THE UNIVERSITY OF MANITOBA

PLANNING GOVERNMENT BUILDINGS: AN ANALYSIS OF THE TIME DIMENSION IN ARCHITECTURE

by

ENN OTS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARCHITECTURE

FACULTY OF ARCHITECTURE

WINNIPEG, MANITOBA

October 1972

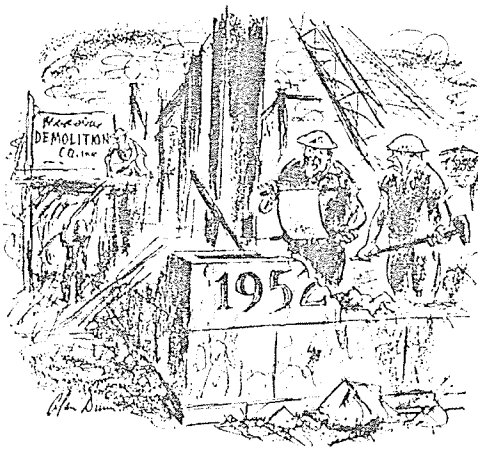
ACKNOWLEDGMENTS

To my wife, who sacrificed so much for this work, I am infinitely grateful.

I also wish to acknowledge the help of professors Jacques Collin and Jonas Lehrman, of the Faculty of Architecture, and Dr. Jerry Grey, of the Faculty of Commerce, University of Manitoba.

Special thanks goes to my friend Bill Reid, architect, for his knowledgable comments and warm encouragement.

TABLE OF CONTENTS



"To you children of history, who, on some far-distant day down the dim, dark corridors of time, may breach this stone . . ."

Drawing by Alan Dunn © Saturday Review

1. Introduction

This study addresses itself to the relationship between architectural activity and time. (Architectural activity is defined here as the process which generates environmental conditioning enclosures for man's use.)

The treatment of this subject attempts to be comprehensive in scope. Therefore, several aspects of architectural activity are introduced. This may result in a rather brief discussion on some issues. However, as this study is intended as a suggestion of a way of thinking about the problem of time in architecture, rather than a finite theory, more extensive formulations of particular items must be left to others pursuing the time question in architecture.

The impetus for this study came from an intuitive feeling that, on the whole, architects are unwilling or else unable to confront the time dimension as an intrinsic and important facet of all architectural problems. The evidence of this failure can be found everywhere in our cities today. At an increasing rate, physically healthy buildings are being abandoned or torn down. Those buildings which are somehow converted to new uses usually required a disproportionate expenditure of time and money

to accomplish the transformation.

With the continuing acceleration of growth and change rates within all sectors of our society, the time problem in architecture is becoming increasingly relevant. In the past, time did not present a serious problem for architects. Buildings where designed with a generous allotment of space for activities. Also, the fact that less mechanical devices were involved, meant that functional or technological obsolescence was not a serious problem. On the whole, buildings managed to successfully live out their natural life span.

Today, however, buildings are designed to space standards which provide less space per activity. Also, as standards of service provision in buildings continues to rise, increasingly complex and specialized equipment is being developed and placed on the market. "Efficiency" has emerged as a primary objective to be met by all contemporary designers. In order to achieve this efficiency, architects are designing buildings which are precisely tailor-made for particular functions. Unfortunately, often those functions have changed before the construction of the building is complete. Such problems arise because

> . . . an implicit assumption has been made that a provision for satisfactory accommodation over the

> whole life of a building, is a simple matter of proficient initial design.[1]

This study examines this assumption, among others, in an attempt to understand which direction architectural activity should be taking in order to overcome the dilemma of planning and design for change.

The focus of attention is upon two related problems in architecture. The first can be described as the problem of planning for the eventuality of future building. I have choosen to label this aspect of architectural activity the developmental planning problem. Developmental planning is concern for architecture at the scale of a group of buildings which are not all built at one time. Generally, developmental planning has been associated with Urban Design and planning. Within these disciplines, "developmental planning" attempts to answer the question: how should an area develop over time? Developmental planning in architecture asks a similar question.

In the past, developmental planning strategies have tended to take the form of "master plans" which describe exactly what development will be permitted where, and when. Lately, however, the "master plan" strategy has been questioned by both architects and planners due to their inability to cope with contemporary rates and types of growth and change.

---

[1] Landau, R. and M. Pearson: "A Note on the Architecture of Time," Architectural Design, Aug., 1971, p. 502.

The second focus of attention is upon the problem of planning and design of particular buildings now which function adequately in the future. This problem is dealing with the relationship between architecture and time at the scale of the individual building or group of buildings which are built at the same time. In the past, architects have simply treated this problem as the problem of providing physically long-lasting structures. This was justified in an age which saw little change in user needs for a particular building during its lifetime. Today, however, this no longer applies in most cases. Increasingly, the problem has become that of:

> . . . sheltering an organisation which has a rate of growth and change which is so great that it makes its buildings obsolescent before they decay naturally.[2]

Thus, the useful life span of some types of buildings is growing shorter and more wasteful (see figure 1.1). In order to overcome this tendency, consideration must now be given to the creation of buildings which are adaptable in ways which increase their useful life spans. There are two related aspects to this problem. The first can be described as the process of initial planning and design of a new building(s). The second can be described as the process of on-going planning of the building once it has been built (see figure 1.2).

---

[2]J. Weeks, "Indeterminate Architecture," Trans. of the Bartlett Soc. (London, Vol. 2, 1963-64).

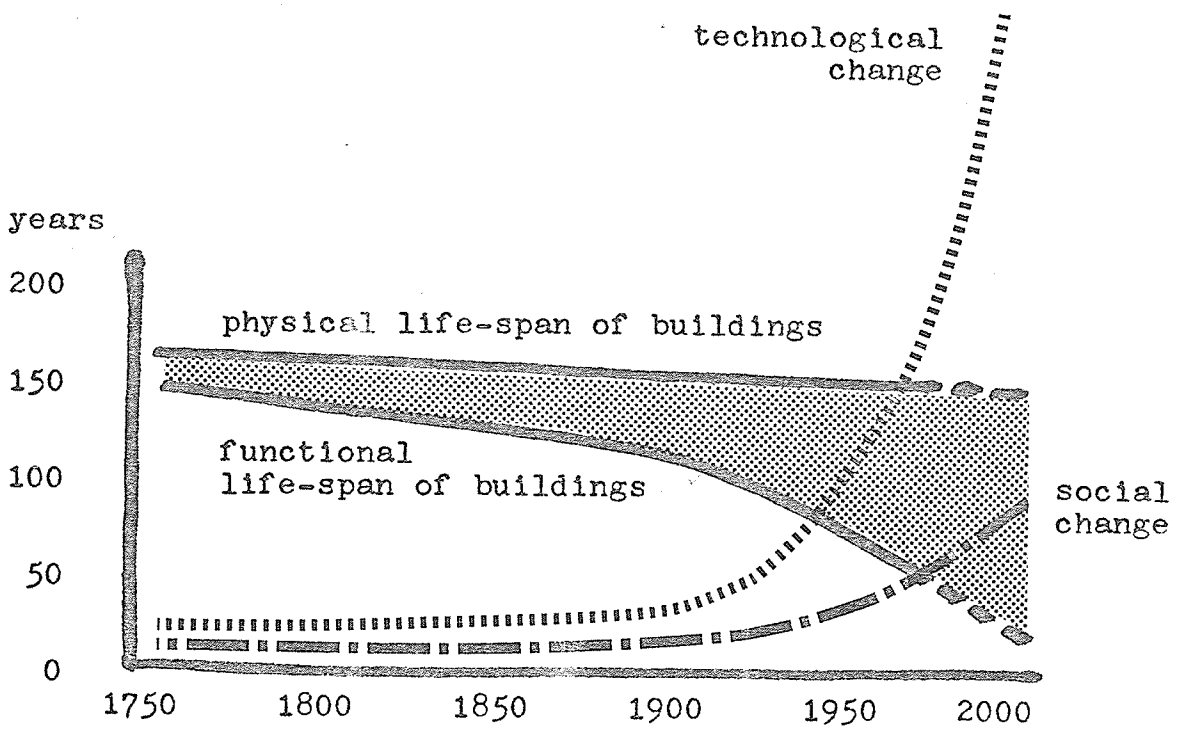


FIGURE 1.1 GENERAL TENDENCY TOWARDS THE PREMATURE FUNCTIONAL OBSOLESCENCE OF BUILDINGS

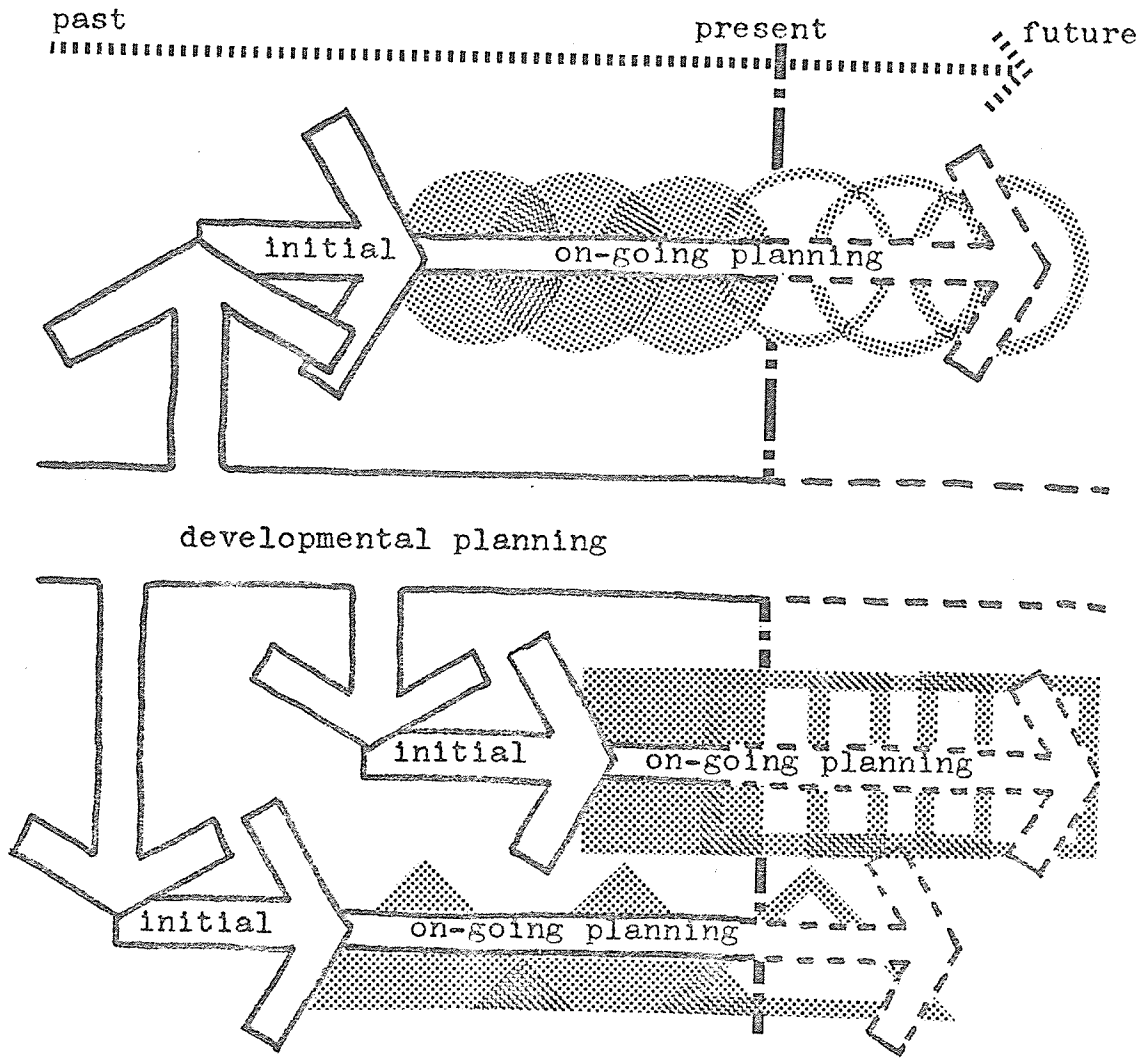


FIGURE 1.2 ASPECTS OF ARCHITECTURAL ACTIVITY

Initial planning of a building determines what that building should be in more specific terms than the developmental plan. It often takes the form of a "Design Program". The design program determines what the new building must accommodate

> . . . by establishing all the activities that will take place in the building, by identifying all the actors that will participate in the building, by describing what type of physical entities (space, equipment, etc.) will the actors require in order to perform the activities . . .[3]

Considering that most buildings built recently will have a life span of at least forty years, can the initial planner account for all the actors and all the activities for that period? At best, the initial planning brief can only determine, with certainty, past, and perhaps present needs of a user organisation. Future needs are determinable only to the extent to which we are able to assess the near future of those processes of change that are responsive to certain irreversible tendencies. Unfortunately, the bulk of future demands upon buildings remains indeterminate. As Hans Reichenbach points out;

> We may be able to predict that the house will break down, but we cannot foretell the exact places where the broken parts will be found.[4]

---

[3] E. Ambasz, "The Formulation of a Design Discourse," (notes from his first lecture at Ulm, 1966).

[4] H. Reichenbach, The Direction of Time (Berkeley, 1956), p. 23.

In order to deal with the indeterminate level of building related growth and change of user organisation's needs, a process of on-going planning may be necessary. On-going planning addresses itself to the problem of adjusting an existing building to changing user needs, or changing environmental needs, during the lifetime of the facility. On-going planning is analogous to the function of a thermostat. Just as the thermostat maintains a room at a constant temperature through a process of adjustment of heat supply, on-going planning maintains the quality of architectural accommodation for user needs through constant adjustment to the organisation and substance of the building. This process is not necessarily maintained by the professional planner or professional designer. For example, changes such as furniture re-arrangement usually only involves the user and therefore can be considered to be "on-line". However, as on-going planning can only function in ways which have not been ruled out by the initial planner of the building, and as the long-term success of a building depends upon on-going planning, all aspects of on-going planning should be the concern of the professional initial planner and designer of buildings. Therefore, on-going planning, whether on-line or not, is a legitimate aspect of architectural activity.

The first section of this report consists of an outline of past and present notions of space and time.

Also, as an extension of the world view most widely accepted today, the behaviour of user organisations and buildings existing in a space-time continuum, is briefly discussed.

The second section attempts to evaluate past and present strategies and tactics within architectural activity. This evaluation is largely based upon the conceptual framework which was outlined in the first section.

The third section of this report introduces an example of the impact of the time dimension on architectural activity. Past, present, and future problems associated with the provision of buildings to house the civil service of the Government of Manitoba are discussed and recommendations as to future strategies are made. As an example of a particular architectural synthesis within a time perspective, the present and near future need for additional space is examined and a design approach is recommended.

The example of the Government of Manitoba's space needs was choosen because:

1. Government organisations are increasingly dynamic, making a traditional approach to planning buildings for its use less appropriate.

2. Documentation of the history of the Manitoba government organisation, and of the construction of its public facilities is available.

3. The author is familiar from first hand experience with the day to day problems which face the planner in the Department of Public Works.

PART A: CONCEPTUAL FRAMEWORK

MANY OF US STILL LIVE INNOCENTLY IN A STATIC THREE-DIMENSIONAL WORLD OF NEWTONIAN CONCEPTION WHICH HAS LONG SINCE COLLAPSED. IN TODAY'S DESIGN TERMINOLOGY THE PROFOUND CHANGE HAS BEEN ACKNOWLEDGED BY WHAT WE CALL "SPACE-TIME" RELATIONS. THERE IS NO SUCH THING AS FINALITY OR FINAL TRUTH . . . TRANSFORMATION IS THE ESSENCE OF LIFE.

Walter Gropius in
Scope of Total Architecture

2. Development of World View as it Affects Architecture

The following brief outline of the general development of man's concept of his universe, especially in the realms of space and time, is presented here because;

> All types of explanation in a given era reflect to a greater or lesser extent the spirit of the age or the 'current conceptual scheme'.[5]

Conversely, the "current conceptual scheme" can affect the nature of explanations within a given era. Thus, an understanding of the current world view may afford clues to the prevailing concept of the relationship between architecture and time.

Man's world view has changed considerably since the days when the existence and behaviour of all phenomena were generally attributed to the magical powers of supernatural beings. Within early cultures, spatial concepts appeared to dominate concepts of time. This tendency is reflected in language today, which describes time in spatial terms such as "long" and "short".

The Aristotelian Universe regarded space as "merely an accident of substance." Architecture of this period

---

[5]W. S. Fowler, The Development of Scientific Method (London, 1962), p. 102.

was characteristically based upon archetypes of aesthetic perfection. Buildings were regarded as eternal. Time in architecture was not considered in terms of growth and change;

> The Greek conception of the world was static, things being considered to be a mirroring of eternal archetypes or Ideas.[6]

The Aristotelian conception of space persisted until the Renaissance, when the discovery of perspective served to free space from objects and gave it a reality of its own. Space and time remained conceptually separate. Later, in the nineteenth century, the Newtonian concept of the universe maintained this separation. The spirit of this age was exemplified by Descartes.

> To Descartes space became the fundamental reality in the world, motion the source of all change, and mathematics the only relation between the parts.[7]

The world was regarded as mechanistic; a world composed of a finite set of mathematical relationships. The primary concern of science was with finding an explanation of all phenomena through an analysis of bivariate causal chains. This analysis had no place for notions such as organisation, wholes or structure. With regard to time, a completely deterministic stance about the future was taken by Newton. His claim was that;

---

[6]L. von Bertalanffy, General Systems Theory (N. Y., 1968), p. 88.

[7]J. H. Randall, The Making of the Modern Mind (N. Y., 1940), p. 241.

> A single determination of the positional and velocity co-ordinates of every part of a complicated system would suffice to determine at every moment of future time precisely how the system would behave.[8]

This notion must have held a strong sway over the minds of planners and architects of the times. Notions of space and time tended to produce plans and buildings which expressed the general feeling that the future was completely determinable. Popular among city planners were plans which emphasised and extended then current values and systems into the future. Plans and buildings remained static indicators of a static world view.

A dramatic transformation in our world view occurred early in this century.

