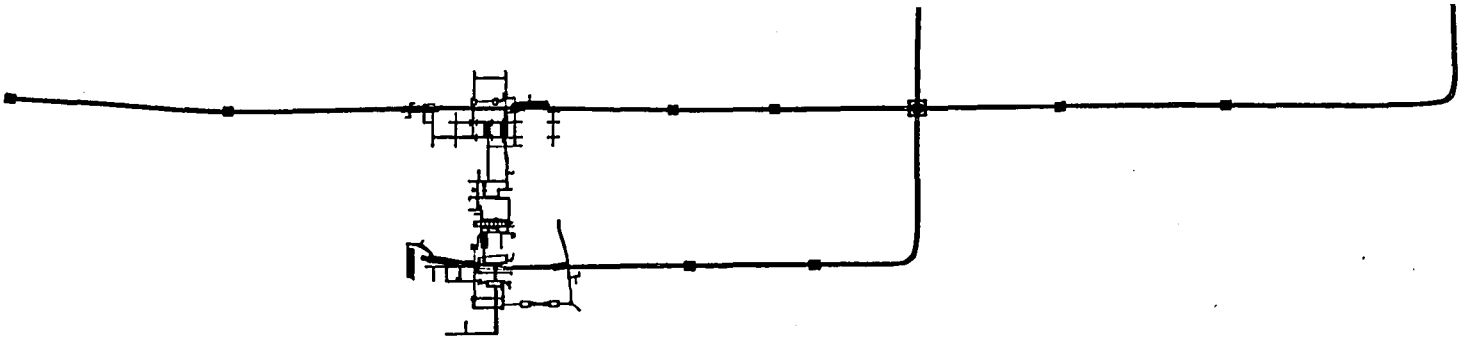
This massive remodelling of otherwise waste space has sparked the further construction of more office and shopping facilities, and in addition has attracted convention, display and recreation centres, and the construction of two major hotels.

The response to the injection of new vitality into this core area has been startling, and there is no reason to believe that the same reaction would not occur in other areas.



INTERCONNECTING PEDESTRIAN WALKWAYS AND SHOPPING ENCLAVES PROPOSED FOR THE CENTRAL AREA OF MONTREAL LINKING THE METRO TO ALL MAJOR DOWNTOWN OFFICE BUILDINGS AND SHOPPING DISTRICTS.





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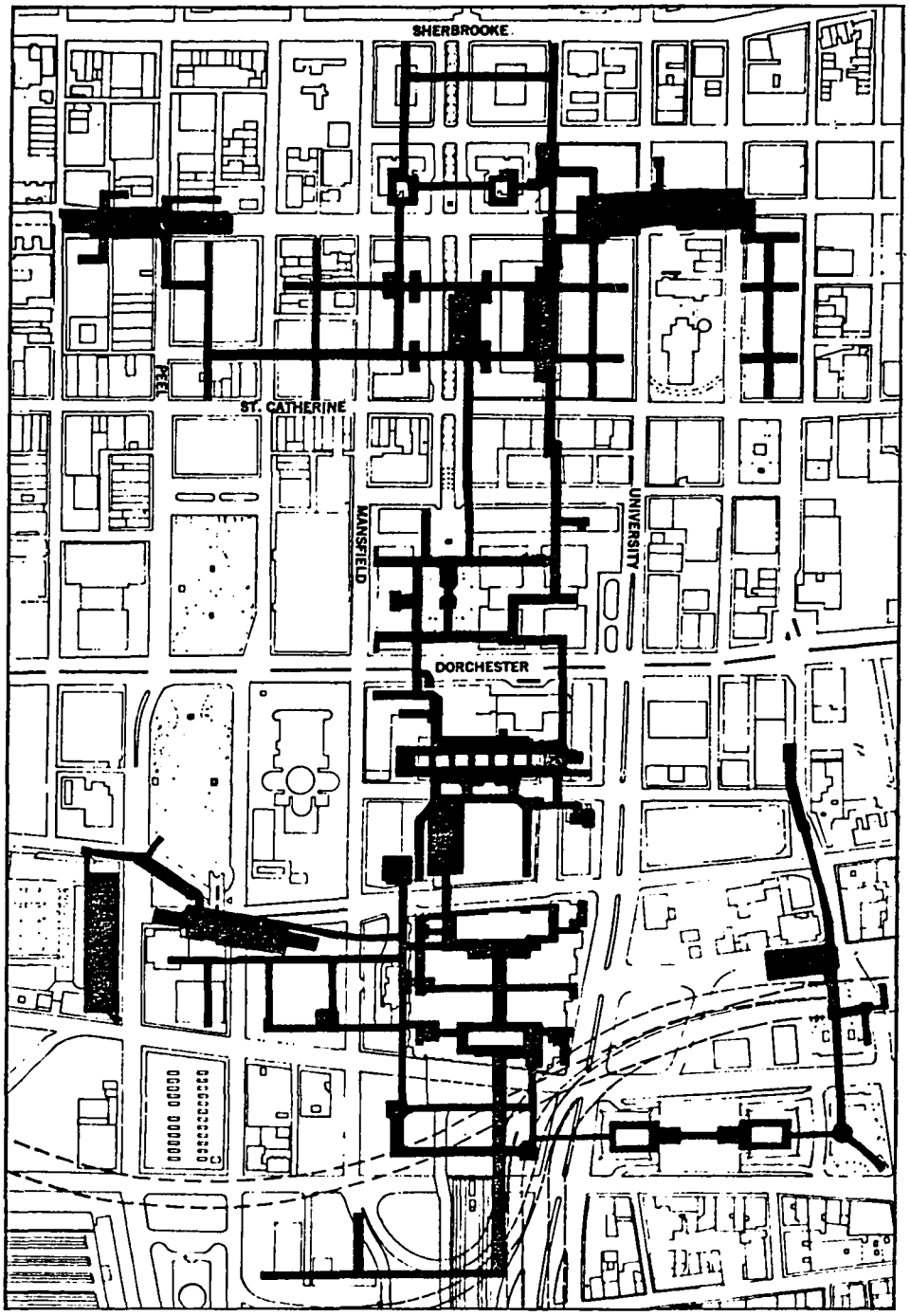
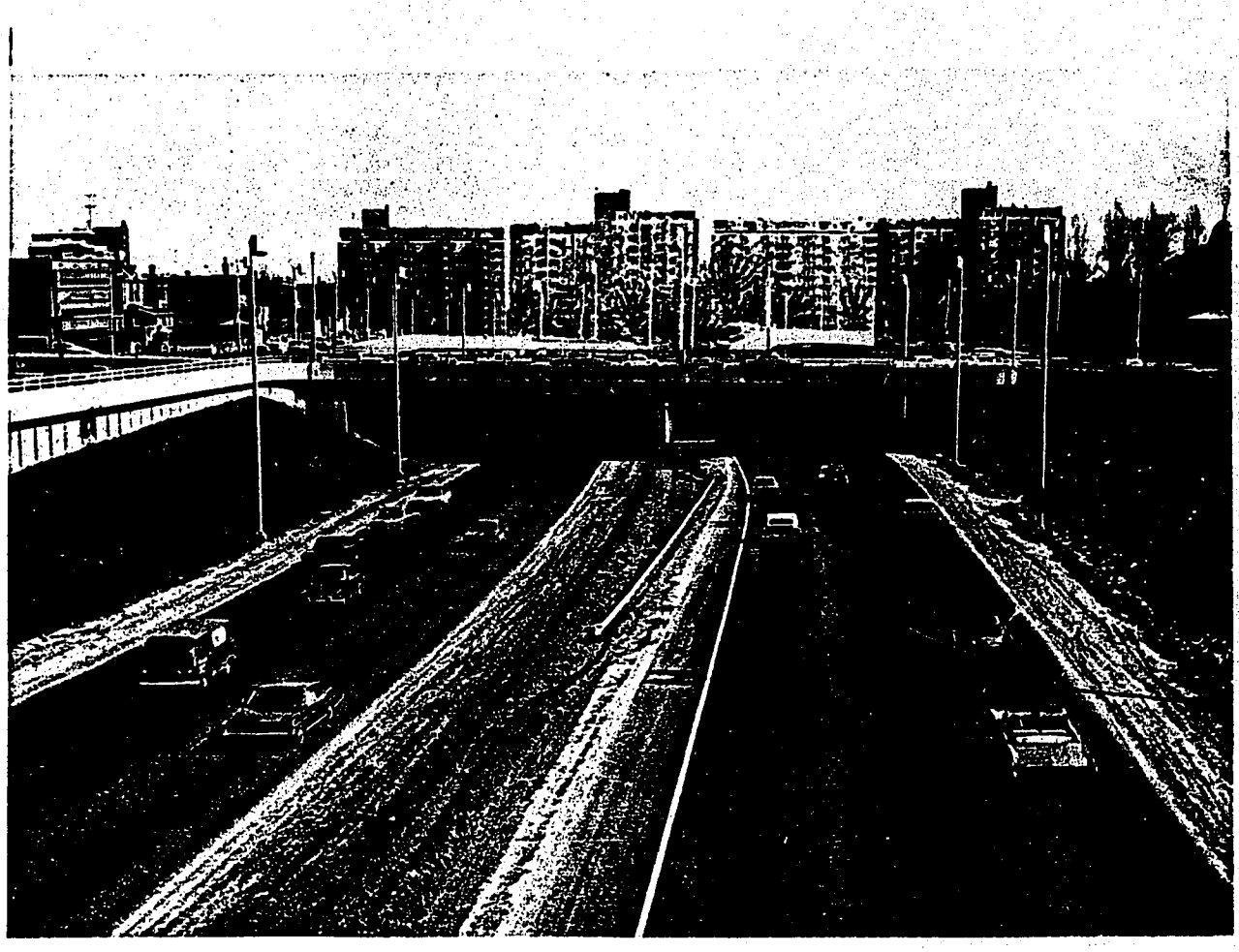


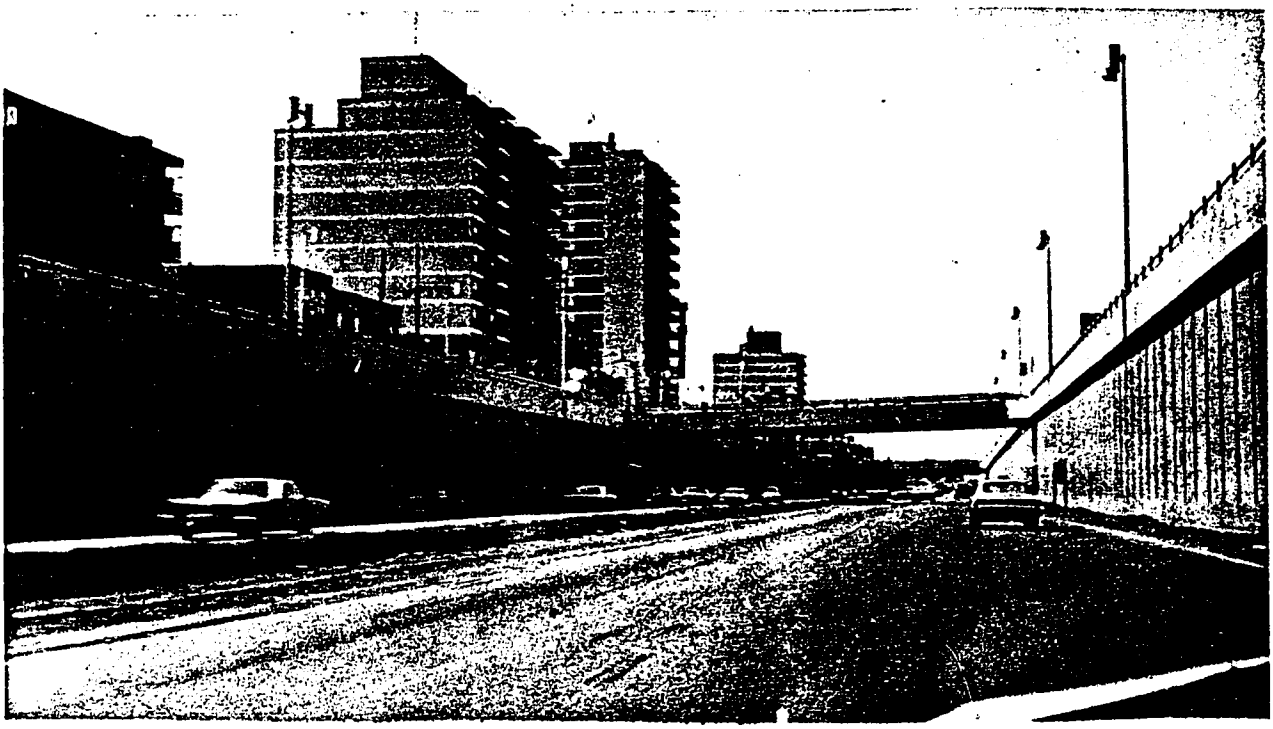
3. Cross Town Expressways

The sale or lease of air rights over major limited access arteries as a means of recovering part of the cost of the raw land has been mentioned previously. It is unlikely that cities will be able to afford to buy land for such limited use in the future, and the use of air rights will be not only logical, but increasingly necessary. A recent exercise by the City of Ottawa to determine the feasibility of a depressed cross-town expressway running east to west through the centre of the City was abondoned because of the high cost. The use of air rights above the proposed expressway were mentioned but the money recoverable from disposal of the air rights did not appear in the calculations.

