A Study of the Urban Fabric:

The Formulation of a Design Tool
AN UNDERGRADUATE THESIS

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Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution.

Albert Einstein
On Science
This document is the result of a search. A search that went beyond the boundaries and limitations of a study of a specific building type. The study explored the organizational principles and interrelationships between urban planning, environmental forces and architectural design.

The goal of this study was not to rebuild trends or fashions of design, or to follow an established philosophy - rather it generated from a desire to express a personal design approach. Therefore, this investigation into a deeper understanding of architectural principles cannot be evaluated as a product but must be viewed as a process; a process that has evolved through a creative approach to the development of a timeless vocabulary.

The purpose of this investigation has been to create a design tool. A tool that designers can adapt for use in their individual approaches to develop an understanding of the interrelated universal principles at all scales that can be used to shape and manipulate our environments. These underlying principles must be comprehended in order to initiate a creative response - not transposed as a meaningless imitation. The process of this study has not been structured as a means to an end, but as a path to a new beginning.
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Introduction
INTRODUCTION

The basis of a thesis is an idea that has been derived through the realization of a truth, a truth that represents a fact or a problem through new levels of insight.

As an expression of a creative idea, this investigation steps beyond the limitations of the rational and stimulates a new level of response. The underlying ideas developed from this type of an approach are not dependent upon details, gadgets or cliches; for real ideas cultivate new thought processes by being original - not transposed copies.

This study attempts to discover and clarify the interrelationships between the natural and manmade orders. As a source of inspiration, the interrelationships related to the natural and manmade orders provide the rationale for asserting principal issues. In turn, these principles are utilized as tools to generate and express a truth - a creative idea.
THESIS OVERVIEW

Comprehensive View

In order to qualify the utility of this investigation a developmental narrative is appropriate. Therefore, this segment is dedicated to explaining the conceptual development of the thesis.

Working on various Urban Design Projects and Charrettes has aided me in recognizing the vital importance of repairing, reusing, and revitalizing the urban fabric. The urban fabric relates to the components that give organization and structure to our environments. Just like a piece of cloth, our urban surroundings consist of a variety of individual parts or overlays. When isolated in their pure state these overlays provide the opportunity to identify issues and define organizational principles. When these "parts" are interrelated and interdependent they become mutually reinforcing to form an integrated "whole".

As architectural design emphasizes the "individual" structure, urban planning addresses the larger issues that effect and manipulate the "whole". These divergent design approaches at both the urban scale and the building scale qualify the search for universally interrelated principles.

Problem Statement

The problem in Valparaiso is typical of many American urban areas. Cities are being separated by two opposing energies resulting in inaction, stalemate, and a void in the Urban Structure. One force is the central business district which includes the municipal facilities and commercial services. The other force is the outer ring of the city or expansion belt, which incorporates shopping malls, commercial development and new residential neighborhoods. The inner city force focuses its development on the CBD. While on the other hand, the expansion belt is pulling the city fabric farther away from its nucleus. The redevelopment in the vacant area is a critical linking component between the two forces.
Thesis Statement

Changes in the urban development process in America are leaving urban land parcels that are void of clearly defined community and environmental roles. If, however, development process and scenarios were made that included identifying appropriate new roles for such parcels this would be critical to the success of revitalization of the urban place and the urban cohesiveness. It is contended that this would include both planning scenarios and processes to stimulate broader opinions and policies in order to unify opposing attitudes and to motivate more dynamic planning development.

Urban Cohesiveness

American cities are a composite of the manmade and natural orders. An urban structure is a composite of all the seen and unseen forces. When components of the whole are not compatible the entire system loses and this results in the fragmentation of the urban fabric. In my thesis, "urban cohesiveness" relates to the role of identify to be assumed by the development and its immediate contextual relationship with the larger existing urban fabric.
THESIS OVERVIEW

Structure of Investigation
The structure of this investigation began as an exploration into the urban fabric and led to the creation of an inventory of issues applicable as a timelessness vocabulary.

