BUILT CONTINUITIES
A Study of the Use of Variable Access Systems for Architectural Design

by
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Built Continuities
A Study of the Use of Variable Access Systems in Architectural Design

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ABSTRACT

The purpose of this thesis is to develop an alternate process of architectural design based on a variety of schemes which respond to different aspects of any given project and site. The major focus of each exploration is the influence of pedestrian access on the building form. After the investigations are compiled a final projection will be synthesized as an assemblage of the strengths of each exploration. This method should enable the project to contain more than a strong design decision.

Thesis Supervisor: Maurice K. Smith
Title: Professor of Architecture
Acknowledgements

to Maurice K. Smith

my friend without whose direction none of the consultant questions would have been in focus.

to Shun Kanda

for Sushi, Sake and the beginning of my design awareness.

to Bob Slattery

for friendly, therapeutic fishing trips.

to Don Mills

for the jokes (I was blamed for), the influence of clarity, and the comraderie.

to Dennis Carlberg

for asking "What do you want to do that for?", the, "built" peanut butter sandwiches, and a sense of light and all that entails.

to Grace Napier

though she never knew it, with the love, understanding and friendship she helped my through the worst times.

to my parents

Larry Furman for their patience, unquestioning Gloria support and invaluable guidance through the longest process.
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Introduction
INTRODUCTION

Whether

- walking down a busy street
- hiking in the woods
- navigating a raging river
- trout fishing in a stream

the perception of our environment depends on our

- location
- sense of smell
taste
touch
hearing
sight

- movement through that particular region

In fact, much of our time is spent moving

- from place to place
- past territories
- through experiences

That may or may not be perceived.
Because of this our view and understanding of the environment is determined by knowing how to get somewhere—where a particular place is in relation to another.

From Webster's Unabridged Dictionary

access - (ək sēs) 1. permission, liberty or ability to enter, approach, communicate with or to pass to and from.
2. freedom or ability to obtain or make use of.

This demonstration reaffirms the suspicions that much of the user's time is occupied with the question, "how can I get to...?": enter
All of the issues of building organization are loaded into the word access.

Issues of
public light screen
private shadow wall
form depend on the location of the public realm; not simple adjacencies. For the most public place in many buildings is the access.
Assumption - the experience of movement - is a strong influence on our perception of the environment - should be a powerful means of designing the built world.

Method - (given a particular site and program) is to explore different projections advocating a responses specific aspect of the criterion project. The final response is an assemblage of all.

Site - Harvard Sq. Cambridge, Mass. is bordered by Mt. Auburn St. Holyoke Place Winthrop St. Boylston St. dense urban fabric strong pedestrian force variety of users.
Program - retail/commercial
   leasible office space
Harvard University office space
Harvard Student Housing and support facilities.
When dealing with a multi-faceted program or a complex site, one can employ one of four methods of design:

1) **juxtaposition** or "fit the pieces" one works with all facets of the design until everything fits.

2) **juggling** keep every aspect up in the air until the optimal situation is found. One change can effect every decision.
3) selection

simply deal with a select number of influences and the others are either subservient to those or not addressed at all.

4) variable advocacies

work out three or more schemes reinforcing a different aspect each time to ascertain the use and position of each in the final projection.
In Harvard Square the different pedestrian forces can support distinct parts of the program.

1) movement in the
Mt. Auburn St.
direction (A)

- promotes retail/commercial
development at
ground
-reinforces the
long dimension of
the site
-provides more
public contact
with the site.

2) movement perpendicular
to Mt. Auburn St. (B)

-Harvard students'
path to/from
class
-promotes student
related
facilities
-allows less
public contact
with site.
3) perimeter access (C) 

- no site penetration of access
- public zone is always at street
- similar, in theory, to most block developments in the area

In addition each advocacy would require a slightly different method of designing. This attitude is expounded further along in this paper (see dimensional diagrams), however, initially it is crucial to exaggerate the differences among the three explorations in order to see each advocated aspect in its own light.
General List of Illustrations

include:

1) simple access diagrams
   (already shown)

2) diagrams of site organizations

3) dimensional analyses of diagrams

4) design of building assemblage systems vocabularies

5) dimensional analyses of building systems

to illustrate:

-the underlying principle or generating force of the particular exploration.