> The first half of the twentieth century saw classical determinism of the nineteenth century replaced by a sort of actuarial law of physics, in which the possibility of unitary prediction of individual events is foregone in favor of a statistical law.[9]

No longer is a deterministic attitude within planning and architecture compatible with the "current conceptual scheme." What was once assumed to be static is now understood to be dynamic. Process descriptions are replacing state descriptions.

> The universe in its entirety must be regarded as one gigantic process, a process of becoming of attaining new levels of existence and organisation.[10]

---

[8] Ridenoir, L. N., "Physical Science and the Future," in Facing the Future's Risks (N. Y., 1952), p. 63.

[9] Ibid., p. 72.

[10] J. Huxley, intro. to The Phenomenon of Man, by Pierre Teilhard de Chardin (N. Y., 1959), p. 13.

Time and space within this new universe have taken on a new meaning. Time has emerged as an important aspect of existence, inseparable from space.

> Einstein declared . . . that the doctrine of space in three dimensions and a separate time element should be replaced by a four-dimensional continuum of space-time.[11]

An analysis of time in architecture must now become an analysis of space-time in architecture. Also, any discussion of space in architecture is really a discussion of space-time in architecture. Thus, time has acquired a new status within a culture which tends to associate reality more with space than time.

> We must be born again . . . in the new pattern, time becomes an essential dimension of reality . . . without which all the others lose their character and being.[12]

Conceptually, we live in a new universe;

> It is a universe of change. It is now known that contingency and uncertainty are part of the weft and weave of any physical system . . .[13]

The chaos of the nineteenth century notion of the world, is being replaced by concepts of organisation, interaction and wholes. The impact of this shift has already been felt in many fields of human endeavors;

---

[11] Fowler, op. cit., p. 81.

[12] D. W. Rogers, "Main Currents in Modern Thought," in D. Fabun, Dimensions of Change (London, 1971), p. 31.

[13] C. Russell, "Entropy, Extropy and Architecture," unpublished paper, University of Manitoba, 1967.

> Science has begun to shift from the measurement of things to the study of processes and the interactions between them; "the proper study of mankind" has become not "man" but change.[14]

Within the discipline of architecture, however, this shift has not materialized:

> For while a small minority of architects among the theory/experimental/student factions have seen the time concern as a central focus for their work, a large part of the practising profession has been either unaware, disinterested or else unable to see the consequences of the topic.[15]

The bulk of the profession continues to unconsciously assume that all architectural problems are static, requiring static answers. A possible reason for this situation may be that we are limited by our heritage of past notions of the universe. Language, as a tangible part of that heritage, constitutes a powerful limitation upon our conceptual powers.

> Our language pattern is, in the main, a screen which prevents us from fully comprehending change . . . Western intellectual man originally had no choice, in order to facilitate the development of thought, but to separate out of the apparent confusion of natural processes qualities which were seemingly permanent and unchanging. These static concepts which still form a major part of our languages have become fixed and cease to correspond to the dynamics of nature--what is static cannot account for process.[16]

Ironically, ancient Greek philosophers realized, as early

---

[14] D. Fabun, Dimensions of Change (London, 1971), p. 31.

[15] Landau, op. cit., p. 502.

[16] N. Patricios, "Ideas and Language," Arch. Design (London, 1970), p. 5.

as 500 B.C., that reality was in fact dynamic.

> Heraclitus . . . devoted himself to finding an explanation of the problems of growth and decay in the material world. His conclusion was that the world is in a constant state of flux; the basic reality of the universe itself must be considered as "changefulness": his theory was summed up in the famous aphorism "everything flows".[17]

Eastern consciousness has for thousands of years embraced this notion. It is interesting to note that the Japanese language and the original Chinese ideograms do not present things in isolation, but rather always conceptualise objects as processes or events. All reality is understood to be in a state of perpetual becoming. This basic notion about the universe is reflected in the following description of a biological entity;

> A living body is not a fixed thing but a flowing event, like a flame or a whirlpool: the shape alone is stable, for the substance is a stream of energy going in at one end and out at the other.[18]

Our present world view allows us to extend this notion of reality to the realm of man-made phenomena. Thus, buildings can be regarded as "flowing events". This is not to suggest, however, that buildings are biological entities. Buildings, as we know them today, can only change in ways which appear extremely simple and crude relative to biological change processes.

---

[17] Fowler, op. cit., p. 6.

[18] Allan Watts, as quoted in Fabun, op. cit., p. 106.

Our present world view also allows us to regard both artifacts and biological organisms as systems. Therefore, as systems, both buildings and users of buildings are recognized as having constituent parts which are organized to create a whole. As the definition of the boundaries of this whole is dependent upon the needs of the individual, a work of architecture in terms of this paper is understood to be the systems which is composed of the subsystem "building" and the sybsystem "user", existing within their environmental context. The behaviour of this system within a space-time framework, constitutes the focus of attention of the second part of this conceptual framework.

3. Behaviour of Organisations and Buildings

Once built, a building becomes the environmental conditioning agent for a group of people. This group depends upon the building which it inhabits. Therefore, buildings should be planned and designed with the potential of behaving in ways which satisfy the needs of their users. In order to understand what the nature of these needs might be, it becomes important for the architect to have a conceptual understanding of the building-related behaviour of user groups. As it is impossible, within this paper, to discuss the behaviour of all types of groups which use buildings, only the behaviour of formal social organisations is presented here.

Formal human organisations are understood to be:

> . . . social institutions with special characteristics; they are consciously created at an ascertainable point in time; their founders have given them goals . . .[19]

This definition includes such institutions as; Government, Industry, Commerce, and Church.

Organisations, prior to the Industrial Revolution, consisted primarily of the Church and the State. With few exceptions, these organisations were autocratic in

---

[19] D. Silverman, The Theory of Organisations, (N. Y., 1971), p. 147.

structure. As extensions of the doctrines of papal infallibility and the divine right of kings, these structures emphasised the ability of the individual in power to personally direct the affairs of the organisation. As operational rules and procedures tended to be based upon centuries of tradition, these organisations were slow to change in many ways including those which affected the use of their buildings.

With the Industrial Revolution (1750 on), industry and commerce emerged as important formally organised institutions. The most popular form of organisation became the bureaucracy. The shift from autocratic structures to bureaucratic structures occurred primarily out of the need for more efficient operation of the larger and more complex organisations which evolved. Consistent with the spirit of the times, the bureaucracy was designed as a

> . . . clearly defined hierarchy where officeholders have very specific functions and apply universalistic rules in a spirit of formalistic impersonality.[20]

Thus, bureaucracy, a product of a static world view, was itself largely static;

> . . . jobs are established, defined, and filled in order to achieve an objective assumed to remain constant and in existence forever . . . the jobs do not grow. Bureaucracy cannot adapt to new problems and opportunities in its environment.[21]

---

[20] M. Weber, in Silverman, op. cit.).

[21] G. H. Rice and D. W. Bishoprick, Conceptual Models of Organisation (N. Y., 1971), p. 197.

Today, however;

> This form of organisation is becoming more and more ineffective . . . it is hopelessly out of joint with contemporary realities . . . new shapes, patterns, and models are emerging which promise drastic changes. Within the next 25 to 50 years, we should be witness to, and participate in, the end of bureaucracy and the rise of new social systems.[22]

Toffler and Bennis agree that these new social systems will be;

> . . . adaptive, rapidly changing temporary systems of diverse specialists, solving problems, linked together by co-ordinating and task evaluative specialists, in organic flux.[23]

The degree of variability and adaptability of architectural resources used to provide accommodation for these new systems will have to be significantly higher than is presently found in buildings which are housing bureaucratic organisations. These short term organisations will require "short order" environments. Even the long term institution, which will probably continue to dominate our society for some time to come, will eventually be transformed from rigidly bureaucratic, to a flexible "systematized" form of organisation. These new forms of social organisation will be designed around problems-to-be-solved. Thus, they will be of an ad-hoc nature (see figure 3.1).

Systems orientated organisational theorists are now studying organisations as entities, with their own

---

[22]W. G. Bennis, Changing Organisations, Essays on the Development and Evolution of Human Organisations (N. Y., 1971), p. 4.

[23]Ibid., p. 12.

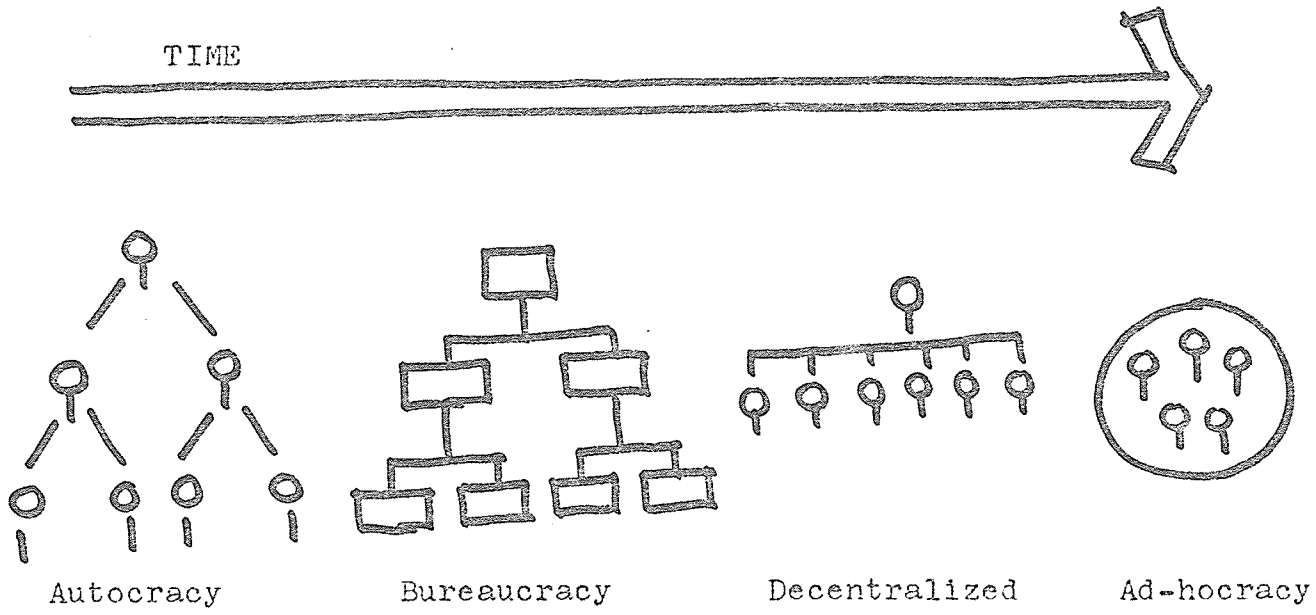


FIGURE 3.1 TREND IN ORGANISATIONAL STRUCTURES

sets of impersonal behaviours.

> The organisation is seen as seeking to adapt, and the frequency and nature of its change is to be explained as the outcome of an impersonal process through which it attempts to satisfy its needs.[24]

Thus, the systems model of organisations focuses upon needs; a property of the organisation itself, rather than goals; a property of individuals. The assumptions which underlie this approach are:

1. An organisation is composed of a set of inter-related parts which form a whole. (i.e., organisations are systems)

2. Organisations have needs for survival.

3. Organisations, as systems, themselves behave and take actions.

The notion that organisations are capable of impersonal action seems to have been confirmed by the fact that organisations, which belong to the same general class of organisation, evolve in similar ways.

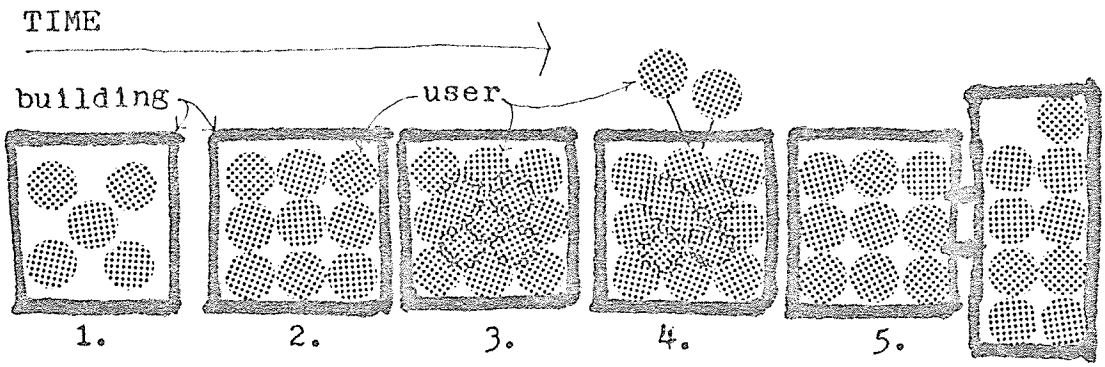
Generally, organisation theorists, who subscribe to the "systems" school of thought, consider biological organisms to be useful models of human organisation behaviour. Unfortunately, this analogy is sometimes taken to the extreme; i.e., social phenomena are regarded as actually being biological. Similar tendencies towards

---

[24] D. Silverman, op. cit., p. 152.

"biologism" have occurred in the fields of Urban Design (Doxiadis, 1968) and Architecture (The Metabolists, 1964).

There seems to be greater justification for regarding processes within social organisation, rather than processes within buildings, as being analogous to processes within biological organisms. Both social organisations and biological organisms appear to grow and change through an almost continuous addition, subtraction, differentiation and specialization of their parts, and the relationships between their parts. Buildings, on the other hand, at their present level of technology and technique, can only grow through a periodic addition or subtraction of a relatively large portion of the whole entity. In the interim between these periodic growth actions, buildings attempt to maintain a satisfactory level of compatibility with the needs of their users and the state of the external environment through a process of rearrangement or renovation of existing elements. This action can be described as homeostatic, whereas, the growth process of buildings can be described as revolutionary (see figure 3.2). This revolutionary change is required in order to relieve the stress which accumulates as a result of the differential between growth and change processes in buildings and growth and change processes in user organisations. As buildings tend to be extremely limited in their evolutionary behaviour, growth and change of buildings usually

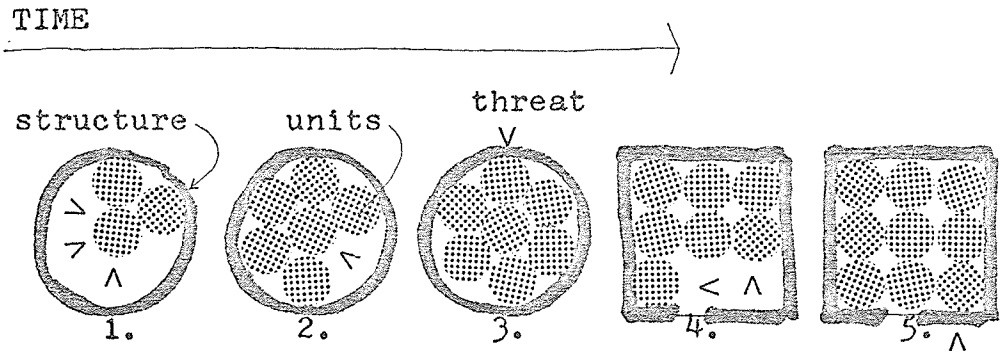


1. building underutilized
2. building use saturated
3. building super-saturated
4. user grows beyond bldg.

} no growth in building size (homeostatic change)

5. growth of building - revolutionary change

FIGURE 3.2.A GROWTH PROCESS OF BUILDINGS WITH DYNAMIC USERS



1.&2. Evolutionary growth in response to threats
3. saturation of the potential of the structure
4. Revolutionary growth - new structure
5. saturation of the potential of the structure

FIGURE 3.2.B GROWTH PROCESS OF DYNAMIC SOCIAL ORGANISATIONS

progresses from the homeostatic to the revolutionary. Organisations, on the other hand, tend to behave in evolutionary ways. As organisations exist primarily in order to satisfy some need in their external environment, they must constantly adjust themselves to meet growth and change in that need. The success of this adjustment depends upon the quality and quantity of the information and energy which is imported from the environment plus the ability of the organisation to respond to this input. It is this flow of input which serves to organize the system in new ways. Each input to a system can be considered to be a threat to the survival of that system. To overcome this threat, the system must "shore-up" that particular element or relationship which is most threatened. This process accounts for the form of a social organisation at any point in its evolution. However, as the internal structure of a social organisation was initially designed to accommodate a specific range of variability, once the limits of that variability have been exceeded, further shoring up must entail a restructuring of that system. This principle is known as the Principle of Increasingly Unfavourable Internal Structure.

The Principle of Increasingly Unfavourable Internal Structure states that; as any system, natural or artificial, grows and changes through time, its underlying structure becomes increasingly unsuitable to the needs of the

organism. As D'Arcy Thompson suggests, this is why a giant insect could not possibly fly. In fact, if the structure (bones, muscles, etc.) of the insect were to increase at the same rate as its mass, the insect would not be able to stand up, let alone fly. This principle is also known as the Square-cube Law, which states that as the mass of an organism increases, a proportionally greater increase in the structure of the organism is required to support it. Galileo expressed this fundamental principle when he stated that:

> If we tried building ships, palaces or temples of enormous size, yards, beams, and bolts would cease to hold together.[25]

Fortunately, within social organisations,

> When one type of structure reaches its limits of possible expansion, further increases in size can be achieved by new structural forms and new methods of specialization.[26]

We see this process occuring within many of our bureaucratic structures where, for example;

> . . . often it is more expedient to accommodate a new problem by setting up a new organisation than by changing the old organisation.[27]

It is the impact of this sort of change within organisations which could lead to premature functional obsolescence of buildings which house the activities of organisations.

---

[25] D'Arcy Thompson, On Growth and Form (Cambridge, 1952), p. 19.

[26] Boulding, op. cit., p. 26.

[27] Rice, op. cit., p. 140.

Another factor, which contributes to the growth of obsolescence of systems such as social organisations and buildings, is the tendency for the environment of a closed system to become increasingly unfavourable to the survival of that system. As all systems are to some extent closed, this tendency applies to all systems to some degree. As social organisations function as largely open systems, whereas buildings function as largely closed systems, the environment of buildings tends to become unfavourable sooner than the environment of social organisations. The obvious direction which architects should be taking, in order to overcome this dilemma, is that of planning and designing buildings which behave as largely open systems. The following chapter examines strategies and tactics for achieving this.

