

The book cover features a lush, green landscape with a large tree on the right, a body of water in the middle ground, and a bright sun or moon in the upper left. In the foreground, a dark, muscular figure stands on the right, holding a long staff horizontally across their shoulders. To the left, a white bird with a large orange beak and a long neck stands near some green plants. The overall style is painterly and vibrant.

# Delight's Muse

on

Christopher Alexander's  
*THE NATURE OF ORDER*

Jenny Quillien

# Delight's Muse

Muses whose dreamy foreheads are lapidary triangles,  
decorate his eyes with your image so that he may always please  
readers seeking in all sincerity  
to agreeably savor whatever gives light.

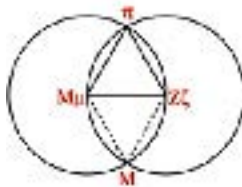
*Le Douanier Rousseau*

(a poem composed by the artist and inscribed on his portrait of writer Alfred Jarry)

ISBN 978-1-4303-1317-5

Copyright © Jenny Quillien 2008. Copyright Statement: The purpose of this work is to promote discussion of the ideas described. Permission to quote and copy is granted for fair use purposes: teaching, research, comment, and criticism. This permission requires that appropriate credit be given both for this work and the original work by Alexander. Nothing from the text may be altered without express consent and no financial gain may be made. Permission does not cover photographic images.

**Culicidae**  
Architectural Press



Ames | Berlin | Gainesville | Tokyo

CULICIDAE ARCHITECTURAL PRESS

AMES, IOWA 2008

Cover Design by Jenny Quillien and Charles Adams

Front Cover: detail from *La Charmeuse de Serpent* by Le Douanier Rousseau

Back Cover: detail from *Dame dans une Forêt Exotique* by Le Douanier Rousseau

# Delight's Muse

on

Christopher Alexander's  
*The Nature of Order*

a summary and personal interpretation by

Jenny Quillien

*“The asking of a question with passionate concern for its answer, a concern that demands life investment, suggests a door, which will sooner or later be found. Whether it is successfully opened to the public is another matter, but if a current worldview can accommodate a new synthesis, the new idea may prove to be the case. A new idea fails if it involves too great a sacrifice of invested belief. If the new idea triggers a passionate enough pursuit to make suspension or abandonment of previous beliefs or current criteria worth the risk, however, the new idea can change the reality structure.”*

Joseph Chilton Pearce

*The Crack in the Cosmic Egg:  
Challenging Constructs of Mind and Reality*

# preface

---

## A CRACK IN THE COSMIC EGG

---

Architecture, alone among the arts, is inescapable. We may choose to remain deaf to music and never read a book, but we cannot avoid our built environment and the impact of its fabric on our private, social, and political lives. Personally, I believe that the places and spaces we create for ourselves for working, dreaming and playing are germane to sane (or insane) living. I also believe that most people, given the choice, prefer sanity and might even put their shoulders to the task of creating saner environments if they only knew where the leverage points were.

This book is a summary and interpretation of architect Christopher Alexander's most recent work. It's true that Alexander is an iconoclast, famous, infamous, revered, despised, ignored, forward-thinking, a throw-back to old times, brilliant and clay-footed. But never mind the person. My contention here is that Alexander is 'on to something' and that—with the rising awareness of just how dreadful our current built environment really is—there is an audience willing to consider new ideas. Alexander's four volume magnum opus *The Nature of Order* offers material that can lead us toward more thoughtful and sensitive interactions between dwellers and dwellings, and away from passive and idiotic acceptance of buildings that do not fit human needs or the planet.

The four books which make up *The Nature of Order* address not only the nature of our habitats but stretch to the nature of order in the universe, science, and other arts. Many general readers will not lightly undertake the effort to plow through a whopping 2000 pages, at least not without some encouragement. *Delight's Muse* has been written as a stepping-stone into Alexander's labyrinth of a publication for those who would prefer to arm themselves with an overview and an initial understanding of the main themes.

My first objective is, therefore, to provide a short, accessible, and illustrated summary. Six years of collaboration on the manuscript and countless hours of discussion with Alexander give me confidence that my understanding is true to his original meaning. A second goal is to bring to the fore the basic scaffolding of what we can consider a new General Theory. Thirdly, I offer my own interpretations. These are grounded in my background in cognitive science and cultural anthropology, as well as my trials and tribulations of actually trying to implement Alexander's ideas.

The major themes woven throughout *The Nature of Order* are 'combed-out' here and presented in the sequence—guided by my best guess—which will facilitate the reader's understanding. Topics move from the more to the less familiar, and from smaller to bigger issues. Alexander took the more circuitous, complex and richer road of telling the story of his journey of discovery. One volume is underrepresented, but certainly not because it is less important than the others. The detailed accounts of actual construction of buildings, which constitute most of Volume III, are case studies that do not lend themselves to summary.

## THE ITERATIVE NATURE OF ALEXANDER'S WORK

To look at Alexander's work as a whole is instructive. Following his steps is like tracking Perceval on his quest for the Holy Grail—up mountains, through swamps, often turning in circles, only to discover old traces of his own footsteps. His research, thinking, and writing is highly iterative.

Careful readers of previous works by Alexander (and an ever changing cast of coauthors) will recognize that although *The Nature of Order* requires adjusting to a different vocabulary, certain themes abide. The older books inform the new work and the new work infuses the old with new meaning.

From the 'yellow series' (the most well-known of Alexander's books and referred to as such by their yellow dust jackets), *A Pattern Language*, *The Timeless Way of Building*, *The Oregon Experiment*, and *A New Theory of Urban Design*, three pervasive themes are germane to the matter at hand.



Back alley in Georgetown. Photo capitalregion.usa

*Old vocabulary:* Patterns: #59 *Quiet Back*, #38 *Row Houses*, #64 *Pools and Streams*. The elements all respect each other, none of them scream for attention. The simple railing orders the relationship between the water and walkway. The row houses and narrow flower beds add further definition. The space is public and supports informal interaction between neighbors and pedestrians.

*New Vocabulary:* The wholeness of this coherent area stems from a slow differentiation of the space. The whole can be parsed into geometrically linked parts, each part adapting to each other part and to the whole.

## 1. RELATIONSHIPS

If you think that a window or a door (to take the most simple situation which you can verify for yourself) is a ‘thing’ which goes into a hole in the wall, then that is exactly what you will get.

In profound buildings, the window and door are not ‘things’ but rather, pivotal points in relationships: inside and outside, light and dark, public and private. Accompanied by window seats, low deep sills, porches and entrance walkways, windows and doors become the heart of privileged places for living and support us in living well with ourselves and each other.

## 2. PATTERNS OF RELATIONSHIPS SUPPORTING EACH OTHER

In profound buildings, the different elements are not stand-alones; they overlap and respect each other. The individual elements are never more complicated than necessary, but are rather unassuming and combine in mutually supportive ways.

## 3. PIECEMEAL GROWTH

Piecemeal growth of an individual building, neighborhood, or town is based on the ideas of repair, conservation of resources, and the healthy more realistic idea that mistakes will be made. Unless money is available for adaptation, most buildings, once built, will be condemned to being unworkable. Piecemeal growth is based on the assumption that adaptation between buildings and their users is necessarily a slow and continuous business which cannot be achieved in a single leap.

*The Nature of Order* continues with these three themes but the approach is different. Vocabulary about ‘relationships’ gives way to vocabulary for ‘transformations.’ Talk about ‘mutually supporting relationships’ gives way to ‘bootstrapping geometry.’ ‘Piecemeal growth’ turns into ‘unfolding’ and ‘constant adaptation of whole to part and part to whole.’



Brooklyn. Photo Michael Krakovsky  
Posted by Nerdprogrammer's cafe

*Old Vocabulary:* As a testimony to unsatisfying built environments, the ordinary street corner scene shown here cannot be connected with any patterns of successful buildings and there are no helping relationships. The two houses ignore each other and both fail to make the street a pleasant place to be.

*New Vocabulary:* In the new vocabulary we talk about the lack of unfolding growth or geometric transformations. There is no sense of ‘wholeness’ as there is in the photo of Georgetown on the opposite page.



# GOD?

Although Alexander would like the world to consider the underpinnings of his work as based in science, I would argue that the real underlying thrust of Alexander's magnum opus is religious. The text is fraught with all the difficulty of undecidable questions about the existence of God. When putting together this summary I had to make a choice about the sequence of presentation. In the original work, Alexander presents his cosmological conclusions in Volume IV as the end result of an excruciatingly arduous intellectual and emotional journey, and casts himself in the role of an ever doubting Thomas.

One option, which would have been logical and concise for a summary, would have been to place the cosmological ideas first, as a premise, setting the stage for the more specific topics. In the end I chose not to do so. My own inclination is to assume that readers interested in a book such as this will prefer to fend for themselves when it comes to spiritual convictions. Also, my own interpretation of the material leads me to conclude that the reader need not agree with Alexander's religious beliefs. Christian, Muslim, Buddhist, Jew, Polytheistic Pagan, Lackluster Agnostic, and Militant Atheist can all jump into the discussions with gusto and return, enriched, to their own spiritual camps.

Still, I can somewhat 'set the stage' by simply quoting Alexander's answers to two questions in a 2005 interview conducted by *Science and Theology News*.

## QUESTION:

HOW HAS YOUR RELIGIOUS BACKGROUND INFLUENCED YOUR ARCHITECTURAL WORK?

*"I have always felt that the religious picture of the world was probably more accurate than the scientific picture of the world that's evolved over the past few hundred years. I was raised as a Catholic, and as a child I spent a great deal of time bicycling around England looking at country churches. But that wasn't particularly what was forming my views about architecture. It was something different. As I got closer and closer to a picture of things that had common sense and seemed to work, I discovered that I felt more and more that the religious point of view—or a religious point of view—is inevitable as an accurate description of matter, if it is going to take into account the empirical facts about architecture."*

*"I gradually have come to the conclusion that the presence of God in matter is inevitable. You can't have a coherent picture that does justice to all the facts unless you have something like that in your mind. Exactly the form that does take, I won't be the ultimate judge of. But I do think it's unavoidable."*

## QUESTION:

HOW HAVE YOUR SCIENTIFIC AND RELIGIOUS BELIEFS COALESCED OVER THE YEARS?

*"As the book evolved over the 30 years, I would say that religion gradually became the most important issue for me. But I say that as a scientist. I don't particularly care for the firmly created divide between science and religion. I am most uncomfortable with it."*

*"I do believe that the nature of God is factual. I think it is something that will be slowly understood better and better, that we will ultimately have a view of the universe in which it's explicit. And as with other parts of science it will be wrong at first, and then gradually get more clear."*

*“Science has demonstrated that the search for truth in an empirical way has enormous benefits for society. It gives us a view where millions of people can share the view they have of the world and learn about it together, and improve upon one another’s observations and so forth.”*



13<sup>th</sup> century Seljuk carpet. Photo transantolie.com

A lesser known Alexander publication, *A Foreshadowing of 21<sup>st</sup> Century Art: The Color and Geometry of Very Early Turkish Carpets*, is the specific link between the ‘yellow series,’ *The Nature of Order*, and God. The book conveys the results of an intense study of the patterned motifs in carpets—mostly early Turkish carpets dating between the 12<sup>th</sup> and 14<sup>th</sup> century. It was in this work that the cosmological aspects and many of the concepts of *The Nature of Order* were, for the first time, truly pulled into the light for inspection. Even to a novice eye, the carpets woven to serve as prayer rugs are the most profound pieces, and the question of searching for God through geometry begins there, in a very palpable way, to make sense.

Being two-dimensional and small, carpets are easier to study than multi-dimensional built environments. However, a carpet is not a town, or neighborhood, or house, or room. As we shall see, there remain deeply intriguing unanswered questions.

## READERS

While leaving the specifics of religious conviction up to individual discretion, two requests are made of readers. First is that they call upon their sensitivity to the Earth as a living whole and their home. Second is that they call upon their own sensuality and curiosity. Sensuality—an awareness and enjoyment of how one responds to objects and places—combined with curiosity—a determination to make sense of things—develops into an attentive inquiry.

The position taken in *Delight's Muse* is that understanding and knowledge—whether in science, art or architecture—are more about inventive synthesis than discovery. Wisdom tells us not to remain wedded to the products of thought but to court the process.

Readers simply need bring a willingness to listen, not only to what is expressed on the page but to the core of their own internal self-knowledge. The everyday experience of where we dwell is our starting point. Why does one place bolster our spirits, calm our nerves, and nourish our soul? Why does another drain us of our vitality, leaving us feeling flat? What is the connection between everyday feelings about habitats and the living systems of grasses and grasshoppers and tigers and tides?

An audience can be won over to a new point of view only through intellectual and emotional sympathy. It is a risky proposition for all parties. Listening sympathetically—the only way really to truly ‘hear’ what a new point of view is proposing—is to risk self-modification. In turn, a new point of view, if engaged by open minds, will be transformed by those listening.

On offer is a restructuring of the attending mind.

Jenny Quillien  
Santa Fe, New Mexico  
January 2008

“The only real hope of people today is a renewal of our certainty that we are rooted in the Earth and, at the same time, the Cosmos.”

Vaclav Havel

“Je me resous à comprendre le pourquoi et transformer ma volupté en connaissance.”

I am committed to understanding the why of things and to drawing knowledge from my delight.

Charles Baudelaire

# TABLE OF CONTENTS

INTRODUCTION THE SOURCE OF DELIGHT .....1

## part 1 essential observations

CHAPTER 1 WHOLENESS..... 5

ORDER AND WHOLENESS  
IN SCIENCE AND ART

FIELD-LIKE STRUCTURES  
BOOTSTRAPPING • AESTHETICS

CHAPTER 2 THE FIFTEEN PROPERTIES.....11

DIFFERENTIATION  
STRONG CENTERS  
LEVELS OF SCALE  
BOUNDARIES • GOOD SHAPE  
POSITIVE SPACE • LOCAL SYMMETRIES  
ALTERNATE REPETITION

DEEP INTERLOCK & AMBIGUITY  
CONTRAST  
GRADIENTS • ROUGHNESS  
ECHOES • VOIDS  
SIMPLICITY & INNER CALM  
NOT SEPARATENESS

COMMENTARY: NOTICEABILITY OF THE FIFTEEN PROPERTIES

CHAPTER 3 UNFOLDING IN NATURE ..... 61

UNFOLDING IS SMOOTH  
& STRUCTURE PRESERVING  
SIMPLICITY AND SELF- ORGANIZATION

POSSIBILITY OF A NEW GENERAL LAW  
ROBUSTNESS, UNIQUENESS AND LIFE  
FROM NATURE TO ART

COMMENTARY: ON MOTHER NATURE

COMMENTARY: A SHORT USEFUL GLOSSARY I

CHAPTER 4 MAN-MADE UNFOLDING ..... 73

WHOLENESS AND UNFOLDING  
STRUCTURE PRESERVING

SHAPE IS THE TRACE OF TIME  
BELONGING

COMMENTARY: NOTICEABILITY OF UNFOLDING WHOLENESS

COMMENTARY: ON BELONGING AND PHENOMENOLOGY

CHAPTER 5 COLOR AND LIGHT..... .87

INTENSITY OF COLOR  
BOUNDARIES • HIERARCHY  
COLOR COMBINATION  
CONTRAST OF DARK AND LIGHT  
FAMILIES OF COLOR

SEQUENCE OF LINKED COLOR PAIRS  
MUTUAL EMBEDDING  
ROUGHNESS  
SUBDUED BRILLIANCE  
INNER LIGHT

## part 2 paradise lost and found

CHAPTER 6 THE PROBLEM.....	97
MEMORIES	FORM AND FUNCTION
COMMENTARY: ON RANTING AS A FORM OF CONSCIOUSNESS	
CHAPTER 7 THE SOLUTION.....	107
THE FUNDAMENTAL PROCESS	RULE OF THUMB: DEEP FEELING
RULE OF THUMB: LEVELS OF SCALE AS A DECISION TOOL	RULE OF THUMB: FORM AND FUNCTION GENERATIVE SEQUENCE
COMMENTARY: ON CURRENT PRACTICES	
COMMENTARY: A SHORT USEFUL GLOSSARY II	

## part 3 towards a cosmology

CHAPTER 8 EPISTEMOLOGY.....	123
MIRROR-OF-SELF TEST	SAMPLE TEST
COMMENTARY: ON THE MIRROR-OF-SELF-TEST	
COMMENTARY: A POLITICALLY INCORRECT STATEMENT	
COMMENTARY: ON FREEDOM	
CHAPTER 9 QUEERERERER WORLD.....	135
CHAPTER 10 THE NUMINOUS.....	137
TWO INTERPRETATIONS	COMING FULL CIRCLE

## part 4 essays and conversations

ESSAYS.....	141
WHAT MAKES CHRISTOPHER RUN ?	THE QUALITY WITHOUT A NAME
THE GENERAL THEORY	FUTURE WORK
FROM PATTERNS TO SEQUENCES	SENSEMAKING
CONVERSATIONS.....	168
BIBLIOGRAPHY.....	170

*“Not chaos-like together crushed and bruised  
But, as the world, harmoniously confused;  
Where order in variety we see  
And where, though all things differ, all agree.”*

Alexander Pope



An old part of town where all things differ and all agree  
Lawrence, Kansas. Photo Charles Adams

# introduction

---

## THE SOURCE OF DELIGHT

---

### *eurhythm*

ancient Greek for 'good rhythm' and 'pleasing arrangement'

*The Nature of Order* investigates nothing less than what the title says. What is orderliness? How does it work? How do we create it? How does it affect us?

The kind of order under scrutiny is an orderliness that we not only intuitively recognize, but also actively seek out. Perhaps we cherish a favorite walk in the country where the lane hugs the hill and the trees make a rambling line along the stream. Perhaps we relish a trip to a museum to marvel at dinosaur bones, or an evening listening to a jazz band. What none of us do is stroll a city's newer outskirts looking at predictable apartment buildings, or walk the beach and eschew the shells in favor of the odd bits of plastic that wash up with them. We all take our pleasure in the loose eurhythm of countryside, old neighborhoods and towns, bones, music, and shells where novelty and surprise mix with pattern. The order is there, intriguing, not deadly; it's alive and evokes empathy and participatory emotions. We're part and parcel of it all. Sometimes, in a ballet dancer's movements, for example, there are so many large and small rhythms that we are only fully aware of the most apparent ones.

When we encounter this kind of order, it will be an expression of some sort of unfolding wholeness. A countryside walk reveals a deep interlock between the land and the history of the inhabitants. At the museum we marvel at the dinosaur skeleton which forms a whole creature, not only the external order which allowed the animal to relate to its environment, but also the underlying order where each bone's subtle form emerged from necessary responses to many different requirements. Our own hipbone has to walk, run, sit and bend. What orderly shape will allow it to do all those things as well as coordinate with adjoining bones? A jazz performance is an unfolding whole, coming not only from the players but also from the relationships between them. Venice and Amsterdam are certainly different places but both are recognizably individuated wholes and their present forms are a consequence of their past realities. Both are more engaging than urban fossils for tourists, such as Brugges in Belgium or Rothenborg ob der Tauber in Germany, where the flow of time has now come to a stop and been preserved, protected, and pickled in Disney's formaldehyde.



When we engage any of these structures, be they organic or inorganic, and sense that individuated completeness of pattern and form which is unique and uniquely adapted to its place in the world, there is vitality, 'aliveness.' This 'aliveness' echoes the life within

us. The walk in the neighborhood or countryside, the jazz concert, and the dinosaur bones, remind us that, we too, are 'children of the universe.' Our appreciation may remain unstudied and unarticulated or it may develop into a lifetime of inquiry.