Decarie Expressway is a depressed auto route which was built. It runs through a heavily populated section of Western Montreal, and is a full city block wide. No attempt has been made to use the space above the pavement although in one section it is covered for some 400 to 500 feet where it passes a large school. Playgrounds and parking for the school extend over this section as well as one of the roads crossing Decarie Boulevard, and it is here that the effectiveness of enclosing a freeway for limited lengths can be most conveniently observed. Decarie is completely silenced, and it is impossible to see, hear, smell or feel the vibration of the traffic underneath. There is no reason to expect that the construction of residential or commercial in a similar location would be undesirable if the covered section extended far enough to shelter the building from traffic disturbance.



Apartments constructed above a freeway as simulated above, appear to be preferable to the non-simulated example shown below. Both photographs are of Decarie Boulevard, Montreal.



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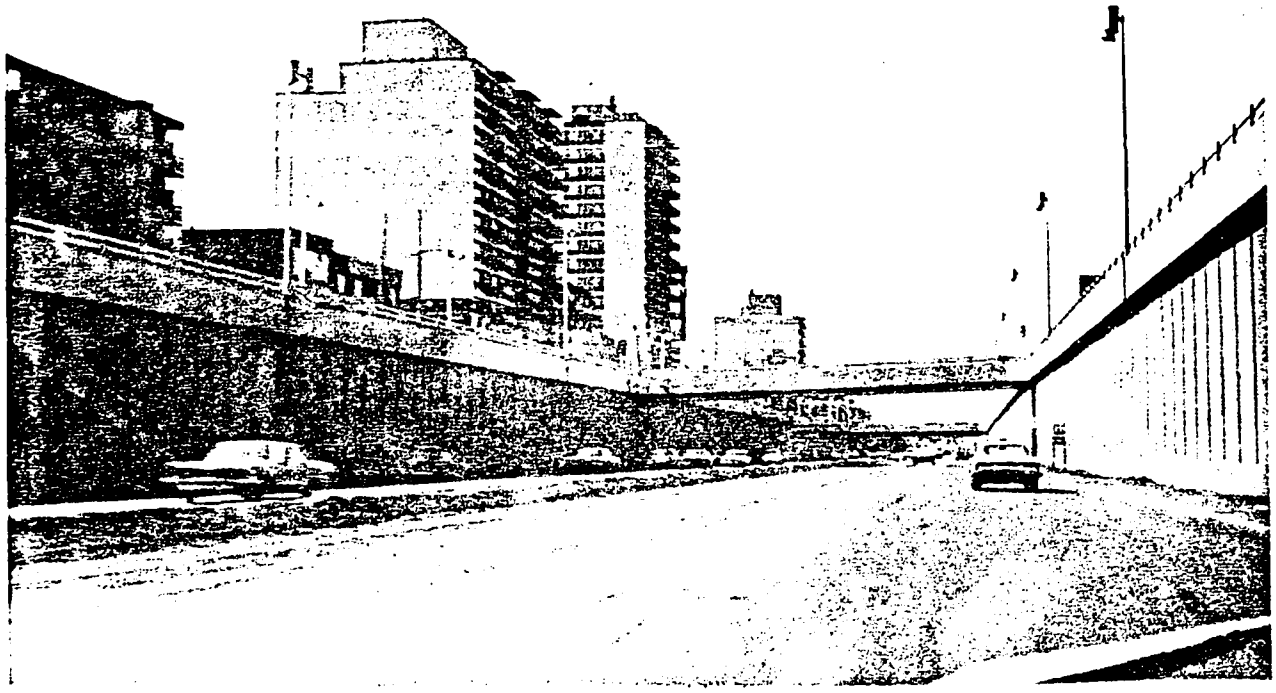
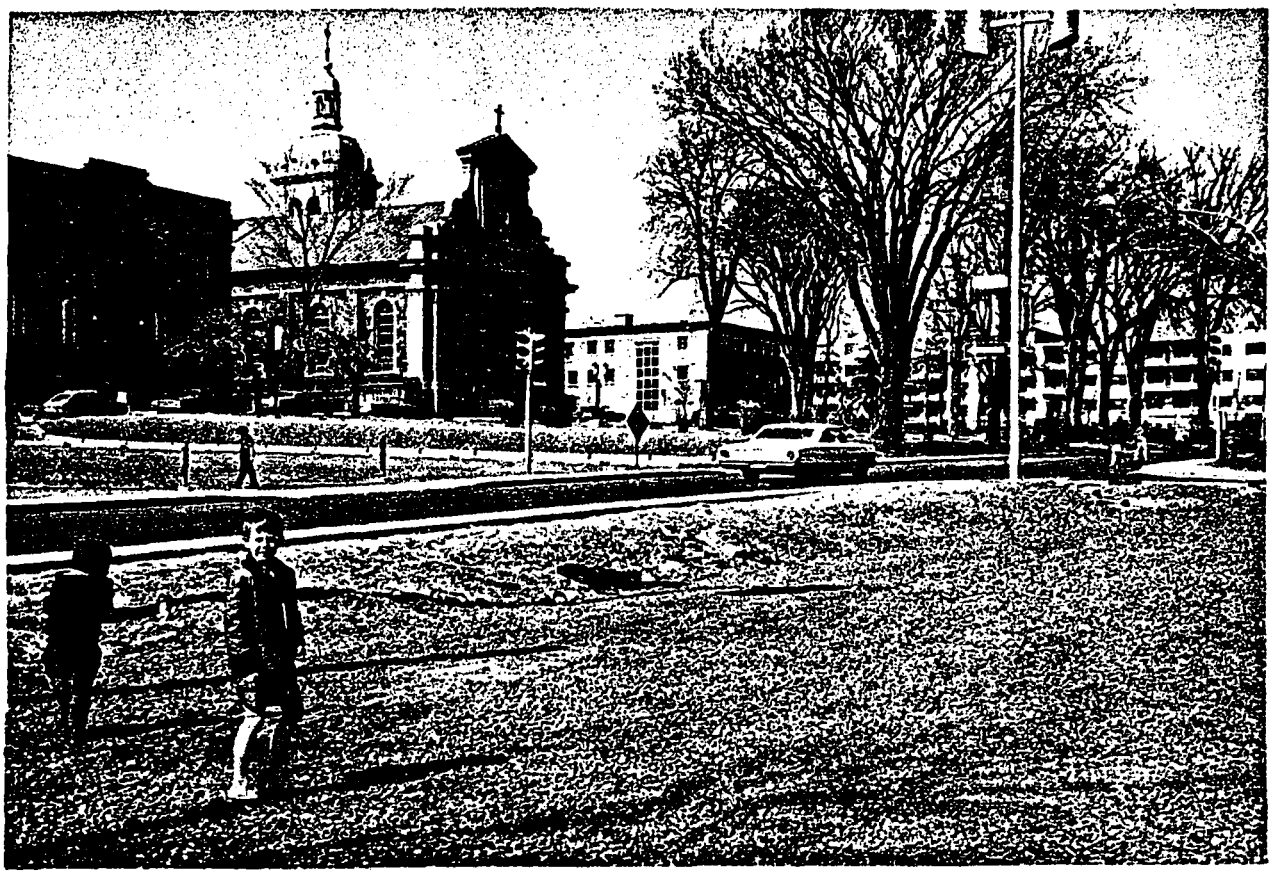
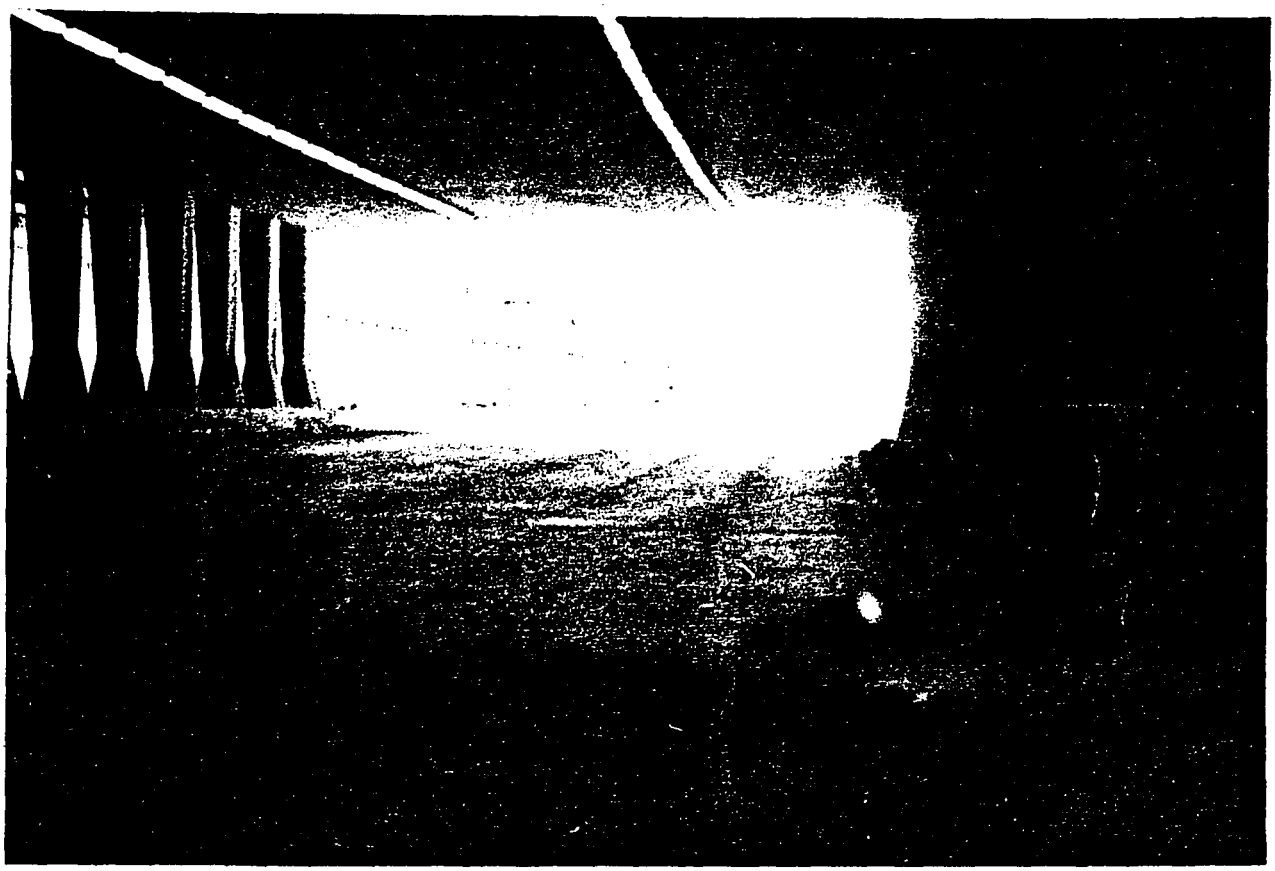
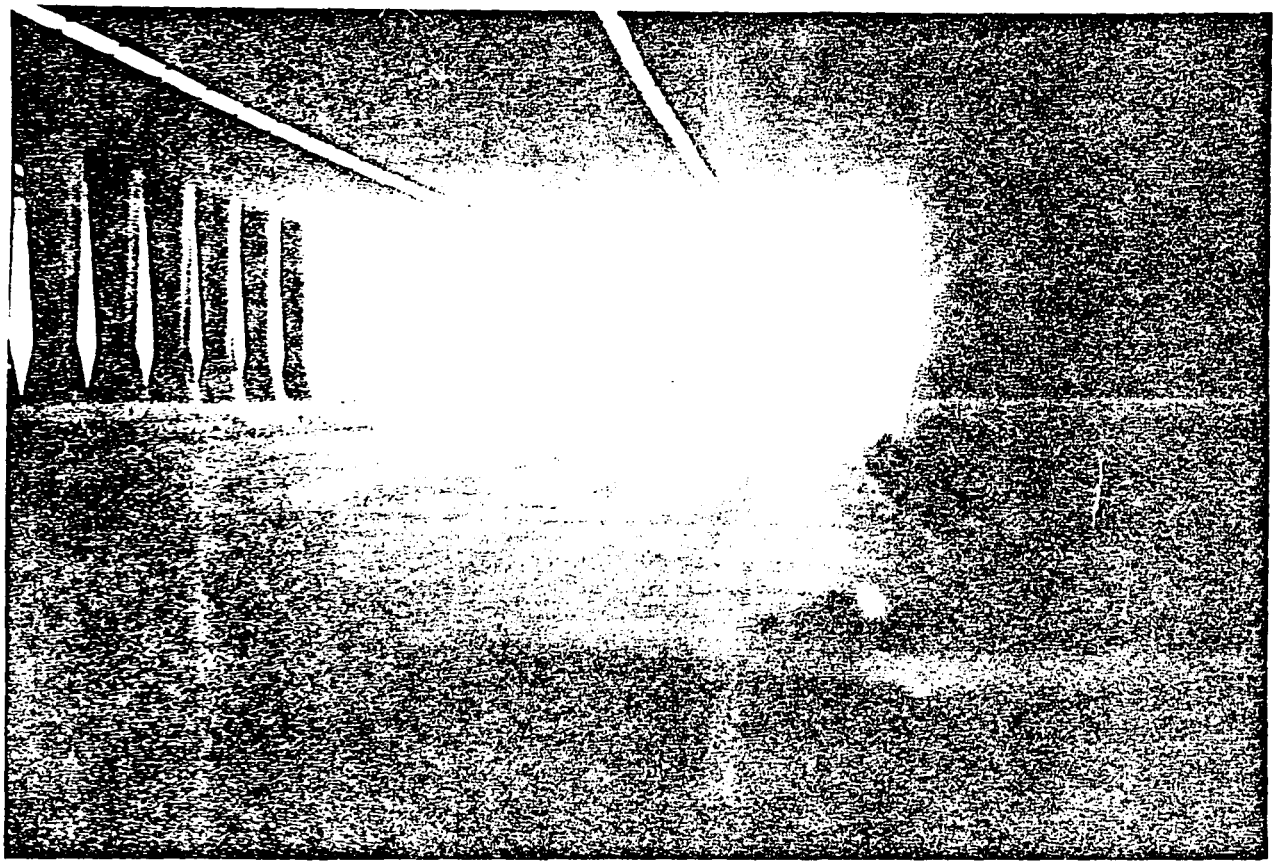






