RICE UNIVERSITY

THE INDIVIDUAL BUILDING AND THE CITY
The Emergence of the Three-dimensional City Floor in the Evolution of Systems of Access

by

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Today's society is characterized by its need for accessibility to a wide variety of activities, and thus the need for highly efficient ordered means of going from one place to another, of transporting goods and services. These means are hereafter referred to as systems of access. Systems of access throughout history have altered and influenced building form. Today's developments require major structures to provide for and order the different means of transportation into systems of access. This demand has created a new building form. The form contains the activities heretofore relegated to a two-dimensional surface or city floor, for example, pedestrian walks, automobile roads and parking areas, train tracks, and subway tracks. This building form also includes shops, restaurants, and various other facilities which depend upon direct accessibility to large numbers of people. The activities previously occupying major individual buildings on separate sites are located in and on this public structure and have a more individuated character. This new building form demonstrates clearly, the role of the individual building as a dependent part of the city. The elaborate systems of access demonstrate the role of such systems as basic organizing elements within the city. Together they demonstrate how major portions of our cities must be rebuilt, and the principles upon which new cities and new parts of our existing cities must be built.
These principles are the thesis:

© THE INDIVIDUAL BUILDING MUST BE CONSIDERED A DEPENDENT PART OF THE CITY.

© THE INDIVIDUAL BUILDING MUST BE CONSIDERED A PARTICIPANT IN SYSTEMS OF ACCESS THROUGH THE CONCEPT OF THE THREE-DIMENSIONAL CITY FLOOR.

© THE INTEGRATION OF THE INDIVIDUAL BUILDING WITH SYSTEMS OF ACCESS REQUIRES CITY PLANNING.

This thesis requires the recognition of the building of cities as a social activity directed toward social ends. The directing of the building of cities toward social ends requires the recognition of need and subsequent legislation enabling civic authorities to implement city planning. Because the city demands an integration with building, because it is the creation of an environment for man and a modification of the natural environment by man, THE CITY IS ARCHITECTURE.

William W. Caudill, Thesis Director
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INTRODUCTION

The purpose of this thesis is to illustrate the role of the individual building in today's urban environment. In order to illustrate this role, it was necessary to investigate the following:

- A basic requirement of society and the nature of this requirement in today's society.
- The historic and evolving effect of this requirement of society upon building form and city form.
- The interpretation and subsequent expression of this requirement and its effect upon building form by architectural theorists.

Two terms have been coined in order to describe briefly rather complex entities.

The first term is "city floor". This term refers to the public realm given over by individual interests to the community for interaction and communal functions.

The second term is "systems of access". This term refers to the ordered means of going from one place to another, the transporting of goods from one place to another, and the delivery of services. Access is used in lieu of movement because it implies an order and direction.
CHAPTER I URBAN POPULATION

A community is by definition, a social group of any size whose members share government and have a cultural and historic heritage. It is obvious that in order to establish a group, in order to share, at least two people must come together. Historically this 'coming together' or interaction was determined largely by the distance separating two individuals. Today, this is not the case and it might be said that this definition has been bound by tradition to a particular place or locale. Today's society, with its speedy and efficient means of transportation, has scattered its communities over vast areas. In today's society the interaction of people must depend upon the systems of access that are provided or as Melvin Webber has stated,

"With few exceptions, the adult American is increasingly able to maintain selected contacts with others on an interest basis, over increasingly great distance; and he is thus a member of an increasing number of interest-communities that are not territorially defined." (1)

"Both the idea of city and the idea or region have been traditionally tied to the idea of place. Whether conceived as physical objects, as inter-related systems of activities, as interacting populations or as governmental dominions, a city or a region has been distinguishable from any other city or region by the fact of territorial separation.

The idea of community has similarly been tied to the idea or place. Although their conditions are associat-
ed with the community—including 'sense of belonging', a body of shared values, a system of social organisation and interdependency—spatial proximity continues to be considered a necessary condition. But it is now becoming apparent that it is the accessibility rather than the propinquity aspect of place that is the necessary condition." (2)

These changes in our community structure, and thus the needs that accompany interaction have been a result of the freedom of movement given us by science and technology. The spatial distribution or the ecology of our communities has changed. It may be argued that primary requisites for the maintenance of these communities are highly efficient systems of access. With the idea of interaction and the need for systems of access in mind, it is possible to pursue the effect that systems of access have had upon the form of the individual building and upon the role of the individual building in the urban environment.
CHAPTER II BUILDING AND CITY IN HISTORY

Historically, the systems of access required by a community, the city floor, have occurred upon the surface of the ground. Historically, the city floor has been a public realm, given over by private interests so that access might be gained and interaction might take place between private individuals and establishments. Its early form might be seen in agricultural settlements and villages.

THE EARLY VILLAGE

In its first form, the village was very much like the village of Ual Ual in Abyssinia (plate 1), or the stone age settlement at Glastonbury (plate 2). These two examples illustrate that buildings were not considered inviolate entities; they grouped and intersected on another as need demanded. The city floor was a random, left-over area that provided for the interaction of the community.

The stone age settlement at Castellazzo di Fontanellato shows the early emergence of a highly organized system of access, and the resultant rectangularity of its plan (plate 3). Ludwig Hilberseimer has attributed this contrast in types to the existence of two forms of society; one, organic and mystical; the second, geometric and magical. Whatever the reason, these types set the pattern of development that appears in the early city. (3)
Stone Age Settlement, Glastonbury
Stone Age Settlement, Castellazzo di Fontanellato
THE EARLY CITY

Increases in population, density, and a need for organized means of protection probably had a great deal to do with the formation of the first access system, the street. The street was predominantly occupied by pedestrians, but as man added the beast drawn vehicles to his own legs, the street became more specialized and a division of traffic becomes apparent. Witness the Sumerian cities of 3500 B.C.