Issues are universal. They contribute to the formulation of an inventory and when utilized as an assessment tool can be applied within the parameters of a specific problem. Issues, as tools, can be used to facilitate the problem solving process by developing a higher level of perception, definition and articulation of the existing set of conditions.

It is important to realize that this list of issues, a type of checklist, is adaptable. By adding new concerns or eliminating issues that are not within the parameters of a specific problem, one can apply this tool to any situation.

Utilization of this type of "check list" involves an understanding and translation of the design implications derived. These models/issues identify principles of organization and in turn are used to generate design concepts.

Inventory of Thesis Issues
The investigation interrelates issues at a range of scales - urban context, site plan, building space. These issues are universal as an inventory and circumstantial as an assessment. Note: Inventory of issues and information gathered in this study has been catalogued in the Appendix.

Circumstantial Issues Related to Case Study
Circumstantial Issues refer to the special needs or qualities that are unique to the case study, site and context.

The Case Study
The Case Study is a specific implementation of the assessments, correlated through an understanding of the principles and interrelations between the urban context - site - building/spatial scales addressing a particular problem.
THESIS OVERVIEW

Thesis Vocabulary Definitions

Ordering Principles - organizational principles used to create order

Axis - linear in character, qualities of length and direction - line between two terminating points

Hierarchy - size, shape, placement of a form or space articulates its importance

Rhythm/Repetition - movement of regular recurrence of elements

Datum - A reference line, plane, volume that serves to organize a pattern of forms and spaces

Transformation - strengthen original concept or organization through a series of manipulations
Enclosure

Overhead - this zone forms the space. Enclosure is implied by a roof plane

Ground Plane - this zone implies the space. Manipulation of the base reinforces enclosure

Surround - this zone contains the space. Enclosure is enhanced by walls or planes

Spatial Patterns

Movement - participants move between points. Linear in character

Association - casual gathering and interaction spaces

Assembly - formal gathering and interaction spaces
Qualification of Thesis
QUALIFICATION OF THESIS AS AN INVESTIGATION INTO ORGANIZATIONAL PRINCIPLES

When addressing the concept of urban fabric and urban cohesiveness it becomes valid to qualify this study in terms of historical development.

Such organization has been developing throughout mankind's history. The organization of primitive villages, historical medieval and colonial towns, and even contemporary urban areas, have a connection with timeless ordering principles. However, the emphasis of those principles has changed due to the advancement in the fields of technology and communication.

The typical organizational response at earlier times incorporated the respect, and utilization of the natural forces - sun, wind, water and natural features - landforms, waterbodies, vegetation, etc. At that time the technology was not available to enable man to dominate the natural order, so design decisions became adaptive responses to environmental factors, along with cultural and traditional beliefs.
A turning point in the concepts of spatial organization occurred during the Renaissance period when designers began utilizing geometric arrangements to control and manipulate the existing natural order. This idea of overlaying geometric patterns led designers to respond to a new set of organizational criteria. Patterns of geometry became the generator of concepts. The creative idea was not a response to the language of the natural order.

As man's technology progressed the need to achieve a universal organizer enhanced the use of geometric patterns. It is among these issues that this thesis searches for the mislaid interrelationships between the natural order, the urban fabric and architecture. As a learning tool, the urban fabric qualifies the relationships between man's created environment and the natural order. The urban environment is a response developed through time by a process of trial and error. To simply copy past forms would not be justified, but to understand the principles or organization would enable their implementation even in today's world.
Thesis Issues
THESIS ISSUES

The investigation interrelates issues as a multi-range of scales - urban context, site, and building/spatial. The following is an inventory of issues. These issues are universal as an inventory and circumstantial as an assessment. Note: Inventory is catalogued in Appendix.