ABOVE AND BELOW THE SAME SECTION OF DECARIE BOULEVARD MONTREAL



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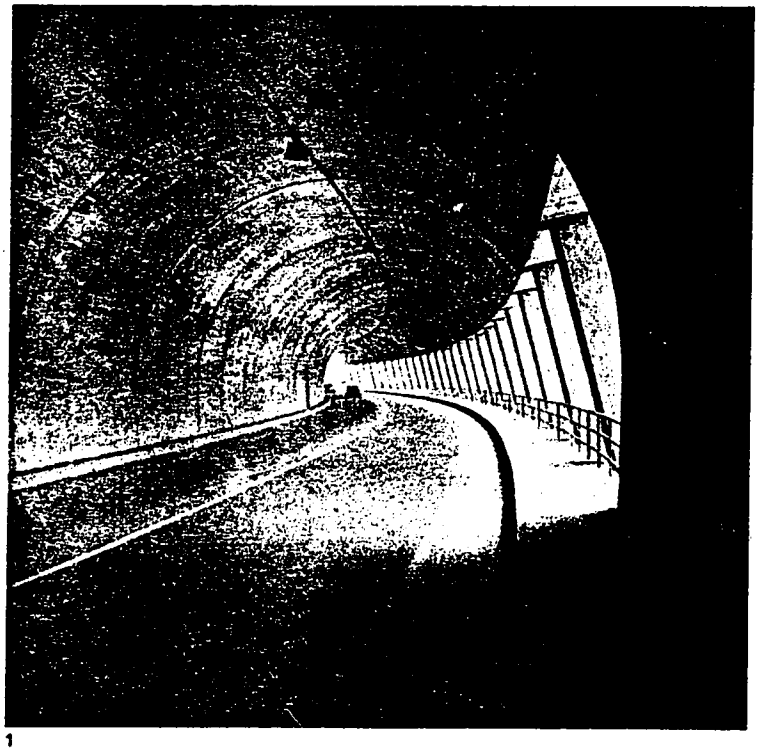

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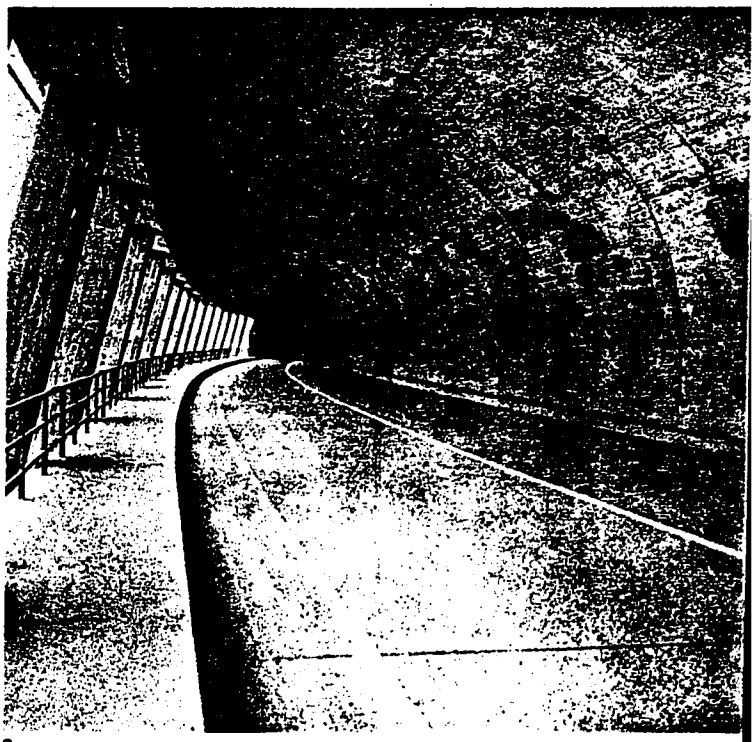
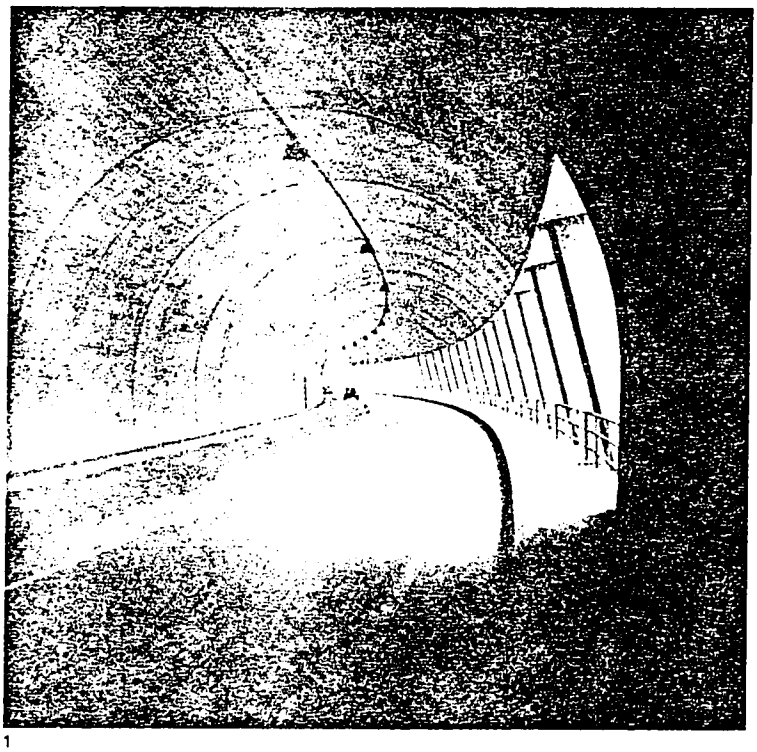


2

THE ENCLOSURE OF ROADS CAN TAKE MANY FORMS.



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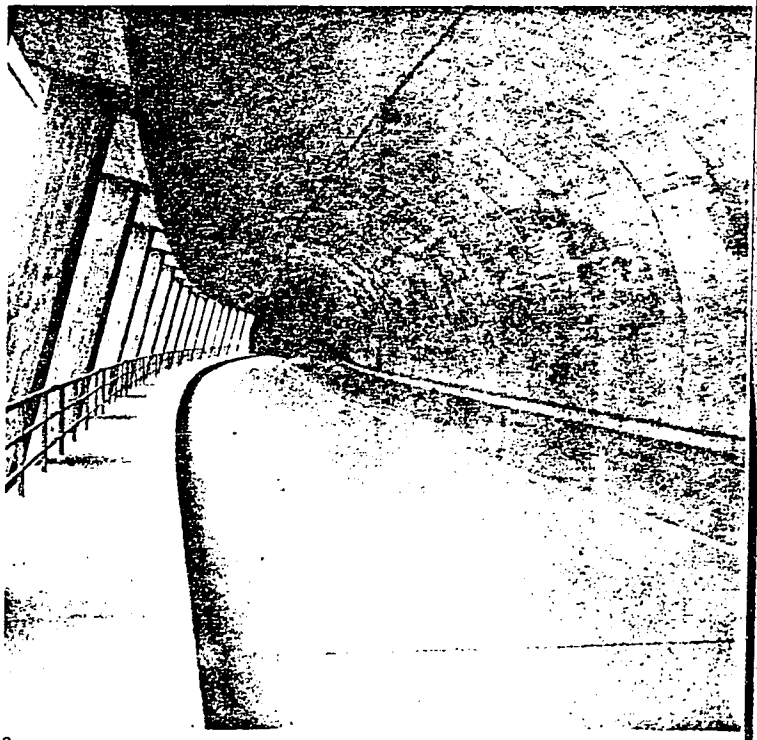


2

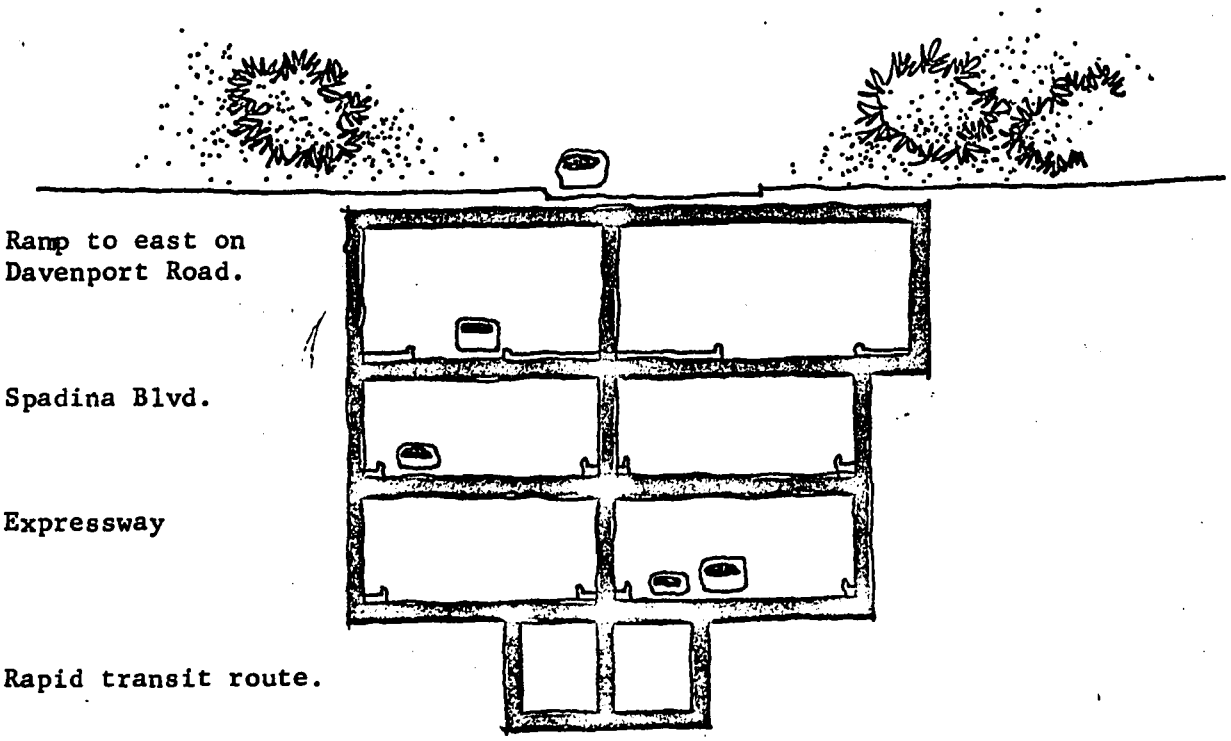
THE ENCLOSURE OF ROADS CAN TAKE MANY FORMS.