Just enjoying a stroll down Ontario Street. Stratford Festival Archives. Stratford, Canada

*"We are convinced by things that show internal complexity, that show the traces of an interesting evolution. Those signs tell us that we might be rewarded if we accord it our trust. An important aspect of design is the degree to which the object involves you in its own completion. Some work invites you into itself by not offering a finished, glossy, one-reading-only surface. This is what makes old buildings interesting to me. I think that humans have taste for things that not only show that they have been through a process of evolution, but which also show they are still a part of one. They are not dead yet."*

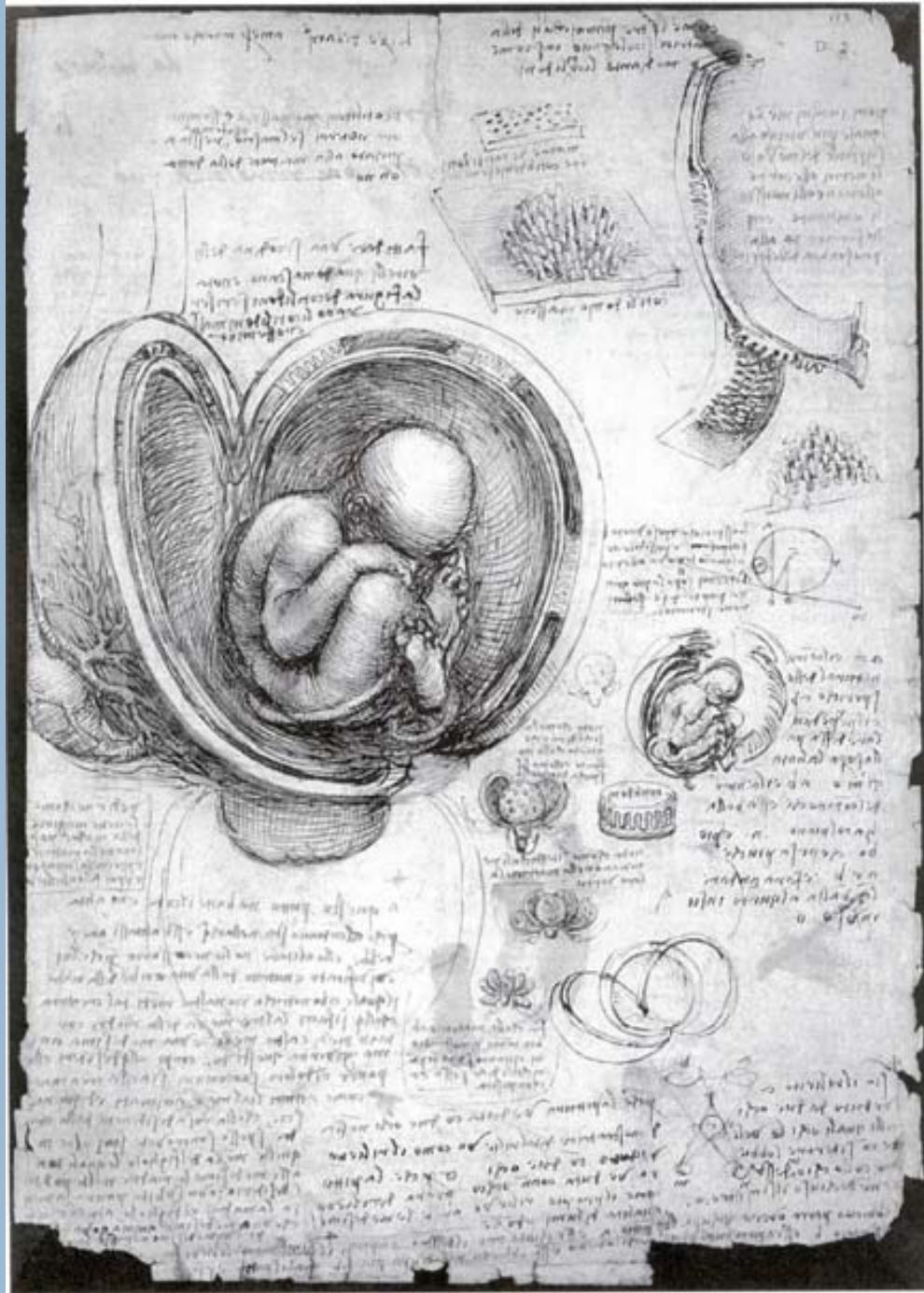
Brian Eno, British rock musician  
statement from a teleconference on design, quoted by Stewart Brand in *How Buildings Learn*



College of Charleston, South Carolina  
A place worthy of inquiry. What makes it work so well?

*"A world must be its own spontaneous source."*

James Carse



Leonardo da Vinci. A page from one of his sketchbooks

part 1  
essential  
observations  
chapter one

---

## WHOLENESS

---

*“It is the artist who leads us into fresh pastures.  
He cannot tell us where he is going for he does not know himself.”*

John Maynard Keynes

### ORDER AND WHOLENESS IN SCIENCE AND ART

Unfolding wholeness is the wellspring of *eurhythmy* and *The Nature of Order* can be considered as part and parcel of the current *Zeitgeist* of inquiry into wholeness, emergence, explicate and implicate order, and autopoiesis.

Scientists, philosophers, artists of past centuries as well as those living today have endeavored to more fully understand just what wholeness is. From biology it is now understood that the cells in an embryo are affected by their position in the whole. D’Arcy Wentworth Thompson devoted his career to the mathematics of morphogenesis. Chomsky developed computable generative rules in linguistics to understand how we produce an infinite number of novel sentences, prose, and poetry from a finite number of elements and rules. In particle physics the one- and two-slit experiments, where the configuration of the whole determines the behavior of the electron, demonstrate that the electron can

be in two places at once, both wave and particle. In neurophysiology, Lashley’s experiments on the engram prove that particular memories do not reside at some locus but are spread throughout the brain. In medicine, Haldane has shown that no definite boundary can be drawn around the lung, and that there is a quality that makes the lung and its surrounds bind together as one whole. We know that the large-scale gravitational field, which is created by the particles in it, affects the local behavior of each gravitational particle. A critic once remarked to Cezanne that there was a tiny bit of blank canvas left in a corner of a painting; Cezanne replied that if he touched it he might have to do the entire painting over again.

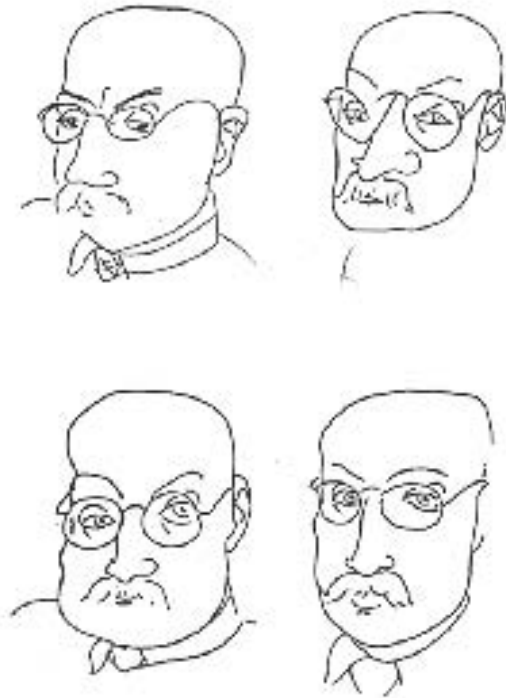
Wholeness is ‘the big deal.’ Local parts exist in relation to the whole; their behavior, character and structure are determined by the whole. In this sense a flower is not made from petals, rather petals are made from their role and position in the flower.

Wholeness involves a structure of subtlety which cannot be predicted from the parts. Four self-portraits by Matisse illustrate its ineffable nature. In each drawing, the separate features, such as the nose, eyes, mouth, are different and yet each of the four

sketches captures the wholeness of the artist's face. The wholeness, far easier to recognize than define, exists over and above the features. Parts interact in non-simple ways, so it is hardly a trivial matter to infer the properties of the whole.



Henri Matisse



Four self-portraits  
Wholeness exists over and above the parts.

## FIELD-LIKE STRUCTURES

*The Nature of Order* defines wholeness as a field-like structure. The idea has roots in the Gestalt experiments in perception done in the 1930s and 1940s. The experiments indicated that we all make judgments about wholeness and pattern in the same way. The German word *Prägnanz* was the term given to the character that creates saliency in figures and makes them stand out as wholes. Greater or lesser *Prägnanz* was found to be dependent on characteristics such as convexity, differentiation, and boundaries. Alexander replaces *Prägnanz* with the expression 'strength of centers.'

The idea is also akin to Alfred North Whitehead's proposal to consider all space as a system of nested centers. In a field-like structure different nested centers all support each other in creating spatial organizations of centrality.

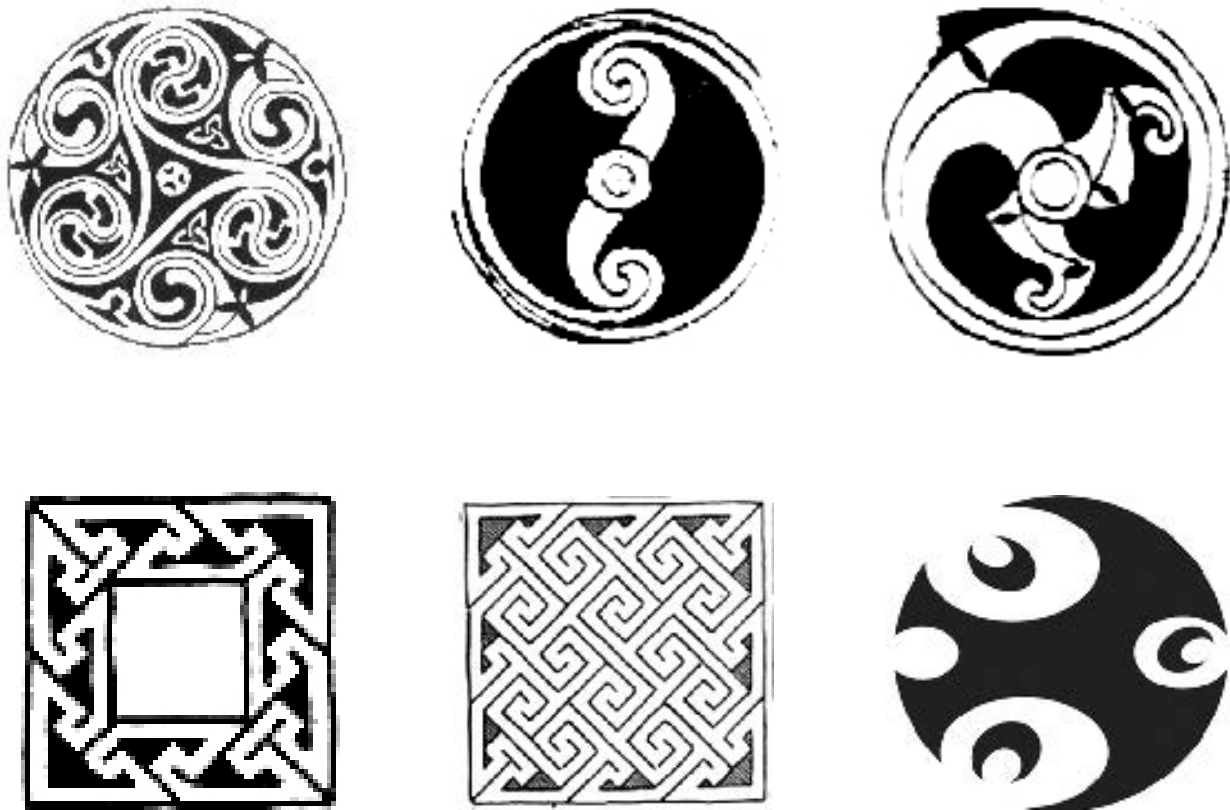
To illustrate field-like structures, I randomly chose Celtic designs as a topic and searched for them on Google images. The following thumbnail sketches all have field-like structures—but some have more *Prägnanz* than others. The three sketches on the top row are more intense as fields than the three on the

bottom row and the figures on the left are stronger than the ones on the right. Consider the lower left hand sketch and imagine a center within the plain white square. Such a center would give the figure more saliency. The middle sketch in the lower row has no centrality to it and seems rather flat. The right hand sketch on the lower row is really quite poor; the different elements don't pull together but seem to be floating off the black background.

A persistent theme in Alexander's work is that the liveliness of any space depends on the constellation

(the field-like structure) of the constituent centers. Centrality and vitality emerge from and are functions of the whole configuration.

Alexander's understanding of the orderly—but not mechanical—inner workings of unfolding wholeness remains essentially intuitive. Perhaps one day new mathematics will allow computer programs to be written that will be able to measure saliency but, for now, human cognition is a more reliable and subtle measuring instrument than anything available in mathematical analysis.



Celtic designs

## BOOTSTRAPPING

In a field-like structure no single center can be considered as the origin of the structure. The vitality of the whole varies over time and evolves through bootstrapping relationships. These relationships, as

understood by Alexander, are recursive phenomena. His understanding relies on a somewhat different way of thinking than that prevalent in much of today's physics.

Most physicists today consider systems to be made up of elements, and that the synergy of these elements may cause new and emergent properties at the system level. Although a system's behavior as a whole may differ from the simple combinations associated with the individual elements, the individual elements themselves do not change as a result of the larger system.

Alexander proposes a contrasting view where the "intensity-life-centeredness" quality of a constituent element (referred to as a center) is affected by its position vis-à-vis all the other centers. Thus the saliency of a center is a global property and not a local property. Centers exist by means of each other, in the sense that they produce each other. A constellation's intensity is self-dependent.



Ceiling painting from a Rajastan residence  
Photo Pierre Arnaud Chouvy

In this ceiling painting from India, the central white datura flower both receives strength from the surrounding field of centers and returns strength to the field. With your mind's eye, imagine the painting with only the white flower on the plain

orange background, or the background without the central flower. In both cases the field would be weaker. As it is, the entire field pulsates, the saliency of each center bootstrapping the saliency of each other center, creating a strong whole.

## AESTHETICS

The aesthetics of math, science, music, art, and architecture revolve around the discovery of partially concealed patterns. However, we still lack

an adequate language in contemporary mathematics to deal with the kind of morphological thinking that is important here. Bifurcation theory, chaos

theory, fractals and high-speed computer models for non-linear mathematics will all be helpful.<sup>(1)</sup>

Developments in complexity theory show how linked variables, under the right conditions, cooperate to form emergent order, but there needs to be a more profound and more detailed understanding of just how order emerges as it does. Nor is there really a way to connect work done at the micro level and work done at the macro level. The phenomena under study are different and so the approaches and tools

are different. Nor is there really a way to integrate the work of those who look at matter and substance (where they *measure* and *weigh*) with those who look at form and pattern (where they make *maps* and *models*).

A deeper understanding of order, wholeness, and the nature of living systems is required before we can fully grasp the subtleties and complexities which give us such delight in a forest, a Mozart symphony, a painting by Cezanne, or a great building.



Congo, 19<sup>th</sup> century

*The Image of Woman* by Andreas Ferninger, Cologne. Dummont Schauberg Press, 1960

A field-like structure, just to clarify a possible confusion, does not get more life merely according to the number of its subsidiary centers: that would lead straight into the baroque. This African sculpture gets its force from the sparseness of centers and the careful choice of shape, voids, and proportions.

---

(1) The general reader can find a good introduction to the mathematical questions in *The Web of Life* by Fritjof Capra. In particular, see the chapter entitled 'Mathematics of Complexity.'



*“Nature is the model, variable and infinite, which contains all styles.”*

Auguste Rodin



Branches with almond blossoms  
Van Gogh

---

## THE FIFTEEN PROPERTIES

---

*“Where there is matter, there is geometry.”*

Johannes Kepler

STRONG CENTERS • LEVELS OF SCALE • BOUNDARIES  
GOOD SHAPE • POSITIVE SPACE • LOCAL SYMMETRIES  
ALTERNATING REPETITION • DEEP INTERLOCK & AMBIGUITY  
CONTRAST • GRADIENTS • ROUGHNESS • ECHOES • VOIDS  
SIMPLICITY AND INNER CALM • NOT SEPARATENESS

Years of observation led Alexander to identify fifteen recurring properties of a geometrical nature whose presence, he argues, correlates with the degree of ‘aliveness’ that can be experienced in both natural and man-made realms. These fifteen properties are always present in nature, but in man-made objects they are present only sometimes and partially.

Alexander suggests that in man-made objects, be it in the realm of sculpture, painting, weaving, music, or building, the presence of these properties is the hallmark of beauty and functionality. His observations are personal and empirical. He invites

readers to make up their own mind and has complete confidence that sensible and sensitive observers of the world will concur.

In nature, these properties appear to be the mechanisms through which stable and semi-stable systems are formed. In other words, all fifteen properties play a role in the integrity and evolution of wholes. In most specific cases (several are given in the following pages), scientists already have a cogent explanation and, collectively, these specific understandings point to the possibility of a more general theory, one yet to be fully articulated.

# DIFFERENTIATION

A persistent theme throughout *The Nature of Order* is that natural biological growth takes place essentially through differentiation rather than addition. We've all learned how a fertilized egg, an initial whole, which develops into a human being, will, through recursive differentiation, repeatedly form internal distinctions, divide and divide again, making bone tissue and blood, hair and limbs. The growth process of differentiation is one of constant fine grain adaptation of part to whole and whole to part.

Alexander argues that beauty in the built world similarly stems from growth through differentiation. Differentiation is easy enough to see in traditional built environments. Just bring to your mind's eye the small hamlet forming at a crossroad. Over the years, as it grows into a town with different types

of buildings and neighborhoods, the hamlet is undergoing differentiation, much like a fertilized egg. When the growth process is differentiation, each new stage will emerge through one or more of the fifteen properties.

In contrast, growth by addition, which is a bit like building with LEGO™, yields a different result. LEGO™ building is the method used by developers in the fast-paced construction of so much of our current environment. These template-driven processes, which start from a detailed image of the 'end-product,' have the power to result in 'overnight' tract housing and shopping malls, yet they cannot yield the robust uniqueness of differentiation and profound beauty which is a process of growth 'from the inside out.'



Working through the medium of print requires a linear stringing out of presentations and so the fifteen properties are sequentially lined up here like good soldiers. In reality they never 'line up.'

They dance. They overlap and double up. Some appear early, others wait their turn. Accepting this limitation of presentation through print, our cast of fifteen characters begins with centers.

## 1. STRONG CENTERS

We start with centers because structures of multiple centers create, and are, wholeness. Definitions are problematic; indeed, coming up with a tight operational definition of centers turns out to be one of the more slippery pieces in the entire puzzle. But, as a means of starting somewhere, even if it is a bit of a gloss, it can be said that a center has coherence. Entities in their own right, centers create focus in our visual field.

Centeredness depends on the overall configuration of the space. Sometimes centers are marked by an internal center where there is another change of continuity (as in the rain drop and jellyfish). At other times they are homogeneous across their interior as compared with the surrounding space (as in the William Morris print). Centers are often bounded (as in the carpet motifs). When centers appear in

sets, they are usually symmetrical and marked by simplicity and regularity (as in the flower-shaped center of the jellyfish or the carpet middle row left).

In general, the strength of a center—or its degree of life (*Prägnanz*)—is a measure of its organization. Conceivably this could be measured by a center's ability to resist disruption, or by its influence on the centers around it or by its lifetime. Just compare the different lifetimes of a raindrop, a jellyfish, and the solar system.