Thesis Inventory

Urban Scale
Urban Forces
Landuse
Urban Cohesiveness
Figure/Ground
Circulation Patterns
Intersections
Urban Image/Perception
Overhead
Ground Plain
Surround
Natural Features at City Scale
Landforms
Water Bodies
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Wind Paths
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Site Scale
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Soil Type/Characteristics
Topography

Building/Spacial Scale
Enclosure
Overhead
Ground Plane
Surround
Spatial Patterns
Movement
Association
Assembly
Organizing Principles
Axis
Hierarchy
Rhythm/Repetition
Datum
Transformation
Circumstantial Issues: Case Study
CIRCUMSTANTIAL ISSUES RELATED TO CASE STUDY

This segment concerns itself with the special issues at the circumstantial level. Issues that are relevant as needs or qualities which are unique to the case study--Valparaiso, Indiana.
LOCATION

Valparaiso is a small city (approximate population 25,000) located in Porter County which is situated in the northwestern corner of Indiana.

Located in the hub of the midwest's major transportation network, Valparaiso is unique in its access to a wide range of modern transportation systems, U.S. 30 and Indiana Routes 2, 49, 130 and 149. All serve the city with immediate access to interstate routes 80, 90, 94 and 65. Daily commuter service to downtown Chicago is available via Conrail or the South Shore.

The particular site being utilized as a tool for this investigation is the old Porter County Fairgrounds, located at the corner of Calumet Avenue and Evans Avenue in Valparaiso. Its location is important due to the fact it is adjacent to an axis of strip development and situated between two opposing urban forces.
HISTORICAL SIGNIFICANCE

The old Porter County Fairgrounds, until recently, has housed the community gathering of the annual County Fair. With the current development of a new fairgrounds outside Valparaiso, the vacant site now sets idle awaiting a new role within the community. The historic role, as a people gatherer, lends the site a particular character; a character that evokes the memories and traditions of the festive occasion.

The traditional purpose of the fair was to exhibit local produce, livestock, crafts, hobbies, etc. in a competitive atmosphere. To add to the diversity, commercial institutions and local businesses took advantage of the fair to promote their products and services. Combined with the local components was the traveling carnival. The carnival added the dimension of the unique and unusual that appealed to most everyone. In addition, grandstand shows, exhibits and auctions promoted mass gatherings at the fair. The underlying strength of the fair was that with such diversity of events it provided something for everyone.
ASSETS AND LIABILITIES

Assets
- Prominent and cohesive downtown business district
- Stable and progressive commercial developments
- Well maintained thoroughfares
- Access to Chicago (45 minutes)

Liabilities
- Fragmented and incohesive strip development (Calumet Avenue)
- Storm drainage problem
- Undefined community or environmental roles for vacant land parcels
- No social gatherers
- Above ground utilities
- Zoning controlled developments.
DETERMINATION OF CRITERIA FOR DESIGN PROJECT

- Fragmented fabric along Hwy. 49 (Calumet Avenue)
- Need for a new level of response at the planning stage
- Need for public and social activity; a place to go
- Reinstall any identify of place to a traditionally socially important site
- Site located along a spine of fragmented strip development
- Key location of site provides a unique opportunity to make a strong organizational statement
- Site program would create a wide range and variety of choices for daytime and nighttime activities
- Create an urban happening place
- To establish a community and environmental role to fill a void in the urban structure
PROGRAM AS A VEHICLE

Purpose
The program for this project was to develop a tool to communicate the new organizational principles for urban fabric. The program is utilized as a vehicle to enhance the comprehension of the underlying ordering principles and to illustrate their application.

Program Goals
- To introduce a place in which "social happenings" could occur within the urban context
- To produce the "social factor" in the promotion of the concept of urban cohesiveness
- To identify a potential role which this special land parcel could play in the community
- To address a social problem; the lack of a place for "social gathering" for all the people
- To establish a variety of spatial experiences on the site in question
- To provide adaptable areas to allow for functional changes over time

Program Basis
Location: Old Porter County Fairgrounds in Valparaiso, Indiana

Users: The program was developed and intended to be used by the citizens of Valparaiso and the surrounding communities

Developmental Intentions: The intention is that a development of a social/urban happening place would fill the current social need. The need for "something to do" for the entire community. Also, the promotion of local produce, crafts and exhibits is to be directed toward stimulating local pride
Proposed Development