WHATEVER THE FORM OF ENCLOSURE, THE REASONS FOR DOING SO TEND TO FOLLOW A PATTERN.

On March 10, 1970, the *Toronto Daily Star* reported on an analysis of the probable impact of the expressway prepared by W. M. Wronski Metro Planning Commissioner, under the heading "Expressway will reduce pollution and noise".

Arguments in favour of a multi-level, depressed expressway are

1) Disturbance in residential districts will be reduced.
2) Noise and pollution (at ground level) will be reduced.
3) Pedestrian and traffic movement will not be hampered.
4) The grade level can be landscaped.
5) Sewers and other services can be combined with the routes.
6) A communications corridor is formed.



CROSS SECTION OF THE EXPRESSWAY AT THE DAVENPORT INTERCHANGE, TORONTO.

The selection of lengths of expressway which could be covered and economically developed needs careful study. The development over the approaches to the George Washington Bridge in New York convinced developers of the utility of building above major highways where the space could be acquired at considerably cheaper prices than surrounding land. In practice the location of multi-storey buildings over a busy, and at times congested road and a bus terminal has not been successful. One man who was interviewed had moved from the fourteenth floor to an apartment above the twenty-fifth floor to escape the noise and fumes.

4. Parking

Todays' symbol of overpopulation is the automobile, and indeed the resolution of city problems depends heavily on workable transportation systems. It is unlikely that western man will give up the individual convenience of the automobile, and we must expect this form of transportation or rationalised variants of it to continue for many years.

Any system which allows the rapid movement of small vehicles and fails to provide storage space for them at terminii or intersection points is incomplete, and this may be the major objection to todays freeway system.

In outlying suburbs, parking will certainly continue close to the dwelling as it is now, but in more concentrated districts, it is unreasonable to expect to have this facility next to the office or even in apartment basements. The problem is not so much the extravagant costs involved in building parking space into buildings, but the congestion caused on the streets, particularly at rush hours when competition for limited road space is most acute.

Recent reports indicate that the major companies are reviewing their products and will be producing greater numbers of compact or sub-compact cars. Experimental engines with reduced output of pollutants, engines combining gas and electric power systems are being developed and the more noxious components of gasoline will be removed[1].

The result is likely to be smaller, quieter, and less poisonous vehicles. But there will be more of them, and eventually some form of restriction in the already conjested central areas of cities will be necessary. The most frequent proposal is a combination of travel by private car and rapid public transit. Parking facilities connecting with rapid transit routes serving downtown are an essential feature of this compromise[2].

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1. Time, February 23, 1970. Pg 70-71.

2. Elcistic. Vol 29, Number 170. January 1970. The Transportation Fit: Needs and Facilities.

The location of parking structures must vary with the need. In Newhaven, Paul Rudolph's parking structure forms the core of a group of department stores, all of which are accessible from inside the garage. In most cities, multi-storey parking structures are available in central locations, but invariably with access from minor streets. It would seem more logical to provide massive parking facilities in close proximity to the arterial road so that traffic coming into a city does not have to enter city streets. If these parking concentrations are located at points served by convenient rapid transit routes leading to all parts of the inner city, central area traffic could be significantly reduced either voluntarily or by the prohibition of all but public service vehicles. Without proper and acceptable vehicle storage, this cannot be done.

The use of air space above freeways for parking structures is particularly attractive because of the co-relation between the two, and because the long, clear spans required for a parking garage suit the freeway dimensions.

Mayor Yorty of Los Angeles, commenting on a report made into the use of air space in 1966, announced that 1,272 parking stalls could be supplied over a freeway at a saving of $2,000,000 over an identical facility on a conventional site[1]. It is noted that the report assumes that the cost of air rights were not included, and unless air rights are obtained without cost for this type of development the comparison with conventional development is less favourable, unless the need for the facility outweighs the cost. This may well be the case where the parking is to serve a densely populated area, where clearance would result in the loss of housing stock, or flourishing commercial activity.

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1. "Parking Garages Over Freeways"
Editorial comment. "THE AMERICAN CITY". August 1966

5. Residential Renewal

One of the thorniest problems in the renewal of decayed residential areas is relocation. In spite of much goodwill on the part of everybody concerned, people disturbed by clearance and renewal do not necessarily return to their old district when new homes have been built.

While the new houses are being constructed, displaced people are absorbed into surrounding districts, or have taken the chance to relocate in a more desirable district, have become a part of their new environment and have little enthusiasm for a second move. The unfortunate aspect of this dispersal is that many families move into similar accommodation to that which they have left, and as renewal spreads they are again faced with eviction and the search for a home. If the family moves to a better district it will be paying higher rents, and even if the move is to another run-down area it would be true to say that in almost every case extra money will be needed for the rent which will reduce the money available for food, clothers and other necessities, to the detriment of the family well-being.

The overall effect of clearance of old residential districts is not yet fully realised, but Canadian studies indicate the effect on those people displaced is socially and economically to their disadvantage, unless relocation includes significant social programs of readjustment[1].

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1. This is clearly indicated in a study by Marvin H. Lipman. "Relocation and Family Life", a Thesis for Doctor Of Social Work, University of Toronto, 1968.

The effect of clearance and renewal on the neighbourhood in which it takes place is also disturbing.

Clearance is often total including houses, corner stores, schools and landmarks familiar to everyone, which together with the loss of the people may add to the hostility that meets residents of later developments. The uneasy acceptance of the project is frequently due to the monolithic presence, single residential use, size of the development, and the method of selecting tenants which favours large or unconventionally structured families due to the point system that favours families with many children and those on some form of welfare produces projects dominated by children, too often without strong parental control. A system that produces a wider mix of families is clearly needed, to reduce the number of children and create a balanced community, otherwise the children form groups to work off their energy within the project and in the neighbourhood schools, where a strong anti-project reaction will also develop against the new comers.

In time these prejudices may disappear, as the families of the project are assimulated into the life of the district, but it is clear that the public housing project that has been the standby solution for many years, is losing popularity as the defects of the system become apparent.[1]

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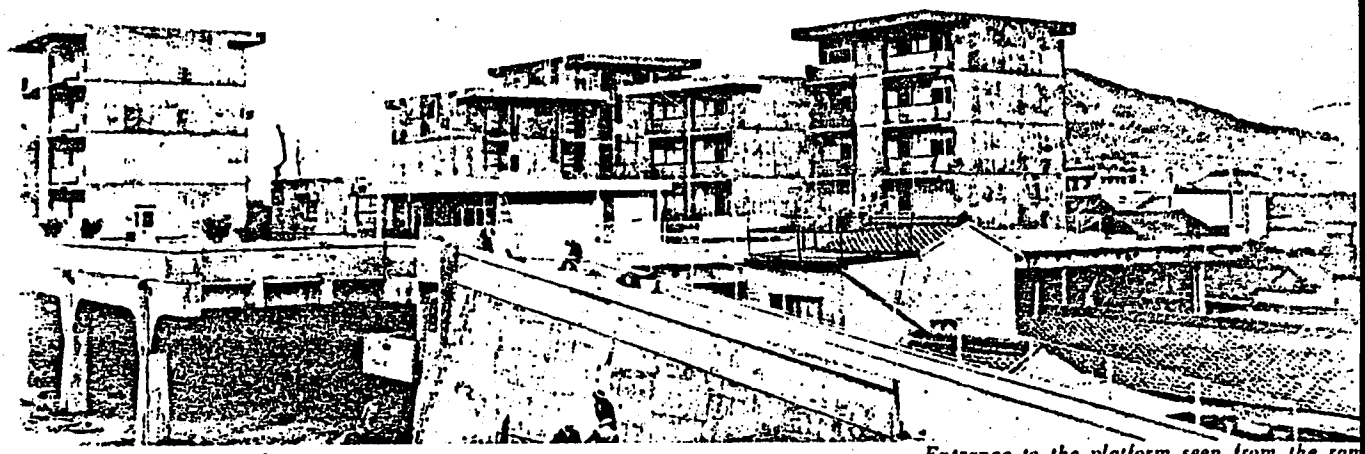
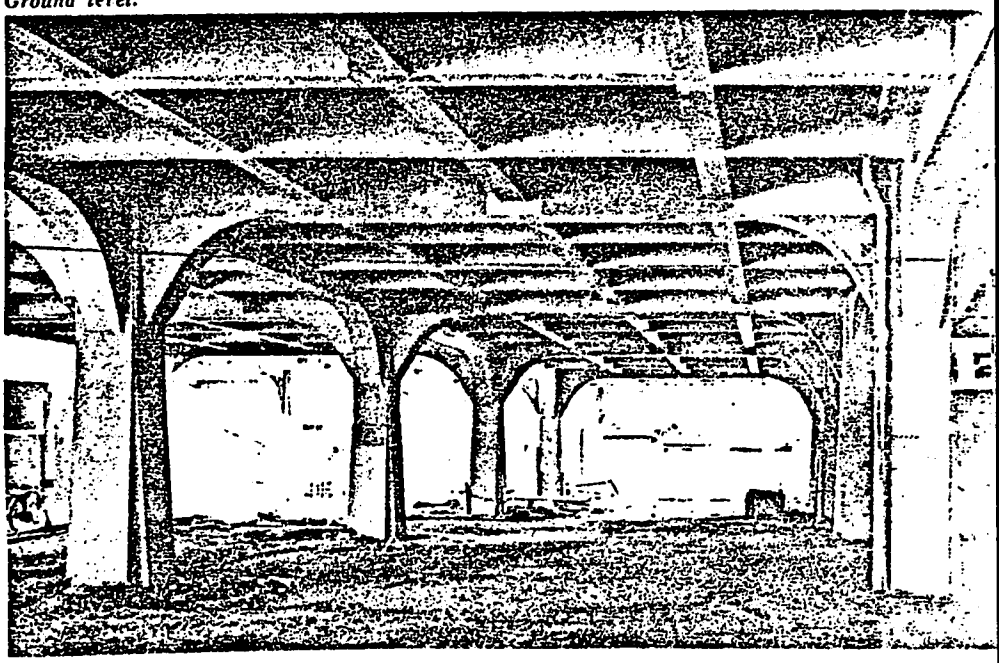
1. Study of Warden Woods and Scarletwood - Toronto

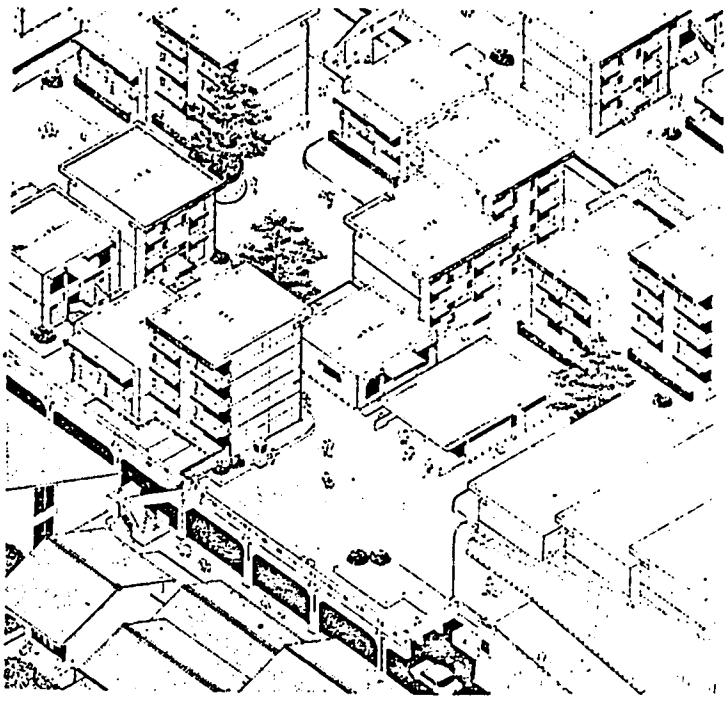


Entrance to the platform seen from the ran

vl-choloride panel from the of the apartments.