-annotated systems used to build the diagram and the relationships among the various constituents

-the dimensional correspondence at the site size, between the design and the context, and within the design

-the working method of each exploration

-the differences in the physical definition of each projection.

-dimensional consistency within each system

-relationships to other building methods.
The Explorations

- projection $A$
- variable $\frac{\text{access}}{\text{use}}$
- projection $B$
- the courtyard system
- projection $C$
Site Diagram A

this shows the relationship among
- the square system
- the frame system
- the access system

In general, the squares are present at the exchange between the use territory and the access zone.

There are places where there is access without the presence of the squares...

...and conversely there is a region where the squares build the use territory.
Dimensional Diagram of Organization A

Certain dimensions are used consistently to give a larger order to the three systems working together in this projection.

The longest straight dimension of access possible before entering a territory. Based on the length of the neighboring Lutheran Church.

Length and/or depth of the two building systems together based on the depth of some of the buildings on the site.

Depth of the built territory belonging to one system only. Also based on dimensions of buildings on the site.
The smallest building size dimension in the context used, primarily, as the usual displacement from the public access into a built territory.

The addition of the squares and the frame is assembled throughout the site as a surrogate street edge to bring the "street public" into the building.
This system is designed to be open and frame-like because the tenants of a retail building may change frequently.

Therefore, it is flexible—to accommodate frequent changes not neutral—so the system can live with the secondary and tertiary inhabitations.
The preceding drawings show possible variations of enclosure. The building system...

...when added to the propped slab system makes deep zone of exchange between the use territory and the access.

This allows

- street edge inhabitations A & B
- open frame
- permits change within the defined territory
- the enclosure to define territory outside of the frame system
- some of the public access to move easily into the zone of the frame system.
The illustration of Butler Square shows the static relationship between an existing building system and the office enclosures. This is a one to one relationship between primary system and enclosure.

The street, where there is a lot of public life, is no place for such predetermined hierarchies. If that sort of design were to be insisted upon at the public interface, the result would be minimal relationship between the semi-public inside and outside public.
The usual relationship in these cases is visual connection through a planar, tempered glass storefront and maybe a depressed entrance. This system is against that kind of apathetic response. If the building is to be part of the street it should take part in the street activity.
SITE DIAGRAM B

In this scheme access
-is perpendicular to
Mt. Auburn Street
-accommodates the Harvard
student flow to and from
class
-promotes student-related
uses

The student-related use
referred to is a development
of student housing and some
support facilities.

The housing will be
-"object-like" (in form)
-similar to neighboring
private clubs
-very "wall-like" and solid
In this diagram the housing cores are shown as 50' X 50' squares. The "field" of support facilities in which the objects live is less complete but more "wall-like" than Scheme A.

-the "field"

-helps to reinforce the strength of the Mt. Auburn Street direction.
-channels the movement into the site at specific points
-provides some protection from the street to the inner most zone of the site.
The general site organization -reinforces the understanding of the interior private zone

-is a courtyard system

-by making a plaza or stopping place claimed by the buildings

-which clues movement from the lighted street to a lighted courtyard through a dark region

a larger courtyard may have several smaller defined courtyards inside it.
Dimensional Diagram of Organization B

-the dimensions of a block which has been displaced in this projection. It is the distance between the two entries to the site.

-appears here as the longest distance from the site entry to a building entry. This is taken from the Holyoke Center where the dimension is from the street to the building entry.