- Existing structure - Farmer's Market
  Surrounding zone - flea market, special exhibits, tailgate market

- Development of a run-off retention pond and park area
  - fishing, swimming, skating, biking, jogging fitness trail, paddle boats, picnic areas

- Run-Off Tank
  - Sedimentation Tank
  - Invert pump station
  - Pond water circulator

- Retail Area
  - Permanent shops (Developmental Anchors)
    - Promote a stable economic environment

- Amphitheater - 1,500 seats
  - Social gatherer
    - Community theater and concert area

- Exhibit and Market Area
  - Adaptable space
    - Promotes changes in exhibits
  - Flexible market area

- Eating Place
  - Fine Dining - Provides a nice place for Valpo, Porter County and NW Indiana residents to use - in conjunction with an activity area

- Casual Dining - An anyone place to eat, dance, visit, entertain and celebrate (young couples and singles)

- Sandwich Shops
  - Deli-type
  - Semi fast
    - Cheap for the on the go person
  - Oriented for youngsters and adults of all ages
    - Outdoor spaces provided for seating space/also indoor areas

- Bars and Night Clubs - Single oriented create nice atmosphere for social activity
  - Dancing
    - Live entertainment

- Children's Museum & Theater
  - Cultural activity
    - Provides controlled educational activities for children
INTRODUCTION TO CASE STUDIES

A case study is the specific implementation of the assessments, correlated through an understanding of the principle and interrelations between the urban context, site and building/spatial scales addressing a particular problem.

The differing array of case studies were intended to qualify the thesis investigation, as well as to develop and stimulate new levels of inquiry.

Case Study I used the inventory of issues to illuminate principles and, in turn, the principles became the generators of the idea. No limitations inhibited the expression or development of the thesis idea.

In Case Study II, a new set of program requirements were introduced to qualify the adaptability of the established generating principles.

Case Study III was constructed to introduce new overlays as an example that the thesis investigation was not a means to an end, but a path to explore new avenues.

To form a consistent basis for this case study, a vocabulary of universal principles is used to evaluate each case study.

Scales of Inquiry
- Urban
- Site
- Building

Ordering Principles
- Axis
- Hierarchy
- Rhythm/Repetition
- Datum
- Transformation

Enclosure
- Overhead
- Ground Plane
- Surround

Spatial Patterns
- Movement
- Association
- Assembly
CASE STUDY I

This study implements, through a creative approach, assessments correlated through a translation of the interrelationships between the urban context, site and building/spatial scales. The particular problem addressed in this study involves the identification of a community and environmental role for the old Porter County Fairgrounds in Valparaiso, Indiana.
CASE STUDY I

ORDERING PRINCIPLES

Axis

Urban Scale

State Road 49 (Calumet Avenue) serves as a transitional path between the central business district and the area of new commercial development. As a major axial path, Calumet Avenue has the qualities of length, direction, and orientation that induce movement and views. By violating the established city grid pattern, the path becomes a line of reference and assumes the role of a spatial unifier at the urban scale.

The major axis is a combination of smaller axes that extend between intersection points. As a common and repetitive element these intersections become important points of reference and orientation.

The intersection, as an axis point, is utilized to express the organizational relationship between the dominant city grid pattern and the major axial path. To develop a continuity, the axis points become generators of recurring elements that establish a perceptual linkage between the central business district and the new commercial development.

Intersection Articulation
Axis

Site Scale

The connection between the site and the major axis is developed from the adjacent intersections. The underlying site organization is a function of the overlay of the existing city and grid and a line of axis perpendicular to the major axis. Responding to the organization patterns creates an ordering system that forms a developmental framework for the site.
Axis
Building Scale
  - Circulation
    The major purpose of the axis is to connect the structures on the site. As an axis it also has the qualities of a datum. (An organization line of reference.)
  - Wind
    The sheltering and channeling of the wind flow paths are utilized to layout spaces. In this case study, the prevalent summer breezes and the people paths, coincide to increase the efficiency of the natural ventilation.
  - Water
    The desire to direct the water run-off allowed creation of roof form that responded to the organizational pattern of the site. A fabric membrane was utilized to create a valley to direct the water toward cisterns. These cisterns then drain into the retention pond.
  - Sun
    The movement of the sun provided a rationale for orientation of specific functions.
Hierarchy
Urban Scale

The central business district and the new commercial development are prominent urban forces (urban anchors). The intersections between these anchors become important linkage points. As circulation elements these points have varying degrees of importance. The size of the intersections and their location along Calumet Avenue indicate the level of usage. This criteria determines the value of an intersection as a reference or orientation that can be used to express an organizational concept.