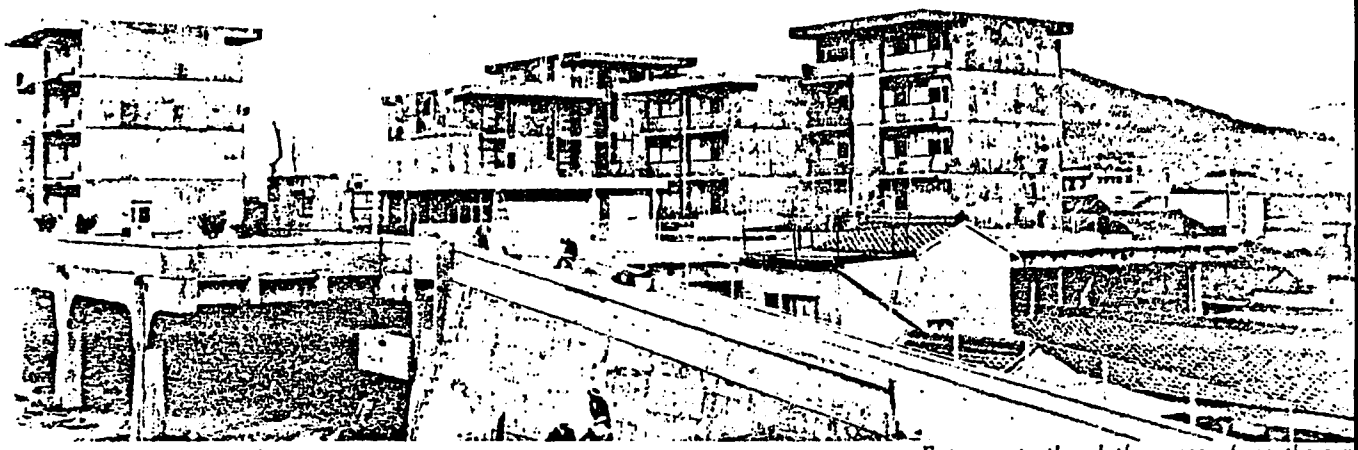
Ground level.





Sakaide Artificial Land Platform.

design: Masato Otaka, arch. and assocs. Masato Otaka, Masaya Fujimoto, Kenji Shioiri



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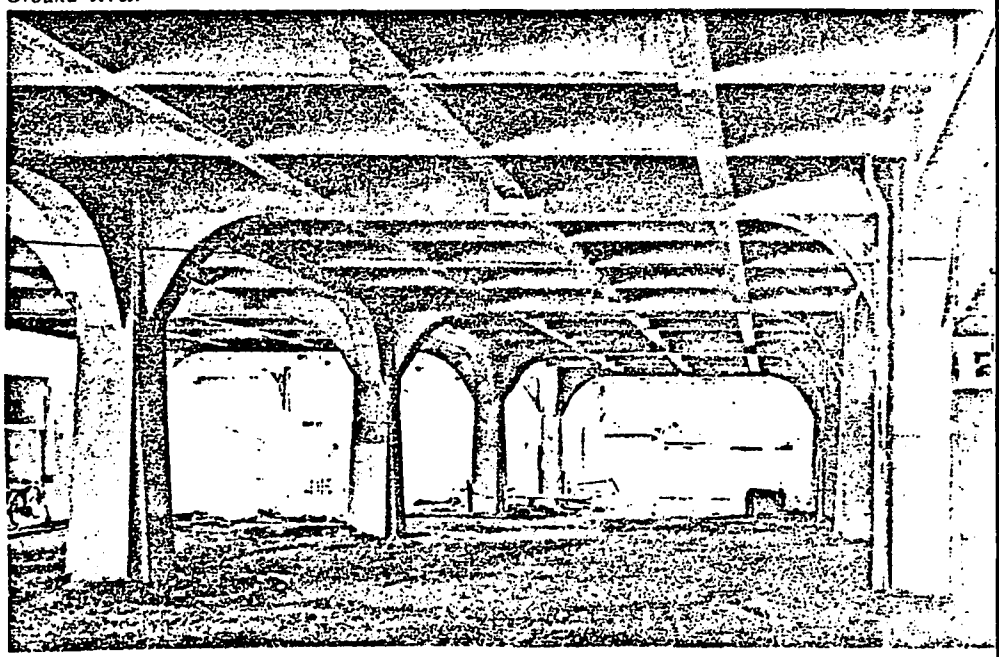
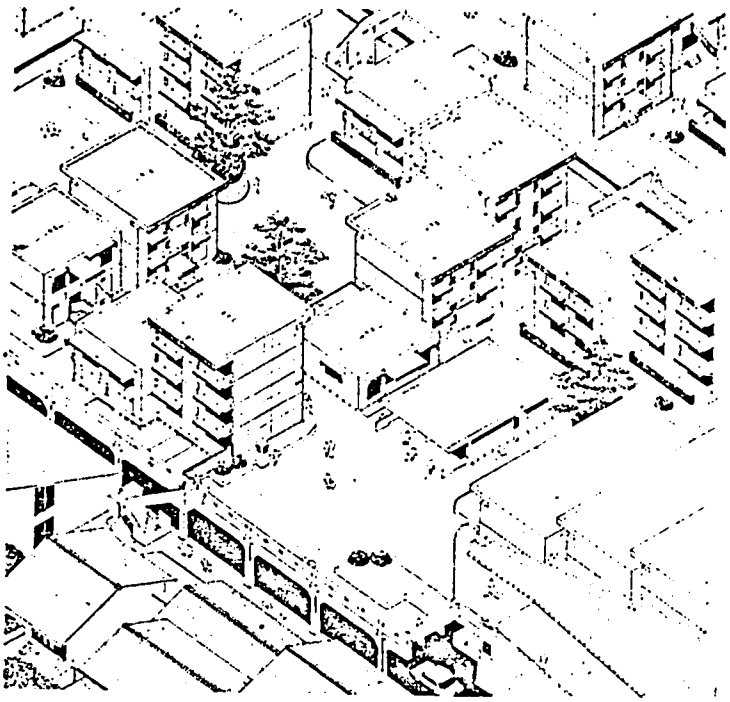
Ground level.





Sakaide Artificial Land Platform.

design: Masato Otaka, arch. and assocs. Masato Otaka, Masaya Fujimoto, Kenji Shioiri

New renewal solutions must correct earlier faults. Some of the requirements for improving the quality of urban replacement housing are:

(1) Construction of new homes must precede demolition of condemned accommodation.

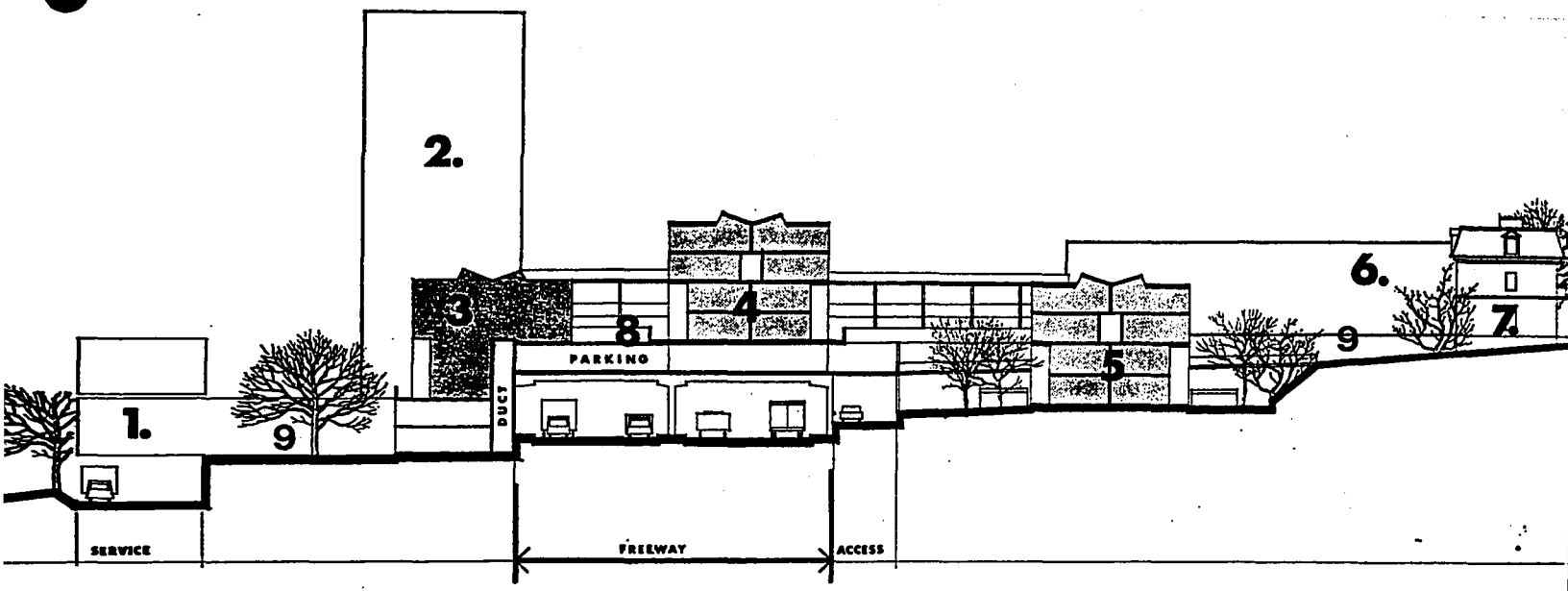
(2) Residents of the Renewal area must have the first refusal of the new homes, with only surplus accommodation available for city-wide distribution.

(3) The new housing must allow diversity of choice, a range of activities that parallels the organically developed neighbourhood, and produce softened demarcation lines between the new construction and the existing district.

(4) Sociologists, welfare workers and the future tenants themselves must be involved in the design process, or at least such a group must be available for consultation. This allows a feeling of belonging to develop before the tenants move in, and should allow a dialogue to begin between the Architect and his real clients, with the practical possibility of new developments being large enough to form 'neighbourhoods', containing their own shops, schools, and services as seems desirable.

This discussion of renewal is an intentional digression from the central argument of this paper but in-fact is one of the key issues. Since our major urban centres exist, some means of renewing or modifying out-of-date and decaying sections needs to be found, which at the same time, respects the four points raised above, reduces the dominance of the automobile and integrates the sections of the city now isolated by the hard linear characteristics of railroad and freeway.

In this instance, construction of new facilities in air-rights above streets and highways could be a powerful factor in the social integration of urban populations and nothing could do more to institute separate mechanical transportation and pedestrian systems than the transferance of constructed space from the side of, to over transportation routes.



1. Light industry next to railway and service road. Roof terrace.
2. Conventional high rise apartment with parking over adjacent freeway.
3. Low rise, high density housing utilising facilities over freeway, and partially extending over the top.
4. Low rise, high density housing spanning between bays of the freeway with parking under.
5. Low rise, high density housing conventionally located but screened from the freeway traffic.
6. Low rise, high density housing at right angles, and partially spanning the freeway.
7. Existing houses retained.
8. Structure over freeway to allow continuous development over, and to provide essential services to surrounding accommodation, and to deaden the sight, sound and smell of traffic.
9. Building above and against the freeway allows open ground to be used for gardens, parks and recreation — or for construction.

DIAGRAM ILLUSTRATING THE GAINS POSSIBLE BY THE LATERAL, AS WELL AS THE LINEAR DEVELOPMENT OF FREEWAYS AND THE ADJACENT LANDS.