-taken from the small buildings in the context this becomes the dimension of the housing core as well as some "designed" open space

-taken from the context this is the smallest significant dimension at the "site" size (smaller dimensions depend upon the building system for their existence)
in addition the site is comprised of five zones

1) Mt. Auburn St. -Cambridge public edge
2) Winthrop St. -Harvard public edge
3) Interior private -private open space landscape
4) Margin between Winthrop and Interior -most building entries are in these zones
5) Margin between Mt. Auburn and Interior

changes in paving as well as light can clue the different degrees of privacy
The housing has a less variable design than Scheme A because of the more private and less changeable nature of the use.

-Reference to existing morphology

While not direct copies of any particular building, they do share some material and dimensional relationships.

This plan shows:
- System of building
- Deployment of housing
- Building of access through the site.

Therefore, an exhibition of all of the factors which work together to acknowledge the different zones in the site.
The Courtyard System

The courtyard system is a spatial structure that allows larger open plazas to have separation and privacy from other places. The process of moving from a lighted area through a darker passage back into the light brings one through various degrees of privacy. This enables one to design a collective place that is away from the street and
define it as such. One example of this is Ciudad Knossos in Santiago, Chile. The plan shown here (drawn by Fernando Domeyko as part of his compiled research of Santiago, Chile) illustrates this principle at work. The collective plazas are public places off of which every house has an entry. They are linked by dark "streets" which serve as connections to the main street but also define the plazas as discrete territories. There is one difference between this system and the system used in Scheme B. Here the street is private and all entries are on the plaza. In Scheme B all entries are in the dark street. That leaves more territory in the plaza for use.
The public access never permeates the site in this exploration. Therefore, this exploration is concerned with:

- the building and modulation of the street zone
- relationship between the built street zone and the surrounding context
- the understanding of the street zone as building

-building the street zone is a major step in realizing the space around a building is as important as the building itself.
The elements used in this scheme are:

- the propped up slab system
- frame system
- wall system
- continuous surface system

as well as:

- trees
- and
- paving

The trees and paving are the only building elements that can be controlled outside of the immediate site. They extend the zone of the site and support relationships present in the context.

Some surfaces may be paved, while others may support weight in other ways. (For example: the canals of Venice.)
Dimensional Diagram of Organization C

This diagram shows the dimensional relationships between the building and context. The effort to support them reinforces a common large building dimension in this context.

The largest building size reinforced by trees and paving to show from where it originates.

The next largest building size used to illustrate the relationship between the Lutheran Church and the site.

The small building size used as the largest wall dimension.

The small building size used to dimension the open public plazas and access zones.
DIMENSIONAL DIAGRAM OF ORGANIZATION C
Building System Plan C

These systems -are similar to those used in Scheme A. -contain wall-like characteristics to prevent penetration through the site. -when added together allow for a street zone that is more than 40' deep.

This drawing also explores some of the various ways territorial entries can be designed (i.e. with level material change direction defined)
The Working Method

- dimensional analysis of building systems
- information about the working process
- on dimensional diagrams and other systems
- on generating vocabulary
- on the "built" access
these drawings show

- the dimensional system being used
- correspondences with the other explorations
- more information about the working process.

4'
- smallest dimension
- private entry
- light from above

8'
- private access width
- threshold between two territories
- space between two systems
12' - standard room size
16' - public access width
standard dimension of most elements in the building system.

20' - usual bay size (frame system)

24' - small access related territories

32' - the largest open public plaza territories

40' - clear height in public access territories

48' - deepest dimension of use territories before more top/sky light is admitted.
Information about the Working Process

There are three distinctions among the dimensional correspondences:

- leading decision
- following decision
- gift

- initial systematic moves
- next layer of adjustment
- dimensions already present in the context
- a result of specific deployment of systems but not previously considered.

This shows the dimensional relationships between the built piece and the space it defines.
For Example

Scheme B
- leading decisions
  - size of territory at streets and plaza
  - space between housing units
  - design of housing units

- following decisions
  - dimensions of territories between
  - threshold dimension
  - connection of plazas
  - areas surrounding plazas.