These initial examples are obvious and straightforward, but, of course, nothing is really simple. As our descriptions continue it will become clear that all fifteen properties are interdependent, each contributing in its way to the density and depth of interconnected yet distinct centers.



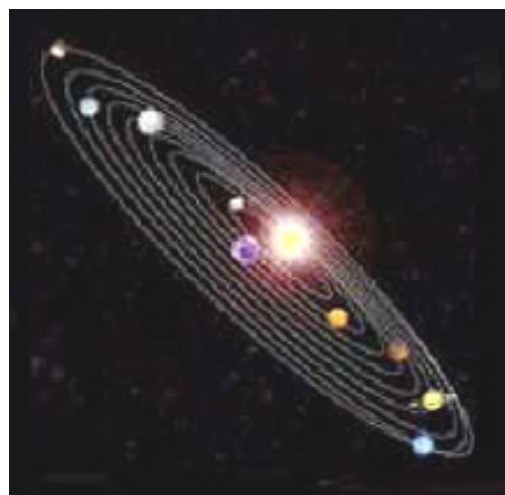
Rain drop



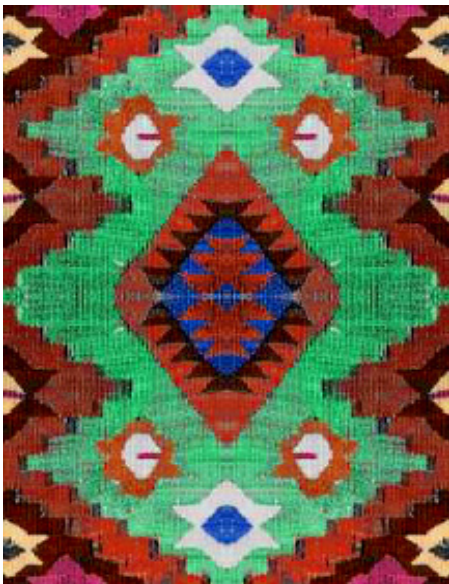
Jellyfish



Carpet motif. Photo Ian Alexander



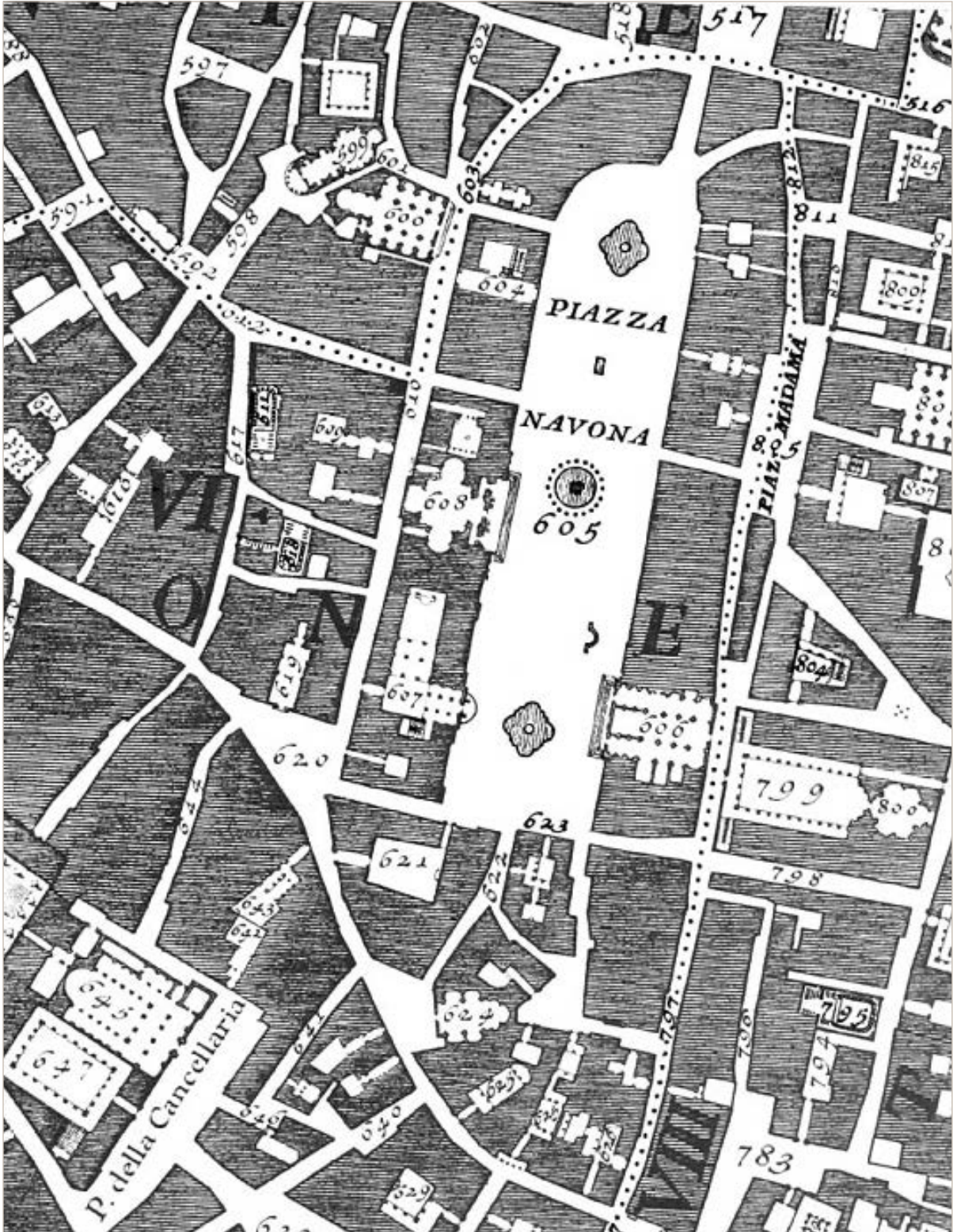
Solar system



Carpet motif. Photo Ian Alexander



William Morris print



The old Noli plan of Rome indicates how the (solid) buildings interact with the (empty) non-built spaces. Both solids and voids are centers in the field-like structure. At smaller levels of scale, other squares and market places throughout the city complement the major centers, such as the Piazza Navona, and contribute to the field-like structure of the whole.

## STRONG CENTERS IN THE BUILT ENVIRONMENT

Physical anchors (centers) in the built environment are prerequisites for social capital—that fount of resources stemming from the capacity of citizens to connect both formally and informally, establish trust and work out patterns of mutual support. Our town halls, town squares, churches, schools, boardwalks and cafes ground us—quite literally—in our roles as members of human communities.

Adaptations to geography and culture give rise to a panoply of different physical underpinnings for social capital. Italy has its plazas, the Mediterranean ports have promenades, neighborhood pubs abound in Ireland, bistros in Paris, and what would Vienna be without its coffee houses. The outdoor centers, illustrated here by the town square of Berne where people play chess on a summer day or the Piazza Navona in Rome where a crowd watches street performers, are never just leftover and amorphous areas. They have real shape—as stages for human interaction.

Just after World War II the United States had around 150,000 tavern-like places (centers) where people could gather and talk. Today less than one-third this number remain, marking an impoverishment of community life and genuine human interaction.

Indeed, many American towns are lacking strong centers at various scales necessary to human community. “*There is no there, there*” is the famous quip made by writer Gertrude Stein when she first visited Oakland, California.



Berne, Switzerland



Piazza Navona in Rome



Tavern in the Balkans. Photo Hadjidimitriou Tzeli



Visual confusion. An absence of strong centers and the other geometric properties

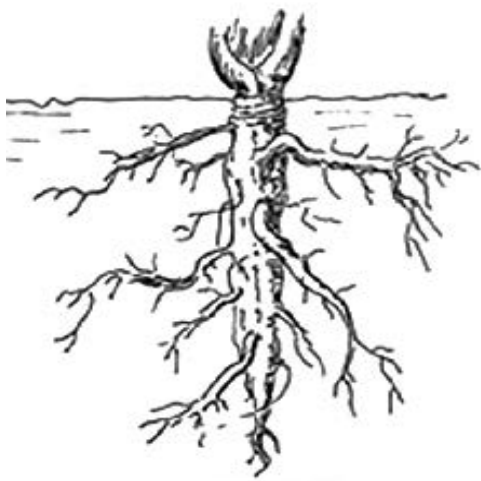


A typical American sub-division lacking a strong center that can support human interaction

*“There is no there, there.”*

## 2. LEVELS OF SCALE

All life tends to form multi-levelled structures of systems within systems. At one level, say, in an animal or plant, there are cells which obey certain laws, then there are aggregations of cells obeying



Root system

different laws and creating new wholes, and then aggregations themselves form larger aggregations, again with new laws. From cells to tissues to organs, to organisms to social systems to ecosystems—new properties emerge with each new level of complexity. The different nested levels ‘help’ each other, perform different tasks, and are necessary to the functioning of the whole. The characteristics of the whole come from the organizing relations of the parts.

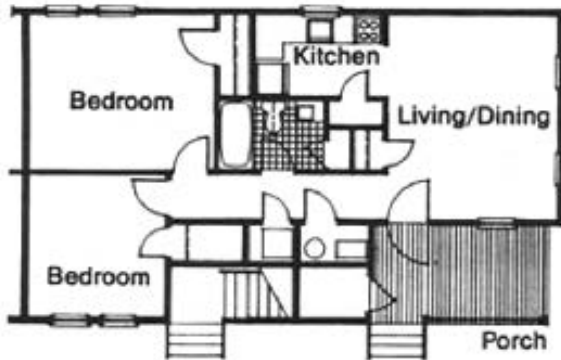
Levels of scale appear to be germane to the structuring of natural systems. Bifurcation theory might someday lead to a mathematical explanation that could unpack the mysteries surrounding their formation. For now, we can only observe. In the case of root systems, for example, there is a predictable ‘jump’ from the scale of the smallest roots to the significantly larger scale of the next sized root that, in turn, will jump to the next scale.

## LEVELS OF SCALE IN THE MAN-MADE REALM

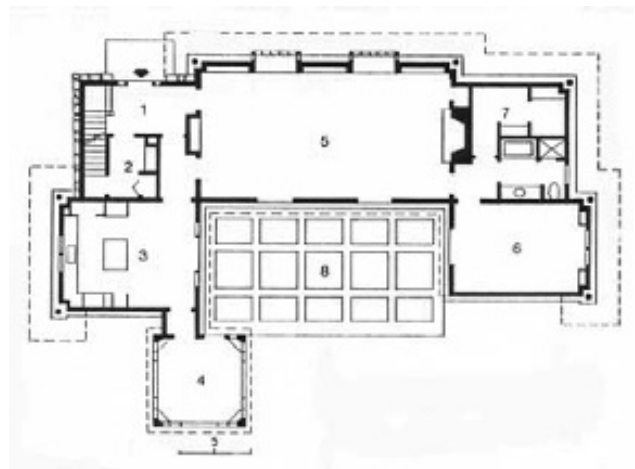
An artifact will 'work' better if there is a scaling factor between two and four among its centers. In other words, a center gains in intensity if the other centers near it have a scale relation of somewhere around one-half (less and the centers lose their distinctness) or twice its size (more and the centers appear unrelated).

Compare the two floor plans and the two pieces of jewelry. Every room constitutes a center in these two

floor plans. Notice how the levels of scale in the floor plan by Frank Lloyd Wright work to increase the saliency of the individual centers and the whole. The centers in the other floor plan lack levels of scale, so that, in failing to mutually support each other, they make the whole weaker. These same relationships are true of the brooches. The scales of larger and smaller elements (both solid and void) in the Persian brooch yield a 'tighter,' more interesting and vibrant ornament.



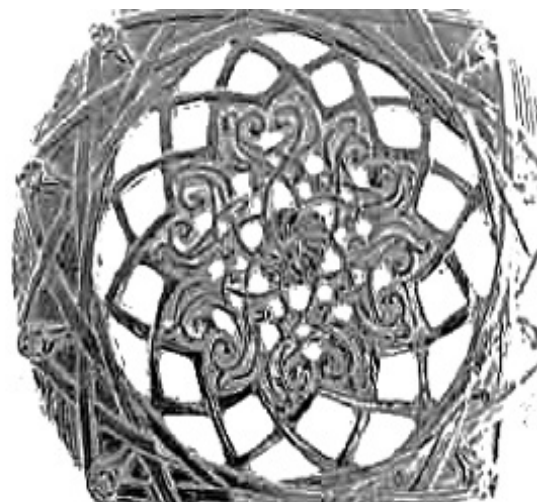
Typical and mediocre floor plan



Floor plan by Frank Lloyd Wright



Modern brooch. Poor levels of scale



Brooch from Persia (Middle Ages)  
with good levels of scale





A modern mall in Sacramento, California



Anywhere USA. A modern office building



Store front in Santa Monica, California

## LEVELS OF SCALE IN THE BUILT ENVIRONMENT

In the built environment, levels of scale play a key role in human orientation and perceptual understanding of space. Our pleasure in interesting surroundings depends on levels of scale as well.

Three conventional storefronts demonstrate how different amounts of information can be conveyed to potential customers.

The shopping mall in California (top photo) might be mistaken for a government building, hospital, or airport parking garage. It could make military sense to construct a fortress with no levels of scale so that the enemy felt intimidated and had no clues as to how to approach or enter. Why stores and malls are built without levels of scale is more perplexing. If we imagine ourselves approaching this building we know we will have to hunt for the front door and take good note of where we left our car.

Rock bottom budgets and standardization of 'big box' construction may be two possible reasons for building without levels of scale. Designers also now give more thought to how to drive in and park than they do to how the customers will negotiate the space.

A typical modern construction style depicted in the office building (middle photo) does have more levels of scale than the big box and, therefore, gives out clearer clues for orientation, yet it remains uninformative and unappealing.

The Santa Monica store displays a lively interaction of many distinct scales, reinforced and enhanced through color. The easy orientation is a genuine source of comfort. Notice how many of the centers relate to each other with levels of scale between two and four. Each center remains distinct yet is 'in relationship' with the other centers.

### 3. BOUNDARIES

Boundaries unite the center with the world beyond and, at the same time, separate it.

Science has developed partial explanations for the phenomena of boundaries, but not yet a satisfying

general one. The sun has a corona because the transition from hot to cold leads to phenomena unlike those in the sun's interior. The blood cell boundary provides a processing zone. Human eyes have a necessarily complex boundary around the iris.



Sun's corona. Photo by University of Oregon



The human eye

#### BOUNDARIES IN THE MAN-MADE REALM

In man-made objects boundaries play the same role. Just as a picture frame faces both in and out, it both separates and connects the picture with the surroundings. A boundary helps focus attention

on the center. Hardly a dimensionless interface, a boundary will have its own intensity and it will itself be composed of centers. The initial center together with the boundary form a larger center.



20<sup>th</sup> century. Painted bowl by Shaari Horowitz



11<sup>th</sup> century. Seljuk bowl



Jewish Center in Duisberg, Germany



The Palace of the Governor in Santa Fe, New Mexico



Gothic Cathedral in Chartres, France

## BOUNDARIES IN THE BUILT ENVIRONMENT

Boundaries around buildings—entrance ways, porches, flower beds, verandas—‘frame’ the building and enhance the experience of transition from the outside to the center. They also provide privileged zones for human interaction.

The Jewish Center in Duisberg is without boundaries to help relate the building to its surroundings. Certainly there is no inviting transition zone where it would be comfortable to speak to an acquaintance, enjoy a break or smoke a cigarette.

On the plaza in Santa Fe, New Mexico, the boundary formed by the long portal of the Palace of the Governors houses a traditional part of everyday activities. Native Americans from the Rio Grande pueblos and Navaho country make themselves work spots in the shade and display their homemade jewelry. Tourists and locals shop, linger a while, chat, and learn about the crafts of working silver and turquoise.

The massive and dense boundaries around the entrance to a Gothic Cathedral intensify our psychological transition as we leave the secular hustle-bustle outdoors for the sacred silence of the interior space.

ALWAYS  
A MATTER OF DEGREE

Our success with geometrical properties in artifacts is always a matter of degrees.

Sidewalks are obvious boundaries. Imagine the experience of walking down a simple sidewalk, such as the one shown above, where the community has managed a successful use of multiple bands. The wide green band with trees, the sidewalk itself, and a low wall with wrought iron combine to create physical and psychological distance from moving traffic and a pleasant place to stroll. Now imagine the experience of the second sidewalk with a less successful and hence less lively juxtaposition of bands.

Boston University's urban campus sports sidewalks with additional dimensions to make them even more successful. The width of the sidewalk, the generous stairs leading into the school buildings, places to sit, all combine to create a stage for student interactions. The sidewalk is a center in its own right and is composed of centers.



Successful sidewalk in England  
Photo Charles Adams

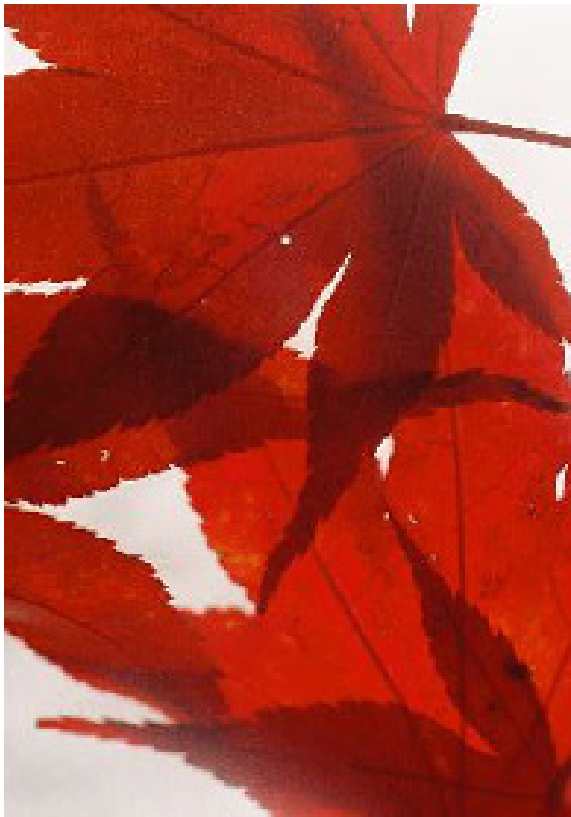


Less successful sidewalk



Boston University. A sidewalk becomes a place to hang out.  
Photo Professor Xin Zhang

## 4. GOOD SHAPE

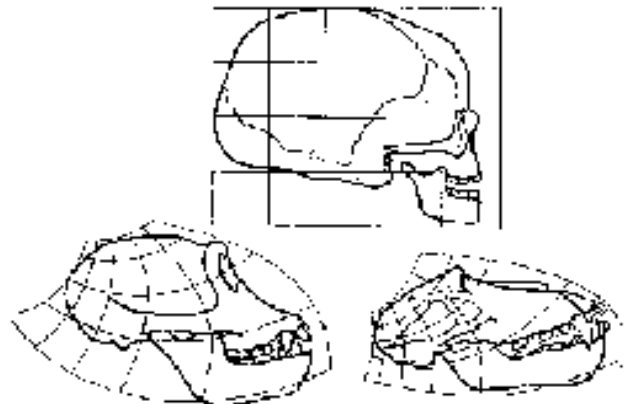
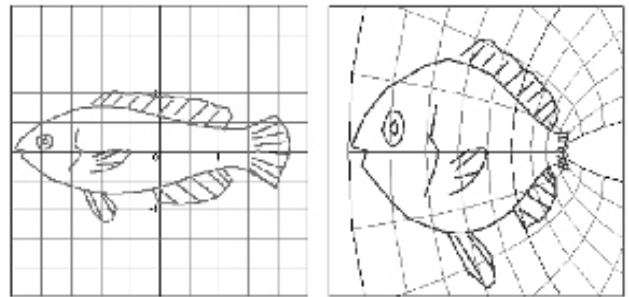


Maple leaf

*“Since the weight of a fruit increases as the cube of its linear dimensions, while the strength of the stalk increases as the square, it follows that the stalk must grow out of apparent due proportion to the fruit: or, alternately, that tall trees should not bear large fruit on slender branches, and that melons and pumpkins must lie on the ground.”*

D’Arcy Thompson

*“Form is a diagram of forces.”* That was D’Arcy Wentworth Thompson’s most well known phrase. Thompson knew what good shape was, although he didn’t use the expression. Good shape is a transformation that strengthens existing centers following a recursive rule. The elements of good shapes are good shapes themselves. There is usually a high degree of internal symmetry, a well-marked center, and positive space next to it. A center with good shape will be fairly compact, with closure, and be distinct from what surrounds it.