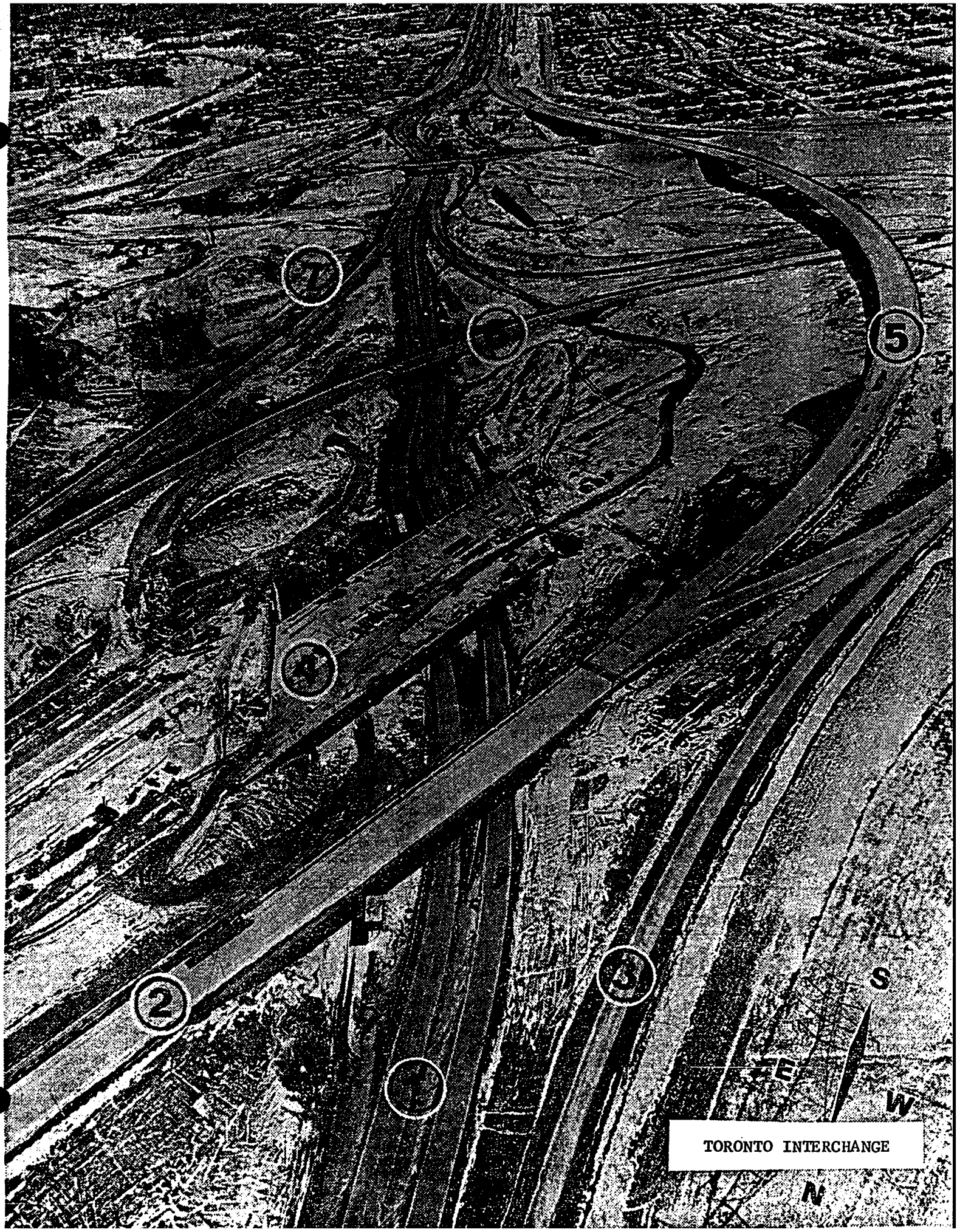
6. Transit Intersections

The emergance of rapid transit systems in Central areas, and the continued growth of suburbs and private automobile will make the transfer point between the car and the rapid transit system an important commercial site as well as a potential local centre for other public activity.

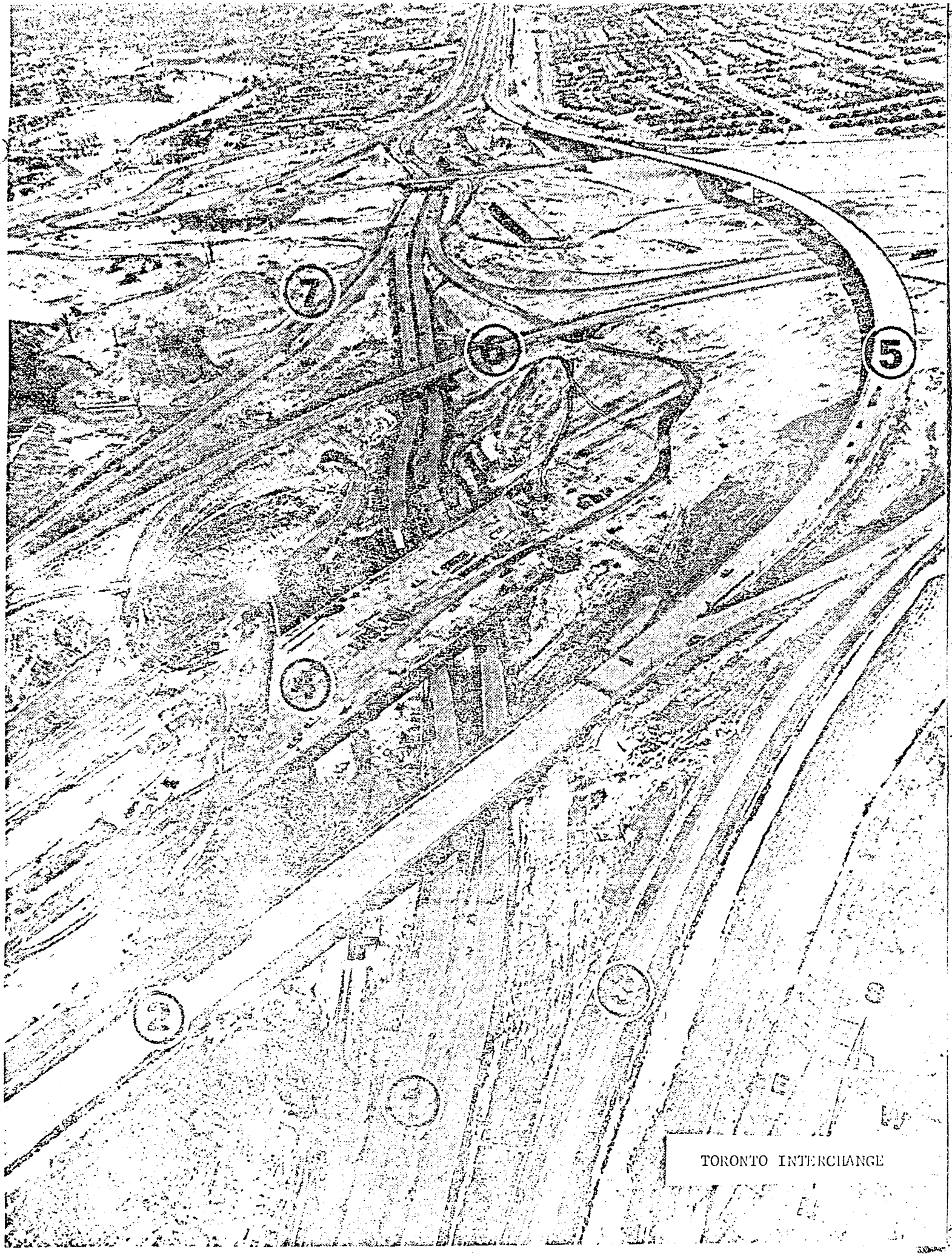
The present phonomonon of shopping centres developing at transfer points such as the exit of a freeway where cars go from a freeway to local streets, is well known. These have developed for two main reasons. First, access by way of the freeway makes it easy to get to these points from remote city areas. Secondly, these shopping centres lie on the path taken by commuters from home to work.

The significance of this is stated in Brennan's Law, which says in effect that people tend to habitually follow certain movement patterns and do not significantly deviate from them. It follows that activities located away from routes habitually used in daily activity are less attractive and will be less used than those lying directly on the route.

The importance of air rights over transit intersections is therefore not principally related to the high cost of land in these areas, but to the high value of the point of intersection. When these points are to be used as transfer points, and it is necessary for people to leave one vehicle to get into another, the value is increased; many



TORONTO INTERCHANGE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TORONTO INTERCHANGE

people decide to shop, eat, drink, buy or look at things conveniently displayed where a journey is naturally broken, rather than stop along the route.

These intersections are the point where traffic concentrates as it travels from the dispersed suburban developments towards the core activity, or disperses on the opposite journey. They are prime locations for municipal activity as well as being desirable for commercial activity, entertainment, hospitals, educational centres and other centralised functions serving dispersed populations.

In addition, there will be a massive requirement for vehicle storage, parking for commuters, for shoppers and for everyone using these centres.

The result of this concentration of activity could produce the high density core of outlying districts, and be the locational factor in the development of the modal city. The importance of the city core would be reduced, but would maintain its ascendancy over outlying nodes as being the major point of intersection, or the point of termination of major traffic routes.

The heirachy of these nodes might be determined by

(i) Volume of traffic passing through the intersection or transfer point.

(ii) The need to break a journey at these points.

(iii) Locational advantages (semic attractions, access to desirable natural facilities, water, hills, etc.)

CANALS, RAILWAYS AND ROADS IN DOWNTOWN MONTREAL

CANALS, RAILWAYS AND ROADS IN DOWNTOWN MONTREAL

SECTION 7

Summary

Technological advance during the last century has been responsible for centralising forces which have combined to produce urban conglomerates of a size and complexity previously unknown.

The rapid growth of urban areas has been undertaken without an understanding of the co-operative and partnership requirements of concentrated urban settlement and a strong social sense of individual liberty has persisted due to the fast and massive influx from rural areas of people essentially unsuited to urban life. This has resulted in urban development unsuited to the long term needs of urban populations and this situation requires urgent repair in order to function.

Techniques intended to control development have evolved with the city, and tend to reflect the rural mans preference for individual/isolation, and the need to protect private property.

By-law controls and zoning have been useful, but are becoming increasingly suspect in this time of dramatic change.

The effects of zoning are good if it prevents unbridled development and creates an awareness of civic responsibility of the individual, balancing the public well-being against individual freedom. The effects are bad when the result is an arbitrary grouping of identical uses, excluding the symbiotic relationships that are the traditional pattern of human settlement, which may give rise to the North American love of old

cities, a nostalgia perhaps reflecting an unfulfilled human need for varied environment that should be respected.

Segregation may be valid when society requires protection against uses that pollute or endanger a community or which result in a negation of individual aspiration. However the powers of zoning are frequently used to create reserves for privileged groups, with financial or social interests tending to dominate human needs.

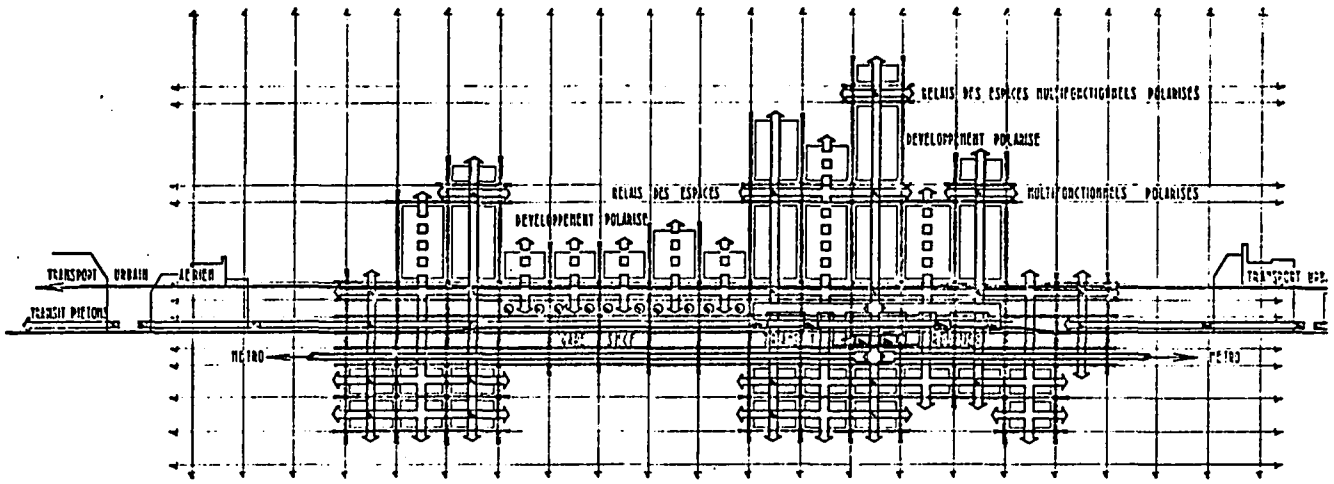
A clear understanding of what a city is, and what it could be is developing with the new generation of city born and raised children, and old concepts of the nature of urban settlement, and the rules governing the way this is done will have to be reconsidered.