4. Summary of Part A

The following constitutes the conceptual framework for the remainder of this analysis:

1. All reality is dynamic, rather than static.

2. The world, as we understand it now, is organised. It consists of levels of inter-related processes.

3. All existence occurs within a space-time continuum.

4. Due to the limitations of mans conceptual and perceptual apparatus, we do not perceive reality per se, but rather a notion of reality.

5. Our heritage of past notions of reality, plus our inheritence of social institutions and values, prevents us from fully comprehending the present.

6. The future can not be completely determined. We can only predict with certainty the mean behaviour of a large number of identical events.

7. There are no totally open or totally closed systems.

8. Human social organisations are largely open systems.

9. Machine organisations, such as buildings, are largely closed systems.

10. Human social organisations develop in an evolutionary pattern. They attempt to adapt to their environments.

11. As social organisations age, their adaptation to the environment becomes increasingly unsuccessful.

12. Social organisations tend to persist beyond their useful life span. They develop the secondary goal of survival.

13. Organisational shape and structure is determined by; - the forces which threaten its survival
- the availability of resources
- the original structure.

14. As organisations grow in size, their internal structure becomes increasingly unsuitable.

15. Eventually, further growth of an organisation can only be accommodated through new structures.

16. As general growth and change rates continue to accelerate, organisations will become increasingly temporary.

17. As the magnitude of problems-to-be-solved continues to grow, organisations will increasingly be formed on an ad-hoc basis.

18. Bureaucracy is being replaced in Western society as the predominate type of organisational structure.

19. The problem of planning resources for social organisations is indeterminate.

PART B: STRATEGIES AND TACTICS

AS FUNCTIONS OF LIVING BECOME MORE COMPLEX AND TECHNOLOGICAL CHANGE ACCELERATES, THE CONSTRUCTION OF PREDETERMINED, UNCHANGEABLE BUILDINGS BECOMES MORE AND MORE QUESTIONABLE.

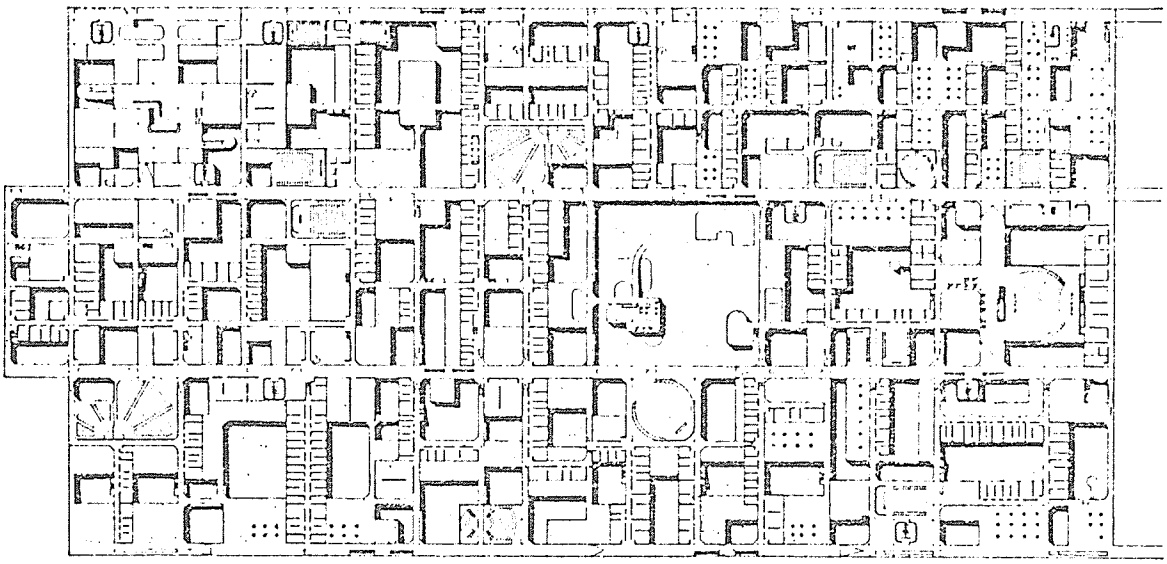
Helmut C. Schulitz

5. Developmental Planning

Developmental planning, as mentioned earlier, attempts to solve the problem of how to provide for the eventuality of future building. In other words, what do we do now, in order to allow future desired development to occur. There are a number of strategies and tactics which can be adopted towards this end.

Strategies

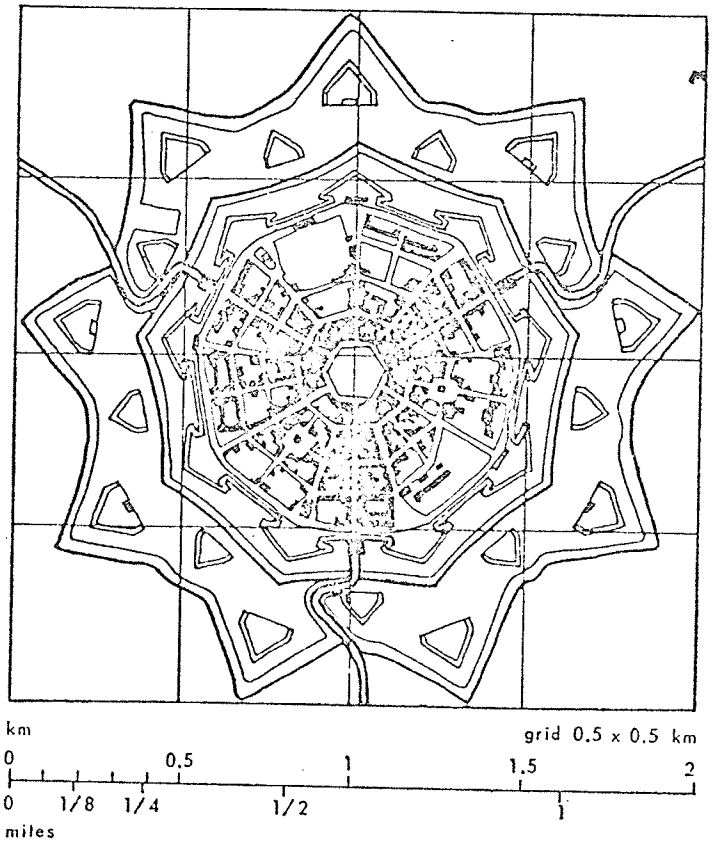
Developmental planning processes in architecture are closely related to the urban planning process. Both urban planning and developmental planning of architecture are dealing with the problem of providing a desired future physical environment. The difference between them is primarily one of geographic scale. Urban planning deals with the physical environment at the scale of a whole city or region within a city. Developmental planning in architecture deals with the physical environment at the scale of a group of particular buildings (see figure 5.1). The underlying decisional processes within both levels of activity are similar, as both are dealing with the ordering of a particular space-time framework for man. In order to examine this hypothesis further, a brief outline of past



above: Candilis, Jossic and Woods: Berlin University,

DEVELOPMENTAL PLANNING
OF ARCHITECTURE

radial plan in a small settlement
Palma Nuova, Italy (A.D. 1593)



URBAN PLANNING

FIGURE 5.1

and present urban planning and developmental planning strategies are presented here.

Once man began to conceive and build cities, it was natural for him to try and create ideal cities. As Plato's proposal for the city of Atlantis indicates, these ideals consisted primarily of abstract notions of canons of proportion and symmetry (see figure 5.2). This practise persisted for a long time. As Broadbent points out,

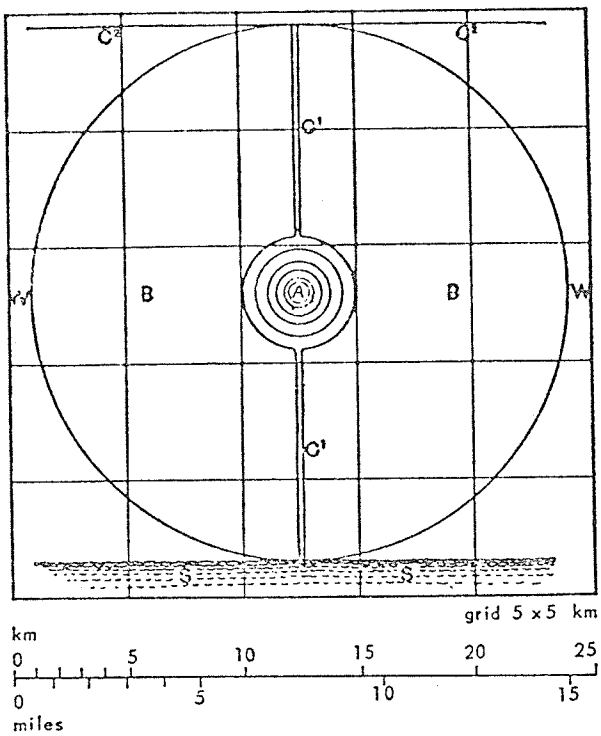
> Canonic devices introduced by the Greek Philosophers (Plato's system of triangles, etc.) underly Roman, Mediaeval and Renaissance design.[28]

Plans for ideal cities were master plans, in the sense that the images which were presented were complete. There was no formal acknowledgement of the time dimension in terms of growth and change. The strict adherence to a set of geometric rules tended to produce closed forms, in both urban design and architecture. Alteration or addition to these forms could not occur without breaking out of the dimensional framework. Prior to the eighteenth century there was little need for adaptability in buildings. Also, as the symbolic content of a building often took precedence over its functional role, the lack of flexibility in design vocabulary was not critical. However,

> It was becoming difficult already, in the 18th century to compose buildings to rule, even though functional requirements were less mechanically demanding than

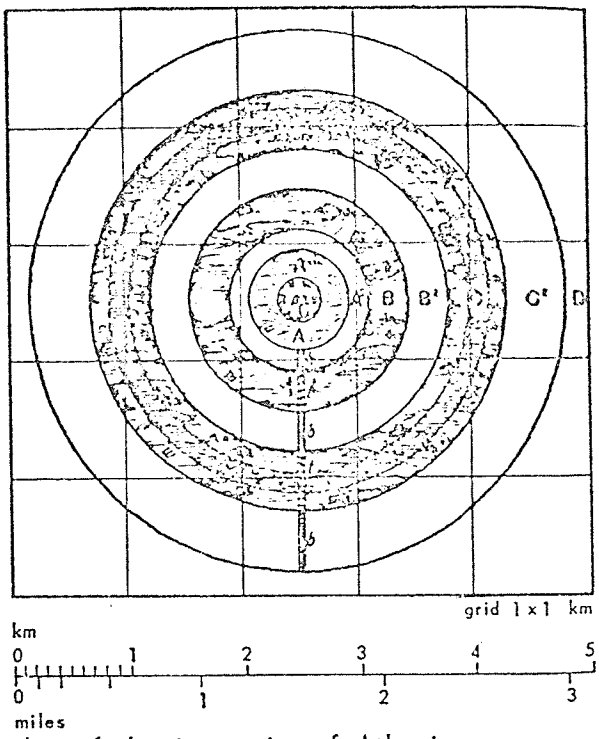
---

[28]Broadbent (source unknown).



general layout

A acropolis
BB outer city
W main city-wall (50 stades from outer water-belt) (117C,D)
C^1 canal (50 stades), 115 D
C^2 main canal round plain (118 C,D)
S sea



plan of the inner city of Atlantis

FIGURE 5.2 PLATO'S "IDEAL CITY", ATLANTIS

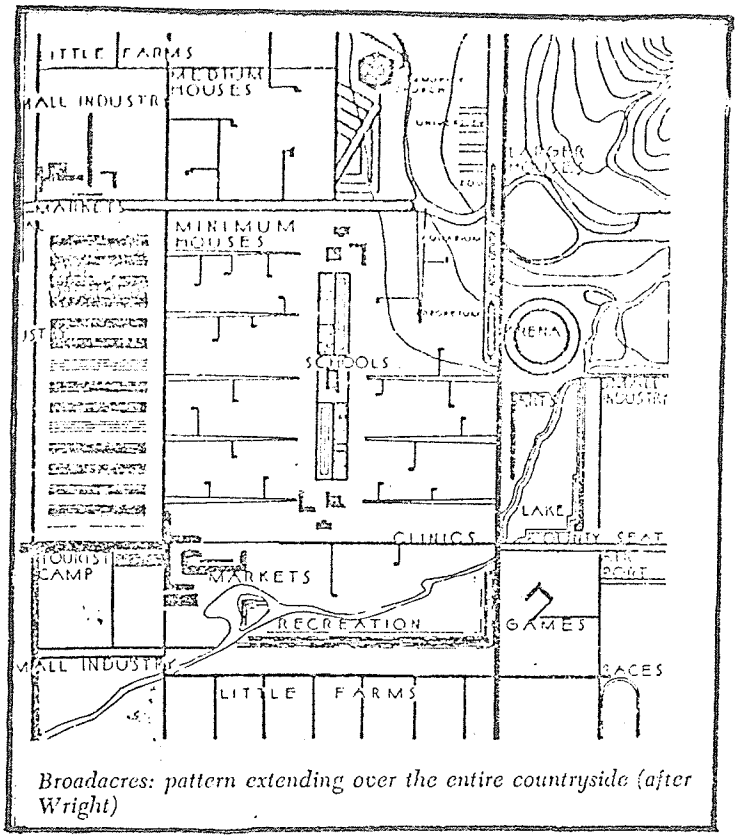
> today and buildings, like institutions, were thought to be permanent.[29]

The eighteenth century marked the decline in design by formal rule. It also saw a shift from cities planned as "ideal" towards cities planned as "utopian". This change in emphasis occurred because, for the first time, a notion of progress emerged. Prior to the eighteenth century, man felt that his destiny was completely out of his hands. Therefore, planning for the betterment of man's environment was not considered. The "doctrine of progress", which emerged in the second half of the 18th century and the 19th century, helped to bring about the Industrial Revolution. It also provided the necessary intellectual environment for such utopian urban schemes as Howard's "Garden Cities" to emerge. Later utopian proposals, such as Le Corbusier's Ville Radieuse (1925) and Frank Lloyd Wright's Broadacres Cities (1937) maintained the tradition of utopian planning into the twentieth century (see figure 5.3).

The utopian urban scheme was primarily an extension of the personal ideological stance of its originator. Usually, this stance was assumed to be universally acceptable and eternal, as is reflected in the lack of adjustment mechanisims in these plans. In the most unfortunate sense of the word, these plans were "master" plans. Not surprisingly, the era of utopian city planning was

---

[29] J. Weeks, op. cit., p. 90.



Broadacres: pattern extending over the entire countryside (after Wright)

FIGURE 5.3 THE UTOPIAN DEVELOPMENT PLAN: Broadacres

short-lived. The practice of master planning, however, has persisted in both urban and architectural planning.

Led by such groups as the Planning Advisory Group in Britain (1964), planning theoreticians have begun to question the appropriateness of master plans as planning vehicles. The increasingly dynamic nature of our society is beginning to render master plans ineffective.

> . . . changing technology, behaviour, values and economic pressures worked together to ensure that the area in fact evolved in competition to the plan. Adjustments and modifications to the plan could only be made on an ad hoc basis due to the plans lack of built-in adjustment mechanisms. The plans tended to function inefficiently--like the Irish timetable which serves only to tell the traveller how early or late the train is running.[30]

The developmental planning of architecture, from a master planning strategy, takes the form of a definitive site map, indicating the location and design of all future buildings--up to a target date. The target date is usually between ten and thirty years into the future. As in the master planning of cities, master planning of architecture assumes that the future is determinable. The master plan which is presented is regarded as an optimal solution. In order to define the parameters which define this optimality, the problem area is regarded as a closed system. Closed systems analysis is a convenient way of looking at a problem, as it lends itself to the use of mathematical

---

[30] J. Willis, "Information for Planning," Arch. Design, October 1970, p. 493.

techniques of Operations Research. However, as Rice points out;

> there are a number of weaknesses to this approach. For example, the problems to be solved, as well as the alternative solutions sought out are inevitably ill-defined. In addition, there is usually more than one set of criteria used to compare alternatives, thereby making an optimum solution highly improbable, since optimizing along one criteria rarely, if ever, produces the best solution along all other criteria involved.[31]

Generally, closed systems analysis places great faith upon man's abilities to objectify his values, goals, and priorities. The planner is also expected to have the ability to exercise complete rationality throughout the decision process. But,

> Can the decision maker reasonably be expected to be rational? . . . rarely is complete information available when a decision must be made. Even if this information were available, man is limited in his ability (i.e., lack of computational equipment, intellect, time) to process the information.[32]

Aware of these shortcomings of closed systems analysis, and master planning in general, planning theorists have recently proposed that evolutionary, open systems analysis is a more realistic approach to planning. Decision making from an open systems viewpoint,

> . . . recognizes that alternatives are not finite in number, that probabilities associated with available alternatives are poorly defined, and that utilities are poorly defined also. Therefore, decision making takes the form of a series of successive approximations and a continuing search program for alternatives . . .

---

[31] Rice, op. cit., p. 116.

[32] Ibid., p. 117.

> there is not so much emphasis on maximization of return by some objective standard. . . .[33]

This approach can also be called an "incremental approach" to planning. The incremental planner admits that values are often too vague to objectify. Therefore, the solution which is generated is not regarded as optimal, but rather as satisfactory. Also, as the long term future of the system is too uncertain to attempt to describe in the present, the plans generated are only regarded as satisfactory for the present and near future. The incremental strategy recognizes that,

> . . . it is precisely our uncertainty which brings us closer to reality than was possible in former periods which had faith in the absolute.[34]

The open systems strategy represents a rational adjustment to the indeterminacy of planning for the future. The emphasis is upon dynamic process, rather than a static product. There are two levels of concern. The first is that of the development of a general descriptive model of the evolutionary tendencies of the user organisation's needs. The second is that of identification of the nature and timing of future development through the monitoring and evaluation of on-going growth and change. However, as it is recognized that needs, goals, and values are transitory, any design manifestation, which may result, should

---

[33] Ibid., p. 169.

[34] Karl Mannheim (source unknown).