"Radiating out from the massive public buildings... towards the outer gates were streets, unpaved and dusty, but straight and wide enough for the passage of solid-wheeled carts or chariots. Along the streets lay the residences of the well-to-do citizenry, usually arranged around spacious courts and sometimes provided with latrines draining into sewage conduits below the streets. The houses of the city's poorer inhabitants were located behind or between the large multi-roomed dwellings. They were approached by tortuous, narrow alleys, were more haphazard in plan, were less well built and very much smaller. Mercantile activities were probably concentrated along the quays of the adjoining river or at the city gates. The market-place or bazaar devoted to private commerce had not yet appeared." (4)

The streets were organized to connect the public realm outside the gates to the public realm in building form at the center. Access to this system was then provided by the inhabitants in the simple manipulation of their dwellings and the provision of paths and alleys. Here the street becomes a pre-determined element. Paths and alleys are 'left-over' space provided in a manner similar to the early village. The street, recognized as a public realm began here to contain the first public utilities, the sewer. It was later expanded horizontally to contain other communal facilities, one example of this is the granaries of Merimdeh Beni Salameh.

"In addition, the village had a communal granary, consisting of woven baskets sunk into the ground." (5)

As trade developed, location and proximity became major factors in the organization of activity along the access system.
of 'street'. This can be seen in a model derived from the Arab cities of North Africa.

Candle and perfume makers who supply the mosque with ceremonial paraphernalia are located near the mosque on the public way. The mosque and university are linked together and located near the palace, thus a spiritual, intellectual, and governmental center developed. Cloth merchants and suppliers of fine leather for book binding are located near the university, and needing protection for their finery, are complemented by metalsmiths and locksmiths. Saddle makers and hostels are located near the city gate for the convenience and accessibility of travelers (plate 4).

"Thus the component parts of the organized Arab city are located as logically as the organs of the human body. Dimensions and locations determined by pedestrian movement." (6)

In both the Sumerian cities and the Arab cities of North Africa there is a predominance of pedestrian interaction between the various activities of the city, the beginnings of zoning as to street type and use, and the dominance of propinquity as a requisite of interaction.

The appearance of the market, temple, or governmental square expanded the public realm in order to provide for the interaction and exchange necessary to the existence of the city. This expansion of the public realm, was stimulated by technological advances in the agricultural base of the settlement, the increase of specialized labor, and the ensuing expansion of trade and travel.

"That the first growth of cities should have taken place in river valleys is no accident; and the rise of the city is contemporaneous with improvements in navigation, from the floating bundle of rushes or logs to the boat powered by oars and sails. After this the ass, the horse, the camel, the wheeled vehicle, and finally the paved road widened the province of transportation, and gave the city command over men and resources in distant areas." (7)

Here, new means of transportation not only satisfied a need but generated a new potential for interaction. This new potential must have caused the appearance of the market. At any rate, these conditions and the appearance of the market
Arab City in North Africa
are found early in the history of the city.

"... the two classic forms of the market, the open plaza or covered bazaar, and the booth or shop lined street, had possibly found their urban form by 2000 B.C. at the latest." (8)

An increase in trade, not only of goods but of ideas, brought forth new building forms and these forms were applied to the special areas of the city. Those special areas as have been pointed out were the market and the shop lined streets leading from the market to the city gates. The colonnade appears around the market place and in some cases extends down the street. The classic form of this development may be seen in the cities of Greece and the cities of the Roman Empire.

GREEK AND ROMAN CITIES

The Greek colony of Priene and the Roman camptown of Timgad illustrate three very clear considerations (plate 5):

- The placement of the major public space near the center, makes it readily accessible to all.
- The system of access that develops from town gate to town center and from major street to alley is a primary element in the shaping of the city.
- The influence of the form of the city on the form of buildings is direct. The special areas of the city, the forum and the streets receive the colonnaded buildings while the alleys receive the unelaborated dwellings.

This may be observed in the Greek colony of Priene.

"A convenient central area, tangential to the most important of the long east-to-west streets, was reserved for the agora." (9)

Another influence of city form on building form is here noteworthy. The early Greek city was quasi-rectangular, the street was not treated as a principal design element but as a minimal left-over space for circulation. (10) The advent of Hippodamian planning principles, the emergence of rectangular planning, had a direct influence on building form; the trend was toward more finished architectural types.
Timgad, Roman camp town

Prienne, Greek colony town
"... rectangular planning gave an impulse towards the creation of more finished architectural types." (11)
The same might be said of more recent developments in building and city form, especially in the United States where every block within the grid has a separate owner with separate aspirations. The difference is the unity of technics and the unity of social aims held by the Greeks.
As these cities developed, the distinction given the street and its various types of traffic increases. In late Hellenistic and in later Roman times the long colonnaded street appears as in this description.

"Antioch according to Libanius had 16 miles of colonnaded streets with a mixture of public and private entry from the colonnades." (12)
These colonnades served the pedestrian while the street became increasingly occupied by carts, chariots, beasts, and Legionnaires. The building was actively giving a part of itself to the city floor.
In Pompeii, a division of traffic was developed in the surface of the city floor, sidewalks appeared (plates 6 and 7), (13). Wheeled traffic was excluded altogether from the Forum. Later wheeled traffic was excluded from the city of Rome from sunrise to sunset. (14)
The shop lined street was a major feature in the Roman town, broad, colonnaded, and totally given over to the activity of shopping; its parallel can not be found until recent years and the development of the shopping center. (15)

THE MEDIEVAL CITY
After the fall of the Roman Empire and the Dark Ages, new beginnings for the city arose in Europe. The development of early Medieval cities closely parallels the development of the early cities of the Middle East. These Medieval cities began in the same simple way as their predecessors.

"Early medieval towns had no differentiation of street types because they needed none. However as the town grew and as traffic increased, the different types of traffic found their logical way along different types of streets. Traffic from town gate to central plaza
A street in Pompeii

vehicle traffic

The forum at Pompeii

A street in Pompeii
Street in Pompeii
(market) sought a direct and convenient course. The streets that led to houses were narrower and more irregular and often dead ends." (16)

Like the Middle East, the European city became more organized and its special areas were given special building forms. Whether a planned colony, as in the case of Montpazier, or an organic development like Sienna, the activities of the city floor influenced building form.

Montpazier is an example of the differentiation between sacred and secular buildings and the emphasis on a system of streets (plate 8).