Site Scale

At the site level the function of geometry is to dictate hierarchy. The size, shape and location of a form or space is articulated relative to its importance.

Natural features, such as a volume of trees or a body of water, can be considered as important site components and at the same time they can serve as a background to the manmade environment.
Building Scale

By manipulation of size, shape, location and function the new structure is given a very prominent presence on the site. The existing structure by virtue of its location and its historical character obtains equal importance.
Rhythm/Repetition
Urban Scale

As expressive tools, repetitive elements utilize visual characteristics and perception to articulate meaning. To repeat an element facilitates in establishing a consistent basis to express an idea.

Along Calumet Avenue, the intersections delineate an organizational concept in a simple and comprehensible manner. Utilizing the principle of repetition reinforces and defines the organizational principles of axis and datum.

Employing the column as the physical means of expression evolved from the need to incorporate an adaptable element. Currently, the column is used only at the intersections to hold up the traffic lights. To use the element in a physical and conceptual capacity would develop a new level of meaning and comprehension. In order not to complicate and confuse the idea, utilizing a common physical element that would serve two purposes would establish reference points and serve to define the underlying concept.
Site Scale

The framework of the site organization applies the principles of axis and repetition to contain space. The columnnades projected from the intersections imply planes that visually reinforce the underlying site organizational concept.

Tree patterns are a response to prevailing summer breezes and winter winds. Defining the parking areas are rows of trees that direct the summer breezes across the pond area, creating a natural cooling action.

Building Scale

The repetitive element of the column is used in the capacity of a structural system. It accentuates the axial definition and defines the datum.

The old exhibit building has a unique rhythmic character. A continuous rhythmic path of void/space or void/column relates the old structure to the new development.

As a continuous axis the column is incorporated in the new complex as is a repetitive structural element. Repeating the column induces movement through the building and defines the axial relationship.
Datum
Urban Scale
The major axis, State Road 49, acts as a datum that organizes adjacent forms and spaces.

Site Scale
The organizing network, generated from the urban fabric, is a composite of reference lines that relate forms and spaces.

Building Scale
The circulation path or axis between the new and old structures organizes and relates the forms and spaces. The datum is defined and reinforced by the linear array of vertical columns.
Process of Transformation

Urban/Site Scale
CASE STUDY I

ENCLOSURE

Overhead
Urban Scale

The overhead is implied by a repeated system of suspended cables. At the intersection the traffic light system is used to define an overhead and reinforce the organizational principles.

Site Scale

The datum reinforced by the repetition of the vertical columns (at a consistent height of 9 feet) results in an implied overhead. Also, the trees define a natural overhead.

Building Scale

The column and cable system expanded to create a building structure. The system introduces a translucent fabric membrane creating a soft overhead.
Ground Plane
Urban Scale

The existing topography was taken as a given. Manipulations are not applicable at this scale.

Site Scale

Manipulation of the ground plane implies space. The depression on the site is a function of creating a retention pond. Existing topography and drainage characteristics determine the general location and shape of the pond. The manmade geometric depressions act as flood retention areas and reinforce the site ordering concept.

Building

The inherent geometry of the children's theater dictates the level change. The development is at a constant elevation.
Surround

Urban Scale
The fragmented corridor of movement required a sense of enclosure to define its edge. Tree lines were used to soften the hard edge as well as defining the understanding organizational principles. Using an alternating pattern of trees establishes a rhythm and defines and articulates the axis.