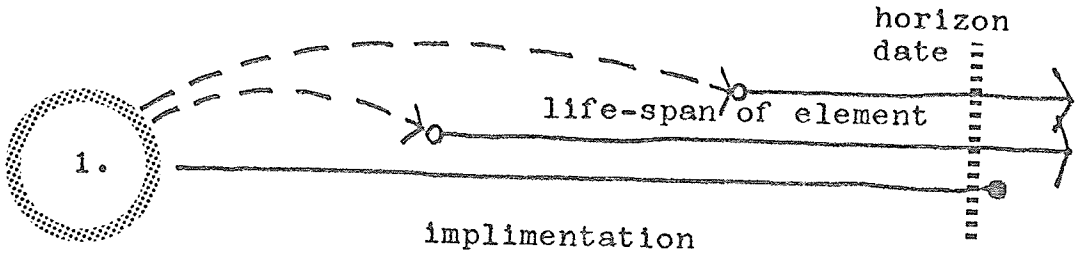
contain a reasonable degree of adaptability and variability. Whereas the incremental plans produced are usually short or medium range in time, the buildings which result are at present inevitably long term (see figure 5.4). A particular instance occurring in an incremental plan constitutes a tactic within the overall strategy.

Tactics

In general, tactics are those circumstantial actions which are designed to accomplish the objectives of a particular strategy. A strategy could be accomplished by a variety of tactical actions.

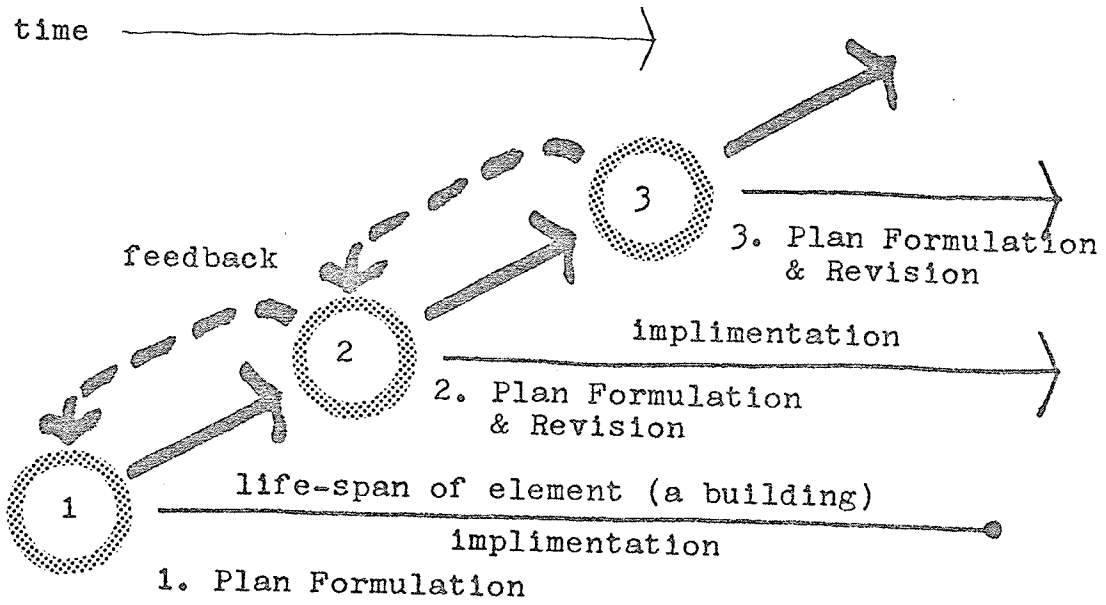
As mentioned previously, master planning usually takes the form of a definitive site map which presents a picture of how the area will look at some time in the distant future. Incremental planning on the other hand, present only a schematic indication of a number of alternative future developments. The determination of more specific formulations occurs once the need becomes imminent. Thus, decisions are postponed until they must be made. This means that the degree of predetermination of the type and design of future building is minimal. As each increment is executed, its manifestation reflects the constraints of the time it was planned and designed, and not the constraints of a past time.

Tactics, within the developmental planning of architecture, range from the highly deterministic, closed



1.Plan
Formulation
(complete image)

MASTER PLANNING

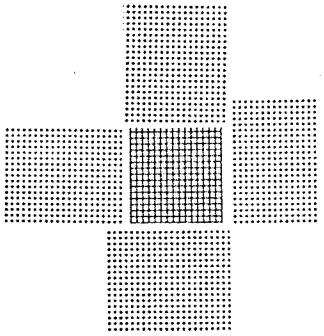


INCREMENTAL PLANNING

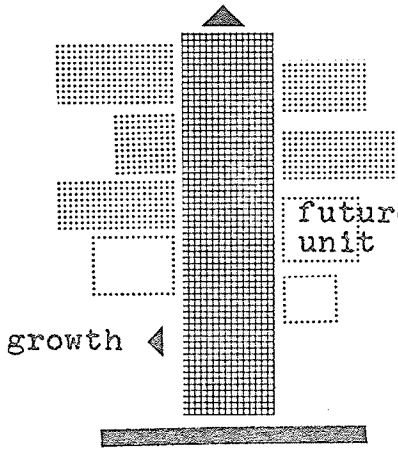
FIGURE 5.4 BASIC APPROACHES TO DEVELOPMENTAL PLANNING

systems approach to the indeterminate, open systems approach. The former is more conducive to a master planning strategy, the latter to a incremental strategy. As an illustration of this range of tactics, six examples are presented here. They do not represent all possible types of tactics, by any means.

A



PLAN VIEW



SECTION

Description

- clip-on or plug-in functional units
- central core fulfills all support functions - structure
  vertical circulation
  vertical H.V.A.C.

(see Warren Chalk's "Capsule homes tower, 1964)

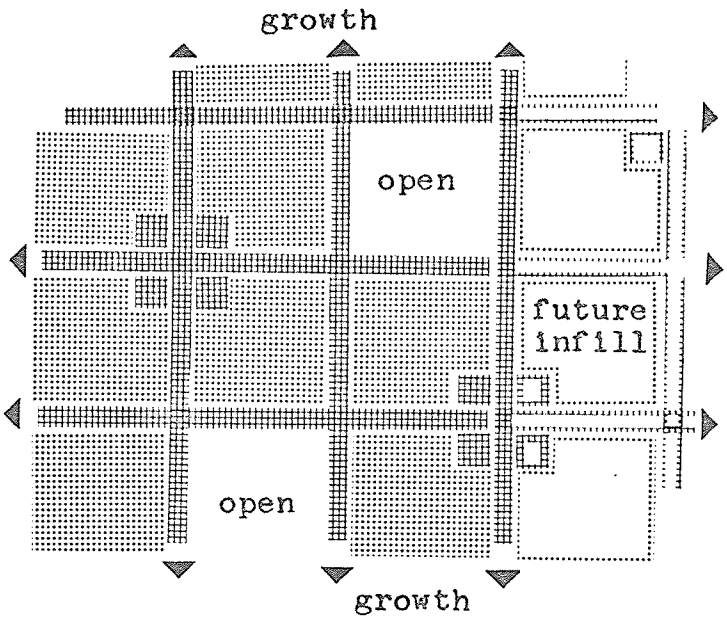
Advantages

- functional units can be replaced
- growth in the number of units is possible through vertical extension of the core
- location of services and circulation is efficient
- grade level can be freed up

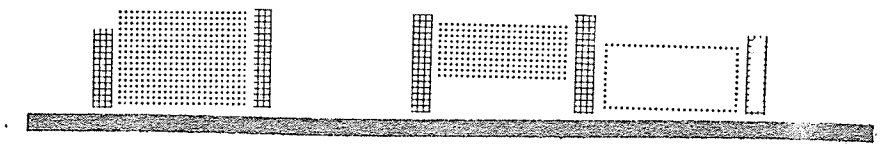
Disadvantages

- functional units, present and future, are restricted to geometric rules dictated by the core
- growth is finite, initial over-investment in structure is required to allow future growth
- core element is internalized, it can not grow horizontally
- core is considered to be permanent
- redundant surfaces are necessary, in order to preserve integrity of functional units

B



PLAN VIEW



SECTION

Description

- grid infrastructure
- vertical service cores at regular intervals
- permanent infrastructure
- temporary infill

(see Y. Friedman's "Spatial City", 1963, U. of Winnipeg, 1971)

Advantages

- infill can be replaced
- growth of both infill and infrastructure is possible
- it can extend over existing structures

Disadvantages

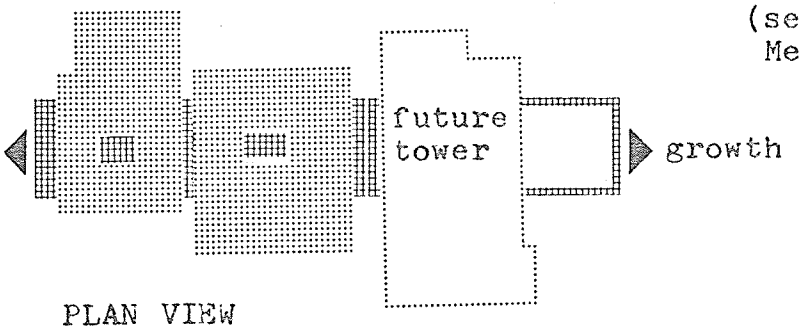
- future growth and change is limited to the extension of the existing geometric rules and systems

C

Description

- indeterminate base
- unique tower structures

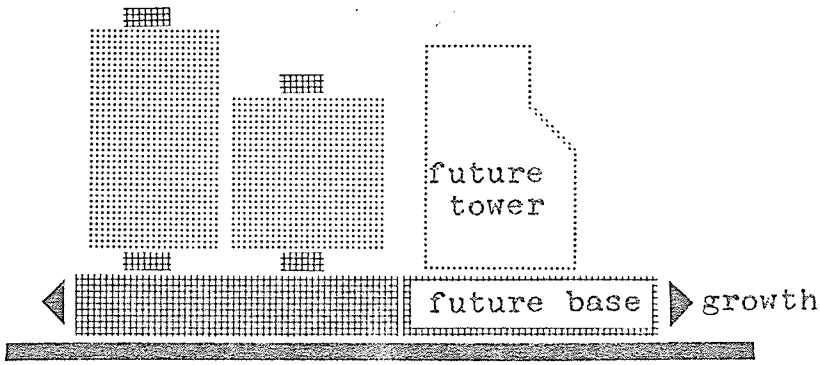
(see Tufts - New England Medical Centre, 1966)



PLAN VIEW

Advantages

- future growth of the base is not predetermined, it can accommodate change in site conditions or change in user's needs



SECTION

Disadvantages

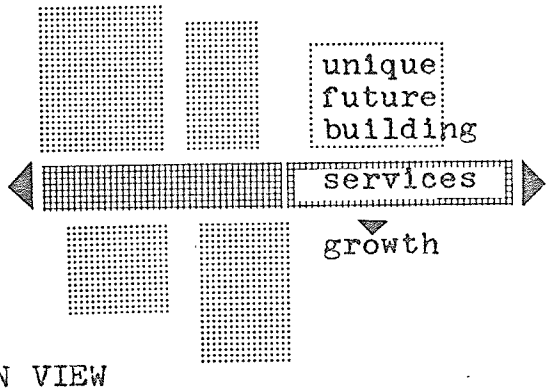
- linkage of towers is limited to the base
- the position of the cores and the the cores themselves, become permanent once built

D

Description

- multi-storey "service wall", containing all vertical and horizontal services, to which unique buildings can be linked

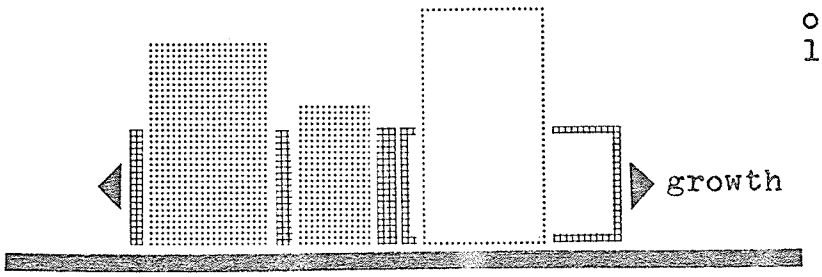
(see Llewelyn-Davies Weeks' Northwich Park Hospital, 1965)



PLAN VIEW

Advantages

- future growth is indeterminate
- buildings can be replaced as they are structurally independent of the service wall
- linkage of buildings occurs at a number of levels

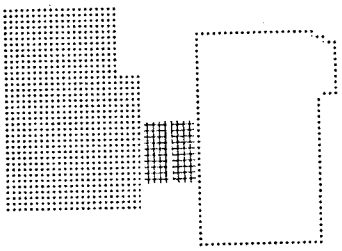


SECTION

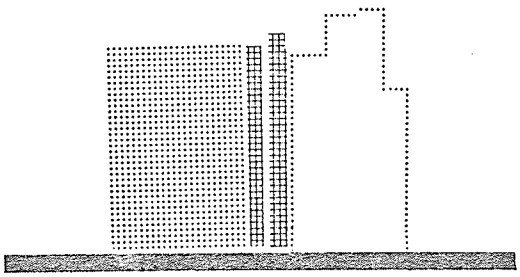
Disadvantages

- as service wall contains mechanical services which may become technically obsolete, it may be less permanent than the building. Therefore, it should also be replaceable.

E



PLAN VIEW



SECTION

Description

- unique, multi-storey buildings
- service cores are structurally independent of the buildings
- linkage may occur if desirable
- buildings are regarded as more permanent than core elements

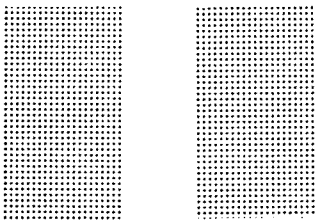
Advantages

- future growth is indeterminate
- core elements can be updated with a minimum of disruption to buildings
- core elements can replaced, added to, or rearranged
- linkage only occurs where desirable
- cores can be shared by buildings

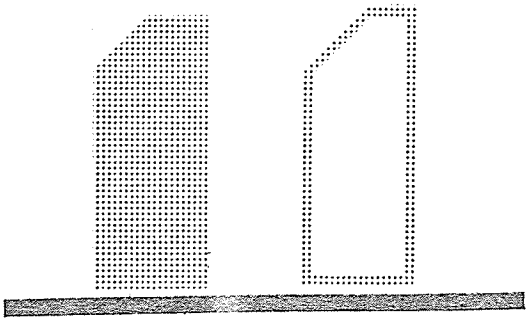
Disadvantages

- external core is less efficient, in terms of distances to be travelled, than an internal, central core

F



PLAN VIEW



SECTION

Description

- a prototypical building is repeated in both space and time

(see Wright's Broadacres City, 1937, and many others)

Advantages

- savings are incurred in design and drawing time
- greater possibility exists for the use of industrialized methods in construction

Disadvantages

- there is no acknowledgement of change in time or space as:
  - improvement of technique and in technology can not be incorporated
  - permissible variation in site conditions must be predetermined
  - if user needs exceed the type of accommodation, there is no alternative available

6. Initial and On-going Planning

Initial planning determines what a particular building should be. On-going planning determines what the building becomes during its life span. As a building can only become that which the initial planner has not ruled out, consideration for on-going planning becomes an important part of any initial planning activity. Therefore, both are presented here.

Initial planning generally consists of a briefing stage and an analysis stage. This information then is applied towards a synthesis and perhaps an evaluation stage (see figure 6.1). Briefing takes the form of a Design Program. This program is compiled either with a deterministic or probabilistic attitude. A deterministic brief attempts to specify all actors and activities which will participate in the proposed building. On the other hand, an indeterminate brief, (which results from a probabilistic attitude) recognizes that future actors and activities and their needs are too uncertain to deal with in the present. Only the most probable general types of activities are described in an indeterminate brief.

To date, indeterminate briefs have been used in the initial planning of research laboratories, schools,

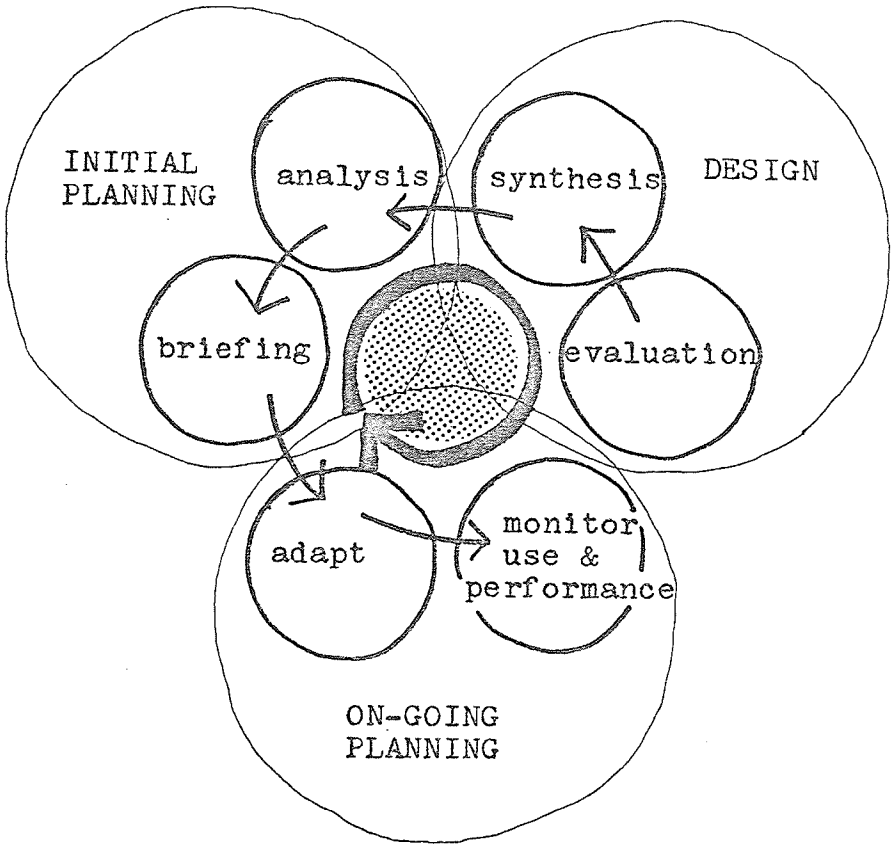


FIGURE 6.1 STAGES WITHIN INITIAL AND ON-GOING PLANNING

hospitals, and exhibition halls, to name a few. As the rate of change in organisations within our society continues to accelerate, indeterminate briefing will most probably grow in importance as an initial planning strategy in the future. An indeterminate brief attempts to generate buildings which are adaptable to unforeseen needs. The ability of a building to adapt to change extends its useful life span.