"The city consists of rectangular blocks with alleys, and two squares - one for the city hall surrounded by arcades, and another for the cathedral - both in the center of the city." (17)

These arcades, though part of the building, serve the people both within and passing by the building. It is a part of the building given over to the city floor. Both the market and the church were placed in the center of the city thus making them equally accessible to the various members of the community.

Not only did Sienna's builders follow the pattern that has been discussed but they stressed in every respect the relationship between building and city as a part of the building task. The form and location of individual buildings were determined by city form. City form was developed from a thorough understanding of the building, the access systems, and the careful and deliberate balance created between the elements (plate 9).

"The main streets are those which are most regular. Lined with shops, they run from the town gates to the main piazza and consequently bear the greatest volume of traffic. As in most Northern Italian towns, the entrance views of a piazza were determinants in the placing of towers and obviously the detailing of an important building was strongly influenced by how it was seen from various places in the piazza. Since town form and building form are so related, it is certain the Sienna's builders must have been thinking of both simultaneously." (18)
Montpazier, France
THE RENAISSANCE CITY

The Roman city was as dense and active as the Renaissance city and confronted with approximately the same problems of traffic. It is in the Renaissance, however, that we find the first recorded thought of a major expansion of the city floor into a THREE DIMENSIONAL SYSTEM of access. Leonardo da Vinci proposed this THREE DIMENSIONAL CONCEPT based on the separation of different types of traffic (plate 10). It is necessary to note that the individual building gave even more of itself to the functions of the city floor, and that Leonardo provided an entire new system of pedestrian access at the second level of the individual building, an intermediate level for the distribution of goods, and the water level for boat traffic. In order to handle the problems of the city, Leonardo had to deal with the form of buildings. He had to see them as dependent parts of the city, to be molded and shaped to meet the needs of the city.

It is apparent that Leonardo had learned a great deal from the city of Venice as was Clarence Stein sometime later.

"The present separation of fast moving bulky boat traffic on the Grand Canal from slower moving traffic on the network of minor canals, along with the network of minor canals, along with the network of footways... anticipated the Radburn plan..." (19)

The streets of the Renaissance did not follow Leonardo's proposal, but took on a new role and buildings took on new forms in relationship to these streets. The meeting became increasingly symbolic as the activities of the street were seen as mundane in light of the gentlemanly activities of the intellect and the removed and elevated activities of worship.

"The Renaissance had a different role for its streets to play, one that would neglect the essential differentiation between streets that serve houses and those that carry noisy traffic." (20)
Leonardo da Vinci's scheme for separation of traffic
The builders of the Renaissance city were concerned with the symbolic meaning their buildings might convey. This might be seen in the following quotation.

"How could the relation of man to God be better expressed, we feel now justified in asking—than by building the house of God in accordance with the fundamental geometry of square and circle? Leonardo da Vinci was preoccupied by the centralized plan (churches). He demands that '... a building should always be detached on all sides so that its true form maybe seen!' Leonardo meant to raise (according to Vasari) the Baptistery of Florence and set it on a base. According to Alberti, 'The church should be isolated from and raised above the surrounding everyday life.' A principle to which Leonardo adhered in all his designs. (21)

And says Palladio, "Buildings for God, should stand in the most noble part of the city on beautiful piazzas raised above the rest of the city." (22)

These ideas of isolation of the building, its removal from an active part in the forming of the city are with us yet and becoming ever more detrimental to the solution of the problems of the city.

The preoccupation with symbolic ideas, their expression in geometry, and their importance within the city can be seen in Fontana's plan for Rome, however, Fontana's plan recognized the vital aspect of interaction and connection:

"... the connection between sites were as important as the sites themselves." (23)

His intent was to connect the shrines of Christianity and other monuments by a network of streets. In so doing, he established a framework for the city's growth (plate 11). A predecessor of Fontana's plan, and one which used the access system as a deliberate framework for city growth was Rosetti's plan for Ferrara.

"All main streets connected vital points of the town to each other; gates to palace gates to old fortress; plaza to plaza, and important buildings to each other." (24)

Here Rosetti added his city to the existing Medieval city and used major activities to control the ends and intersections of his streets (plate 11), (25).
Ferrara

Rosetti's plan

original town

Ferrara

Fontana's plan for Rome

PLATE 11
In the Renaissance the content of form became somewhat removed from physical problems of interaction and devoted to abstracted ideals about the symbolic message to be conveyed. However some of the traditions in building form and city form remained, as can be seen in the colonnaded walls of Piazza Annunziata. The colonnade remains, but the buildings are lifted above the street on platforms of their own. Palladio, in his Palazzo Chiericati, maintained the tradition of the colonnaded form upon the square, even though his building was a palace and not a mercantile venture.

"And in Palladio's Palazzo Chiericati, built on a large square rather than a narrow street, Palladio visualized the Roman forum facade with long colonnades in two tiers."

**THE BAROQUE CITY**

The building forms of the Baroque seem affected by two things: one, the elaboration of space and its infinite characteristics; two, the plasticity with which the buildings are modeled. There is a third and more important characteristic to be noted, that is, the extension of the space of the building into the landscape or city-scape around it by the use of convergent axes. This may have developed from the system of access used by the French nobility in the 16th century to order their hunting forests. Wide paths were cut through the forest and at the intersection of these paths, circular clearings were formed. These clearings, called 'rond points' were usually located on high ground so that game crossing the paths could be more easily seen. They served not only as identifiable points in the forest, but as social gathering places (plate 12).

The parallel between this pattern of organization and Baroque planning is evident from the town and palace of Richilieu to L'Enfant's plan for Washington D.C. (plate 12). The role of the building depended upon its function. The buildings inhabited by or symbolic of the powers of the time were placed on the axes at the rond points. The task of the everyday building was to provide the frame along the axes.
Rond points

French hunting forest, 17th century

Palace and town of Richilieu
What has been illustrated so far, is the predominance of two modes of transportation within the city, the pedestrian, and the beast-drawn vehicle. Boat traffic in the city occurred only on a few occasions and was naturally separated from the other types. Very early in the history of the city the means of access became conflicting. Very early in the history of the city the individual buildings provide for the pedestrian in special areas of the city.