Site Scale
Trees were used to develop a natural surround. The line of columns that extend through the site create visual planes and imply the containment of space.

Building Scale
The architectural elements of the plane and column are used to define the surround. These elements also articulate the principles of datum, axis and repetition.
CASE STUDY I

SPATIAL PATTERNS

Movement
Urban Scale
Movement is lineal along an axis.

Site Scale
The major movement path is the axis connecting the existing structure and the new complex. Paths connect the parking areas to the major axis.

Building Scale
The circulation through areas is enhanced by the repetitive columns along an axis.

Association
Urban Scale
The transitional area includes small businesses, fast food restaurants that create casual gathering areas.

Site Scale
The natural areas provide the gathering opportunity for passive or casual activities.
Building Scale

Within the new complex, casual gathering places are the restaurants, market and exhibit areas, museum and shops.

Assembly
Urban Scale

Collector areas such as the downtown and new commercial areas (County Seat Mall).

Site Scale

The amphitheater is the formal gatherer at the Site Scale.

Building Scale

Within the new structure, the children's theater becomes a formal gatherer.
CASE STUDY II

As a transformation exercise, this case study introduces a new set of programatic requirements to qualify the adaptability of the established generating principles.

Developmental Concept

The program requirements used in this study are coherent with Valparaiso's proposed developmental concepts. Conceptual plans have been developed to use the site as a major city park. Recreational areas such as: softball fields, athletic fields, practice areas, a biking/jogging trail have been integrated within the site. The existing historical exhibit building would become a pavilion. In addition, the regulational size athletic field would utilize the existing grandstands. The flooding problem in the surrounding area establishes the need for a type of retention area. Therefore 11 acres, of the 29 acre site, has been proposed to be excavated for a retention area.
ORDERING PRINCIPLES

Axis

The axis acts as both a circulation element and as a datum. The repetitive three lines emphasize the axis by introducing movement, overhead and surround. The axis terminates at both ends, as an intersection.

Hierarchy

As a physical recreational area, certain facilities acquire importance through their large size or unique shape. (Ex.: baseball and athletic fields) Placement of the facilities becomes a function of relative area and orientation to the sun's path.
Rhythm/Repetition
Repetitive placement of trees emphasizes axis and enhances movement.
Repetitive tree lines are a response to prevailing wind paths.

Datum
The axis is the datum. It is the reference line that the individual elements can relate.
Transformation

The entire exercise is a site transformation. The underlying principles are used to establish a framework.
ENCLOSURE

Overhead
The program requirement of large open areas creates the need to establish a distinct overhead. Using trees, as natural canopies, is an easy and inexpensive method to form space. Dictating the tree locations is a response to prevailing wind paths.

Ground Plane
Manipulation of the base plane is expressed in the pond/retention area. A major portion of the site are flat grass areas for the various athletic fields.
Surround

With a large flat site it is necessary to contain space. The introduction of trees adds not only an overhead, but also contains and identifies spaces by acting as a plane.
SPATIAL PATTERNS

Movement
The major axis provides the spine for vehicular movement. Perpendicular to the spine are pedestrian paths. Peripheral movement is established in a free form fitness trail, bike and jogging path.

Association
Casual gathering opportunities are provided for in the pond area. Picnic areas, passive activities. The pavilion in this program is considered a casual gatherer.
Assembly

The grandstands act as the largest place for formal gatherings. Also, the ball fields can be considered as a gatherer.
CASE STUDY III

The intention of this case study was to illustrate that this thesis has not an ending - rather a starting point to be used in correlation with new overlays of issues.

In Case Study III, the generator of the issues change, but the organizing principles remain the same. A fellow thesis student, Marvin Wicker, was instructed to take the language that I had developed to generate organization at the site scale. He used this as a starting point to relate to at the building scale to generate rationale for organizing principles. The generator or rationale in this case was:

1) Urban Fabric (given)
2) Views to site and site features
3) Cycles of sun, wind and water

A programatic requirement was established in order to develop the following spaces:

1) Restaurant
2) Market Area
3) Small children's theater and exhibit