An alternative approach to initial planning of long-term buildings, is that of initial planning of short-term buildings. This approach has been forwarded by groups such as Archigram, and individuals like Buckminister Fuller. Advances in construction technology, especially in the use of light weight and portable structures, has significantly contributed to the interest in disposable architecture. However, a number of problems remain to be overcome before the temporary building can become a viable alternative to the long-term, updateable building. Some of these problems are:

- existing codes and regulations discourage the use of temporary buildings for most occupancy types. The codes were designed to deal primarily with permanent structures.

- large, multi-storey buildings presently invariably require components, such as elevators, stairs, plumbing, and structure, which are long-lasting and too expensive to discard prematurely.

- frequent demolition and construction of buildings

is disruptive to the continuity of both the general urban environment and the functioning of the user organisation.

- as the initial capital cost of construction continues to climb, it becomes increasingly economically attractive to up-date an existing building rather than replace it. This is especially true if the building was designed specifically as an adaptable structure.

- the image of temporary buildings is very unfavorable in the public mind. Temporary buildings have very low prestige value.

This does not mean, however, that in the future, short-term buildings will not be an answer. All indications are that the general tendency is toward shorter and shorter life spans for buildings within our cities. As an example of this growing impermanence, in 1947, the average life of residential buildings in the United States was estimated at 50 to 60 years; by 1962, the estimate had dropped to 40 to 45 years (see figure 6.2). The decline in the longevity of buildings is even more pronounced when one considers that, until recently, the French building code specified that buildings must be able to withstand the forces of time for a period of at least 140 years. This overall tendency towards shorter life spans for buildings should be recognized by the architectural profession. The question of whether this tendency is desirable should arise. If it is deemed to be undesirable, as this author

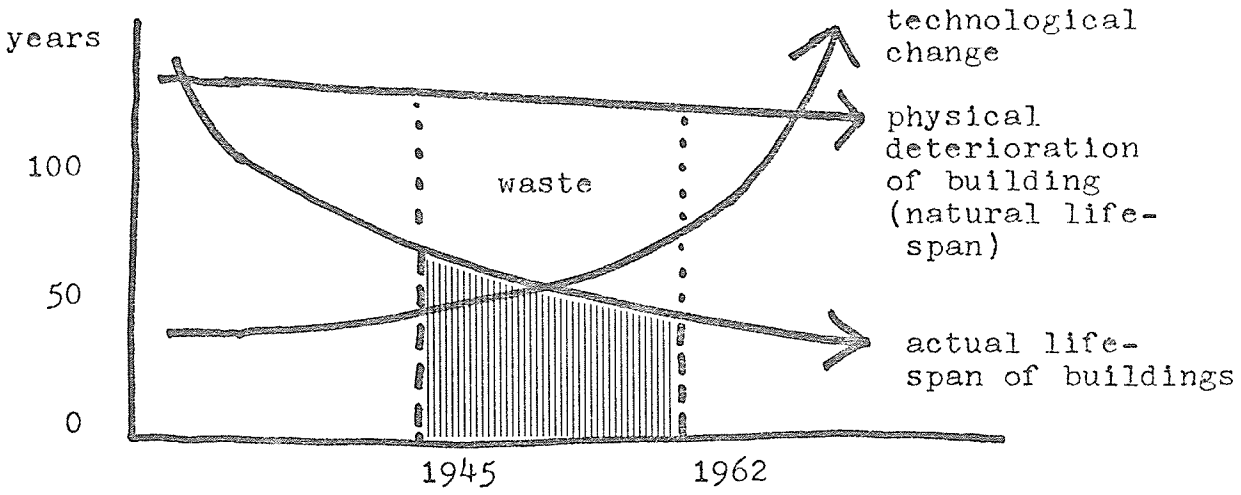


FIGURE 6.2 OBSOLESCENCE TENDENCY OF RESIDENTIAL BUILDINGS IN THE UNITED STATES

feels it should, then planning and design methodologies should be revised accordingly.

The extension of the useful life span of a building can be achieved partially through the provision of adequate variability and adaptability in the organisation and substance of that building.

Initial and on-going planning tactics for adaptable buildings employ either a notion of buildings as closed systems or as open systems. Both approaches are attempting to offset the growth of obsolescence in building. Generally, the growth of obsolescence in buildings is a function of:

- the amount and type of mechanical equipment in the building.

- the degree of customization required in the building, in both spaces and services.

- space quality and quantity standards adopted for the building.

- the rate and type of change in the user organisation's needs.

- the rate and type of change in the environment in which the building exists.

- built-in mechanisms for updateability in the building.

The closed systems approach tends to produce buildings which consist of a finite set of systems which fit together and interrelate in predetermined ways.

Adaptability to change is accommodated by the rearrangement of elements within these systems. A common example of a closed systems building is the modern office building. Usually, adaptability is limited to the rules defined by a modular grid pattern. Care is taken to integrate the structural, mechanical, communications, and partitioning grids so that there is a maximum of variability.

Even simple systems, which are designed to be internally variable, do not necessarily adapt to elements of another system. Even with a more complex group of integrated systems, changes are difficult to make without disruption of functionally dependent parts. Thus, more up-to-date systems are difficult to introduce into a building at a later date. Therefore, the initial planner is charged with the responsibility of providing adequate potential for adaptability solely by means of the initial design. As this is often a difficult task, the resulting closed systems are only a minor improvement over a totally unadaptable building. In order to program a successful closed systems building, the initial planner must be able to foresee, define, and design for the range of probable user needs during the entire life span of the building.

On the other hand, the open systems approach to adaptable buildings places greater emphasis upon the role of on-going planning. The building is regarded as an evolving <u>system</u>, in the sense that component elements and

subsystems can be replaced or updated when necessary, with minimum disruption to other elements. However, "Almost any structural or material solution contains some inherent inflexible rigidity."[35] Therefore, even an evolutionary building will become progressively more obsolescent. Hopefully, the rate of obsolescence will approximate the rate of material decay of the building. Buildings which have been conceptualized as open systems are, in fact, only partially open systems. The initial planner defines the degree to which they can be open. This definition includes the following considerations:

- the best possible knowledge of the probable general types of user needs during the period of foreseeable use of the system.

- the limitations of building technology and codes.

- existing and future restrictions of the site.

- the limitations of financial arrangements

- the limitations of other resources, such as, manpower, materials, equipment, time, etc.

An important realization, which forms a basic departure point for the planning of an evolutionary building, is that components of a building undergo differential obsolescence. As Helmut Schulitz points out;

---

[35] J. Lehrman, "Growth and Change in Offices," The Canadian Architect (June, 1966), p. 44.

> The difference between the average life span of buildings (40 to 60 years) and the life cycles of building components (4 to 100 years) shows how uneconomical it has been to construct buildings as fixed entities, where obsolescence of the whole package depends upon the most short-lived component.[36]

In order to accommodate the growth and change of systems with varying rates and types of obolescence, they must be as independent as possible from each other.

An open systems building, which recognizes differential obsolescence, can be described as "componentized" in the sense that the building is regarded as an assemblage of components rather than as a single unit (see figure 6.3). A simple analogy to this shift in architecture from integrated buildings to componentized buildings occurs in home stereo music systems. A few years ago, the most popular form of stereo equipment was the console, which contained radio, record player, and even television in one package. The quality and obsolescence of the entire unit depended upon its weakest component. Today, the most popular format for stereo equipment is the separated component system. "Componentization" of stereo equipment has resulted in freeing the entire system from premature obsolescence by allowing parts of the system to be updated.

The expression of the components of a building is already a part of the designers vocabulary, as is evident

---

[36] H. C. Schulitz, "Structure for Change and Growth," Arch. Forum (March 1971), p. 60.

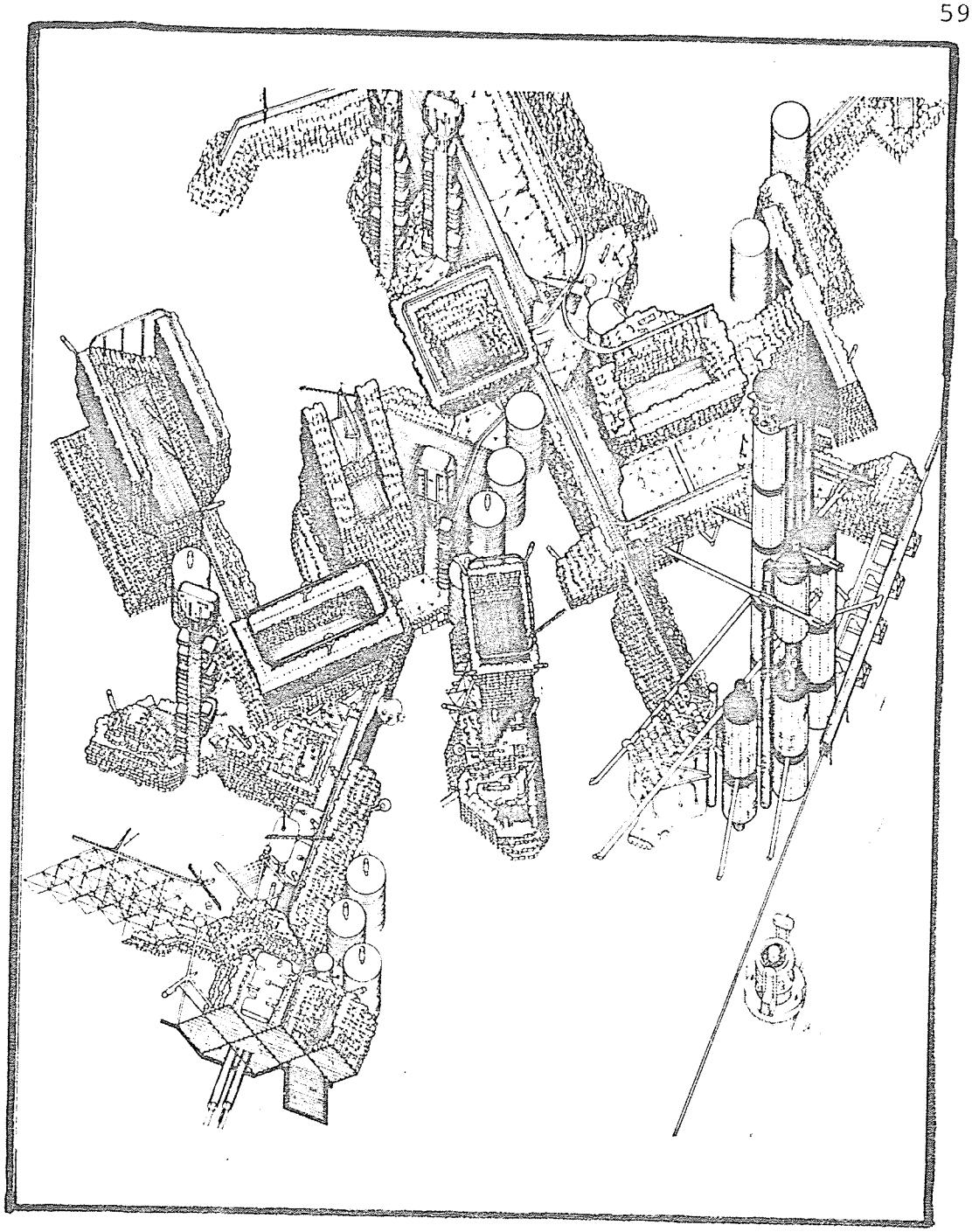


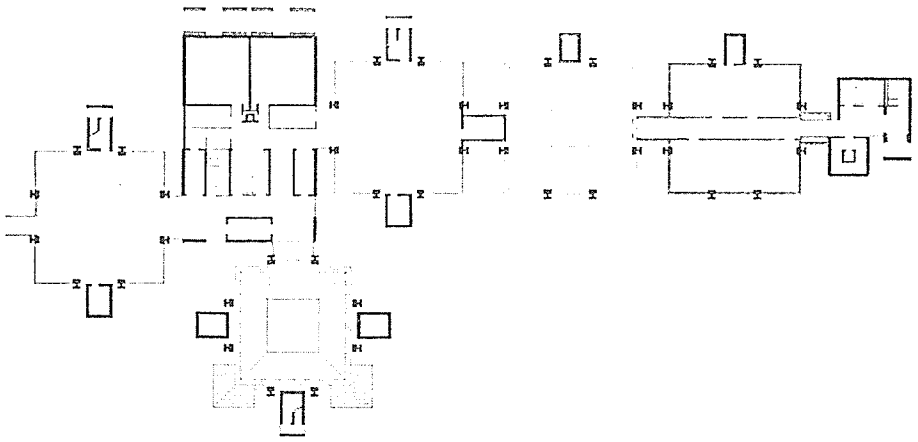
FIGURE 6.3 COMPONENTIZED URBAN FORM

Peter Cook: "Plug-in City", 1964

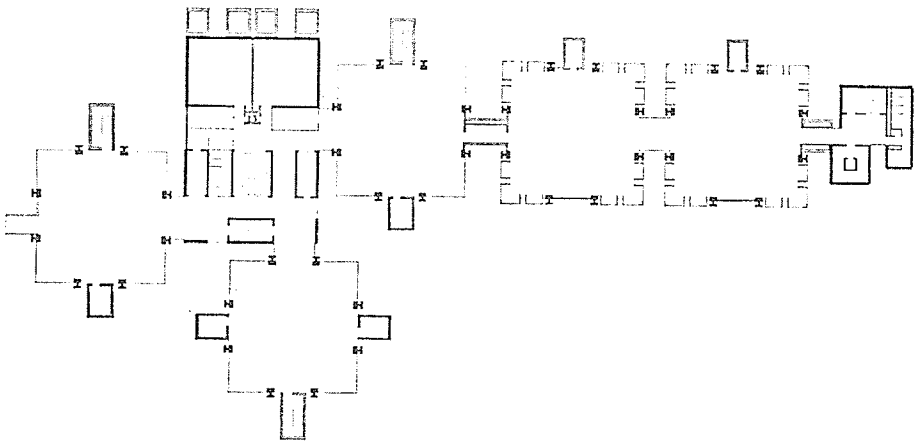
in such pioneering work as Louis Kahn's Richards Medical Research Building (see figure 6.4). Unfortunately, much emphasis has been placed upon the aesthetic expression of the component, and little upon its value as an aspect of a buildings mechanism for accommodating growth and change.

There are several ways in which the initial planner may view the user functional spaces of a building. One approach is to regard spaces as non-specific. Perhaps the foremost exponent of this tactic is Mies van der Rohe, as is illustrated by his Crown Hall building at IIT (see figure 6.5). Unfortunately, this generalization of spaces usually leads to the situation where no user functions are accommodated well. To overcome this problem, a multi-strategic approach to functional space has been suggested. A multi-strategic space has built-in potential for a specific range of accommodations. Usually, however, a multi-strategic space can only satisfactorily accommodate one set of functions at any one time. This is in contrast to the multi-purpose space which is designed as a complete statement of the generalized needs of a range of functions. A multi-strategic space is not complete at any one time in that it has the potential to become something else; i.e., it is evolutionary.

Regardless of the tactic employed to deal with the general functional space components, there will always be a proportion of specific spaces involved. Examples of



Typical laboratory floor plan.



Ground floor plan.

FIGURE 6.4 COMPONENTIZED ARCHITECTURE

Louis I. Kahn: Richards Medical Research Building, 1960

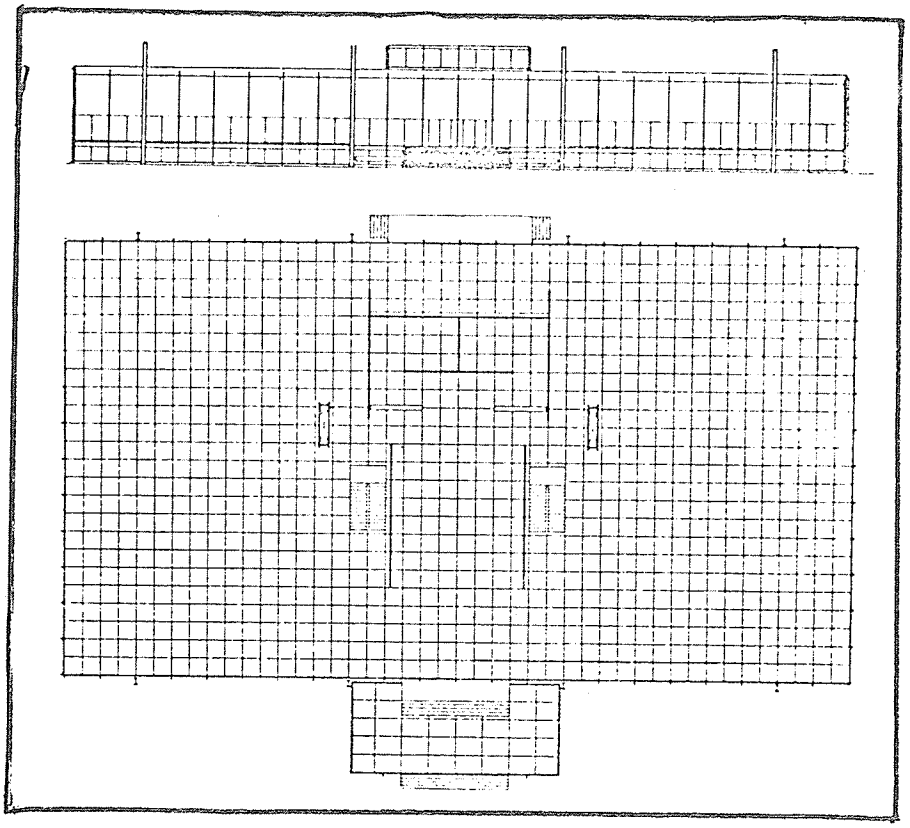


FIGURE 6.5 AN EXAMPLE OF NONSPECIFIC FUNCTIONAL SPACE: CROWN HALL, I.I.T., CHICAGO by Mies van der Rohe

specific areas in a building are; entries, washrooms, mechanical rooms, elevators, etc. The functions within these spaces are not likely to change. However, as a number of these spaces are dependent upon mechanical equipment, they are susceptible to obsolescence through technical innovation. Another type of specific space is the space which requires a specialized environment in order to adequately accommodate its functions. This function is not permanent. Examples of this type of space are; special laboratory areas and special storage areas. Generally, these space components are dependent upon technology and techniques and, as such, are subject to rapid obsolescence. They present a major dilemma for a time conscious architect.