The most exceptional thing to note is the fact that Leonardo da Vinci put the city floor within the building and expanded the entire floor into a THREE DIMENSIONAL SYSTEM of access, access for boats, goods, vehicles, and pedestrians. Some four hundred and fifty years were to pass before his concept became a reality for any extensive project. Meanwhile, the Industrial Revolution was to bring unprecedented problems to the city floor, problems not seriously considered by many until recent times.

THE INDUSTRIAL ERA

The industrial era complicated the city floor more than ever before in history. It brought more people, more carts, more wagons, beasts, etc., to the city. Its technological advances brought the train, more goods, more services, and an arsenal of utilities onto and into the city floor.

Early attempts to handle this menagerie of activity range from visionary to makeshift. An early, and visionary, project was a speculative venture by the Adam brothers at Adelphi Terrace. In this venture a multi-level traffic scheme separates the goods on the wharf and in the warehouse below from the pedestrians and the houses above. This is a remarkably clear solution executed in 1760 (plate 13).

Other schemes that extended the city floor were presented in London in 1863 and 1865 (plates 13 and 14).

The accommodation of vehicles in the existing city have brought forth similar ideas in the 19th and 20th century. These might be seen in the Oxford Street proposals for London, the elevat-
The Adam's Adelphi Terrace

Bridge at Lundgate Circus

streets for people

Tunnels for distribution of goods, London
Oxford Street proposals, London

Seattle Monorail, a 20th century parallel
ed trains of Chicago, and the Seattle Mono-rail. The "elevateds" were soon dropped under grade as at Paddington. (27) These underground transit systems and the lines of sewers, water supply, natural gas, electricity, telephone, etc.; economic and political development, and its system of land ownership created a new and inviolate right of way in the American city floor.

"... the demarcation between public street and private property took on new rigidity." (28)

Accompanying these changes in the city, was an outward migration of its inhabitants and an extension of the city floor over vast areas. The advent, acceptance and rapid development of the automobile has made this all too obvious. Thus the floor of the pedestrian city was invaded by beasts, carts, wagons, and assorted other rolling paraphernalia; and these were succeeded by mechanized derivatives, the last and most demanding of which has been the automobile. This gaseous device has all but succeeded in taking over the floor of the inherited city as well as it has provided us with a tool through which we might gain access to ever more distant parts of the new city. The new city is characterized first, by the flight of residents to the happier, quieter dwellings of the outskirts, and second, the almost immediate following of the market to their doorstep.

Recognizing the impact of these new means of transportation, Tony Garnier in 1901 presented his Cité Industrielle (plate 15).

"Garnier's ideal city of 35,000 inhabitants was based upon a network of transportation arteries with each type of transport separately provided for." (29)

Though Garnier's city form was a brilliant and visionary scheme, the buildings were by and large conceived in the age old manner. It was for Auguste Perret to alter building form to meet the demands of the city.

"Perret's idea was to build a city of isolated towers spaced far apart. In certain ways Perret had turned the principles embodied in his apartment building on the Rue Franklin into a city pattern: the street level was to be open to through traffic, the residential areas were
Tony Garnier's Cité Industrielle 1901
to be located in the tower floors above, and the roof was to be garden space." (50)

Perret's effort gives the first clue of the THREE DIMENSIONAL CITY FLOOR in a contemporary idiom. The city floor is lifted above the ground, including all its utilities, and traffic goes by below. Le Corbusier, evidently stimulated by Perret's idea proposed the Ville Contemporaine (plate 16).

"The Ville Contemporaine was, of course, a diagram. Its most important features were these: all fast automobile traffic was to be handled by a few elevated highways that criss-crossed the city, made its center quickly and easily accessible, and were joined at their ends by a peripheral highway system that bypassed the city pedestrian traffic was to take place on the normal ground level, on streets and walks threaded through open parks and gardens. As most of the buildings were to be elevated on stilts or pilotis, pedestrians were free to walk anywhere, everywhere and without the slightest danger. The center of Corbu's Ville Contemporaine was to be a group of skyscrapers, cruciform in plan, fifty or sixty stories in height, and spaced very far apart to permit the development of generous park spaces between them. The cruciform towers were to contain offices for the administration of the city, for business and the professions. A civic center was to be located near-by.

The next "ring" in this pattern, the Ville Contemporaine actually consisted of a series of concentric rectangular belts, was a development of apartment houses, each of them six 'double stories' in height. These apartment houses were to be built in the form of long continuous 'walls' wandering in and out, changing direction, and thus creating spacious garden courts and parks for the use of the apartment dwellers. As these buildings were to be raised on pilotis as well, there was free movement between adjoining courts underneath and through the various structures.

Finally there was to be an outer ring of garden apartments of a very special sort..." (31)

Here noteworthy as pointed out by Paul Ritter, is the separation of traffic and the definite arrangement of various systems of access.

"The long sides of the blocks have garaging in mid street. In all four directions and on every second floor, there are bridge connections to the other superblocks. Complete traffic segregation." (32)

It is doubtful that Le Corbusier saw the problems of parking in the critical way that they have developed. It is clear, however, that Corbusier was organizing his city upon the idea
Le Corbusier's Ville Contemporaine 1922
of access, access for auto, pedestrian, and transit, access for services and goods, all organized into clear systems and integrated with building form.

"... Corbu went far beyond his aesthetic analysis, far beyond the analysis of function, of plan, of structure, of prefabrication. To him it was clear that architecture in the twentieth century could no longer be the isolated building, the individual house (or even the individual skyscraper). The city as a whole was architecture, its basic organization, its spatial relationship, its form, its levels of activity, its heart ..."

(33)

The forms of Corbusier's buildings were intimately involved with his city idea. From his idea of their part in the larger whole came the pilotis; the gardens in the sky, on the roof; the pedestrian shopping streets thru their very mid-section.

Such ventures were never built, except in part, and the city continued its sprawl, especially in America.

The move away from the center by city residents caused a following migration by their everyday service and market facilities, and from this migration grew the shopping center.

This center, begun as a simple chain of small shops and an anchor grocery store, expanded to include large department stores, theaters, office buildings, hotels, and an increasing number of small shops. The shopping center brought the pedestrian realm into its heart and provided the customer and the entrepreneur with a new level of accessibility. It is this migration that has been characterized by the concept of decentralization, multiple nuclei, and the linear city expanded into a sheet or network of streets and activities. This characterization has been reinforced because the shopping center became a small scale, pedestrian downtown. It offers the advantages and few of the disadvantages of center city.