The drawings of transformations in skull shape and fish are taken from *On Growth and Form* (1917) by D’Arcy Wentworth Thompson who, like Baudelaire, drew knowledge from his delight. Thompson observed that there are only a few generic shapes which nature keeps using, and that these shapes are greatly modified by slight variations in their physical and chemical environment during growth and development. He draws two different species, say of crab or fish, and superimposes a grid over each. By mathematical transformation of the coordinates he shows how easily a great variety in crab and fish shapes may be produced from just one generic crab or fish pattern. The concept of mathematical patterns in biology and their influence on morphology are modern ideas, with notable contributions from Goodwin, Kaufman and Capra. Studies of the basic patterns in morphology illustrate the enormous range which adaptations of a few generic patterns can produce.



Good Shape. Church in Tabriz. Photo worldbybike



Good Shape. Blue Mosque in Azerbaijan

*“How hard it is to find a good chair and how easy to find a novel one.”*

Adolf Loos 1898. Munich exhibition

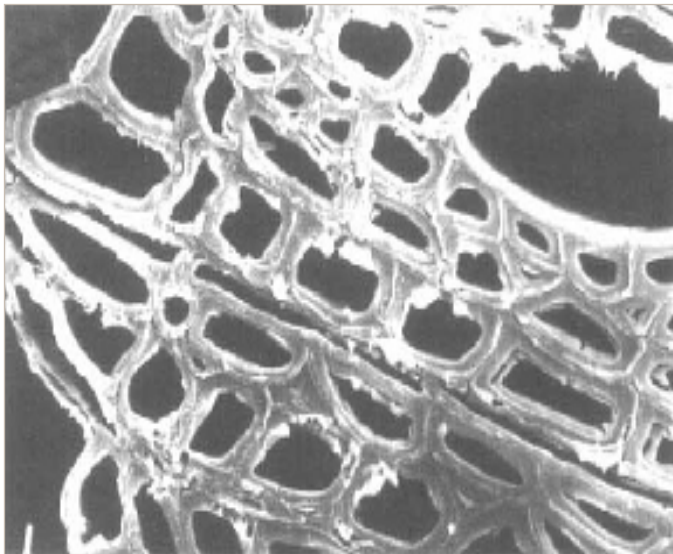


Good Shape in Chairs



Bad Shape in Chairs

## 5. POSITIVE SPACE



Detail of aspen wood seen from a microscope



Classic Indian dance

Positive space describes the desired qualities of spaces in-between existing centers.

The convexity and compactness of an existing center (its good shape) will be the outward expression of its internal coherence. This property will influence the shapes of spaces surrounding the center, thereby giving forms to those spaces that are equally pleasing and also have a contained character—positive space. Positive spaces, in turn, fortify the good shape and strength of centers.

When the in-between spaces become well-formed and compact, they become centers in their own right. Initial centers plus centers—in the form of positive space—meld to form larger scale centers.

In the structure of aspen wood the empty in-between spaces are themselves well-formed and an integral part of the field-like structure. Somewhat akin to the Noli plan of Rome shown earlier, the solid and void work together and the small and larger scale elements bootstrap each other.

Accomplished dancers or practitioners of Aikido will naturally create, between and around themselves, a flow of changing positive spaces. Beginners not well centered in themselves and out of sync with their partners will be less connected by the spaces in-between.

## POSITIVE OUTDOOR SPACE

At the heart of successful built environments lies positive outdoor space.

In old cities, the in-between spaces of back streets and gardens have often become positive spaces and places (centers) in their own right. The feeling created is that of compactness. Modern suburbs and commercial zones typically suffer from an amorphous 'emptiness' between buildings and parking lots with no inviting in-between spots to walk or sit.

The district of Trastevere in Rome offers a typical scene. Far from being neglected, the alleys are embellished with balconies, places to sit, and plants. Neighborhood folks stroll in the evening, meet each other, or have a glass of wine and pasta.

The Place des Vosges in Paris derives its beauty from clearly shaped components, definite boundaries and a substantial central marker. Everything is 'tight.'

Green areas which clearly benefit from a great deal of landscaping effort can still fail to engage us if the gardeners are clueless when it comes to positive space. Here in suburban America, the green areas are rather shapeless and without much vigor.



Back alley in Trastevere, Rome. Photo David Winslow



Place des Vosges, Paris



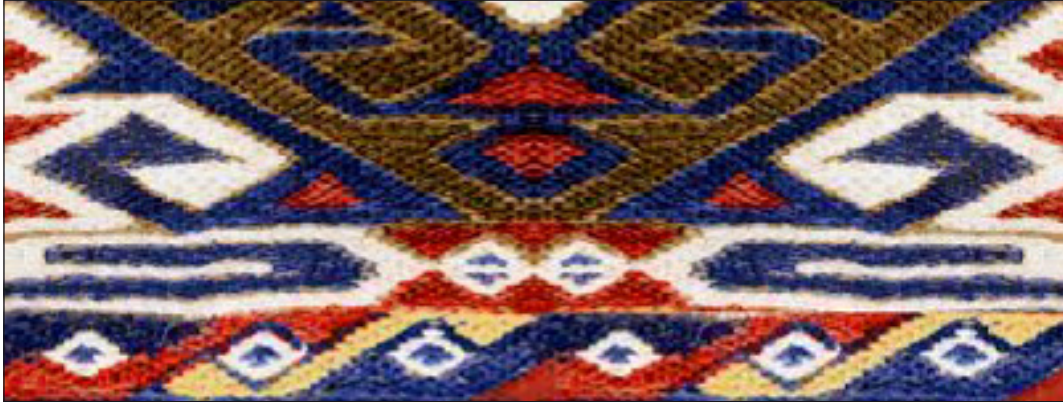
Suburbia in America



## POSITIVE SPACE IN THE MAN-MADE REALM

Positive space ranks as one of the top hallmarks of a good artifact. In the segment of the Turkish rug, it is no longer possible to say which elements are centers and which are in-between spaces. The field-like

structure is tight: all elements are centers which bind together as one vibrant whole. In the pot the shape is good and the decorations create positive space on the surface. The field-like structure is again compact.

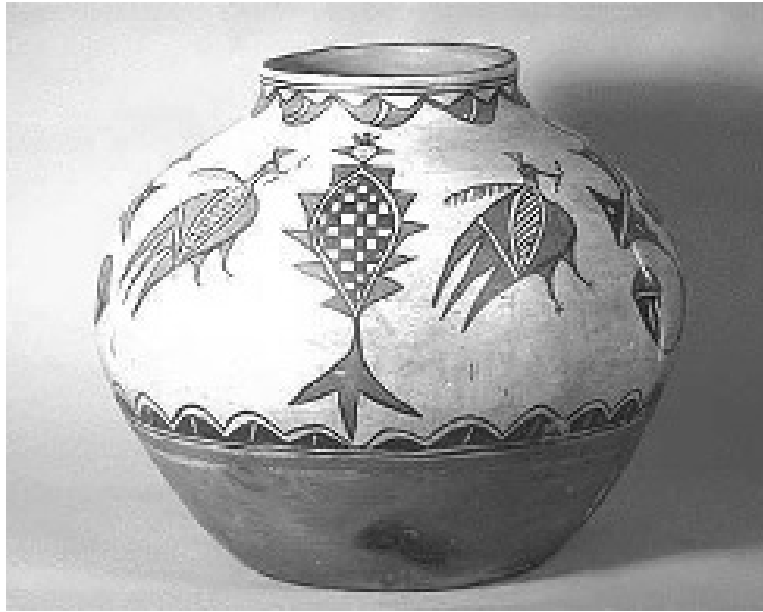


A segment of an old Turkish carpet. Photo Ian Alexander's natural pattern library  
Note: There is no relation between Ian Alexander and Christopher Alexander.



An old pot from Acoma Pueblo in New Mexico

ALWAYS A MATTER OF DEGREE



An old New Mexican pot from San Ildefonso Pueblo  
Good shape, however, the decorations 'float' creating less positive space on the surface than on the pot below.

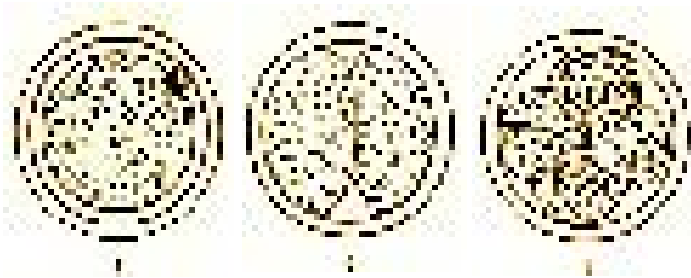


An old New Mexican pot from San Ildefonso Pueblo  
Good shape and positive space. The decorations create better positive space around them than on the pot above but less well than in the Acoma pot on the opposite page.

## 6. LOCAL SYMMETRIES

The property of local symmetries refers to the fact that so much of the natural world comes in pairs and that so many small paired elements are nested within larger paired elements.

The most basic growth pattern in living organisms is through cell sub-division into equal and symmetrical parts, which may, in turn, subdivide again. The cells in our body, the symmetry of our eyes, hands, arms, the patterns of any tree branch or leaf, remind us of the ubiquity of local symmetries. Observe how the fern leaf is composed of nested levels of locally symmetrical growth patterns.

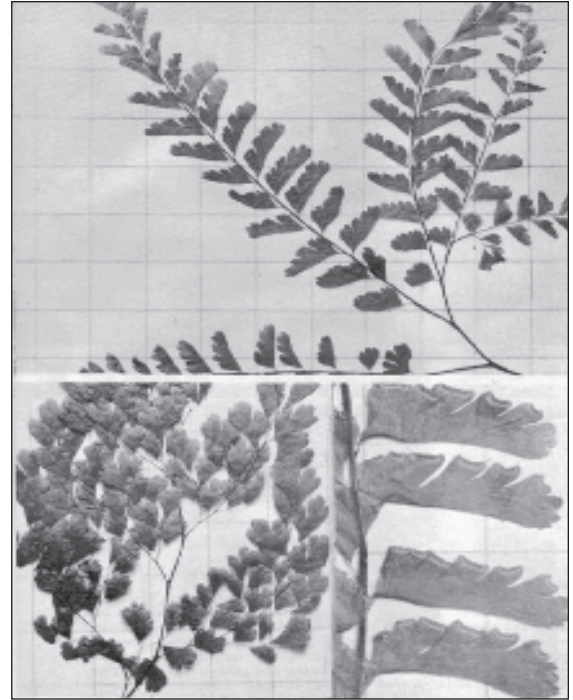


Cell division into local symmetries

Unfolding wholeness usually means conserving existing local symmetries as the structure moves forward in time. The growth process will only create those asymmetries that are absolutely necessary.

The perceived coherence (*Prägnanz*) of a field may actually be measured by the number of locally symmetrical sub-configurations nested at different levels of scale. We could argue that, fundamentally, wholeness is overlapping local symmetries.

Much discussed in current science, local symmetries remain part of the unsolved mystery of biological growth and morphogenesis. Frequently, as in the symmetrical shape of soap bubbles or crystal formations, the available explanations invoke the principles of minimum energy and least action.



Fern leaves



Quartz crystal

## LOCAL SYMMETRIES IN THE MAN-MADE REALM

In these three cases a few minutes of intense looking will reveal a surprising number of local symmetries going from the larger elements down to the tiniest ones.

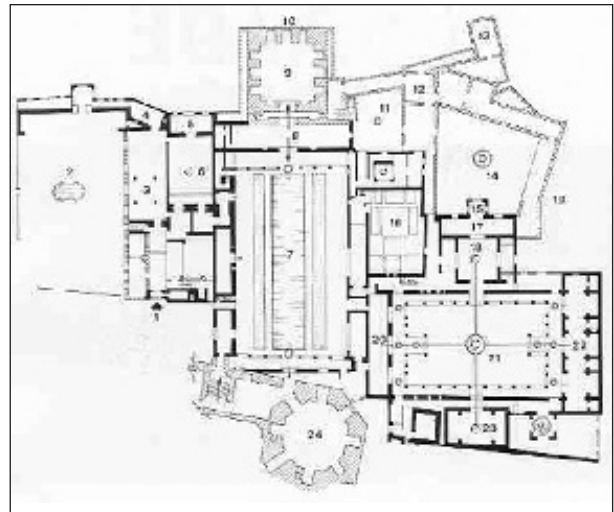
The Wolftrak carpet motif is simple yet it involves quite a number of small paired black elements and small paired white elements in nested larger pairs that are also symmetrical.

The Alhambra has no overall symmetry but adapts loosely to its hilltop site. The coherence comes from a complex nesting of locally symmetrical rooms, courtyards, shapes and sizes throughout the building.

The Central Asian carpet has an intense field-like quality of coherence despite the absence of an obvious strong center. The field-like structure becomes intensified as smaller locally symmetrical elements coherently come together to form larger symmetrical elements which in turn form even larger ones.



Wolftrak carpet motif. Photo Ian Alexander



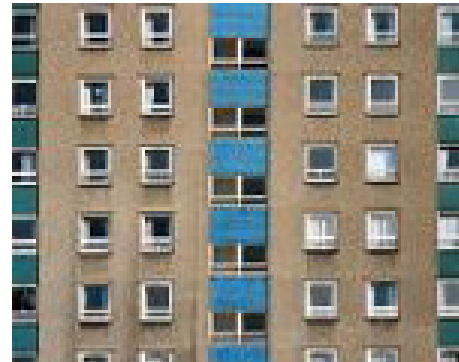
Floor plan. Alhambra, Spain



Carpet from Central Asia. Photo Ian Alexander

Our minds find pleasure in what E. H. Gombrich calls 'graded complication' where the order is not too obvious, and therefore numbing, or taken over by confusion.

The deadening local symmetries in high-rise housing units bore us to tears while we'll gladly wander Belgian streetscapes, which may not be fancy or well-heeled, but have *eurhythmy*. The local symmetries involve many partial and overlapping patterns and disparate elements which entertain our senses.



Social housing



Street in Belgium

## 7. ALTERNATING REPETITION

Zebra skin, waves, sand dunes—the world is full of alternating repetition of two sets of centers. Significantly, in alternating repetition the secondary

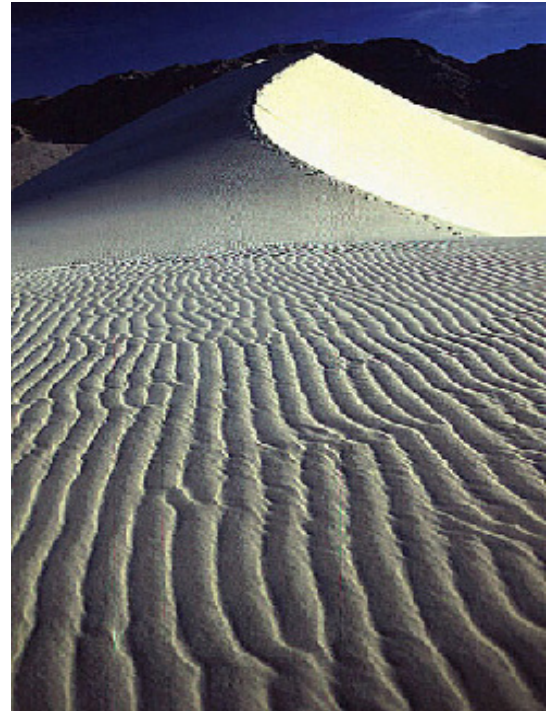
centers are coherent in their own right and often have the same order of magnitude as the size of the primary repeating units.



Alternating repetition in rice terraces in Bali. Photo Ian Alexander

As for the other properties, although there is no general theory explaining the pervasive nature of alternating repetition, there is often an explanation for specific cases. The motion of fine and coarse grains is the origin of the alternating rhythm of sand dunes.

In the case of the mackerel cloud formation, the dynamics of vapor formation create clouds of a certain size. The nucleation of the vapor in one clump ‘sweeps’ another volume clean of vapor. The space loses its vapor as the denser droplets form in the zone next door. As the cloud forms, the spaces full of vapor and the spaces emptied of vapor alternate, forming the striated pattern in the sky.



Alternating repetition in sand dunes  
Photo University of Alberta, Canada



Alternating repetition in a mackerel sky

## ALTERNATING REPETITION IN THE MAN-MADE REALM

In the man-made world, much beauty derives from the rhythm of centers that repeat and are intensified by an alternating rhythm which interlocks with the first. Recursive alternating repetition is more satisfying than the simple repetition so prominent in modern construction.

Grace and rhythm created through multiple dialogues of alternating repetitions bring us back again and again to great buildings such as the 13<sup>th</sup> century Ibn Tulun Mosque in Cairo, Egypt and the Palace of the Doges in St. Mark's Square in Venice.



Palace of the Doges in Venice. Photo Bob May



Ibn Tulun Mosque in Cairo





Royal Ontario Museum in Toronto. Architect Daniel Libeskind  
Featured in James Kunstler's website "*Eyesore of the Month.*"

Obviously, other buildings serve as counterexamples for the graceful alternating repetition in the Palace of the Doges or the Ibn Tulun Mosque. In fact, some buildings stand ready as counterexamples for all of the properties shown so far and all of the remaining ones as well.



Denver Art Museum. Architect Daniel Libeskind  
Featured in James Kunstler's website "*Eyesore of the Month.*"

Lovers of traditional architecture often ascribe to Christopher Alexander a Luke Skywalker quality while architects such as Daniel Libeskind find themselves cast in the role of Darth Vader, at best a misguided soul to be pitied. How do we develop a satisfying building culture for our own times? Imitating buildings from the past is not satisfying nor is the goal of 'signature buildings' at all costs.

## 8. DEEP INTERLOCK & AMBIGUITY

Deep interlock strengthens existing centers and boundaries through a third set of centers that belong

ambiguously to both. In turn, the third set of centers gets its strength from the other two.



Interlock in the human brain

In the natural world we again have explanations for specific cases, but no general theory. In the cerebellum, the deep interlock increases the surface area permitting an increase in the number of connections. Similarly the magnetic domain

in a ferrous crystal allows for two materials to be in contact for an enormous surface area within a constant volume. In the evolution of a river, the meanders and interlock of land and water are formed by centrifugal processes.

## DEEP INTERLOCK & AMBIGUITY IN THE MAN-MADE REALM

The built environment and the sea interlock here in the Orkney Island village of Stromness. The surface of contact between the sea and the land is increased by the indentations formed by the wall supports and the boat landings. Geometrically, these indentations

form areas (centers) belonging ambiguously to both land and sea. The doorway to the Stillhouse at the Seagrams distillery in Waterloo, Belgium interlocks deeply with the wall while the windows, lintel and vines all provide additional ambiguity.