Thus, there are basically three types of space components in a building. The first is the general purpose, multi-strategic space, the second is the specific space with a permanent function, and the third is the specific space with a temporary function. The distinction between these spaces becomes more apparent when one considers the respective on-going planning processes involving each.

On-going planning has two primary processes. The first is monitoring the growth and change characteristics of user's needs and using this information to establish critical dates for action and the type of action required. The second process is defining the on-going adjustments to the building. These adjustments can take the form of simple

rearrangement, renovation, or replacement. Generally, it is more economical to integrate as far as possible the rearrangement and renovation levels. Integration can be accomplished primarily by making systems accessible, relocatable, and independent.

Updating of a multi-strategic space should be a matter of rearrangement, rather than renovation or replacement. On the other hand, specific spaces with temporary functions are more difficult to update simply through rearrangement. Usually, a renovation or replacement of systems serving this space is required. The specific space with a permanent function, generally requires major replacement of its contents and servicing.

7. Summary of Part B

The following forms a recommended approach to architectural activity within a space-time framework:

1. Developmental planning tactics should acknowledge the presence of growth and change in space-time by not unnecessarily restricting the nature and substance of future increments. Generally, prototypical solutions or rigid physical infrastructures should be avoided in favour of indeterminate assemblages.

2. Within any developmental planning tactic, the initial planning of a particular increment should be attempting to generate buildings which are updateable.

3. Differential obsolescence of building components should be acknowledged through a "componentization" of the building.

4. Components should be identified according to compatability of function and obsolescence characteristics. There are three basic types of space: the multi-strategic space, the specific space with a temporary function, and the specific space with a permanent function.

5. The on-going planning, required for a particular building, should involve, as far as possible, simple rearrangement of existing resources, rather than renovation or replacement.

	DEVELOPMENTAL PLANNING STRATEGY	DEVELOPMENTAL PLANNING TACTICS	INITIAL PLANNING STRATEGY	INITIAL PLANNING TACTICS
IDEAL SPACE/TIME ORIENTED APPROACH	Continuous Planning	Independent, Unique Buildings	Temporary, Disposable Buildings	Non-specific Spaces
REALISTIC SPACE/TIME ORIENTED APPROACH	Incremental Plans	Indeterminate Infra-structures	Long-term Adaptable Buildings	Multi-strategic Spaces
SPACE ORIENTED APPROACH	Master Plans	Prototypes & Determinate Infra-structures	Long-term Unadaptable Buildings	Specific Spaces

FIGURE 6.6 SUMMARY OF APPROACHES towards a SPACE/TIME ARCHITECTURAL SYNTHESIS

PART C: CASE STUDY; GOVERNMENT BUILDINGS

IN ORDER TO EXAMINE FURTHER THE IMPLICATIONS OF THE TIME DIMENSION IN ARCHITECTURAL ACTIVITY, THE FOLLOWING EXAMPLE OF THE PROBLEM OF PLANNING BUILDINGS FOR THE USE OF THE GOVERNMENT OF MANITOBA IS INTRODUCED. THE PROBLEM IS CONSIDERED FROM A PAST, PRESENT AND FUTURE TIME FRAME.

8. Empirical History

The history of planning buildings to house the government of Manitoba can be described as having passed through three phases. It is presently in the midst of a fourth stage in its development. The delineation of these phases is artificial as the actual evolutionary process is continuous. Nevertheless, it is convenient to describe the development of public works in this manner.

Initial Growth Phase

The first phase lasted from 1871 to approximately 1911. It's beginning was described by the first Minister of Public Works in the 1874 Annual Report:

> In the month of January, 1871, I received instructions to fit up a place for the purpose of holding the first session of the first parliament of Manitoba. . . . A log house was rented from A. G. B. Bannatyne, Esq. . . . and in the winter of 1871 and 1872 a number of alterations were made in order to put it in proper shape for a parliament building.[37]

This phase can be described as the Initial Growth Phase as it encompasses a range of development, from the beginnings of the government, to the establishment of the government organisation as a mature institution. During

---

[37]Manitoba Department of Public Works, Annual Report, June, 1874.

this phase, the number of individuals in the government grew from half a dizen to almost a thousand. The population of Manitoba increased from 15,000 to 461,394. Thus, by 1911, the ratio of civil servants to the population of Manitoba was approximately 2 civil servants per 1,000 head of population. This low ratio reflected a prevailing notion that the less bureaucracy the better. The primary role of government in Manitoba, during the initial growth phase, was that of watchdog. Thus, the original departments within the government were:

- Department of Agriculture
- Department of the Attorney General
- the Treasury
- Department of Public Works
- Department of Education.

No new departments were added until 1927, when the Department of Mines and Natural Resources was formed. Up to that time, all new problems were resolved by the existing departments.

Between 1871 and 1911, there appeared to be no conscious strategy towards the developmental planning of government buildings. It seemed reasonable to public works planners of the time to accommodate the entire government operation under one roof. This was accomplished by simply replacing a building, once it became overcrowded, by a larger building (see figure 8.1). The Bannatyne house, which

1. Bannatyne House
2. Post Office Road Offices
3. Parliament Building
4. Legislative Building

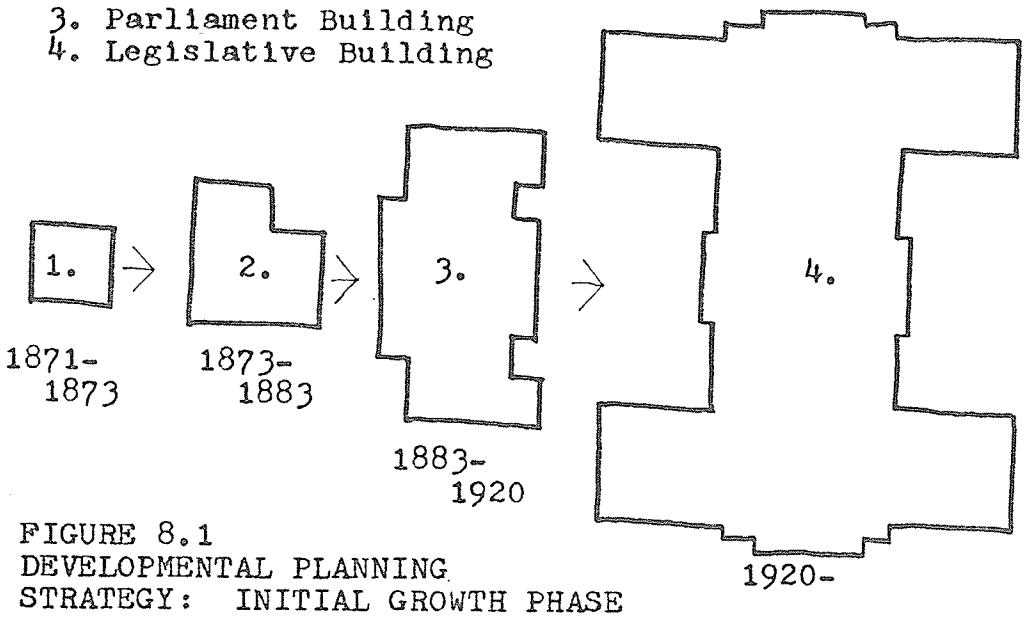
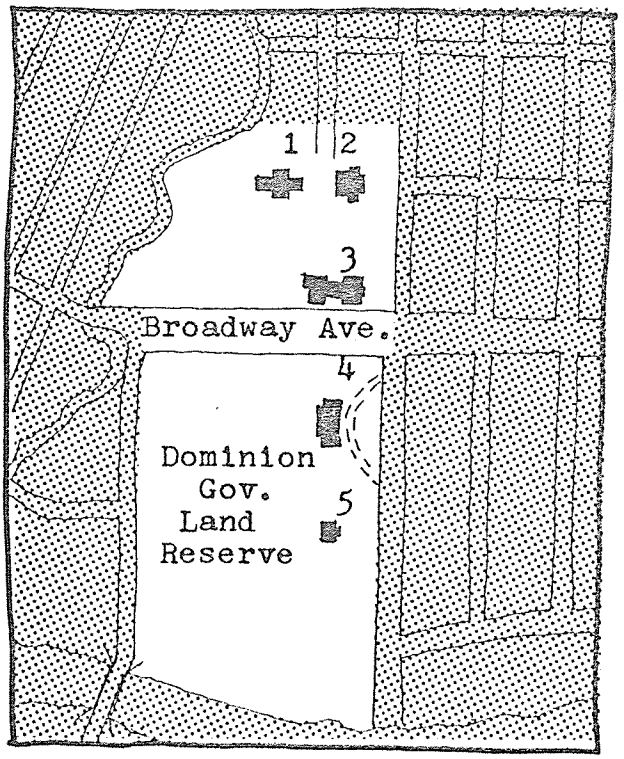


FIGURE 8.1
DEVELOPMENTAL PLANNING
STRATEGY: INITIAL GROWTH PHASE



1. Jail
2. Court House
3. Land Titles
4. Parliament
5. Government House

FIGURE 8.2

BROADWAY - KENNEDY
PRECINCT, 1883

burned down in 1873, was replaced by larger, rented accommodations in an office building on Post Office Road. However, as C. P. Brown indicated by 1882;

> Owing to the rapidly increasing volume of business in the various departments of the government, the accommodation provided by the offices on Post Office Road was found to be totally inadequate for the requirements of the departments.[38]

The building which was built in 1883 to replace the Post Office Road offices was the first parliament building for the province of Manitoba, which was initially planned, designed and constructed as a parliament building. The construction of this building also marked the establishment of the Broadway-Kennedy area as the Provincial Government Precinct. Already in the area was a land registry office, a new court house and a new jail. (The jail is still in use today.) (see figure 8.2). Unfortunately, as the civil service continued to grow, the new parliament buildings became rapidly obsolete. Already in 1892, Robert Watson, Minister of Public Works, was complaining of inadequate accommodations;

> The legislative building, first occupied in or about 1883, and although no doubt well suited then for the purpose of use, is now considerably overtaxed for proper accommodation.[39]

Again, in 1909, a similar appeal for more up-to-date accommodations appeared:

---

[38]Manitoba D. P. W., Annual Report, 1882.

[39]Manitoba D. P. W., Annual Report, 1892.

> Owing to the constantly increasing business in the various departments, the offices in the Legislative Building have become over-crowded. . . . It is therefore evident that in the near future more spacious and up to date buildings will have to be provided.[40]

Finally, thirty years after Watson first complained of out-dated quarters, a new, much larger Legislative Building was under consideration. The construction of this building marked the end of the initial growth phase in the planning of government buildings.

During this first phase of the growth of government, the economy of the Province underwent a series of booms and busts. The years from 1871 to 1882 can be described as a mixture of high immigration of settlers and plagues of locust. The construction of the railway during this period helped to keep the economy healthy. However, after 1882, railway construction was complete and the economy suffered a subsequent recession. When the stock market finally recovered from the 1883 crash in 1896, the prosperity which resulted lasted for a period of fifteen years. Known as the "Great Boom", this short period in the history of Manitoba was responsible for the construction of most of Winnipeg's major downtown commercial and institutional buildings, before 1960. As historian W. L. Morton described it:

---

[40]Manitoba D. P. W., Annual Report, 1909.

> The world, it soon became apparent after 1897, would buy all the wheat Manitoba farmers could grow, and would loan all the money Manitobans could spend on the development of the province's resources.[41]

The "Great Boom" had a profound effect upon the attitude of the government towards its buildings. Swept up by the optimism of the times, the government established a dipartisan committee of the Legislature in 1911, to bring about the design and construction of new law courts buildings and a new legislative building in the Broadway-Kennedy precinct. From the terms and conditions of the competition it appears that the overriding objective of the planners was to present a public image of prosperity and permanence.

Unfortunately, prosperity ended in 1912, even before construction of the new legislative building had begun. As a result of the over-optimism of its planners, the cost of the new buildings,

> . . . was to prove to be one of the heaviest strains on a community which was still borrowing against the future, the splendid new buildings were to prove so many ornate millstones around the neck of the future taxpayer.[42]

Originally estimated to cost two million dollars, the new legislative building ended up costing over nine and a half million. The scandal that ensued from a disclosure of the findings of The Royal Commission on the Erection of Public

---

[41] W. L. Morton, Manitoba: A History (Toronto, 1967), p. 273.

[42] Ibid., p. 315.

Buildings, brought the government to its knees in 1916. Implicated in a fraud was the foundations contractor, the Provincial Treasurer, the Minister of Public Works and even the Premier. The famous Winnipeg General Strike caused further delays in the construction of the new buildings. When the legislative building finally opened, July 15, 1920, the history of the Government of Manitoba was well into its second phase. This phase can be described as the "Saturation Phase".

Saturation Phase

During the forty years of this phase, no construction of government buildings was undertaken. Instead, the generous space provided by the new buildings was slowly filled. The space owned by the government in 1920 was not fully utilized until the early fifties, when a saturation point was reached. In 1920, there were just under 1,300 civil servants and approximately 260,000 square feet of usable office space. This meant that the average allotment of space per civil servant was at least 200 square feet. This is more than double the present standard of space allotment. By 1941, the ratio of space to civil servants had changed very little (see figure 8.3).

Despite the slow growth in the number of civil servants between the years 1911 and 1941, a number of new government departments were formed. As mentioned earlier,

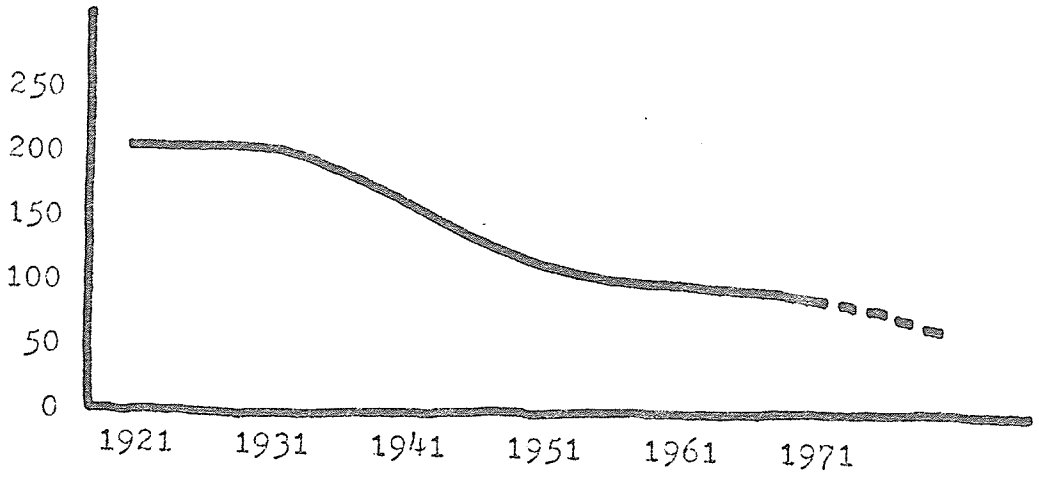


FIGURE 8.3 AVERAGE NUMBER OF SQUARE FEET OF GOVERNMENT OFFICE SPACE PER CIVIL SERVANT, 1921 TO 1971

the Department of Mines and Natural Resources appeared in 1927. A year later, the Department of Health and Welfare was formed to deal with the growing social problems brought on by the depression. In 1934, a Department of Labour was established to cope with the severe unemployment of the times. Finally, in 1947, the formation of the Department of Industry and Commerce brought the total number of government departments to nine, where it stayed until 1966. With the exception of the Department of the Attorney General, and part of the Department of Health and Welfare, all government departments were housed in the Legislative Building until the mid-fifties. The sudden rise in the number of civil servants in the fifties made it necessary, for the first time, to rent extra space for government needs. As B. R. McPherson, Provincial Architect, explained;

> The continued expansion of government services resulted in a corresponding expansion in office space requirements. A substantial amount of time was spent on securing this space and renovations. . . .[43]

The decision, in 1957, to build a general purpose administrative building to consolidate all rented premises, marks the beginning of the third phase of development.

Decentralization Phase

The general administrative building, which finally

---

[43]Manitoba D. P. W., Annual Report, 1959.

opened in 1960, was the first permanent indication that the day when the entire government operation could be housed under one roof was gone. The developmental planning strategy of the planners of this building, known as the Norquay Building, consisted of an attempt to reconsolidate all government activities which could not be accommodated in the Legislative or Law Courts buildings. Unfortunately,

> The building, according to officials at the time, was too small the day it opened. It was designed and built with the intention of leaving plenty of room for future government and staff expansion. But when the ten-storey administrative building was opened, officials were saying they could do with half as much room again.[44]

Because of the shortage of space in the new building, the government has been forced to spread its operation throughout the city. In 1971, the government was renting space in at least twenty-five locations, not including regional health centers. In addition, approximately 875,000 square feet of office space has been purchased by the government in various locations. The most significant purchases, to date, have been the acquision of the Robert Fletcher Building, the Fort Osborne Complex and the former Winnipeg Auditorium. The amount of rented and owned space, apart from the main downtown government complex, is growing rapidly. The logistics of moving has become extremely complex, as increases in staff continues to accelerate.

---

[44] N. van Rijn, "Gov't Bucks Trend by Decentralizing Operations," Winnipeg Tribune, May 20, 1972.