The shopping center, often makes use of a three dimensional floor to provide for the separation of service and storage so that these activities as well as auto traffic do not conflict with the pedestrian shopper. It makes use of the
principle of integration established by Leonardo, Perret, and Corbusier.

One example is Southdale Shopping Center, Minneapolis, Minn. designed by Victor Gruen and Associates in 1956 (plate 17).

"This center includes two department stores, which are powerful customer magnets, a number of small specialty and service shops, a post office, and a childrens' center that offers rides, a maze, and a tiny zoo. All storage of merchandise has been relegated to the basement level, so that there is an atmosphere of intense shopping activity -much as in a downtown area, but without the chaos and frenzy of downtown traffic." (34)

In this example, "the chaos and frenzy" has simply been relegated to the parking lot, but this has at least been buffered.

"A development of offices and related buildings has been planned for 400 surrounding acres. This will create a transition from the center to its neighborhood and prevent the blight that often follows when huge parking areas are juxtaposed with housing." (35)

Another example by Victor Gruen and Associates is Midtown Plaza, Rochester, New York designed in 1962 (plate 18).

"There a covered shopping mall is but one element in a larger plan for redeveloping part of the central city." (36)

"Rochester closed a street, which made the mall development feasible, and agreed to construct a grade separated loop road around the downtown area and to build a 2,000 car three level garage beneath the mall site." (37)

These projects are attempts by private interest and in the latter case, with the aid of city government to make more accessible, facilities on the city floor. They are in a sense grand children of the pioneer of American Urban Design efforts, Rockefeller Center, begun in 1931 by Reinhard and Hofmeister; Corbett, Harrison and MacMurray; Hood and Fouilhoux.

Rockefeller Center not only provides a ground level space, but a sunken plaza and a system of tunnels connecting the various buildings (plate 19).

"At the Center, the attention to walking starts subsurface and reaches as high as 69 stories on the landscaped rooftops. As the climax of the walking system, where walking breaks into dance, the skating rink is sunken. One can exit from it by one of the two classy
Southdale Shopping Center, Minneapolis, Minnesota,
Victor Gruen 1956
Pedestrian Concourse

Service and Trucking Space
Rockefeller Center, New York City
below sidewalk restaurants; these in turn open into the elaborate subsurface "concourse" network diagrammed below. This concourse ramifies for a length of a full mile and a half and surfaces inside 19 different buildings. Among the scrambled wonders the explorer passes along the way is the only humanly maintained mezzanine for a New York subway station; the Rockefellers take care of it." (38)

The reason for the development of the sunken plaza are here noteworthy.

"Early in the game, the Centers skating rink and plaza were to be not for skaters but for passengers arriving by the Baltimore and Ohio railroad through a new tunnel under the Hudson River." (39)

This tunnel exit was abandoned in favor of more direct tunnels leading to hotels, department stores, and major office buildings and covering approximately five miles of walking distance.

"To the question, why not a corresponding walkway system raised up above street height? The answer is that one of the 1930 Rockefeller Center schemes did indeed offer a raised pedestrian platform, with bridges over the cross streets, but the idea could not have seemed urgent, since the city surface was not yet flooded as today by cars and carbon monoxide." (40)

The Center provided an elaborate service system some 30 feet below ground, and a 12 story parking garage. It illustrated clearly the means and the scale required to separate traffic, to provide but two parts of the access systems, service and pedestrian. The most unfortunate part of this project is the labyrinth of tunnels, euphemistically labeled "concourse", and the pressing of man into the mold of the mole.

Rockefeller Center set the stage for a number of downtown developments, one partially completed, and the other not yet under construction are The Place Ville Marie in Montreal and The Market Street East project for Philadelphia. In both of these projects, the keynote is access, access to the city and access to the various activities of the city, access ordered into systems.

In Place Ville Marie some significant changes take place in the city floor (plates 20, 21 and 22).

"... more significant in terms of urban design were the
Basic levels, Place Ville Marie
four levels (totaling 1.2 million square feet) underneath the plaza—the part of PVM that did not meet the eye. On those four levels (see drawing) Zeckendorf's team of architects and planners has created an organism consisting of promenades a half mile in length, let in part through sunken courts, and serving about 150,000 square feet of retail space. Below these promenades there were two levels of parking (capacity: 1200 cars), and below it were the CN's tracks and platforms. Trucks were brought into PVM through underground roadways without interfering with parking or pedestrians."

The most significant part of this project may be in the way the PVM complex was placed into the city.

"PVM's network did not stop at the property line. It was tied into adjacent buildings so that, for example, pedestrians could move under cover from PVM to Central Station. All told, the initial construction created 1½ miles of promenades and there were plans to extend PVM's sub-plaza organism to future buildings as well."

Another significant feature is the way it integrates with the Metropolitan transit system, thus recognizing its role in the access system of the city.

"...its tracks are located so far underground that each station includes a mezzanine level halfway between the tracks and the street. These mezzanines will become integral parts of the Downtown network of promenades."

The validity of access within our economic structure is somewhat born out by the following:

"One significant detail emerged as these new structures went up; most of those that were tied into this PVM complex by means of the promenades and other networks tended to rent very rapidly. Some of those that stood alone found it harder to attract tenants." (44)

It is well to note that the basis for all this effort is the idea of interaction and connection of facilities within the system as Vincent Ponte, planner of the complex, points out.

"The conception itself is not new. Four hundred and eighty years ago, Leonardo da Vinci sketched a plan for putting wagons and walkers on different levels. The idea has been proposed time and time again and sometimes tried out on a small scale. The best known example, New York's Rockefeller Center Concourse winds through 17 acres, but its labyrinth of passageways scarcely invites people to linger. Montreal's, when it is finished, will
link six subway stops, 9,000 parking spaces, five skyscrapers, three department stores, two railroad stations, four luxury hotels, eight theaters, 30 first class restaurants and scores of smart shops and markets in a meander of pleasant skylighted malls, enlivened by greenery and fountains. It is more than a pedestrian thoroughfare; it is an environment that people may enjoy all day long." (45)

Another bristling example of present trends is the Market Street East project in Philadelphia by Skidmore, Owings and Merrill (plates 23, 24 and 25).