Village of Stromness. Photo Orkney archives



Without interlock. The Arc de Triomphe in Paris



No interlock in a typical school door



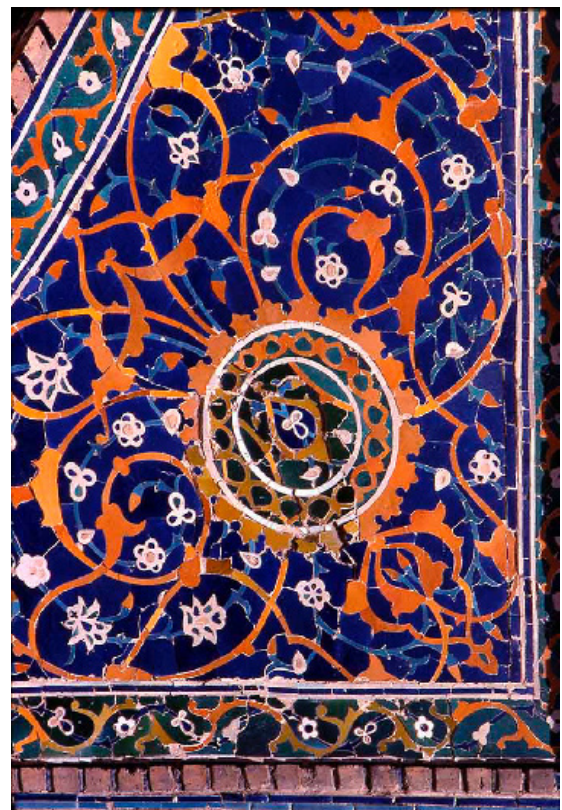
Seagrams distillery



Tile work in the underground station at Baker Street in London  
*Well, Sherlock, not much going on here.*



Tile work from Fez, Morocco. Deep interlock & ambiguity



Tile work from Samarkand. Deep interlock & ambiguity

## 9. CONTRAST

At the most elementary level, all structure and form comes from contrast, which is the essence of differentiation. The difference between opposites

gives birth. Alexander notes that the contrast between nothing and something is the basis of Spencer Brown's account of mathematics.



A mystery seed  
This photo was part of an exam for students on-line.  
Natal University of South Africa

## CONTRAST IN THE MAN-MADE REALM

In artifacts, contrast is a bit like the process of leveling and sharpening when we adjust the contrast in a photograph. Contrast includes all dimensions of

building: dark and light, colors, texture, form, size, direction, materials, inside and outside, plain and decorated, hard and soft.



The full range of grayscale. Photo of Charlie Parker. Gershwin Fund Collection. Library of Congress

## ALWAYS A MATTER OF DEGREE

Four lecture halls illustrate a range of contrasts in the same type of functional space. The top two rooms enjoy the interplay of natural light. The lecture hall in the Sorbonne limits contrast to forms and light and shadow. In Santa Fe, New Mexico, architect John Gaw Meem honed light and shadow for good vision in the lecture hall at the Laboratory of Anthropology. The highly versatile space beckons with the pleasure of

contrasts of dark/light, full/empty, detailed/plain, and soft/hard. Different conditions for different kinds of learning can be easily created. Below, a recently built facility in Kuala Lumpur uses uniform artificial lighting, which combined with the lack of contrast in other dimensions, creates an atmosphere that is rather cold and boring. Least interesting is Potchefstroom with inflexible uncomfortable high tech solutions.



Lecture hall in the Sorbonne. Paris



Lecture hall. Laboratory of Anthropology. New Mexico



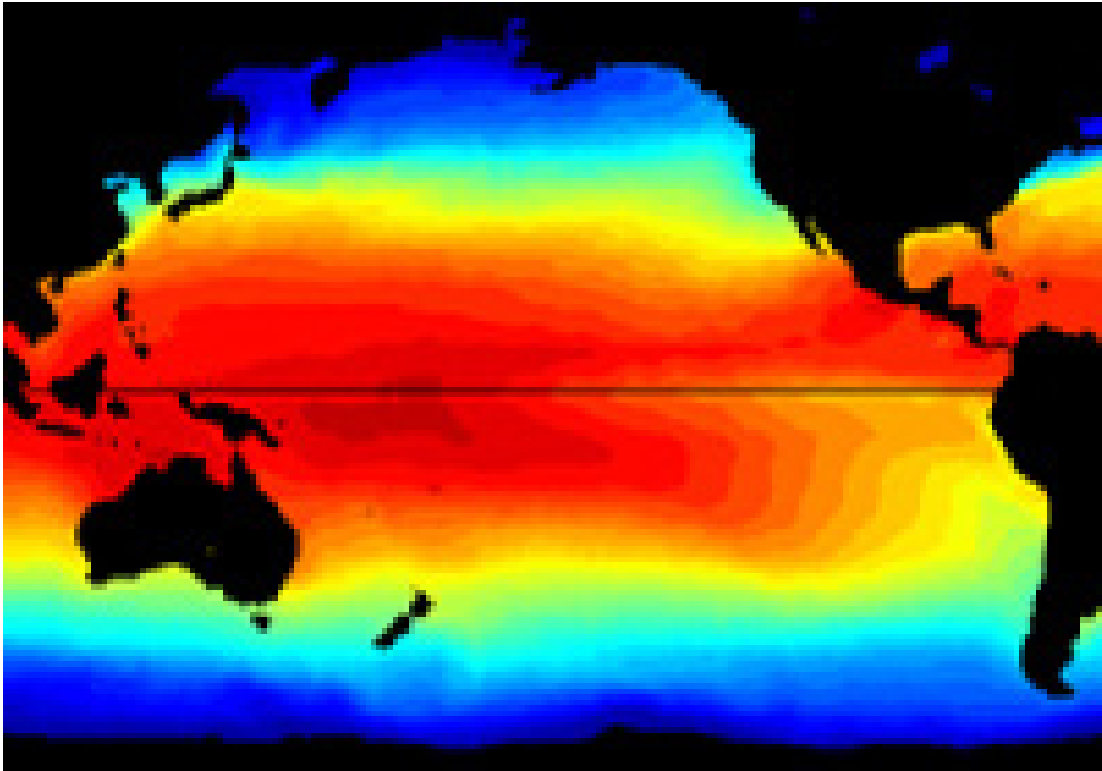
Lecture Hall. Kuala Lumpur, Malaysia



Lecture Hall. Potchefstroom University. South Africa



## 10. GRADIENTS



Temperature gradients from the equator to the poles

Gradients arise when things vary with regularity. Fundamental to integral and differential calculus, the concept of regular gradients has led to increased understanding of many phenomena in physics.

Alexander chose the case of a spider web. Like so many passages in *The Nature of Order*, there is an obvious truth (spider webs display gradients), but the description (page 73 of Volume II) defies clear translation into mathematics.



Spider web

*“A spider’s web starts at the middle. The spider works her way outward from the middle in a spiral. In each successive ring of thread, the total enclosed area of the web-cells is about equal and the threads get closer together, as the spider has to walk across radials that are further and further apart, and needs something to hang on to. We may also think of this as an area-based effect, because the spider can only straddle a “cell” of a roughly fixed area when walking, thus creating a pattern with rough centers related by an inverse square law for the radial dimension as a function of distance from the middle. As a result, centers forming a gradient make their appearance in the space.”*

GRADIENTS  
IN THE MAN-MADE REALM

Gradients intensify the field by 'pointing' toward the center. Although commonplace in nature and in traditional work, gradients are scarce in modern design and architecture.

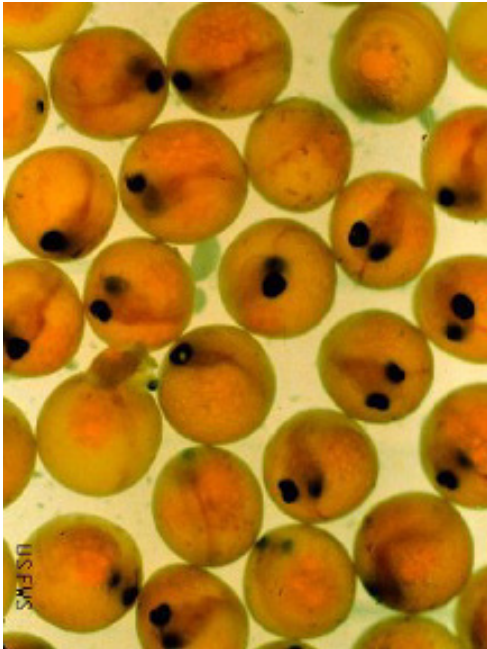


Le Corbusier chose to not use gradients in his Villa Savoye.

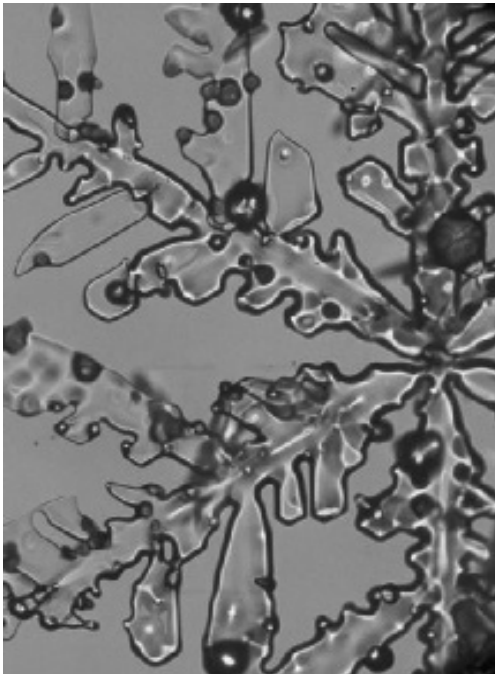


A stone wall in Central Asia built with large blocks at the bottom and a continuing gradient of smaller stones and carved motifs as it moves upwards.

## 11. ROUGHNESS



Fish eggs are just slightly irregular in shape and in spacing due to their three dimensional context. Each egg adapts precisely to its context and small differences in context can lead to substantially different results.



Natural snow crystal

Schopenhauer tells a story of porcupines who huddled together one night because they were cold. They got too close and poked each other with their spines so they moved apart and got chilly again. They shuffled in and out until they found that 'just right' distance where they could be warm and not get poked. When diverse elements 'wiggle' together so that each finds its spot, roughness arises.

In other words, roughness pertains to the resolution of problems when diverse elements come together in three-dimensional space. The irregularity of the shapes precludes perfect order, so they hold together in dynamic tension.

Mass-produced and mass-assembled identical modular units kill this fine level of adaptation of diverse elements and thereby eliminate the complex harmony of different kinds of shapes coming together.

Fish eggs, natural snow crystals, an old farm wall and door in Italy, and (next page) an old farm in Mexico embody roughness. The counterexamples chosen are the computer generated graphic of a snowflake, two modern doors (one cheap, one expensive) and (next page) modular houses in Colorado.



A computer graphic of a snow crystal is a far cry from the Real McCoy

## ROUGHNESS IN THE MAN-MADE REALM

For man-made objects, the term 'roughness' might be misleading, implying coarseness or imprecision, when it is, in fact, a quality of greater precision. Roughness comes from paying attention to which centers matter most, and letting go of what matters least. The appeal of handmade and hand-painted crafts often stems from the sensitivity of the artist who knows how to guard more carefully the essential centers in a design. Typesetters, to take one craft, use leading and kerning to override mechanical spacing in favor of a 'rougher' but actually more precise spacing that improves readability of the text on a page.

In the built environment, the reality behind roughness can often be one of serendipity. In the country wall and door from Abruzzo, Italy, stones were found, collected, and adapted to other stones without changing their shape or character.

Both the inexpensive standard cement wall with door and the expensive wall with decorated door are products of modular assembly of uniform units.



Farm door in Abruzzo, Italy



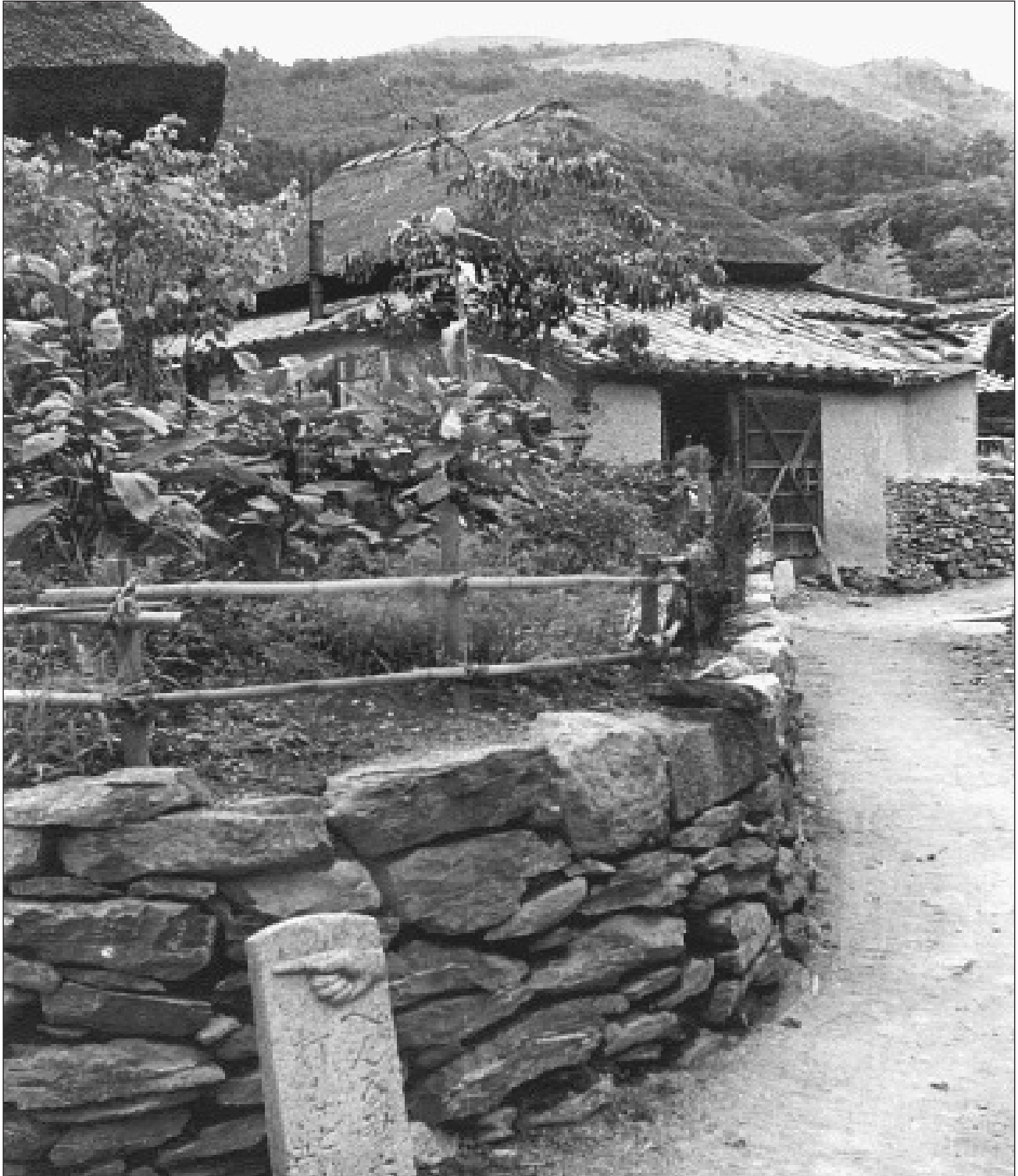
Modular cement door



Real estate photo



Housing built for a mining town in Colorado. There is no roughness in the sense discussed here. The houses are designed elsewhere and plopped down without reference to each other or the site. Photo by Eric Magolis



Roughness. A farm in Mexico where each object respectfully wiggles into place.  
No doubt there was incremental construction over a period of time.

## 12. ECHOES

Uniform growth processes create natural homomorphism and isomorphism among the different parts of any single system. In other words, the various smaller centers, from which larger centers are made, are all members of the same

family with deep internal similarities. Observe the subtle echoes of shapes, sizes, and colors in these lilies and the puffins. Notice also how local symmetries, contrast, roughness, good shape and positive space make their appearance.



Lilies



Puffins

ECHOES  
IN THE MAN-MADE REALM

A family-like appearance in artifacts may be the shapes of things or more simply the echo of similar materials and technology.



Stromness, Orkney

A juxtaposition of both a distant and close view of Stromness harbour affords us an opportunity to appreciate echoes at different levels of scale. Each house in the village echoes with the neighboring houses. Although each building is unique they share similar forms and volumes, color and texture, and orientation to the sea.



Stromness, Orkney

The design and construction method used for the Botta house preclude the quality of echoes.



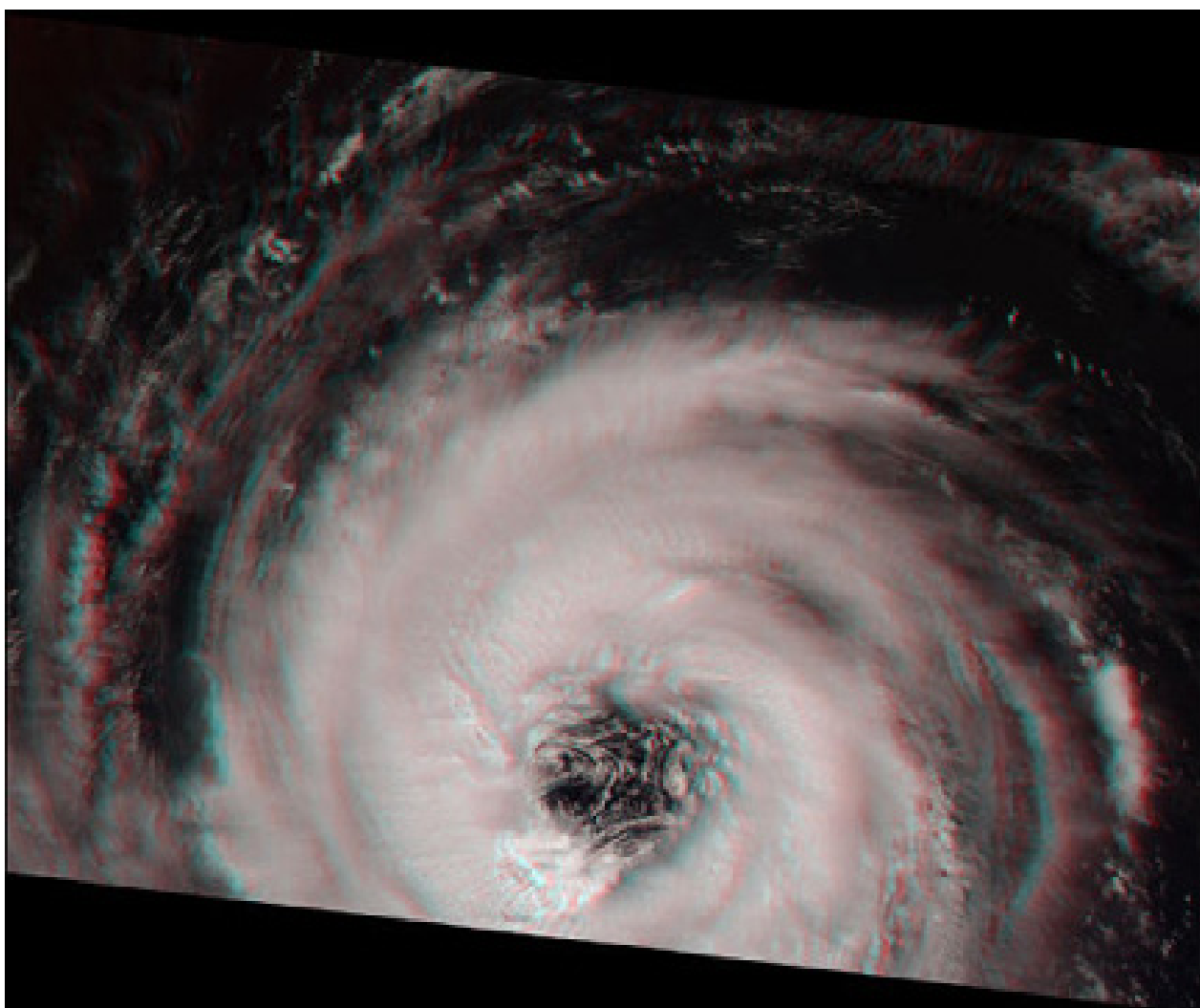
Botta House



## 13. VOID

In natural systems differentiation of minor systems almost always occurs in relation to the 'quiet' of some larger and more stable system. Thus smaller structures tend to appear around the edge of larger and more homogeneous structures. Perhaps in complex systems, the powerful quiet center occurs to maintain wholeness; this appears to be the case in most general models of fractal geometry.