The growth of individual departments is approaching the point where many are large enough to now warrent a building of their own. The Department of Health and Social Development is already too large to fit into the Norquay Building without spilling over to other locations. The fitting of any particular department to a building will present a dilemma to the planner. Departments grow and change continuously. Whereas a building may have the potential to be internally changed continuously, its growth will be inevidably periodic. With the exception of that special moment when the building will correspond exactly to the needs of the department, there will always be under or over utilized resources (see figure 8.4). The values of the planners in the first phase allowed buildings to be under utilized for a much longer period of time than contemporary values would allow. Buildings which are built today are rarely, if ever, under utilized. This means that buildings are becoming functionally obsolete much quicker than in the past.

Fortunately, the Norquay Building was designed as an adaptable building. This has permitted a degree of variability in the ways in which it can be used. However, as the Norquay Building was designed as a closed systems building, flexibility is limited to the possibility of rearranging partitioning. As a result, the organisation of the building has become increasingly unfavourable (see

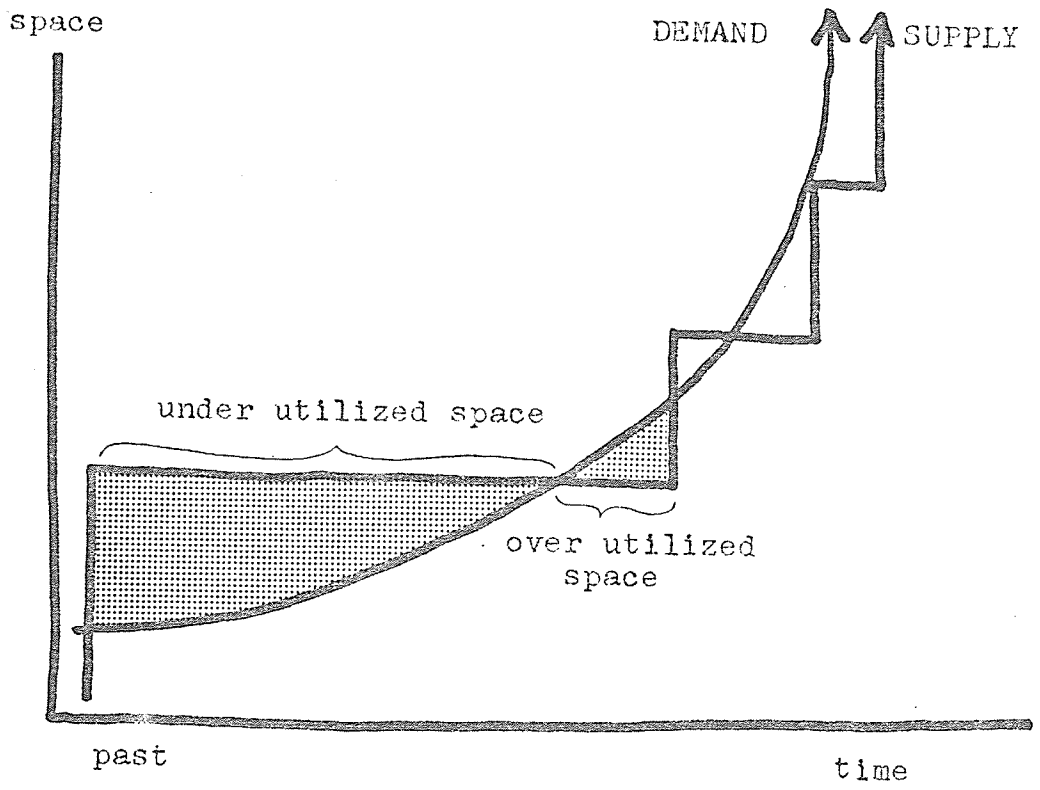


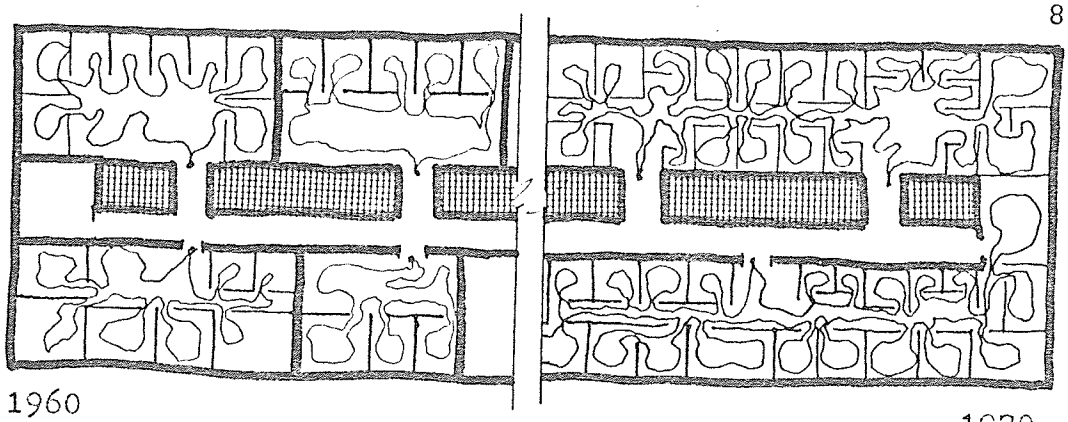
FIGURE 8.4 SUPPLY / DEMAND RELATIONSHIP BETWEEN ARCHITECTURAL RESOURCES AND ORGANISATIONAL NEEDS

figure 8.5). The shape of the building was determined by the expectation that it would always be used by a number of small groups (100 sq. ft. to 1,000 sq. ft.). Therefore, as functional groups in the government continue to grow in size, the geometry of the Norquay Building becomes increasingly unsuitable (see figure 8.6). The imminent adoption of "Burolandschaft" or open office planning principles, wherever possible, will render the long corridor, rectalinear plan of the Norquay Building even more unsuitable to government needs. Experts seem to agree that a large, open area of at least 10,000 square feet, is vital to the success of "Burolandschaft" planning.

The consolidation of departments into their own buildings constitutes the fourth and present phase in the history of the planning of government buildings. This phase I have chosen to call the "Departmental Consolidation Phase".

Departmental Consolidation Phase

The consolidation of government departments within their own buildings should by no means be regarded as a permanent developmental planning tactic. As new extra-departmental organisational structures emerge, and as new concepts of management develop, the objectives of future planning may be something quite different. One possible future direction for developmental planning might be greater emphasis on relating groups according to function,



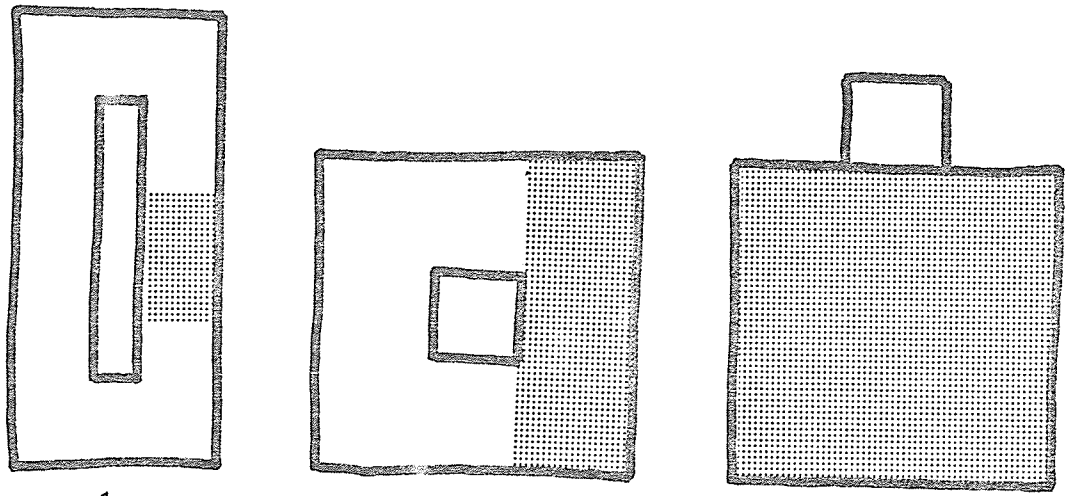
1960

1970

- many tenant groups per floor

- one or two tenant groups per floor

FIGURE 8.5 ENTROPY GAIN IN THE ORGANISATION OF THE NORQUAY BUILDING



1.

rectangular plan - core internal

2.

square plan - core internal

3.

square plan - core external

FIGURE 8.6 RELATIONSHIP BETWEEN THE SHAPE OF AN OFFICE BUILDING'S FLOOR AND THE SIZE OF TENANT GROUP

rather than by departmental affiliation. The development of communications technology may even render spatial location an unimportant aspect of future planning.

Department of Public Works planners have recently proposed a "Master Plan" of the construction for the future buildings in the Broadway-Kennedy precinct. A developmental planning tactic contained in this "master plan" consists of the construction of a prototypical office tower, which is then to be repeated (see Chapter 5, tactic "F"). Each building constructed is intended to house a particular government department. The assumptions which underlie this approach are:

1. Government policy regarding public buildings will probably remain constant during the next twenty years.

2. The type of future space needs will be similar to the type of present space needs.

3. There will be no significant technological advances relating to office buildings in the next twenty years.

4. The one particular building selected as the prototype is an optimal solution, i.e., it can not be improved upon.

5. The local site conditions are not an important determining factor in the design of a building, if the same building is considered to be adequate for different sites.

6. The department will continue to be the most important organisational boundary within the government.

As government policy is likely to change over a period of twenty years, and as the organisational structure of the government is constantly changing, the appropriateness of a "master plan" strategy especially one which employs a prototypical building tactic must be seriously questioned.

But what would constitute a more acceptable approach to the developmental planning of the fourth phase? What initial planning strategies and tactics should be considered? The next chapter attempts to define more fully the problem as it presents itself today.

9. Definition of Problem

At this time, it appears from government sources that the government most urgently requires an additional 150,000 square feet of general purpose office space in the form of a new building in the Broadway-Kennedy area (see figure 9.1). This building is required to help alleviate overcrowding in the Law Courts Building, Land Titles Building and Norquay Building. It is also felt that the additional space will provide accommodations for a number of groups which are presently in temporarily rented premises. As the bulk of the space in the new building will be taken up by the Department of the Attorney General, it has become known as the "Legal Offices Building".

Since 1966, there has been a marked increase in the number of government departments (nine in 1966, to fourteen in 1972). Also, there has been a significant acceleration in the rate of organisational change during this period. This growing adhocracy and impermanence in the Manitoba government organisation, has been marked by the emergence of such inter and extra departmental groups as Planning and Priorities Committee of Cabinet, Management Advisory Services, etc. Perhaps the most dramatic indication of a growing dynamism in the government organisation,

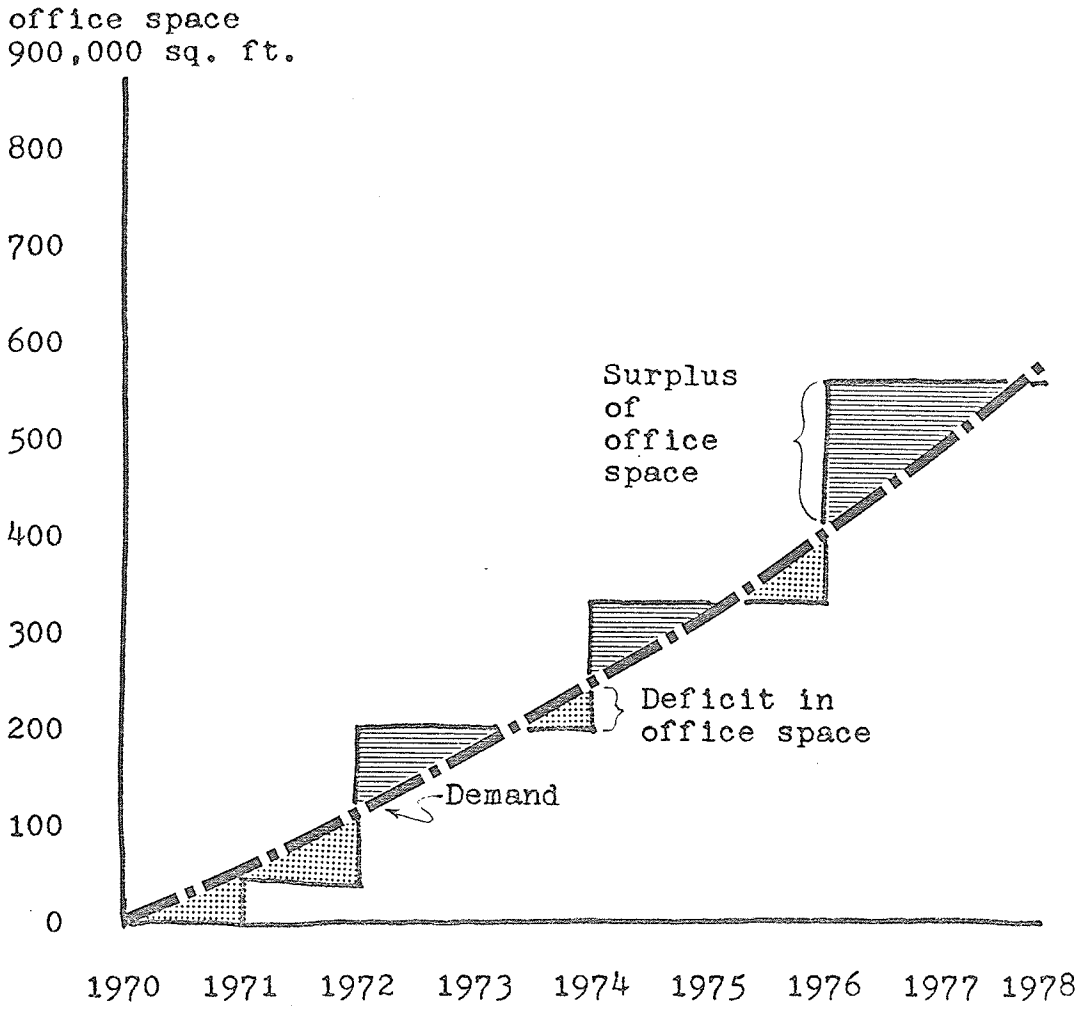


FIGURE 9.1 NOTIONAL OFFICE DEMAND TO PROPOSED SUPPLY (from Manitoba Government's "Master Plan for Government Facilities")

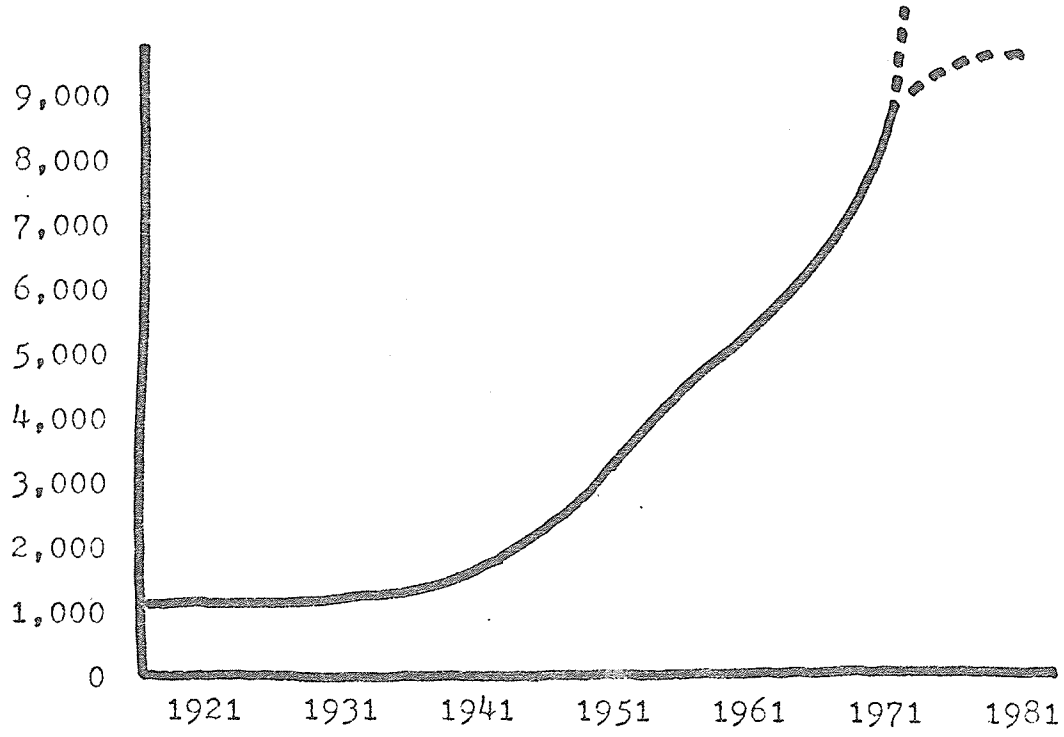


FIGURE 9.2 GROWTH OF THE CIVIL SERVICE OF THE PROVINCE OF MANITOBA,(1921 to 1981)

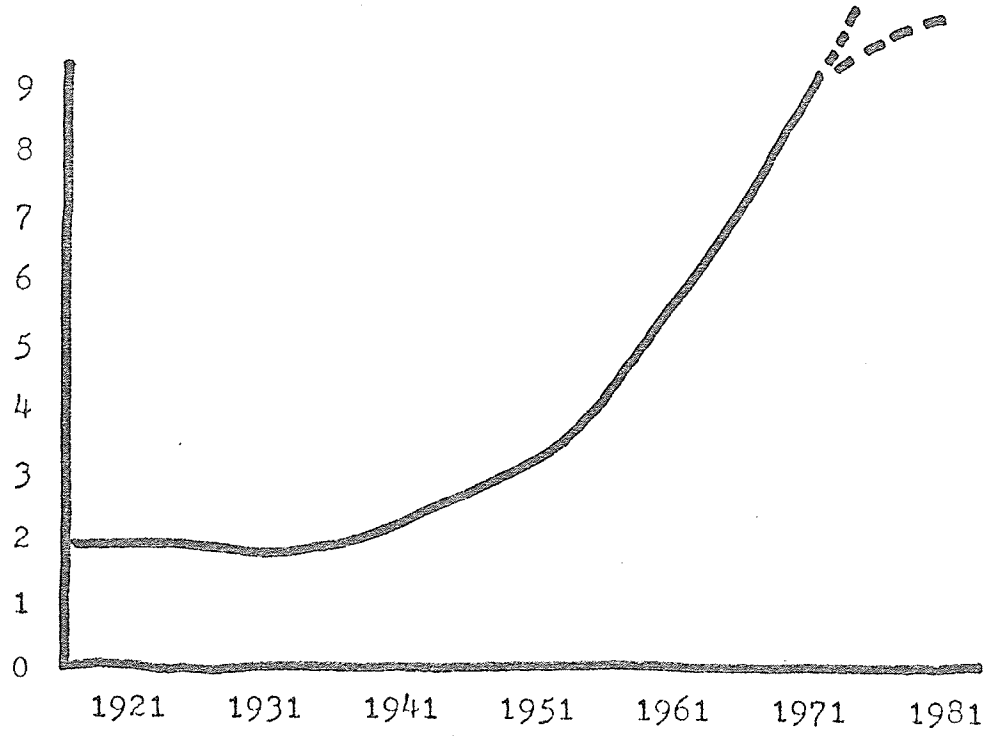


FIGURE 9.3 NUMBER OF PROVINCIAL CIVIL SERVANTS PER 1000 HEAD OF POPULATION IN MANITOBA

ANALYSIS OF SPACE NEED

1971 - 72	Immediate requirement (rented and renovated to overcome the space crisis)	60,500 net sq.ft.
1972 - 73	Notional 2 year need (to reduce saturation and terminate leases - first phase of Master Plan)	117,200 net sq.ft.
1973 - 74	Notional 3 year need (to terminate leases, construction of the New Magistrates' Courts Building and to cater to notional increase - second and third phase of Master Plan)	181,000 net sq.ft.
1975 - 76	Notional 5 year need* (fourth phase of Master Plan to satisfy notional increase)	324,000 net sq.ft.
	Notional 10 year need* (long range planning to probable completion of Master Plan)	883,000 net sq.ft.