"The street has, in effect, become a vehicular platform (A) over the main level of pedestrian activity (B) and the subway tracks (C). At this concourse level, mid-block bridges (D) lead to the refurbished shops and spaces on the south side of Market. The north is continuously walked by a new building (E) containing shops and offices. Past this edge structure, the concourse widens into a lofty, glass-roofed pedestrian mall (F), running the spine's entire east-west length. The mall is widest at the midblock subway platforms and here is penetrated by service shafts (G), leading to a procession of office towers (H) above the spine. One level below the mall are truck tunnels (J) terminating in docks located beside the shafts north of the mall at this point (which is approximately halfway along the spine's length) are the newly joined tracks of the Reading and Pennsylvania commuter railroad lines (K). Their station feeding directly into the major pedestrian flow. One story above the street, over the railroad station is a linear commuter bus terminal (L) and above it, four levels of parking (M). Both the bus terminal and parking structure extend continuously along the spine for four blocks."

(46)

Most significant to the idea of access in this project is the manner in which it has been used to tie the existing confused transit systems into a point of exchange, an exchange from surrounding metropolis into city center. It is an understanding of these emergent building types and the city types into which they have been introduced and the basic purpose about which they have been organized that can guide the development of the city. Such an understanding of their role in the process of access and their role in transforming our existing city, at least into the city of today, has been exhibited by Louis Kahn in his proposal for Philadelphia (plate 26).
Subway

Railroad and Service

Concourse-Mall

Market Street East
Street Level

Bus Level, Parking above

Market Street East

PLATE 25
"Harbor" Building, Louis Kahn, Philadelphia
Kahn begins with a study of movement, what he calls, "The Architecture of Connection". Of this he says,

"Expressways are like rivers, and like rivers, they may carry a variety of traffic. These rivers should frame the area to be served, Center City. Rivers in turn have harbors." (47)

"In Kahn's vocabulary the harbors are municipal parking garages, great cylindrical towers with all day car storage space at the core (for use by suburbanites) and apartments, offices, or motels around the perimeter. Here the river traffic begins to be sorted out. 'From these harbors canals branch out that serve the interior'. These canals have few, if any intersections and permit motor traffic to move smoothly and at an even rate (trolley cars and local buses use separate approach streets to the center). 'From the canals branch out cul-de-sac docks', Kahn continues. The docks provide short-time parking, service, unloading, etc. 'They serve as entrance halls to the building', he concludes." (48)

Kahn has not removed the car from "Center City", he has ordered it. He has provided a system of access according to the needs of man and society, and he has illustrated the importance of movement, access, interaction and an order of these means in the modern city.

"A modern city will renew itself from its order concept of movement." (49)

These projects demonstrate the following:

- The ordering of our systems of access by type.
- The integration of our systems of access with the specific activities of the city, heretofore housed in individual buildings on separate blocks.
- The emergence of the true scale of Architecture, that scale being the city.

A significant example which holds the germ of this idea, though executed on a small scale, is Holyoke Center by Jose Luis Sert. It contains an interior arcade on the ground floor. Other ground floor space...

"... is given over to shopping and banking, making Holyoke more of a link than a barrier between university and community." (50)

The arcade serves the added purpose of lobby and pedestrian street at one and the same time. It gives over a part of itself to the city floor and yet uses that part wisely.
This project recognizes its role as a dependent part and is determined as much by its surroundings as it is by the activities within it.

The need for new means of access is being exhibited by individual and co-operative efforts within the city of Houston, Texas (plate 27). What began with a single underground tunnel connecting a parking garage with a bank on separate blocks, has multiplied to the point that Gerald Egger, Houston Post Real Estate Editor, has proclaimed, "Downtown Houston is going underground." (51)

And Mayor Louie Welch has added,

"Within the next few years, it will be possible to spend all day walking and shopping downtown and never touch the street. Tunnels and malls will connect every major downtown building." (52)

If this development occurs, and signs are fairly positive that it will, it will provide a new group of "sidewalks" but these walks will be absolute chaos without some organizing principles and points of identity with the surface. At present every tunnel is different and is emphasizing its difference.

In two interviews, one with Mr. Ed Soteras or Century Properties and another with Mr. Joe Gilbert of Gerald D. Hines Investment Co., it was determined that the primary motivation behind tunnels and the proposed "Midtown Mall" (an underground mall), is the convenience of access; the subsequent raising of property values and the evening and Saturday use of parking garages mainly provided for weekday commuters. Mr. Soteras pointed out that real estate along or near these tunnels was an increasingly valuable commodity and that the most successful tunnel was the system linking the Ten-Ten Garage, Tennessee Gas Building, Bank of the Southwest, Bank of the Southwest Tower and the Chamber of Commerce Building. Its success, it may be argued is due to the access it provides to the greatest number and the largest variety of activities. What is here most significant is the fact that the city floor is changing, the climate for this change is good, and yet new buildings continue to
Downtown Tunnels, Houston Texas

Existing          Proposed       NORTH

PLATE 27
appear as if they were a part of the past. They have not recognized their role in the process of change of the whole, and the process of access is all but forced upon them. In short, they are providing for this new system in a most banal way.

The contrast between the unorganized, piecemeal approach in downtown Houston and the large scale developments of Place Ville Marie, Market Street East, and Kahn's Philadelphia proposal reveal the inadequacy of relegating to the part that which is the task of the whole. This contrast reveals even more that the needs of the large city must be met on a scale equal to the problems. Architectural theorists have now begun to recognize this need for specifying the role of the building and the scope and scale of Architecture.
Vincent Scully has defined the true scale of Architecture as that of all structures in relation to each other and to the land. (53) This definition has been carried even further by Christian Norberg-Schulz; he sees Architecture as providing for man in a very special sense; of buildings and cities, he says,

"Buildings and cities both divide and bring together human beings; and 'milieus' fitted for different public or private activities are created. A milieu is characterized by its possibilities for social life." (54)

As the first chapter has pointed out our society has changed, the nature of it is quite different from the society that laid down the patterns upon which our cities have been built. Our possibilities for social life are based upon the maintainence of selected contacts. Selection is today, choice from a wide range of possibilities, and access to these possibilities is essential.