In the formation of voids in the Great Barrier Reef, the voids seem to be natural counterparts to the dense complex structures around the edges. A similar process might occur at cosmological dimensions where dense filaments of galaxies form around vast volumes of emptiness. As the seasonal hurricanes move across the Caribbean, the eye of each storm remains the temporary tranquil spot.



NASA photo of a cyclone

VOID  
IN THE MAN-MADE REALM

Every successful center depends on the existence of a still place.

At different levels of scale, the Piazza del Campo in Sienna, the port of Hydra, and the Court of Lions at the Alhambra are structured by voids.

In Sienna, the piazza is bounded by a thick complex ring of centers. The main center—the unusual bowl shaped piazza—is a strong void. The buildings express local symmetry and echoes. In Hydra the water of the port serves as a still place. The pool (void) at the Court of Lions at the Alhambra is surrounded by boundary walls composed of centers manifesting alternating repetition, echoes, and roughness.

In each case the entire field is made up of centers, each bringing more strength to the surrounding centers and the field as a whole.



Sienna



Port of Hydra



Court of Lions, Alhambra



Temple Library, London



Public Library in Ellsworth, Wisconsin



Matoaca High School library in Chesterfield, Virginia

## ALWAYS A MATTER OF DEGREE

Voids in the built environment are key to our sense of peacefulness. We will seek them out when we wish to still our minds or concentrate without distractions.

Libraries are privileged places for solitary reading and reflection. A major component in how well a library works will be its degrees of success in incorporating voids in the interior spaces.

The Temple Library in London really pulls it off. The high ceiling and balconies create a central void. Carefully placed bookshelves around the windows create a series of smaller voids. These are in the form of alcoves and serve as individual work stations. The woodwork and natural light add to the beauty of the space.

The empty space in the public library of Ellsworth, Wisconsin lacks the 'good shape' necessary to provoke the desired sense of stillness.

The library at Matoaca High in Chesterfield, Virginia suffers from no void at all.



*“En toute chose, la perfection est atteinte, non pas quand il n’y a plus rien à ajouter, mais quand il n’y a plus rien à enlever.”*

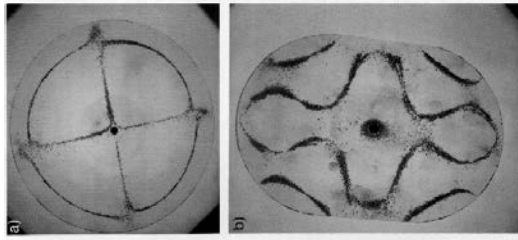
In all things, perfection is finally attained not when there is nothing to add,  
but when there is nothing to take away.

Antoine de Saint-Exupéry  
speaking about the evolution of airplane design in *Wind, Sand and Stars*

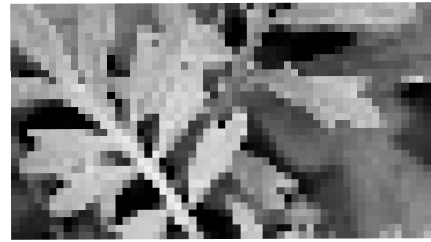
## 14. SIMPLICITY AND INNER CALM

Nature seems to clean out irrelevant structure as the farmer prunes his orchard. Irrelevant and irritating centers are removed until nothing unnecessary remains.

Simplicity and inner calm are the Occam’s razor of any natural system. Each configuration occurring in nature will be the simplest one consistent with its conditions.



Chladni figures



Leaf structure

Chladni figures are formed by sand on a vibrating plate. The sand moves toward the still spots in the standing wave which takes the simplest form possible. In the case of a typical three-dimensional

form of a leaf, the way the plan and cross section vary from stem to tip will be the least-weight structure for a cantilever supporting a uniformly distributed load.

### SIMPLICITY AND INNER CALM IN THE MAN-MADE REALM

In artifacts and the built environment, simplicity and inner calm come into being when everything unnecessary has been removed, thereby more strongly

revealing the deep structures. The process decreases the number of centers while increasing the strength and value of the remaining ones.



Simplicity and inner calm in a village street



Simplicity and inner calm in a passageway in Israel

The Cotswold house embodies simplicity and inner calm. Every feature is required by structure and use. Nothing irrelevant has been added.

The two 'McMansions' were constructed for a market where the main requirement is to make a statement concerning wealth. The prospective buyers

engaged in this marketplace find themselves in a race to outbid each other. The statements are made through unnecessary size, disregard for the land, and cosmetic 'features' which serve no functional purpose, such as the phony Greek pillars for the front door. Construction is guided by image and iconography.



House in Cotswold



McMansion



McMansion

## 15. NOT-SEPARATENESS

No system exists in perfect isolation. The idea that the life of each center in the universe is, somehow, dependent on the life of all the other centers might be viewed as a generalization of Mach's principle. Mach asserts that all particles of matter are somehow connected so that gravity itself, and the gravitational constant  $G$ , is dependent on the total amount of matter in the world; and thus every particle is somehow directly linked to every other particle.

Not-separateness is experiencing a living whole as being at one with the world. Ponds, such as this one, cannot be sharply isolated from their surrounds. In the same way, old farming villages are not separate from their fields.

One of the most obvious aspects of modern building is the deliberate striving for a separate stance and a disregard for all other structures.



Pond in England





Not-separateness in Derbyshire. Photo Mark Baker



Very separate office buildings in La Defense near Paris. Photo David Kolb

---

## NOTICEABILITY OF THE FIFTEEN PROPERTIES

---

*“Noticeability of a feature is essential.”*

Herbert Simon

The fifteen properties have all been ‘noticed’ before. It’s hard to imagine any art appreciation class lacking a discussion of ‘centers.’ The Japanese design tradition of Notan takes ‘contrast’ and ‘positive space’ to high art. The modern study of the harmony of unlike elements—‘roughness’—goes back to Copernicus and earlier.

Indeed, these properties have all been ‘noticed afresh’ many times by many people. In a book of stories, *“Seeing Nature,”* Paul Krafel<sup>(2)</sup> speaks of his years as a Park Ranger attentively observing, be it the slow decay of a deer carcass killed by a mountain lion, the flow of his urine as he pees on a rock, or the patterns of water run-off in the violent storms of the American Southwest. He notices afresh ‘gradients,’ ‘not-separate,’ ‘levels of scale,’ ‘unfolding wholeness,’ and his own participatory delight. Paul Krafel’s story called *“Walking”* begins with *“Learning is the spiral of change I am most familiar with. Each tiny lesson changes thoughts and behaviors. Changed behaviors lead to new experiences which lead to new tiny lessons. Accumulating lessons refine dim awareness into conscious mastery.”*

Noticeability of the fifteen properties begins with dim awareness and a need for obvious examples and leads to an appetite for conscious mastery through a finer and more complex shading of examples.

Unfortunately, *The Nature of Order* lacks such subtly shaded demonstrations, particularly in sufficiently coherent collections to address the question of how the fifteen properties manifest themselves within a building tradition. It would be instructive to develop a database of both obvious and subtle examples from culturally coherent neighborhoods (perhaps the Malay quarter in Cape Town, South Africa), towns (Sanáa in Yemen or Stromness in Orkney) or regions (Brittany or Dordogne in France).

As we continue our summary of Alexander’s work, the commentaries and final essays in Part Four will develop an accompanying story line emphasizing what is, to my mind, the greatest gift of *The Nature of Order*. This gift is a coherent vocabulary for noticeability. Noticeability is a pre-requisite for ‘learn-ability’ and for the construction of new hypotheses about how the world works. Of course, vocabulary is also a prerequisite for action. Eskimos and skiers have coherent and rich lexicons describing snow which supports the noticeability of snow’s various states. These terms are vital to their respective tasks. Alexander’s vocabulary will become vital to our tasks of creating deeply successful habitats.

---

(2) Krafel, Paul. *Seeing Nature: deliberate encounters with the visible world*. White River Junction, Vermont: Chelsea Green Publishing Co., 1999.

*“The process itself is the actuality.”*

Alfred North Whitehead



Caterpillar to Butterfly  
Kellscraft collection

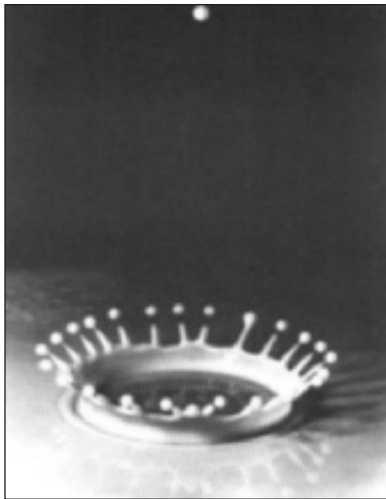
---

## UNFOLDING IN NATURE

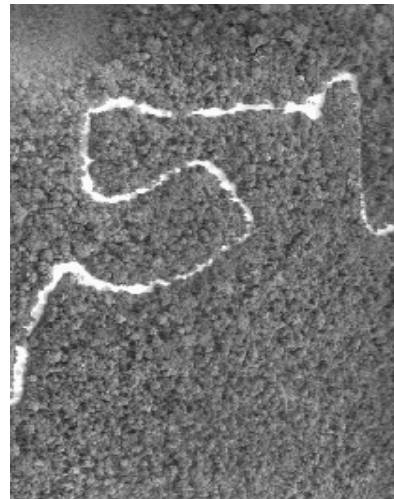
---

*“bewegliche Ordnung”*

‘moving order’ is Goethe’s expression for the dynamics of natural forms



Milk drop



Aerial view of river bends

In nature, whatever wholeness exists at any given moment will be transformed and intensified so that, in the next moment, the wholeness remains intact, preserved and more pronounced. Unfolding takes place through the repeated appearance of the fifteen properties.

The milk drop splash creates a strong center and levels of scale. The splash forms a ring—the first center. The perturbations around the edge of the ring then aggregate in smaller drops, smaller but not tiny. Although the smaller drops that form around the crown of the splash break the symmetry of the original ring, they will be arranged in a regular

circle and be of roughly equal size (local symmetry, alternating repetition and positive space). In other words, the smaller drops conserve the orderliness of the original splash, and therefore extend the ring structure.

A meandering river edge exhibits good shape, positive space and deep interlock. Along the edges of the river, random perturbation will form disturbances. These disturbances are latent centers and, as they intensify, they must go one way or another into a zone along the edge. The centers, which form on either side of quiet and turbulent places in the stream, create a pattern where the two parts interlock.

## UNFOLDING IS SMOOTH AND STRUCTURE PRESERVING

Unfolding is essentially smooth and structure preserving—each state follows without breaking the structure from the state before. Even in those cases where there is a catastrophe—the mathematical term for the appearance of some new feature not apparent in the earlier state—the catastrophe always begins as a feature which is consistent with the symmetries of the earlier state, and which then develops as the new source of structure. Three examples at different levels of scale flesh out these concepts.

Take galaxies first. The spiral form in a galaxy comes about because pre-galactic material will include some random motion. Random perturbations give rise to an oscillating pattern of gravitational waves of rarefaction and compression. As this wave system develops, it can go to only two or three large-scale forms. Much of the time it goes to a two-armed spiral, one of the simplest transforms of a slightly perturbed oscillating disc of material in which a gravitational wave appears.



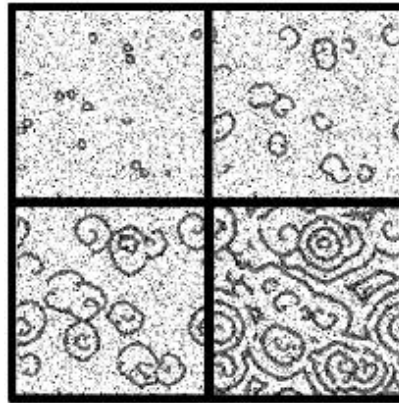
NASA photo of a galaxy

Next, look at the four stages of aggregation of dictyostelium, commonly known as slime mold. Coalescence of thousands of particles and their formation into one glob takes place smoothly. What happens mechanically is that the chemical agent

acrasin is diffused. The gradients of concentration of the acrasin, sent out by the individual swimming cells, become a basis for orientation and, as a result, cells clump together. The cells give the impression of swimming towards a center even though this center

is only manifested mechanically as a chemical gradient in the water. In fact, the concentration of acrasin is simply highest at the center of gravity of

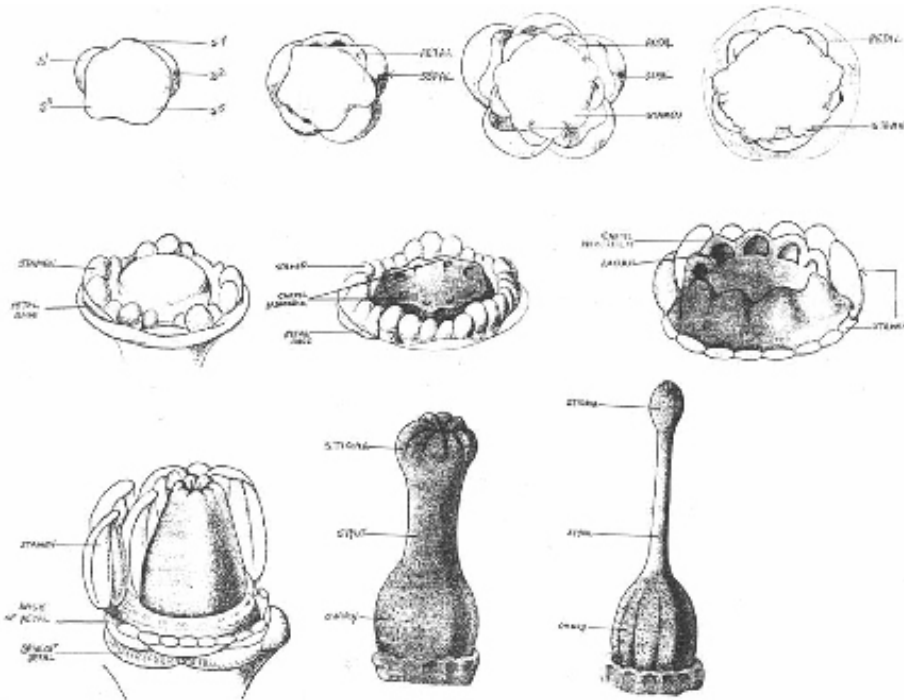
the individually moving cells. This center becomes the real center in the ensuing configuration because of the effect of chemotaxis.



Slime mold

Third, look at the pistil development in flowers as it goes through a succession of changes. The final form looks nothing like the beginning, however,

the transition is smooth. Each new stage, a whole unto itself, emerges from the former whole through a progressive differentiation and creation of centers.



Unfolding of a flower pistil

In each of these examples the sequences are slow, the transformations are smooth, yet there is enormous change. New forms come into being which are unpredictable from the initial state. The properties appear again and again. A prepared mind and eye will

constantly notice these processes. Local symmetries and echoes are obvious in crystal growth. Alternating repetition occurs when a cylinder buckles. The growth of the ecosystem of a forest occurs through the transformation of not-separateness.

## SIMPLICITY AND SELF-ORGANIZATION

In natural unfolding the principle of simplicity states that each step will be the simplest one consistent with the demands placed on the system. The principle of self-organization states that the future will be congruent with the present and past. As already noted, the principle of unfolding wholeness is consistent with current physics and biology. Further work in non-linear mathematics, fractals, catastrophe theory, and bifurcation theory should allow better understanding of self-organization. Alexander has proposed the following path of inquiry.

Alexander observes that, although science offers specific explanations for self-organization in a number of cases, there is no general theory of why things happen this way. We have explanations for structure preservation in the local mechanics of ridge formation in sand dunes (alternating repetition of

coarse and fine grains), and local symmetries in the faces of crystals, and strong centers and good shape in the mechanical action of stream flow. In fact, in the case of the meandering river, science has produced three equally convincing explanations: one based on least energy consumption, one on the action of centrifugal force, and one on the highest probability path for a fixed length random walk between two points. All three give correct numerical predictions for curvature and frequency of loops.

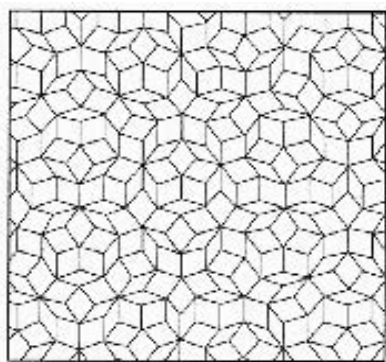
In physics, once the mechanical behavior of various systems has been reduced to mathematical formulation of the behavior of forces, we look for deeper principles of simplification such as the principle of least action, the minimum energy principle, or Pauli's exclusion principle of the 'sum over paths' method in quantum mechanics.

## POSSIBILITY OF A NEW GENERAL LAW

Alexander suggests that there might be a law that requires only that nature create centers, and that the evolution of centers through the formation of other centers is the essential mode of unfolding. It could be that there is essentially something in the geometry of living systems that creates order by itself.

To explore this possibility, Alexander turns to high-speed computers which can now simulate the behaviors of complex systems through generating simple rules for the component elements. A key idea

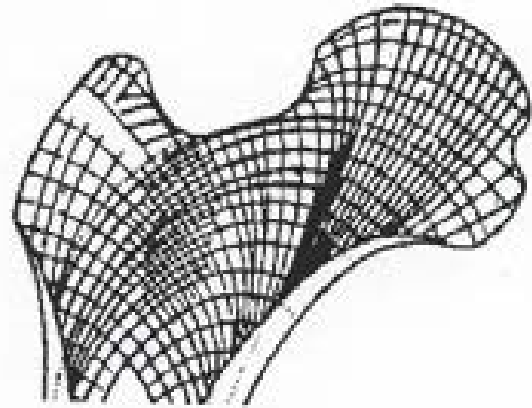
is that these systems converge to attractors (small regions in the state-space of the system) and that, under suitable conditions, order will arise. New views on the evolving system of genetic material suggest that evolution may follow certain pathways, not because of extraneous pressure, but by virtue of ordering tendencies of internal dynamics and the requirements of geometry. These theories hold promise for the questions raised here and for many of the problems glossed over by neo-Darwinian thinking.



Penrose tile

Two cases are offered for reflection. First, in Penrose's famous quasi-symmetric tiling pattern of stars and pentagons found in naturally occurring crystalline, it seems that the order observed requires an ingredient of non-locality in its assembly. Penrose noted that in putting the pattern together, one had to, from time to time, check out what was happening many atoms away in order to not make a mistake in assembling the pieces. The molecular assembly appears to be guided by a process that acts on the basis of the larger scale order.