FIGURE 9.4

* - - Based on projections established from the growth in numbers between June 1969 and June 1970, of Provincial Civil Servants as stated in "Provincial Government Employment" - Quarterly Catalogue No. 72-007, issued by the Dominion Bureau of Statistics Public Finance and Transportation Division.

Developmental Planning

The combination of uncertainty about the impact of future government policy upon public works planning, plus the difficulty of ascertaining the nature of possible future needs of the government organisation, makes an indeterminate developmental planning strategy appropriate.

Policy, in this context, is defined as the political input to government decision-making. It is the responsibility of the elected representatives of the people to formulate policy in a democratic state. Policy regarding the planning and design of government buildings is the responsibility of the Minister of Public Works. Theoretically, this policy will reflect the wishes of the general public, rather than the wishes and self-interests of the civil service or the party in power. The political climate of Manitoba as has been demonstrated by the past, can be highly fluid. Therefore, much of the policy of the government must also be regarded as fluid.

Some of the more obvious policy questions, which might occur in the planning of government buildings, are:

1. Is it more advantageous politically to lease as much space as possible, or is it more desirable to own as much space as possible?

2. Should individual departments be consolidated into their own buildings?

3. Should the governments internal services, such

as library, laboratory, computer, reproduction and art services be centralized?

4. Should the government preserve historic government buildings?

5. Should government buildings be located as an impetus for the general revitalization of a particular area?

6. Should public works be used as a source of employment during slumps in employment?

7. How much parking should be provided for government buildings, and for whom?

Present Department of Public Works policy seems to favour:

- government ownership of space
- consolidation of most departments in their own buildings
- centralization of internal services
- preservation of selected historic buildings
- the use of open area or "Burolandschaft" space planning
- the use of public works as winter employment.

It also appears that present government policy favours the purchase of "bargain" priced buildings from other levels of government. These buildings, for a variety of reasons, have become functionally obsolete to their previous owners. In most cases, expensive renovations have been required to convert these buildings to provincial government use.

An outstanding example of this process of "metamorphosis" of a building is the former Winnipeg Auditorium, which is now well on its way to becoming a library and archives building. Other examples of this process are; the Taylor Building which was converted from a bowling alley to government offices, the Robert Fletcher Building which was once an automobile factory and is now a government office building, and the Fort Osborne Barracks in Tuxedo, which was converted from an army base to a government offices complex. As the acquision of these buildings is unpredictable, sufficient flexibility to accommodate these occurrences should be built-into any developmental planning strategy considered.

A recommended approach to the present developmental planning problem, with regard to policy, would be to plan the provision of space according to present policy, and then to test the solution for compatibility with possible future policy. The resulting developmental plan would be short term (5 years). However, any construction which results from the plan would be inherently long term (30 to 100 years). Thus, buildings which are built now, will act as constraints to future developmental planners. This responsibility must be taken into consideration during the initial planning of the Legal Offices Building.

Initial and On-going Planning

The Legal Offices Building will be subject to pressures to grow and change during its lifetime. This pressure will come from both the advances of technology and changes in the government organisation itself.

Growth in user needs has, in the past, been handled either by the relocation of part or all of the expanding group. Rarely has the original space, occupied by a group, been able to be expanded to meet growth in space needs. This has been largely due to the fact that Manitoba government buildings have, up until now, been designed as closed forms. Growth, within a closed form building, is limited to the saturation of the existing potential of existing space. Growth, beyond this saturation point, requires that the territory of an other group within the building must be occupied by the expanding group. This process works well if there are groups within the building which are decreasing in size at the same rate as other groups are increasing. Unfortunately, this is rarely the case. Therefore, some groups must eventually move out of the building to free up enough space for other groups (see figure 9.5). Usually, the dislocated group must move into temporarily rented premises. As the number of groups which have been forced to relocate accumulates, eventually a point is reached when the construction of a new building can be justified.

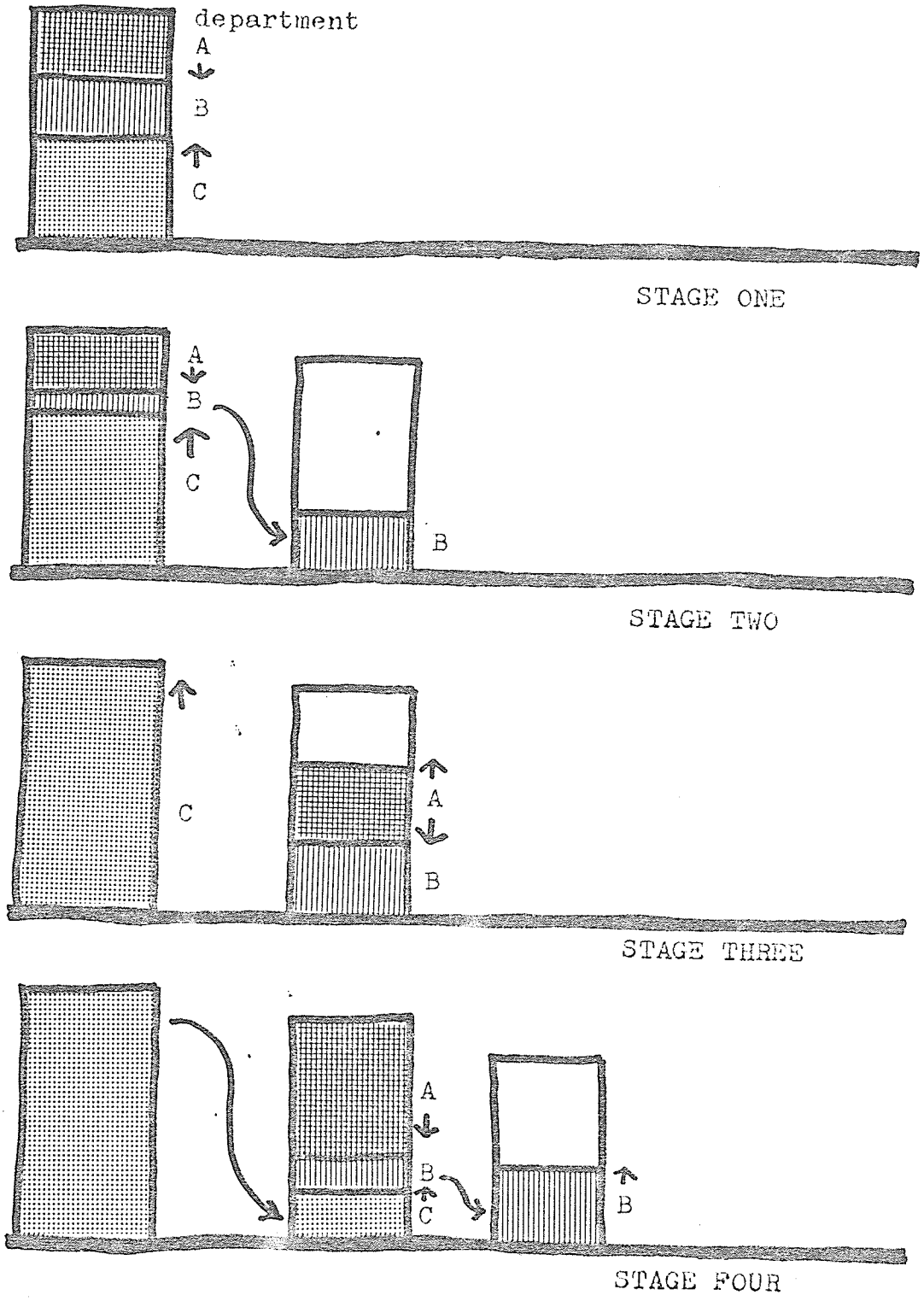


FIGURE 9.5 VERTICAL GROWTH TACTIC

This process would be satisfactory, if the consolidation of government departments was not an objective of public works planners. As present policy does favour departmental consolidation, the fragmentation of departments by dispersing them into rented premises, should be considered to be undesirable. In the future, policy regarding departmental consolidation may change. If, for example, a large surplus in privately owned office space were to develop, it may become politically more desirable to rent space from the public sector, than to own space. In the meantime, tactics for maintaining as much departmental consolidation as possible, should be explored.

One tactic for maintaining departmental consolidation, would be to place a department into a building which is larger than it presently requires. Then, as the department grows, it merely expands into the space which has been provided in the initial planning of the building. Unfortunately, public opinion would probably not permit government buildings to stand partially unoccupied. Therefore, the excess space must be utilized during the time it is not required by the department. Generally, smaller, extra-departmental groups, which are more temporary in nature than departments, should be delegated to these spaces. Unfortunately, the number of these temporary groups within the government is presently far less than would be required to fill in excess spaces in

government buildings. As a result, smaller departments would be delegated to these spaces. This, in effect, makes the smaller groups within the government "second class citizens", as they must relocate their operations once another department requires room to expand. Often, the smaller department will be greatly inconvenienced by this process.

On the other hand, if each group within a government building could be given room for expansion, without interference between groups, then departmental consolidation could be maintained. This would require the possibility of horizontal expansion of buildings. Actual growth of a department's space would rarely be purely horizontal, however. As departments expand in different ways and at varying rates, some vertical expansion will also occur. For example, if department "A" grows at a rate which is double the growth rate of department "B", it will require twice as much space, or it will require additional space in half the time of department "B". As we are dealing with a multi-storey building in this instance, the addition of space must occur all at one time. This is due to the limitations of present construction techniques in Manitoba. In order to compensate for the differential growth rates of departments within the proposed building, some vertical as well as horizontal growth will be required in the future. Another cause for the vertical expansion of

a group's operation may be related to a change in the environmental needs of the group (see figure 9.6). For example, a group which has a great deal of contact with the public may be best located near the sidewalk level. However, if the need for direct contact with the public were to significantly lessen in the future, then it might become more desirable for that group to relocate its operation, perhaps higher up in the building. Similarily, a group which requires a large storage area to be in its area, and has few staff, may initially be housed in space which is below grade level. Then, once all its storage requirement has been transfered to a computer, for example, all justification for remaining in an area below grade may be gone. To accommodate these changes, growth must be possible both in a vertical and horizontal direction.

Horizontal growth, in a contiguous fashion, can occur, either by the extension of the existing building, or by linkage to an adjacent building (see figure 9.7). The extension of a building is presently a less attractive alternative than linkage. Extension requires that a large portion of the existing building must be dismantled in the future. This can be disruptive to the operation of the building during the construction period. Also, as present forms of temporary walls are less desirable than permanent walls of standard construction, the area of vertical surface, to be removed to allow extension to occur, should

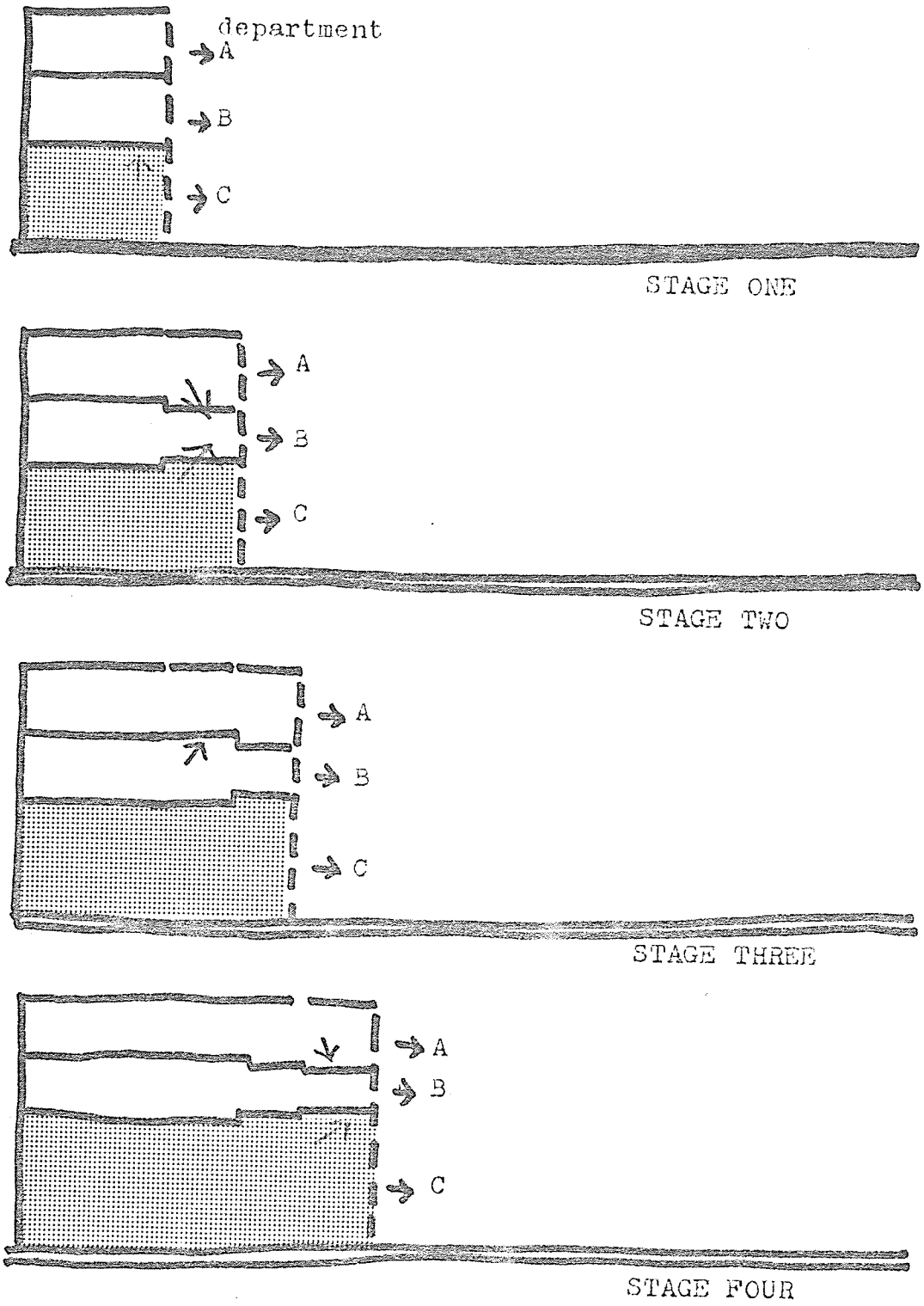
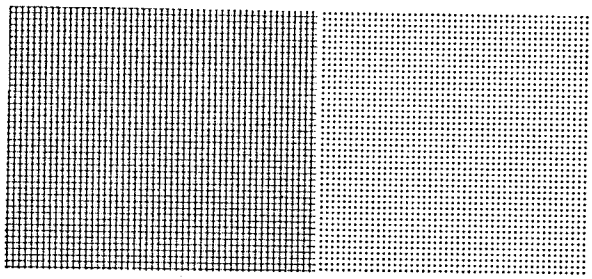
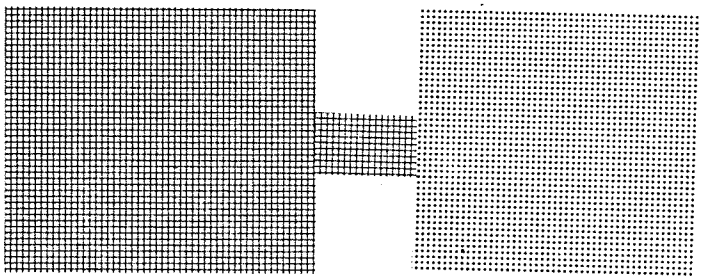


FIGURE 9.6 HORIZONTAL GROWTH TACTIC



1. BY EXTENSION



2. BY LINKAGE

FIGURE 9.7 GROWTH OF BUILDINGS

be kept to a minimum. Linkage, on the other hand, requires that a potential for connecting to an existing building occurs only at strategic points. Usually, these points are at the end of a major circulation route. The building becomes open-ended at these points. The particular nature of this open-endedness is determined by the site limitations and design of the building itself.

A general disadvantage of a horizontal-vertical growth tactic is that urban sites rarely allow contiguous horizontal growth to proceed beyond a few hundred feet. However, in the Broadway-Kennedy Government Precinct, there is enough contiguous land available now, to permit a horizontal growth of government buildings for the future (see figure 9.8).

As well as open-endedness, the initial planning of the first phase (the Legal Offices Building), in a horizontal-vertical growth development, should also emphasise the following characteristics:

- it should be updateable
- it should minimize the predetermination of the future development
- it should be functionally autonomous in itself.

The nature of the design manifestations of each of the above characteristics is dependent upon the constraints which are present.

In summary, the following strategy is recommended