- gifts
  - due to compulsive systematic dimensioning of the pieces and deployment in a systematic manner...
  - ...there are more common dimensions created than actively designed.
On Dimensional Diagrams and Other Systems

The dimensional system is an understanding of the use of dimensions within a given territory. It is not a grid or insistent imposition on the site. These dimensional diagrams are simply a "check" and illustration of this understanding. In addition, the system should be developed to accept the presence of something very different from itself and should be relatively "self-stable" at a small size so that pieces of the system can be assembled in different ways.

This is so that one system does not necessarily control the whole site.
On Generating Vocabulary

-For the purposes of compatability.
and
-Knowing the final projection is an assemblage of many different systems

The vocabulary of each system come from a root similar background.

The dimensional qualities of each system are similar to each other so they can be exchanged at will do not have to be located on the site as the projections suggest.

In this way the synthesis will be an easier process of arrangement.
The vocabulary is derived from a simple frame piece A which when fattened B becomes a wall piece. The assemblage then can be reversed to get C which has much more screen and claims the same amount of territory as B. If the stem is removed from B the shallow "U" results D which can be altered in dimensions F or used as fireplaces E. The wall piece B may also be lengthened into a "T" G and that may be assembled with two pieces H. Along with the frame pieces come pieces K and L which are derived in dimension from A but can be used individually.
On the "Built" Access

There are three major ways of building the access:

1) building it directly - that is, whatever structural or spatial system being used defines only the access zone.

2) build it with the territories on either side - the access zone is defined as the slack region in between two or more built territories.

3) build it optionally - that is, the access zone is built directly within the neighboring territories and allows for the use to claim some space.
access definition

1) build it directly

movement is controlled by the building system.

(main house)

to community.

David D. Martin House, Buffalo, N.Y.
Frank Lloyd Wright, Arch.

2) use space between built territories

movement is in "slack" zone.

(primary school, Darmstadt, Germany)

Hans Poelzig, Arch.

3) adjacent built territories also build access zone definition is optimal (use or access)

"doga"

La Alberca, Spain

the access here is defined as the slack between the cylindrical rooms.
The first two methods are used where the access remains relatively separate from the territories on either side and essentially acts as service. The third method is most useful when there is desired contact and exchange between the access and the use.
in these cases the access is defined by columns or walls directly.
An Informed Beginning

- assimilation
- on "joining" systems
- what is not here...
- conclusions
Assimilation

The second part in this process has two facets

1) editing

- the ability to evaluate
criticize
each project in terms of
strengths
their weaknesses.

- the usage of the strong
characteristics of each
design in conjunction with
one another.

2) assemblage

This is not a collision or
super-imposition of the
various design projections.
"Assemblage" means the
joining, arranging or adding
pieces
Each
of different systems.
projection is made of a
distinct system or set of
pieces that can continue or
not. Therefore, in whole or
part, the system can be used
independent of other
influences.
Schematic Zoning Diagram

This diagram shows a possible assemblage of the three schemes.

Scheme A) the strength of this scheme was its location nearest the Cambridge public Boylston Street edges, but as it neared Mt. Auburn Street the Harvard student housing on Mt. Auburn the transition to that use and relationship to that section of Mt. Auburn Street became ambiguous.

Scheme B) the strength of this scheme was in its location near the other forms of student housing and activity. Therefore, the Winthrop Street edge of the site was most suitable. However, as it neared the most public edges its relationship with the street seemed brutal. The only housing core that does make it to Mt. Auburn does not enter directly off the street.
Scheme C) The kind of intensity of street zone design used in this scheme is most appropriate for the retail/commercial zone of this project. Therefore, the most definition is on Mt. Auburn in relation to the "Cambridge public" movement.
Site Diagram of Final Projection

These diagrams illustrate the schematic zoning diagram. The same symbols are used here as in the previous three schemes and can be traced back to these projections.