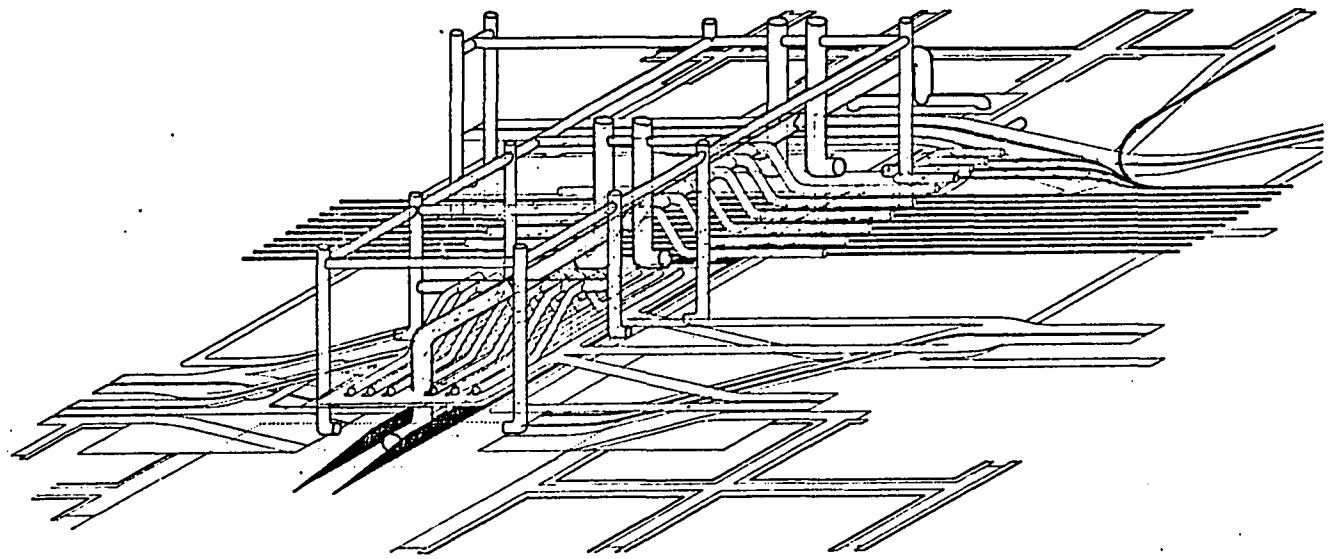
There is a demonstrable growth of interest in the environment and in urban systems, and it is this enlightenment of new generations which must be taken as the main task of present day planners. Cities of the coming century must not be modelled by the restrictions of thought and growth instituted by preceeding generations.

The importance of providing transportation without having it dominate the life of the citizen is a problem of environmental design with the highest priority, and the resolution of this in the existing urban centres may be the mutative leap necessary to revitalise the city, and the effective beginning of the urban isation of our centres of population.

From what has been set out in the body of this thesis it appears possible to contemplate radical change of our cities without unreasonable disruption by the use of air rights.

The linear city has been popular for many years as a theoretical means of providing fast access to the greatest number of city functions possible by concentrating communication lines into a single combined strip with the construction of major facilities around it.

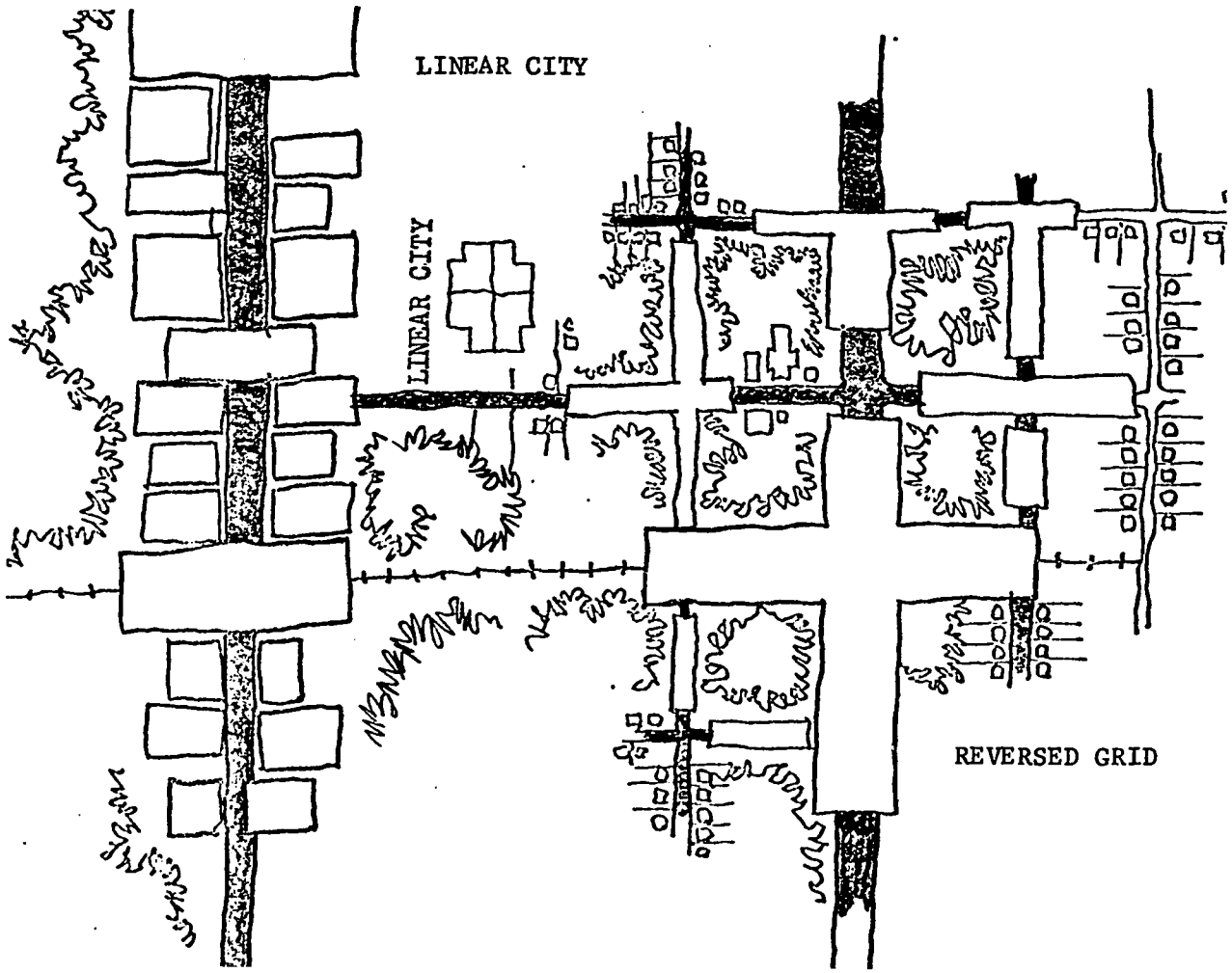




In the context of existing urban development, the linear city may have limited application since an expanded core already occupies the ground. Greater sensitivity is necessary, which might be introduced by a modification of the linear situation.

By utilising the air space over existing roads leading from the central core, and renewing residential sections in the same way a new pattern could emerge which might be termed the reverse grid. In this proposal, functions requiring direct access to fast communications are located above and along the rapid transit systems of road, rail and metro. These become the revitalised core areas and operate as a linear city.

Secondary uses are located along secondary routes, modifying the existing city structure as it leads away from the core



Finally, the utilisation of the intersection in it's emerging form could produce outlying centres for the dispersed suburban populations, creating not only service and administrative aggregations at the points of best access but visual emphasis to establish reference points in low density residential districts.

The objective is to reduce the dominance of transit and access routes by careful examination of their present function and by the capitalisation of under developed space, and to bring back a sense of individual participation in city development by the introduction of condominium as a legal devise and as a desirable social amenity.

Utopian solutions are of little value. Remedies must spring from what we are now, not what we would like to be.

The hope for urban man lies in his ability to picture the city and the society he wishes to achieve, and in his manipulation of the Democratic processes by which he is governed to achieve what he wants.

The use of air rights over public land to achieve public ends is a legitimate activity. Condominium, a form of private ownership well suited to urban situations.

Speculation on what should be done to keep cities habitable is of no value if means do not exist to implement ideas. Present social and economic attitudes are powerful forces, and to get work done it is wiser to direct then sensibly, than to oppose them.

SECTION 8

APPENDICES

APPENDIX 'A'

For estimating the route-mile costs of highways, the basic structural cost equation can generally be expressed as follows: (1)

(i) $Scow_i = Wrow_i f(X_i)$

(ii) $Sc_i = Wc_i g(X_i)$

where $Srow_i$ = The costs per period of acquiring right-of-way (ROW) needed for the i^{th} mile of a particular system;

Sc_i = The costs per period of constructing needed highway or roadbed facilities for the i^{th} mile of a system;

$f(X_i)$ = A function expressing the relationship between basic ROW costs per period and population density over the i^{th} mile;

$g(X_i)$ = A function expressing the relationship between basic construction costs per period and population density over the i^{th} mile;

$Wrow_i$ = An index expressing the multiple of basic ROW costs that the i^{th} mile costs will be because of width;

Wc_i = An index expressing the multiple of basic construction costs that i^{th} mile costs will be because of width.

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(1) The Urban Transportation problem, Meyer/Kain/Wohl. Ch. 8 Costing Procedures and Assumptions.

Total system cost estimates can be obtained by summing these costs for every route-mile in the system.

NOTE: (i) The expressions $f(X_i)$ and $g(X_i)$ need interpretation which is not given in the text.

(ii) $Scow_i$ and Sc_i include a time factor to include interest on these investments.

(iii) The authors note that because of the difficulty in obtaining reasonably accurate estimates of actual costs, it seems unnecessary to use more sophisticated capital cost calculations.

APPENDIX 'B'

EXAMPLE OF COMPLIMENTARY USES BY PUBLIC AND PRIVATE ENTERPRISE

Compatability of land use is well illustrated by an example from Livermore, California.

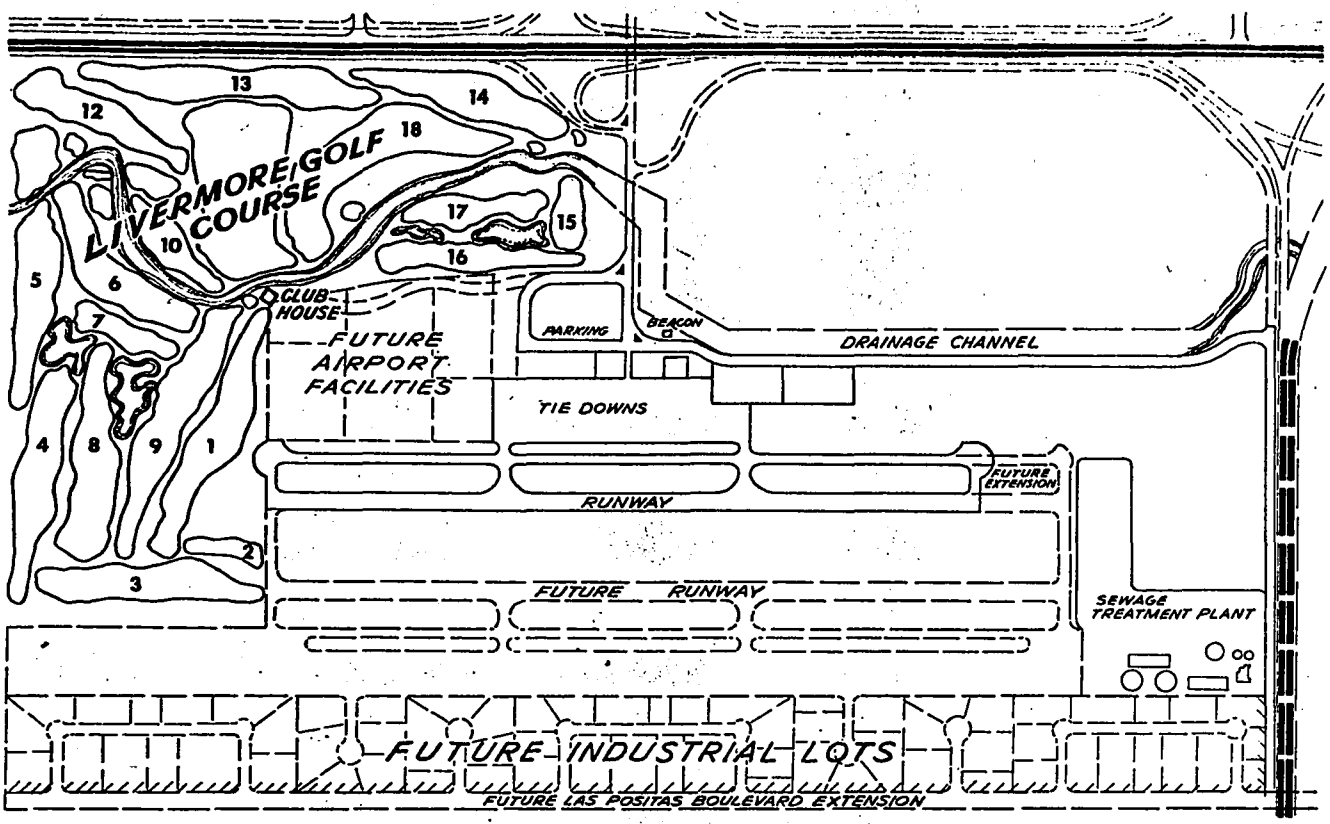
The original City Aeroport became obsolete because of residential encroachments of surrounding lands, and the use of the aeroport was becoming limited.

A site was chosen close to an existing sewage plant treatment plant which blocks residential growth at one end of the runways, and a municipal golf course was laid out at the other end, with a clubhouse located to serve both facilities.