"Architecture controls the environment in order to make interaction and collaboration possible." (55)

It might be said that this is the basic functional part of the social purpose of Architecture... to provide for the interactions of man. The city and the building must be seen in light of this basic need for interaction. Cities and buildings must therefore be structured, ordered, organized, (or however one might phrase it) toward this end.
These definitions expand the realm or scale of Architecture beyond the individual building. These definitions place the individual building into a larger context. The specific character of that context becomes the question. Kevin Lynch has stated that the architect must recognize:

"... that the specific character of a site is now perhaps as much the result of human action and desires as of the original geological structure." (56)

This is not sufficient, the recognition of the building as a part must go beyond its formal dependency on existing characteristics. It must, as Norberg-Schulz has pointed out, be integrated into a functional-social context, it cannot be seen in isolation. The architect must recognize,

"... the fact that any building belongs to an environment and forms a part of a larger context. This may consist in a functional relationship to other objects; in other words, the building task it serves forms a part of a more comprehensive task." (57)

This functional-social context as it now exists, is characterized primarily by the increased demand for interaction, the subsequent need for systems of access and the increased dependency of our social and economic units; as Donald L. Foley has stated.

"The specialization, and hence dependency that accompanies economic development requires that household and business establishments be in contact with an increasing variety of other establishments; city is attractive to them primarily because it offers the economies of urbanization which facilitate the establishment and maintenance of these contacts." (58)

These conditions—the demand for interaction, the need for systems of access, and the increased dependency of our social and economic units—have prompted our cities to take on new forms. Though these new forms have not yet all been ordered into expressive architectural statements, the recognition of these changes is occurring and have prompted such statements as appears below:

"The functional theme can never be studied in isolation. Its functions will always be related to the functional aspects of the surroundings. From the smallest utensil to the most encompassing geographic environment, there exists functional continuity." (59)
"The form then is often determined by the fact that most functions consist in a series of actions which are 'connected' with different places. The frame must adapt itself to "action-complexes". A region today is as much characterized by types and capacities of connections as by composition of the units."

"The individual does not count; society does. And in village Architecture, whether in Persia, Africa, or Mykonos, society is the unit, not the individual. Any single building in the village is conditioned by what is around it, and what came before. As society is continuous so is the architecture. Surely there is a place and a need for continuity of this kind in Western Culture and Architecture. We live in a society that is fragmented, fugitive and often shallow. We practice architecture in a highly competitive, building by building, way that is frequently without significance. In architectural terms, continuity means the use of fewer materials; an emphasis on what is alike, not on what is different; the elimination of unnecessary articulation; the use of land without the wholesale use of the bulldozer. It means designing with respect for adjoining buildings -their scale and color and mood, with respect for the spaces between buildings themselves; finally, it means thinking of each building as a part of a process, not as a world unto itself."

Today our means of access are in their most primitive, adaptive form. Our means of access have not been ordered one to the other. We have buildings now separated from their functioning neighbor, buildings built upon a system of access long since outdated. We have new systems of access developing and the buildings being built along it retain the form of their ancestors. The need for integration is clear, as Edward Larrabee Barnes has stated.

"Isolated highways and buildings are defining an upper level circulation system with no overall concept for inter-connection. I do not think that the building by building approach is valid. Whole sections of the city must be taken as units and the true dimensions of the approach and entrance systems must be recognized. Until a firm base is established, it is impossible to build a tower."

A method of thinking about buildings, their position in this myriad of activities, means of transportation and services is offered by Peter Smithson.

"It is difficult to think about the relationship between buildings except in conventional terms. I am sure that
what fills the minds screen when it is asked to call up the idea of a building is a certain sort of lump next to the road; pretty well what any architect would have in his mind since the onset of the individual building in the 70's and 80's of the last century. An air photograph of downtown L.A. or newly developed Rotterdam, shows the same big lumps, unrelated even in the most obvious and literal sense one to another—roads and emptiness in between. This is a failure of architecture, of our modes of thinking about architecture not something that can be laid at the feet of the client or the town planning bureau. Buildings should be thought of from the beginning as fragments; containing within themselves a capacity to act with other buildings; be themselves links in systems of access and servicing. This, I hold, is the only viable mode of city-structuring: for all to develop a sense of structure." (63)

Most important here is the recognition of the activities housed in an individual building as part of larger system of activity requiring interaction and thus access one to the other and the buildings providing of themselves means of access for man and for services. In a new and ideal form this is more easily realized. In our existing cities the means toward this end are not as apparent, but we must recognize the essential kernel that:

- Individual does not mean isolated.
- Function is continuous.
- Architecture is the frame for the actions and interactions of Man.
CHAPTER IV SUMMARY AND STATEMENT OF THESIS

Society has, as a basic requirement for the maintenance of its communities, systems of access. History illustrates that as the social demand for interaction has increased, systems of access have been provided and these systems have influenced building form. These systems have been, in large part, relegated to the **TWO DIMENSIONAL SURFACE** of the city floor.

The rapid expansion of science and technology that has occurred since the Industrial Revolution, has created new means of transportation and communication. These new means have allowed the communities within our society to disperse over vast areas. The individuals within these communities must, in turn, make use of many complimentary, and at the same time, conflicting means of transportation. The problems confronted in ordering these various means of transportation require structures to house and separate them from one another. Developments toward this end, the ordering of different means of transportation into systems of access, begin with Leonardo da Vinci and are presently characterized by the Place Ville Marie in Montreal, Canada and the proposed Market Street East project in Philadelphia, Pennsylvania. In all these developments we see what might be termed a **THREE DIMENSIONAL CITY FLOOR**.
These developments demonstrate conclusively that building form and city form must be altered in order to provide the systems of access required by our society. Likewise, they demonstrate that the needs of society far surpass the needs of any individual interest group, and that individual building efforts must be re-directed toward social ends.