And Dimensional Diagram of Final Projection

The dimensional diagram not only reiterates the previous three schemes it also shows the dimensional consistencies among them.

Plans

Building System Diagrams Section

Elevation

These diagrams show, in more detail, the joining of the three schemes. The first three levels of the sections and elevations is the only zone that has been worked out by this method.
On "Joining" Systems

There are three methods of joining systems:

1) direct contact - that is, where there is no space between systems, one simply becomes the second either through juxtaposition or dimensional compatibility.

2) direct transformation - where a separate third system is designed (with attributes of the others) to intermediate between the two systems.

3) spatial assemblage - where the two systems do not come in direct contact with one another. Instead there is some space between that is claimed by both systems.
The method of conjugation used most frequently in this projection is that of direct contact. The systems (as stated earlier) are compatible because they share the same roots. In addition, the resulting projection could be quite different if it only relied on the influence of the building system and not the context or use.
What Is Not Here

The result of this investigation is information about the public access zone in a project. What it is not is a building. While the issue of movement through a building drives many other aspects of the design, in general it only touches upon them in a tangential way. There are many more issues which should be advocated in the building design so they may be seen in their own light as well.

1) landscape -both interior and exterior. To be developed as if it were the most important issue in the site development.

2) vertical access -as a possible formal result to the higher density of the development. Some aspects of this could be used in the final building.

3) alternate access systems -how adaptable is the building to the reception of horizontal access at a raised level? How will it change the building?
Conclusion

This thesis has been an illustration of a working method. No buildings have been designed, although any scheme could be taken to completion. What's more, the true value of this exploration lies in the development of an attitude toward working with facts

various constraints.

Implicit in this process is the analysis and evaluation of the context site.

Initially, the game was to pick one aspect of the project and push that as far as one could.

-to find its strengths and weaknesses

Then, three such investigations were added together.

-Coincidentally, each one was strong where the others were less so.

However, a major benefit of this exploration method was to develop dissimilar systems; each one intensifying the characteristics of the other.
Therefore, one would work at more than one or two aspects of the design at a time. 

- Light could not be seen without shadow
- Public open space would not read without closed, contained privacies.

In this project the programmatic difference between the needs of retail development and those of housing promoted a major difference within the design:

- The development of a flexible building system that did allow some options but not all possibilities
- The development of privacies that had some aspects of the other systems but were extremely closed and contained few options.

This difference begins to promote a clear understanding of whether one is in a public or private territory.
-the point is all of these places

distinct forms should have uses
different characteristics
so they can be understood as different.

-to be sure

-it is not clear how accurate a sense of the environment the average consumer has
-one does not know how much form information needs to be present to advise the user on what to do, where to go, etc.
The question remains, "can there be too much?"

If, for instance, there was no signage in public buildings.................

...how much of the organization would be understandable to the user?

-This paper is not against signs.

-It is for a clearer understanding of the built environment.

Perhaps one that is designed with a more optional method.

(How it would be understandable leads back to the issue of access.)
### List of Illustrations

(all photographs are by the author unless otherwise noted)

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Ciudad Knossos, Santiago, Chile, drawing by Fernando Domeyko from his analysis of Santiago, Chile.


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Plan of Primary School, Darmstadt, Germany, Hans Scharoun, architect, from *Scharoun - A Monograph*, p. 15.

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B  La Alberca, Spain, from Global Architecture, Villages and Towns, # 1, Iberian Towns, p. 86.

89 A  Plan of Darwin D. Martin House, Buffalo, New York, Frank Lloyd Wright, architect, from In the Nature of Materials, # 100.
B  Perugia, Italy, from Streets for People, p. 193.

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111  Drawing of Price Tower, Bartlesville, Oklahoma, from Frank Lloyd Wright Three Quarters of a Century of Drawings, # 209.

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