Second, think of how a growing bone adds material precisely where the stress is greatest—so that the resulting shape of the bone, which emerges from the growth, tends to equalize the stress in every part. This requires a process that ‘knows’ how to add growth tissue just where stress or strain is greatest. The idea is simple enough and may become transparent once molecular biologists have isolated the particular mechanisms responsible for translating strain energy into growth. The Darwinian idea of selective advantage acting over generations seems remote from the simplicity of the process itself.



Bone

In other words, we are entertaining the possibility of a geometric principle of deep regularity, reminiscent of the principle of least action, but more general. The evolution of any living system would be governed by transformations of the mathematical wholeness. Local symmetries and centers would have a natural dynamic which self-preserved as it moves forward

in time. New structures are explained because they appear first in a diaphanous, weak, and latent form (frequently as a result of intensified random perturbations). In death and decay, order appears by a process of sweeping away, yet preserving many essential centers and symmetries. A teleological urge for life is not necessary.

## ROBUSTNESS, UNIQUENESS AND LIFE

Any description of form in purely static terms impoverishes the facts: everything is dynamic. Each differentiation adds relationships of interdependence among the centers making differentiated structures more robust and capable of complexity.

Some inorganic systems such as crystals may grow according to just a few relationships. Organic forms must be compared with a mathematical solution to a complicated requirement of simultaneous equations.

The wholeness of a form at any point in time is always in a nearly balanced equilibrium, however, never completely, since the configuration is destined to change. It's not a frozen pattern but more one of rhythm and fluid change. Again mathematics guides us. We know that simple equations produce unsuspected richness and variety and that complex and seemingly chaotic behavior can give rise to ordered structures. Exact predictions may be impossible. Unfolding may be similar to the current

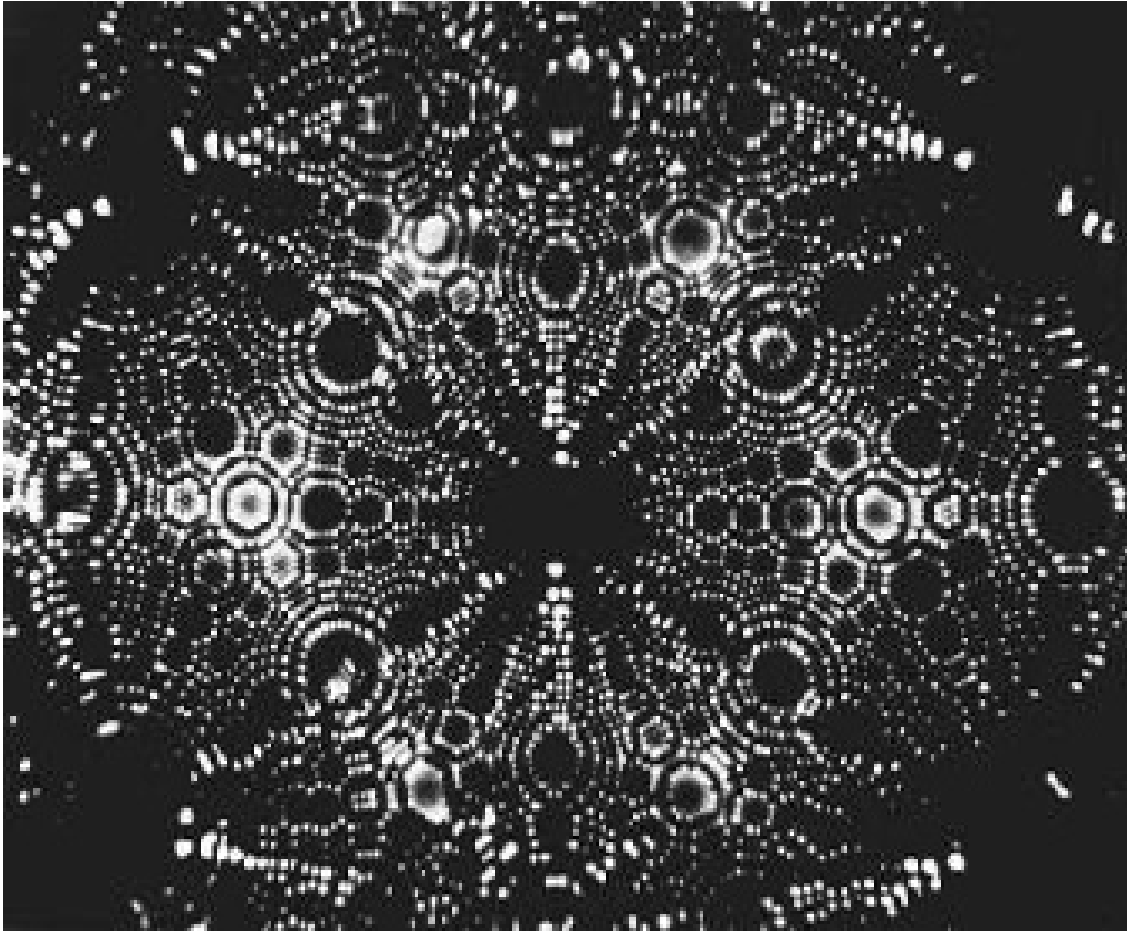
understanding of weather and the famous butterfly effect. In a non-linear system (and the world is mostly non-linear), the next stage is dependent on the current configuration as a whole, and a tiny element may have a huge effect. The general direction taken by the weather may depend on a variable such as the density of clouds, but a change in the 6<sup>th</sup> decimal place of density may lead to entirely different weather conditions.

In this holistic and geometric way of looking at things, the geometry is deeply regular and, at the same time, every part of space is unique because it is created by differentiation, not addition. Each part, individuated, is true to its context and its essence. Earlier thinking was essentially based on a worldview where the world could be broken down into modular units. At the base of this worldview was the idea that each atom of, say, hydrogen, was identical. We know now that this is not true and that each atom differs according to its context.



Life, as proposed by Alexander, is the property of space where each spot develops its uniqueness according to its place in the larger scheme of things.

When each spot is correct in its uniqueness, it reflects the wholeness beyond. In other words, the spot is the counterpart, the fitted entity, which is just right.



Every part is the fitted entity, which is just right.  
Photomicrograph of atoms in a tungsten crystal, magnified 2,700,000 times

## FROM NATURE TO ART

The definition of life proposed by Alexander holds for the man-made as well as the natural world. As a demonstration of the subtle transition from natural to man-made, let's probe into the progress made by Degas, the French painter. Degas' early work was rather 'lifeless' as compared with his later drawings. The early drawings were done at what the art critic and essayist, John Berger, called 'copying distance.'

The turning point for Degas, according to Berger,<sup>(3)</sup> was the discovery of photographs by Eadweard Muybridge. The photographs allowed Degas to fully study and 'take-in' the gestures of the unfolding movements in dancers, athletes and horses. With this assimilation, the later drawings were not from 'copying distance' but as from the inside. The energy of unfolding movement guided the artist.

---

(3) Berger, John. *The Shape of a Pocket*. New York: Pantheon Books, 2001.



Drawing by Degas

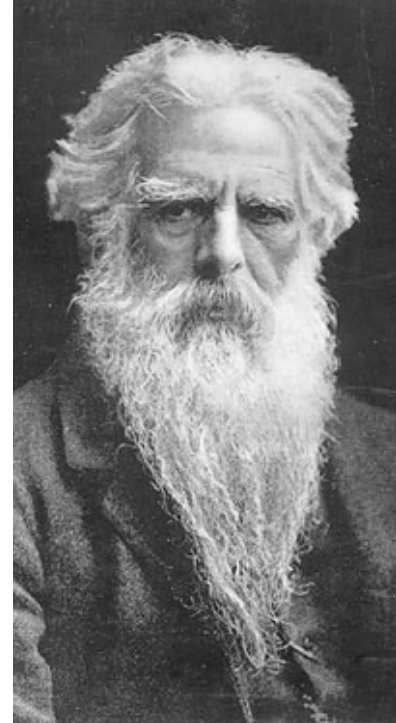


Photo from Wikipedia

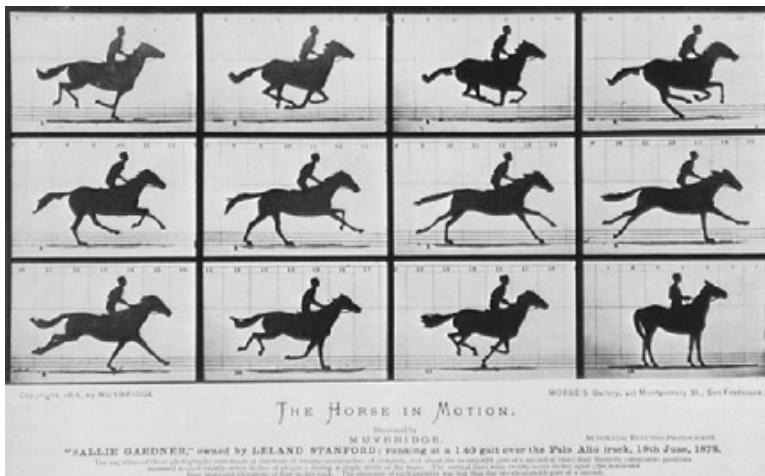


Photo from Wikipedia

This formidable figure is Eadweard Muybridge. A successful photographer in San Francisco, he was commissioned in 1872 by businessman and racehorse owner Leland Stanford to determine whether all four hooves of one of his best horses were suspended in the air simultaneously as he trotted. Muybridge began photographing horses in motion after Stanford's request, but six years went by before he was able to produce a satisfactory series of images showing a horse running at a full gallop. The photographic technology of the time was not suited for capturing moving subjects, let alone accommodating the use of multiple cameras requiring extremely precise timing to produce the desired series. Muybridge, after many attempts to mechanically open and close the shutters on his cameras faster than they were designed to move, decided to use a new approach: electricity.

## ON MOTHER NATURE

*“See how various the forms, and how unvarying the principles. We feel persuaded that there is yet a future open to us; we have but to arise from our slumbers. The Creator has not made all things beautiful, that we should thus set a limit to our admiration; on the contrary, as all His works are offered for our enjoyment, so are they offered for our study. They are there to awaken a natural instinct implanted in us—a desire to emulate in the works of our hands, the order, the symmetry, the grace, the fitness, which the Creator has sown broadcast over the earth.”*

Owen Jones, *The Grammar of Ornament*, 1856



Ordinary slime mold. The utter beauty of unfolding forms in nature

Alexander will no doubt be criticized both for being less of an original thinker than he portrays himself to be and for being too ‘far out’ for comfort. For sure, many of the components in Alexander’s proposals have long histories. To take one significant point, the perception that centers in a field-like structure define and bootstrap each other rather than maintaining an integrity independent of their context, goes back to 1887 when the well-known botanist Julius von Sach’s formalized this same intuition as ‘Sach’s Rule.’ *“The behavior of the cells in the growing point is determined not by any specific characters or properties of their own, but by their*

position and the forces to which they are subject in the system of which they are a part.”<sup>(4)</sup> Before that, in 1790, Emmanuel Kant argued, “We must think of each part as an organ, that produces the other parts so that each reciprocally produces the other ... Because of this {the organism} will be both an organized and self-organizing being.”<sup>(5)</sup> This same perception is key to on-going work of biologists, notably Humberto Maturana.

Also, designs and technologies inspired by models from nature are quite common. Sports helmets, I’m told, acquired both strength and lightness from investigations into how a woodpecker’s skull allows constant banging without, seemingly, so much as a headache for the bird. Delta Willis’ *The Sand Dollar and the Slide Rule* is a delightful read on the subject.<sup>(6)</sup>

Classic works such as E. H. Gombrich’s *The Sense of Order*—referring to earlier classics by authors such as Charles Owen or A. H. Christie—cover much the same ground as *The Nature of Order* when it comes to the interest in the morphology of forms and how the man-made realm emulates nature.<sup>(7)</sup> There are, however, significant differences. Gombrich was focusing on the ‘unregarded art’ of decoration and, importantly, stressed the fact that he was rejecting the Lockian view of man where the mind is an empty bucket or ‘*tabula rasa*’ in favor of the Popperian view that man’s mind is a searchlight. To survive we constantly search our environment. To bag our lunch and not be had for lunch, we scan the environment for patterns, regularities and disturbances that could mean danger—or lunch.

Alexander isn’t interested in empty buckets or searchlights. His concerns are much more about how the mind recognizes itself, so to speak. The main topics are recognition and the similarity or dissimilarity of structure between nature, our built environment, and ourselves. It involves paying attention to our intuitive reactions to places. As I was writing these pages, old friends from France came for a visit. They had stopped first in Florida and had been somewhat undone by the rather vulgar display of wealth. They had spent a day with a professional interior designer whose private home they described as “*totally impersonal and tarted up with hundreds of pastel colored throw pillows and roaming poodles sculpted by Edward Scissorhands.*” To offer a counterbalance, I proposed an excursion into the small Hispanic villages of the southern Rockies where my friend Julien released a sigh and, using the French reflexive verb, said, “*Ah, enfin, je me retrouve. Je me reconnais.*” (*I find myself. I recognize myself.*)

Perhaps Alexander’s most ‘far out’ claim is that life is—literally—an attribute of space. The more uniquely adapted and organized space is, the more life there is. Alexander is at least guilty of developing his own idiolect and he concocts his own definitions, so he can claim what he wants. But even if the reader is only willing to entertain the idea as a metaphor—it does focus attention in a new and intriguing way.

And truly, credit where credit is due. Innovation and progress often ensue from a new emphasis and a novel arrangement of already known elements. Henry Ford didn’t actually ‘invent’ the car. He re-arranged existing bits and pieces in a novel way and transformed ordinary lifestyles forever. We do need to recognize the insightfulness with which Alexander dips into the natural world as the best source of models for built forms. Beyond investigation on the principles used in nature, Alexander leads the reader to a profound recognition of nature’s elegant, robust, and economic multi-purpose forms which are far superior to ours. The kernel of the mystery is nature’s vitality and capacity for change from within.

---

(4) Von Sachs, Julius. *Vorlesungen über Pflanzen Physiologie*, Oxford: University of Oxford Press, English edition, 1887.

(5) Kant, Emmanuel. *Critique of Judgment*, 1790; translated by Weyer Pluhar, Indianapolis: Hackett, 1987.

(6) Willis, Delta. *The Sand Dollar and the Slide Rule*. Reading, Massachusetts: Addison-Wesley, 1995.

(7) Gombrich, E. H. *The Sense of Order: a study in the psychology of decorative art*. London: Phaidon Press, 1979.

---

## THE SCAFFOLDING OF A GENERAL THEORY A SHORT USEFUL GLOSSARY I

---

*“We begin by describing the shape of an object in the simple words of common speech;  
we end by defining it in the precise language of mathematics.”*

D’Arcy Thompson, *Morphology and Mathematics*, 1915

In an introductory text for the general reader, it is best to keep new terminology to a minimum. A short glossary of essential terms, however, is handy. These are the building blocks of Alexander’s General Theory.

### *Differentiation*

Differentiation is the process of development from the inside out where an original whole experiences internal differentiation resulting in the next iteration of that whole.

### *Field-like Structure*

Field-like structure expresses how the organization of matter in the universe is one of interconnectedness where each ‘center’ defines and is defined by all the other centers within the field or whole.

### *Fine-grain Adaptation*

Fine grain adaptation refers to the recursive dialogue between whole and part, each informing and adapting to the other.

### *Geometric Properties*

The geometric properties are the fifteen different transformations in the differentiation process. Order is a process of always becoming. The properties are aspects of a field evolving; they are the ways through which the field intensifies itself, preserving and enhancing its structure.

A full understanding of just how these properties interact with each other in the dynamics of growth is lacking. The observations that are possible include the following: centers can be voids, positive spaces, boundaries, a third set of centers in deep interlock and ambiguity, and so on. As centers become stronger through positive space, boundaries, alternating repetition, and so forth, they form larger centers. These bootstrapping (self-intensifying) field-like structures of centers constitute wholeness.

### *Living Structures*

Structures are living when the order is indistinguishable from the process that creates them. A slow motion video of a drop of water forming on a tree branch or kitchen faucet beautifully demonstrates just how the tear drop is the shape of time.

## *Robustness*

Each differentiation adds relationships of interdependence among the centers making differentiated structures more robust and capable of complexity.

## *Structure Preserving*

Each new state preserves and enhances key structures of the previous state. Out of all possible changes, only a tiny percentage will be structure preserving.

Structure preserving involves minimum symmetry breaking. Some properties follow others rather naturally. Boundaries tend to form in zones where the gradients around a center fall off (thereby distinguishing it as a center). Good shape takes effect in an already existing center. Deep interlock is an evolution of an existing center and boundary. Levels of scale often come into existence when an irregularity starts as latent center that strengthens over time. The field effect tends to strengthen existing centers making them into even stronger centers.

For now, the discussion remains piecemeal and a posteriori. It is only possible to analyze what has happened, not what should happen in a future transformation. Also, on silent cat paws, a number of moral implications enter the picture along with a faint deus ex machina. The rules of Nature and Nature's God are to be studied and followed.

## *Unfolding*

Unfolding is the smooth emergence of a new state from a previous state. Unfolding incorporates both Goethe's concept of 'moving order' (*bewegliche Ordnung*), which describes the ever changing patterns of relationships within an organized whole, and Ludwig von Bertalanffy's concept of 'flowing balance' (*Fliessgleichgewicht*) which emphasizes that a dynamic balance or 'steady state' is achieved within the continual flow and change.

## *Wholeness*

Wholeness is a field-like structure of nested centers, each bootstrapping itself and others into more intense order. Our understanding of wholeness cannot be separated from our understanding of process.

The relationship between parts and whole has been central to Alexander's quest for the Holy Grail and he never quite locks it down. David Seamon<sup>(8)</sup> thinks that another architectural theorist, Bill Hillier, may have a segment of the secret but Alexander doesn't realize it. "...Alexander's fifteen properties are largely local in their interpretation of wholeness. For sure, 'levels of scale,' 'interlock,' and 'gradients' speak partially to the way a center relates to other centers larger and smaller, but it can also be said that these properties interpret this interconnectedness mostly in terms of parts rather than in terms of configuration and topological relationships and interconnections. ... For Hillier, the central local structure is what he calls convex space—the quality of local space that relates it to its immediate surroundings. On the other hand, the central global structure is axial space—the quality of a local space as it is integrally interconnected with the much larger pathway fabric of which it is part. Axial space has crucial significance for Alexander's theory of wholeness because it relates to a place's global pattern—that is, the way the particular spatial configuration of the place's pathways fabric lays out a potential field of movement that draws people together or keeps them apart."

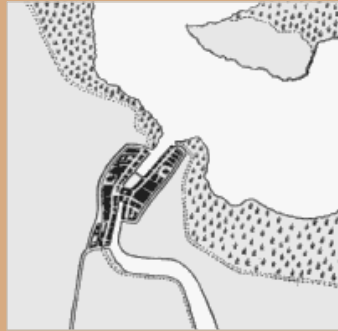
---

(8) Seamon, David. *Christopher Alexander and a Phenomenology of Wholeness*, Presentation for the Environmental Design Research Association, Sacramento, California, June 1, 2007.

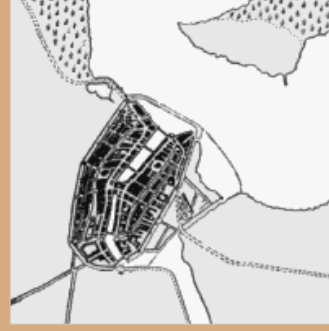
*“C’est la vie qui a toujours raison, l’architecte qui a tort.”*

Life is always right; it’s the architect who gets it wrong.