Architectural theorists have defined the role of the individual building as a dependent part of a larger context. They have recognized and stated that the activities of the individual building extend beyond the individual building in "action-complexes". These "action-complexes" are basically a description of the social interaction and the processes of access that must exist between the various activities. These conditions and theories require that:

- **City must be defined not only as a group of buildings and structures but as a complex of inter-related and constantly interacting functions.**
  
  This requires that the city be seen as a social instrument. The building of cities must, likewise, be seen as a social activity directed towards social ends.

- **City floor must be defined as the public realm given over by private interests in order to provide for the communal needs of the city's inhabitants.**
  
  It is important to recognize that the city floor, traditionally relegated to a two-dimensional surface, is evolving into a three-dimensional system of access; for people, automobiles, buses, trains, trucks, goods, and services.

- **Systems of access must be defined as the ordered, not simply accommodated, means of going from one place to another.**
  
  Order implies:
  - Zoning of different means of transportation and service by type, speed, and volume;
  - The provision for the different means in a manner consistent with their nature, i.e., automobiles should
have continuous movement for the most efficient operation and pedestrians should have maximum freedom in their movements;

- A balance between various means of transportation in order to maintain an efficient system;
- The location of elements for harmony with existing surroundings, with each other, and, in the case of utilities and services, ease of maintenance.

**INDIVIDUAL BUILDINGS MUST BE DEFINED NOT ONLY AS A STRUCTURE HOUSING CERTAIN FUNCTIONS BUT AS A GROUP OF FUNCTIONS INTERACTING WITH OTHER FUNCTIONS BOTH WITHIN AND OUTSIDE OF THE CITY.**

This requires that the building be seen as a functionally dependent part of the city. As such it is a part of the social instrument of 'city' and its design must be socially directed.

The basic requirement for the maintenance of our society is access; this requirement is demanding new systems of access, these new systems require integration with buildings, and thus the thesis may be argued:

**THE INDIVIDUAL BUILDING MUST BE CONSIDERED A DEPENDENT PART OF THE CITY.**

**THE INDIVIDUAL BUILDING MUST BE CONSIDERED A PARTICIPANT IN SYSTEMS OF ACCESS THROUGH THE CONCEPT OF THE THREE-DIMENSIONAL CITY FLOOR.**

**THE INTEGRATION OF THE INDIVIDUAL BUILDING WITH SYSTEMS OF ACCESS REQUIRES CITY PLANNING.**
A community requires interaction.

Today's society is composed of dispersed communities. Membership in these communities is established by selection.

Access to these communities must be efficient. Access, to be efficient, must be ordered, systems result.
Systems of access began on a two dimensional city floor. The horizontal manipulation of buildings was all that was required.

Increasing traffic and conflicting means of transportation demand the three-dimensional city floor.

The Industrial Era, the automobile, the train and other new modes of transportation require even more complex structures to segregate traffic and create systems of access.
The individual building is a dependent part of the city.

The individual building is a participant in systems of access through the concept of the three-dimensional city floor.

Planning is required to coordinate the various systems of access, activities, and services.
CONCLUSION
Planning requires the large scale coordination of systems of access, activities, and buildings. There are two avenues through which it might be realized, the first is cooperation by individual interests, but this is a highly idealized view that has shown itself to be ineffectual. The alternative is clear, legislative action is necessary to guarantee provision for communal needs.

Serious investigations must be made in order to realize the full potential of this approach. It is not adequate to simply place the automobiles on the roof of buildings, the pedestrians in tunnels, or any other combination without first determining, in some more rational way, those things which must be known in order to organize systems of access, to integrate activities with these systems, and finally to house the activities in buildings.

- Complete studies must be made of our various means of transportation analyzing their type, individual efficiencies and performance characteristics. These means must then be zoned according to their particular natures and the basic pattern of the system must be set.

- Complete studies of the activity structure of our communities must be made. These studies must analyze the various activities relative to their needs for interaction and locate them for maximum coordination with the access system and with each other.

- Finally, that which requires the most effort, the study of methods for inducing or requiring the individual building effort to surrender that portion of its independence which has heretofore kept it isolated from its neighbor. This surrender, is not so much the relinquishing of freedom as it is the recognition of the building of cities as a social activity whose end is a
social purpose. The social purpose here reinforced is the interaction required by all.
This approach, when applied to our existing cities requires that:

1. A complete study must be made of the existing and required access systems. Major systems must be established for the total.

   This study must bear in mind the existing facilities; buildings, streets, utilities, etc. and then establish the areas wherein new developments might begin.

2. A complete study must be made of the existing activity structure. These studies must analyze locations, types and needs for access. These must be integrated with proposed new activities and new access systems.

3. New large scale developments must then be prepared and implemented by the cooperative efforts of the individual building interests or the exercise of civic authority.

Thus any project must be considered a dependent part of the city. All projects, large and small, must be governed by a comprehensive plan.

The cooperation required to design and implement such a plan is an impossibility without legislative action.
Because the city demands an integration with buildings; because it is the creation of an environment for man and a modification of the natural environment by man; THE CITY IS ARCHITECTURE.
NOTES


(2) Webber, pp. 108-109


(8) Ibid.


(10) Spreiregen, Urban Design: The Architecture of Towns and Cities, p. 3.


(13) Nash, Roman Towns, p. 9.


(15) Ibid., p. 212.


(21) Ibid., p. 17.

(22) Ibid., pp. 18-21


(24) Ibid.

(25) Ibid.


(30) Ibid., pp. 39-40.

(31) Ibid., p. 41.


(33) Blake, Le Corbusier, p. 39.


(35) Ibid.

(36) Ibid., p. 90.

(37) Ibid.


(39) Ibid., p. 45.

(40) Ibid.


(43) Ibid., p. 41.

(44) Ibid., p. 48.

(45) Ibid.


(48) Ibid.

(49) Ibid., p. 118.


(51) Gerald Egger, "Never Touch the Street," Houston Post

(52) Gerald Egger, "Massive Tunnel Network is Being Built Downtown," Houston Post.


(55) Ibid., p. 111.


(57) Norberg-Schulz, Intentions in Architecture, p. 103.

(58) Foley, Explorations into Urban Structure, p. 85.

(59) Norberg-Schulz, Intentions in Architecture, p. 115.

(60) Ibid., p. 116.


(62) Ibid., p. 298.

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