A remodeling of the sewage treatment obtained an effluent suitable for use in the maintenance of greens and water hazards on the golf course, provided irrigation to the arable land around the runways of the Aeroport, and provides fire protection for both activities.

This source of cheap water reduced the costs of watering the golf course which normally accounts for 35% of maintenance costs, ground water is replaced and because of the high nitrate content of the effluent induces strong turf growth.

Crops grown in the lands around the aeroport also benefit from this fertilization.



Construction of the golf course, airport, sewage-treatment plant and industrial park in close proximity made it possible for each of them to complement one or more of the others.

Although these municipal facilities are provided for the benefit of local residents an adjoining strip of land has been set aside for industrial development with the Municipal facilities as bait.

> Although we created this complex primarily to serve our residents, the practical economics of building revenue-producing services have become evident.[1]

From the figures quoted it appears that the total cost of development, partially offset by Federal government loans, is more than covered by revenues from the golf course, and the storage and operational facilities of the aeroport.

Although climatic and other considerations may make this development particularly suitable to dry areas, the significance of this project lies in the enterprise of the Municipality in organizing its Municipal works for both economic advantage, and the public good.

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1 The American City, May 1968, Vol. 83, No 5, Buttenheim Publising Corp., 757 Third Avenue, N.Y. W.H. Parness, "Gold Course and Aeroport Irrigate with Sewage Effluent", City Manager, Livermore, California.

APPENDIX 'C'

LIFETIME FAMILY BUDGET

Home ownership, and therefore full participation in Condominium schemes would normally exclude lower income groups. If the improvement of status of home ownership over some form of rental is valid, some means must be devised to assist the poor, so that they can fully participate in socially desirable housing patterns.

A recent article (1) has pointed out that given credit at a low rate of interest, it is theoretically possible for almost any family to buy their own home.

This has been done by assessing a "Lifetime family budget" which assesses the total expenditures of a family over a 42-year working life of the male.

A family earning $2,604.00 per year spends an average of $42.00 per month on shelter, for a 42-year total expenditure of $23,634.00. Other housing costs, add $14,676.00 for a total of $38,310,00.

It is suggested that if a 40-year mortgage were made available at 3% for the purchase of a $12,000 home, the family would be able to maintain payments on the total housing cost including principal and interest, taxes, utlities and insurance, with an increase in their present spending of only $361.00 per year.

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(1) Give them Credit. Isadore Seeman
Journal of Housing NO.8, 1968
Note: Figures based on averages obtained from U.S. Dept. of Labour, 1960-61.

The calculation for this family is as follows:	
Total expenditure on shelter over 42 years	$ 23,634.00
Other housing costs	14,676.00
Total housing cost for renting	$ 38,310.00
Expenditure over 40 years	$\frac{40}{42}$ x 38,310
	= $36,480.00
Total cost of house purchase over 40 years	= $48,760.00 *
Difference between present outlay and that needed for house purchase	$48,760 - 36,480
	= $12,280
Spread over 40 years	$\frac{12,280}{40}$
	= $307.00 per annum

From these figures it is apparent that if credit were made available to this family before the husband is 27, an increase in monthly payments for housing needs of $361.00 p.a., or $28.00 monthly would put them in the home owner class.[1]

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* The author raises this figure to cover "all family expenditures" to achieve a differential of $361.00 or $28.00 per month.

1. Figures in this article are not based on an itemised list. It is not clear for example, if maintenance is included for the $12,000 house over 40 years; although this may increase the cost difference between renting and owning accommodation; this concept remains valid as one possible means of providing housing.

There are two sources of subsidy contained in this proposal; the first, the artificially low interest rate charged on the loan, and the second, the need to pay the difference between expected rental costs and those of purchasing a house. However, it appears unlikely that these costs would exceed present subsidy patterns for public housing, even when adjusted to present day figures, and there remains the essential fact that low income groups can own their own homes assuming the pride, concern and responsibility that home ownership generates.

Low cost housing is unlikely to result from cheaper forms of construction, and in fact there is no need to reduce these costs. What is urgently needed are new financing techniques, such as the one outlined here, which will utilise lifetime earning capacity and dispence with large down payments on essential services, such as accommodation.

SECTION 9

ACKNOWLEDGEMENTS AND REFERENCES

I. BOOKS AND PAMPHLETS

1. Davis, Irwin. Condominium and the Strata titles act. Real estate institute of British Columbia, 1967. 20 p. (Bulletin No. 10. Reprinted from the Canadian bar journal).

2. Halverson, Richard C. Condominiums: time-saving homes. (Christian science monitor, October 3, 1968).

3. Hanford, Sr., Lloyd D. Development and management of investment property; 2nd ed. Chic., Inst. of real estate management, 1968. 178 p.

4. Harvard university. Graduate school of business administration. Condominium: housing for tommorrow. Boston, Management reports, 1964. 94 p.

5. Lambert, Barbara. Condominium concept: Ontario seeks to solve legal tangles. (Ottawa citizen, Jan. 28, 1968).

6. Morin, Claude. Condominium: report prepared for the Advisory Group, C.M.H.C. Ottawa, 1967. 31 p.

7. National association of home builders. Condominium: a program presented at the NAHB convention-exposition, Chicago, 1963. Wash., NAHB, 1963. n.p.

8. Outen, Boyce C. Condominiums come to town: may draw suburbanites back to city. (Lawyers title news, September, 1962).

9. Rohan, Patrick, J. and Reskin, Melvin A. Condominium law and practice. N.Y., Matthew Bender and co., 1965. 15 chapters.

10. Rosenberg, Alvin B. Condominium in Canada. Toronto, Canada law book, ltd., 1969. 14 chapters.

11. Air Rights and Subsurface tunnel road easements. Appraisal Institute Pamphlet. 1964.

II. PERIODICAL ARTICLES

1. Amenities close the deal: Victorian village, Houston, Texas. (In NAHB Journal of homebuilding, July, 1967, p. 44).

2. Another look at condominiums, their problems and prospects. E.N. Bailey. (In Mortgage banker, May, 1965, p. 33-6).

3. The appraisal of condominiums for assessment purposes. Holland Hilton. (In Real estate appraiser, July, 1967, p. 2-8).

4. The appraisal processes and the condominium. Goerge R. Peacock. (In Appraisal journal, July, 1964, p. 351).

5. Assessment problems of condominium ownership. James Andrews. (In Urban land news and trends, November, 1963, p. 1, 3-6).

6. Based on realistic analysis of the aging process, retirement condominium offers total care for the aged: Northcrest retirement community, Ames. Iows. (In Profressive architecture, May, 1968,, p. 144).

7. 'Beautiful confidence' in Hong Kong; apartment. (In Engineering news-record, July 20, 1967, p. 60).

8. The Chicago experience of condominium: what to do and what not to do. (In Building management, November, 1966, p. 32-4).

9. Classic elegance sells city dwellers new townhouses in a fine old neighborhood: Atlanta. (In House and Home, May, 1967, p. 98-9).

10. Comments on comdonimium. Edith M. Brown. (In Canadian realtor, August, 1965, p. 2-3).

11. Commercial condominiums can bring profits. (In NAHB Hournal of homebuilding, December, 1968, p. 133.)

12. Condominium: a new look at an old idea. (In Construction review, September, 1965, p. 4-6).

13. Condominium advantages create booming sales. W.S. Everett. (In Journal of property management, September-October, 1968, p. 234).

14. Condominium and the law. Murray E. Blankstein, (In Canadian builder: part one, November, 1967, p. 78-80; part two, January, 1968, p. 20-1; part three, February 1968, p. 32-5).

15. Condominium canadiensis. (In Building management, October, 1963, p. 22-3).

16. Condominium comes of age. (In House and home, March, 1967, p. 78-85).

17. Condominium legislation introduced in Ontario. (In Homebuilding news, March 31, 1967, p. 1).

18. Condominium projects. (In house and home, April, 1969, p. 80-5).

19. Condominiums. Donald D. Evans. (In Appraisal journal, July, 1964, p. 339-57).

20. Condominiums - a symposium. (In appraisal journal, October, 1962, p. 453-80).

21. Condominiums in Israel. Alexander Cohn. (In Appraisal journal, January, 1967, p. 88-101).

22. Condominiums take to skis. (In Business week, November 18, 1967, p. 196).

23. Cooperatives and condominiums. (In Changing times, January, 1969, p. 31-3).

24. Cooperatives and condominiums. H. Eugene Fox, (In Journal of property management, July-August, 1965, p. 178-83).

25. La copropriété est-elle pour demain? (Dans Bâtiment, juin, 1968, p. 29-30).

26. Early American opulence got vital first sales for this pioneering townhouse-condominium: Oklahoma City. (In House and home, May, 1967, p. 94-7).

27. Elevator serves only two apartments on each floor, provides privacy for condominium buyers in Florida. (In NAHB Journal of homebuilding, March, 1968, p. 22).

28. For sale: a big builder's townhouse formula: Data core-development analysis townhouse assn., Hallcraft homes. (In House and home, May, 1968, p. 105-8).

29. God, man and the condominium: casualty loss and tort liability; fashioning an insurance program for the condominium. P.J. Rohan and M.A. Reskin. (In Journal of property management, January-February, 1968, p. 32-44; March-April, 1968, p. 75-82).

30. A guide to FHA financing of condominiums. (In Practical builder, April, 1967, p. 112-5).

31. Here's what it takes to create a brand-new market: Hertage village, Southbury, Conn. (In House and home, April, 1967, p. 76-91).

32. Historic townscape and harbor views determine the design for a new housing cluster in an old sailing town: Marblehead, Mass. (In Progressive architecture, May, 1968, p. 140).

33. Housing 1967: condomium - a step but not a march. Aubrey Davies. (In Building management, May 1967, p. 11).

34. How Canada's three condominium acts compare. C. Christopher Johnston. (In Building management, Sept. 1967, p. 25-8; Canadian realtor,June 1968, p. 5-7, 22).

35. Now, the detached - house condominium. (In House and home, Sept. 1967, p. 12).

36. Perfecting the condominium as a housing tool: innovations in tort liability and insurance. Patrick J. Rohan. (In Law and contemporary problems, spring, 1967, p. 305-18).

37. The real estate condominium: its tax problems and implications. Louis M. Clark. (In Appraisal journal, Oct. 1967, p. 475-95).

38. Should the condominium go downtown? Norbert J. Stefaniak. (In Journal of property management, July-August, 1966 p. 168-73).

39. Single-family units sell in condominium cluster. W.R. Beaton. (In Journal of property management, May-June, 1968, p. 135-40).

40. The staggering gives each unit identity .... and privacy particularly at the rear. (In American builder, March, 1968, p. 50).

41. Take a second look at - the vacation condominium. (In NAHB Journal of homebuilding, Feb. 1967, p. 50).

42. This condominium townhouse project was a surpirse sell-out: Berea, Ohio. (In House and home, Oct. 1967, p. 44-8).

43. This condominium will open full next summer ... the sales program is almost over: Fort Lauderdale. (In American builder, Dec. 1968, p. 38).

44. Town houses - what a difference! Queen's court, Nassua Bay, Houston. (In Practical builder, Oct. 1967, p. 78).

45. A viable method of low-income housing - condominiums. Mathias Plum, Jr. (In Mortgage banker, Oct. 1967, p. 32-6).

46. What sells condominiums: Bonnymede, Santa Barbara, Calif. (In American builder, March, 1967, p. 50-1).

47. Where condominiums are new, they take skillful selling. (In American builder, May, 1967, p. 72).

48. "Last Hitch in the Inner Belt". John Morris Dixon. Architectural Forum. May 1966.

49. Painless Urban Highway Routing. Engineering News Record. Nov. 1966.

50. Centre City Living. Bruce Anderson. Habitat.

51. Woolwich - Erith New Town. Misc.

52. Parking Garages over Freeways in Los Angeles. The American City. August 1966.

53. Against High Density Living. Robin H. Best. New Society. Nov. 1966.

54. Modern Living, The City. Development Proposed for Brooklyn. Time. March 10, 1967.

55. Air Rights, Albert W. Clurman. The Appraisal Journal July 1964.

56. Development over approaches to George Washington Bridge built about 1960-61. Misc.

57. Space for Urban living; A Plan of action to provide urban homes for middle-income families utilizing air rights over public facilities. Nelson A. Rockefellers Study for Urban Middle Income Housing. Albany 1961.

58. Note on Air Rights Development in New York. Quotes from the N.Y. Times. The Appraiser. June 1967. Vol. 23 - No. 6.

59. Report of the Task Force on Housing and Urban Development. Queen's Printer. January 1969.

60. The Role of the Highway in Urban Development. Magazine of Public Works. July, 1968.