Le Corbusier



AMSTERDAM 1340



AMSTERDAM 1425



AMSTERDAM 1585



AMSTERDAM 1613



AMSTERDAM 1663



AMSTERDAM 1880

---

## MAN-MADE UNFOLDING

---

*“The critical difference between most human designs and organic forms remains the vitality of response.”*

Delta Willis, *The Sand Dollar and the Slide Rule*

The material presented in *The Nature of Order* constantly requires the reader to weave back and

forth between natural and man-made realms. We turn now to unfolding as it applies to building.

### WHOLENESS AND UNFOLDING

Intuitively we all know that a building has to work as a whole. Its ability to support life, to have life itself, its beauty, all depend on the integrity of its wholeness and how it fits within its surroundings. To build wholesome buildings, the architect must put aside ego and fashion in order to quietly have a good conversation with the situation. A good conversation depends on sensitive listening and insightful questions about the whole that will be the context for the building.

If the building is in the countryside, it is the land that matters. The building should be subservient to the land through respecting levels of scale, a quiet ornament that knows its place. When this is understood, building volumes will have more subtle centers and both land and building will mutually enhance each other. From Northern Norway to Southern Greece thousands of rural churches and chapels nestled into the countryside speak to this principle.



Early Christian Church, Ireland. Gallarus Oratory, 600-1100 AD



In the countryside, at very low densities, successful building often means rectangular volumes placed with the axis parallel to the main contour of the

land. As density increases, it may be that creating positive space between adjacent building volumes becomes the important feature of unfolding.



Umbria, Italy. Photo Adam Butler



Sarlat, France. Both buildings and outdoor space are lock and key.

When introducing a new building, the priority always goes to increasing the life of the existing space. Finding the right volume and form is akin to

lock and key relationships. Many old towns have this quality because community stability and cultural values ensured that this happened.



Harbour Mille, Newfoundland. Photo Charles Adams  
A tiny hamlet, no longer country but not yet town, that fits its spot like a glove.



Lock and key. Skyline of Prague

## STRUCTURE PRESERVING

The exact unfolding of wholeness  $n$  to wholeness  $n+1$  and on to  $n+2$  is impossible to predict. Each phase needs to come into existence before the next structure-preserving move can be precisely determined. The impossibility of determining the true and complete outcome of a decision is an utterly critical aspect of the building process. To make a simple analogy, imagine that building a single house involves making 30 binary (yes/no) decisions (of course, it actually involves thousands of decisions). Designing a house all-in-one-go (as we do with standard blueprints) would be like putting 30 coins in a platter and tossing them all simultaneously hoping to get all heads. It might take a few hundred years, at one trial per second, to get all coins on heads. It's far more

intelligent to toss one coin at a time until it lands on heads. At two seconds per coin it would only take a couple of minutes to reach 30 heads up. It's the same in building. We need to make our decisions in sequence, concentrate on the wholeness of each stage, get the feedback, confirm that our decision is structure-preserving, correct as we go, and proceed only when all the necessary information for the next step is available.

Unfolding doesn't mean giving up planning when we build; current technology offers wonderful advantages. The much admired French high-speed train was developed using computer simulations to fast forward learning understanding of shape.



The French TGV owes its excellent shape to repeated computer simulations that allowed feedback, learning and adaptation at relatively low cost.

## UNIQUENESS FROM CONSTANT ADAPTATION

Since it is impossible to really predict the actual three-dimensional reality of a building from a drawing (pencil or computer), accurate judgment can only be made in the real world. This brings us back to the issue of wholeness, its subtlety, and the unpredictability of small changes that can have a big impact. The accurate perception and readjustment of where a window needs to be may lead to a change in

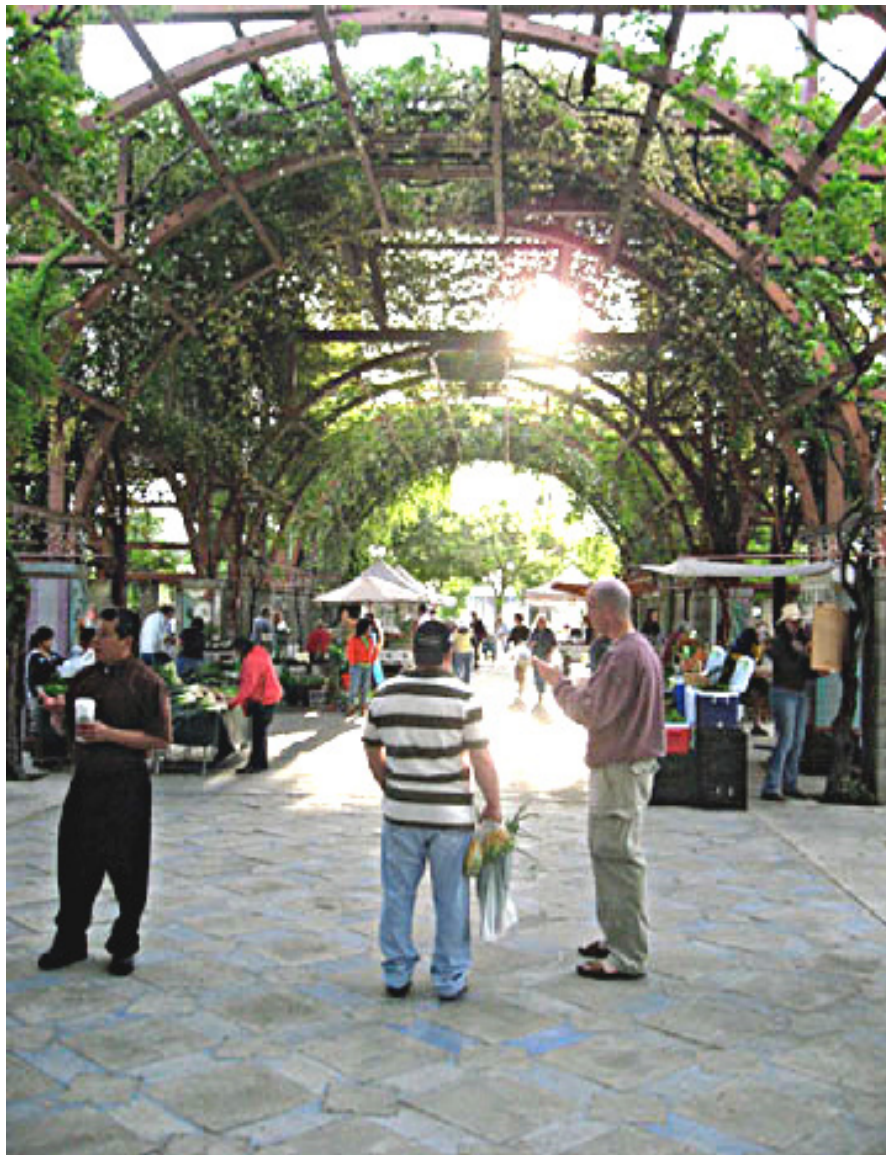
internal partitions, or adjusting how a garden space is organized. Yet, it is just this uniqueness—the 'just right' adaptation—of windows, ceiling heights, stair width, etc., which is what it is all about. Wholeness will not exist in the large unless it also exists in the small. It is only when a field of centers is completed down to the fine structure, that a building become truly sensuous.

## BELONGING

In unfolded structures in the built environment, the fifteen properties appear naturally and enhance our own well-being. Boundaries and levels of scale tell us where we are. Voids give us space to breathe and hear our own thoughts. The property of 'simplicity and inner calm' evokes our own inner calm.

In living structures people are deeply at ease, at home, relaxed in themselves and not separate from

their environment. Through perhaps what is trust, there will be a different sort of freedom—a freedom to be oneself and to engage in activities more directly. We are all creatures of habit and, in fact, our lives revolve around just a few recurring patterns of behavior. When our built environment supports these patterns we feel at peace. When our physical surrounds frustrate our behavior, we cannot actually feel in harmony with the world.



Farmer's Market in Fresno, California, built by Alexander and colleagues  
Photo Farmer's Market Association

## SHAPE IS THE TRACE OF TIME



Hilltop town. Southern France



Venice

Built environments, which have unfolded over time in the manner being described, are recognizable by the way our mind's eye can work backward and imagine the past.

From the photo of the old fortified hill town in southern France we can imagine the original bare hill. The need for defense led farmers to build on high

ground with protective walls while the cultivated fields filled the valleys. New houses wiggled into the possible spaces left. Constant adjustments were made. Each differentiation preserved the essential centers of the existing whole. The town is a living structure.

Similarly, it is possible to imagine the original lagoons of Venice without habitation. The land



Aruba. Photo Charles Adams



Rotterdam, Holland

and the water were the context and the houses and wharves were the further differentiations of that whole. Later, modern conveniences and motor boats were introduced without destroying the whole.

Now evaluate the next two images. The 'Fantasy Castle' hotel is in the tourist area of the Caribbean Island of Aruba. Our mind's eye cannot work

backwards. The hotel has no past of its own or link to the land since it was based on an image from the world of cartoons.

The other template-driven construction is located in Rotterdam, Holland. It seems difficult to attribute the form to anything other than a desperate need for the designer to be 'original.'

# SIMPLICITY AND SELF ORGANIZATION



Location unknown. Differentiations only as required

*“The house...was ordinary, or rather not extraordinary, which is not the same thing ... it fitted in.”*

Witold Rybcynski  
*The Most Beautiful House in the World*

A harmonious structure is one whose internal similarities and differences correspond to its condition. A bit like the idea of the least action principle, differentiations are only made as required by step-by-step evolution of necessary centers. Creating only necessary structures leads to the unusual mixture of complexity and simplicity which is familiar in nature: unpretentious, complete, and deeply simple. Without image, purity and grace come with ease.



Santa Fe, Columbia. Differentiations only as required



Paris, France. Differentiations only as required



The grace of complexity and simplicity in an improbable room  
Saropatak (1540-1610) near Miskolc, Hungary



---

## ON THE NOTICEABILITY OF UNFOLDING WHOLENESS

---

*“I never guess.”*

Sherlock Holmes in *The Sign of Four*

*“But we must conquer the truth by guessing, or not at all.”*

Charles S. Peirce, MS. 692

Although *The Nature of Order* makes essential contributions to epistemology, I personally experienced a shortfall when it came to knowing-about-knowing, of intuiting, unfolding wholeness.

After six years of working with Alexander on manuscripts, I decided to try my luck at actually creating spaces and undertook remodeling an old adobe house in New Mexico. It took work in the real world and the input from other authors to actually move myself forward. Working with unfolding requires ‘noticeability’ and actual experience in the ineffable tasks of intuition and insight. The hands-on experimentation, mistakes and corrections, were absolutely key to my learning.

### ABDUCTION

Early on came the realization that intuiting latent wholeness was a process of abduction as described by Charles Sanders Peirce. The process is much like Sherlock Holmes unravelling a mystery.<sup>(9)</sup> Sherlock takes stock of the clues—traces of clay on a pair of trousers, pink handkerchief on the kitchen table, the victim’s car found in a neighboring village—and then he proceeds with a scan of external and internal worlds for a hypothesis (*if the butler did it . . .*) that would bring greater order to the disparate facts. If the butler did indeed do it, reasons Sherlock, then we should also find other clues, say, traces of the butler’s presence in the victim’s car. In this way Sherlock proceeds in his investigation, circling in on the solution. When deciding what move to make next in a remodel (say, an additional window or higher garden wall) the process is the same.

If perceiving latent wholeness is abduction, and if it is concrete rather than abstract, then the fine grain of transformations—so key to profound spaces—cannot be generalized, but must, like Sherlock Holmes, proceed ‘case by case.’ To paraphrase Henri Bortoft, seeing comprehensively is concrete and holistic rather than abstract and analytical.

---

(9) Sebeok, Thomas A. “‘You Know My Method’: A Juxtaposition of Charles S. Peirce and Sherlock Holmes.” in *The Play of Musement*. Bloomington, University of Indiana Press, 1981, pp. 17-52.

## TRAINED INTUITION

*“Wholeness [is] revealed by allowing the phenomena to reveal themselves through trained intuition.”*

Henri Bortoft

Somewhat later came an appreciation of Henri Bortoft’s ‘trained intuition.’ Insights rarely occur to a novice who is not well-informed about a problem domain, basically because the novice does not know what feature to ‘notice.’ A chess player who looks at a game in progress knows what to notice, a non-player does not. Likewise, even in the simple case of a house remodel, significant periods of time spent dwelling attentively within the space yield knowledge about latent structures that a casual visitor cannot access.

John Cameron, a serious scholar of Goethe and Henri Bortoft describes his journey of explicit ‘intuition training’ in unfolding wholeness.<sup>(10,11)</sup> One initial exercise presented two dozen randomly shuffled images of an annual plant in its various stages of growth and decline. The images could not actually be put in order without developing a “*feeling for an underlying pattern of development (gesture) of the plant.*” Understanding the ‘gesture’ of a particular plant came from days and days of drawing, both directly and from memory, the same plant over and over again. Eventually through an embodied process of enactment (moving the hand in initial mimicry of the plant form, then progressively ‘drawing out’ the impulse)—an active receptivity rather than a passive one—knowledge came.

## COGNITIVE SCIENCES AND PROGRAMMING

Now, computer programming might seem a strange bedfellow for discussions of intuiting wholeness but consider the following remarks by one of the great minds of the 20<sup>th</sup> century, cognitive scientist Herbert Simon.

Simon, in a presentation on the possibility of computer programs to carry out ineffable tasks such as intuition, insight, and inspiration, emphasized (for both human thinking and computer programming) the essential role of the “*noticeability of features, whether it is provided by an explicit clue or some other means.*”<sup>(12)</sup>

He starts his discussion from the everyday definitions of the ineffable tasks. Intuition is the ‘sudden’ appearance of a solution where the problem solver cannot give a veridical account of the steps taken to find the solution.

---

(10) Cameron, John. “Place, Goethe and Phenomenology: A Theoretic Journey,” *Janus Head* 8(1):174-198 Amherst, N.Y.: Trivium Publications, 2005.

(11) Bortoft, Henri. *The Wholeness of Nature: Goethe’s way towards a science of conscious participation in nature.* New York: Lindisfarne Press, 1996.

(12) Simon, H.A. “Explaining the ineffable: Artificial Intelligence on the topics of intuition, insight and inspiration.” [Recipient of the 1995 IJACI Award for Research Excellence. Quebec, Canada], *Proceedings of the Fourteenth International Joint Conference on Artificial Intelligence*, 1995, pp. 939-948.

Inspiration adds the component of a solution which seems to come from an outside source (divinity, muse). Insight adds a connotation of deep understanding. Simon spells out the steps for insight:

1. There is a search for a problem solution.
2. Some body of information builds in long-term memory around the problem and knowledge of methods.
3. The search proceeds unaware that it is following an unsuccessful path.
4. The search is directed by attentional mechanisms (noticeability of features).
5. Much of this body of information is held in short term memory and is continually changing.
6. Some of the more permanent features of the problem situation are being noticed and learned and then stored in long-term memory so that the information available for the problem solution is changing and usually improving.
7. 'Interrupt' mechanisms will pause the search after some period of failure and shift activity to another problem space where the search is for a different problem representation or a different search control structure.
8. When the search is interrupted, short-term memory is lost. Problem solvers speak of periods of incubation during which the problem is not attended to consciously. The subsequent picking up of the attention will be governed by a new representation with new 'noticeable features.'
9. As long-term memory increases, the new direction is likely to be more productive.

For Simon, ineffable tasks of intuition, inspiration, and insight are really recognition models. Through practice at attentive observation and active receptivity, as described by John Cameron, we can develop 'trained intuitions' when it comes to unfolding wholeness. As my understanding deepened, Simon's observations turned out to be important.

## INTUITING WHOLENESS IS ADDICTIVE

Intriguingly, cognitive scientists and programmers have done much in recent years to develop a 'theory of fun.' Why do we spend hours on jigsaw puzzles and routinely do cross-word puzzles in our daily newspapers? Actually, it's the experience of increasing coherence that keeps us plugging away at a puzzle. Intuitions about 'unfolding wholeness' turn out to be addictive. Modern video games are built on computer programs which slowly reveal nested structures to the player. In his quest for the Holy Grail, Alexander is following a similar addiction, which, by the way, is also contagious.

---

## ON BELONGING AND PHENOMENOLOGY

---

*“Places are fusions of human and natural order and are the significant centers of our immediate experiences of the world.”*

Edward Relph

Alexander writes at great length, and sometimes quite movingly, about our basic human need to belong to a space, to be ‘not-separate’ from our surrounds. Although Alexander certainly knew of Goethe, Heidegger and Merleau-Ponty, in the years that I spent working with him, readings and discussions did not go in that direction. As far as I can recall, no mention of authors dealing with *place* was ever made. Only recently, through conversations with David Seamon, have the writings of Edward Relph been brought to my attention. How curious this is! It seems to me now that the epistemological kinship between Alexander and the phenomenologists is at the heart of the matter. Relph’s now classic (1976) book, *Place and Placelessness*,<sup>(13)</sup> develops a coherent conceptual framework that provides an excellent backbone for Alexander’s poetic prose and for reviewing more profoundly human responses to geometries in the built environment.

Relph’s structure is based on dialectical oppositions and covers a very wide and refined range of relationships with the built environment. Alexander’s work is really concerned with only two of them. One is existential insideness (belonging, attachment), the state of unself-conscious being-in (Heidegger’s *da-sein*) as opposed to existential outsideness, the experience of alienation from one’s surroundings. The other is the scale between authentic and unauthentic. Authentic refers to the genuine experience and creation of a place of identity. The relationship is direct. Unauthentic involves the mediation of symbols, icons, fashion, kitsch and conventional stereotypes.

*Note: A fair number of phenomenologists count themselves as part of Alexander’s audience. Since in this work I refer frequently to cognitive sciences and artificial intelligence, I would like to offer these readers the acknowledgement of kinship made by the artificial intelligence hotshot Marvin Minsky. Minsky holds that most pre-computer phenomenologists were philosophers in search of an information processing vocabulary and would probably have been in the thick of artificial intelligence research if the computer had existed to give them its rich possibilities for metaphor and modeling.<sup>(14)</sup>*

---

(13) Relph, Edward. *Place and Placelessness*. London: Pion Press, 1976.

(14) McCorduck, Pamela. *Machines Who Think*. Natick, Massachusetts: AK Peters, 2004.

*“All melodies the echoes of that voice  
All colors a suffusion from that light”*

Samuel Taylor Coleridge



Birmingham Zoo Image Gallery

---

## COLOR AND LIGHT

---

*"All art is erotic."*

E.H. Gombrich, *The Sense of Order*



Buddhist monks from Tibet

*Note: Color, obviously, is part and parcel of the natural world, but this discussion will be limited to color in the man-made realm.*

There is no reason to automatically assume any parallels between color and the fifteen properties, but Alexander concludes that there are interesting ones.

Color and geometry interact. We know that color and brilliance are affected by spatial organization. When it is sensitively distributed, color intensifies

geometric properties and the wholeness of a field. They differ, however, in that wholeness of geometric space can be understood in terms of structure, while the wholeness of color is felt as 'inner light.' This inner light, which abounds in nature, is difficult to achieve in human artifacts. It is noticeable in some of the Middle Eastern miniatures of the 14<sup>th</sup> and 15<sup>th</sup> century, the deep yellow of Buddhist clothing in Tibet, in some paintings of Gauguin and Bonnard, and in a few buildings such as the Blue Synagogue at Safat or the House of Tiles in Mexico City.

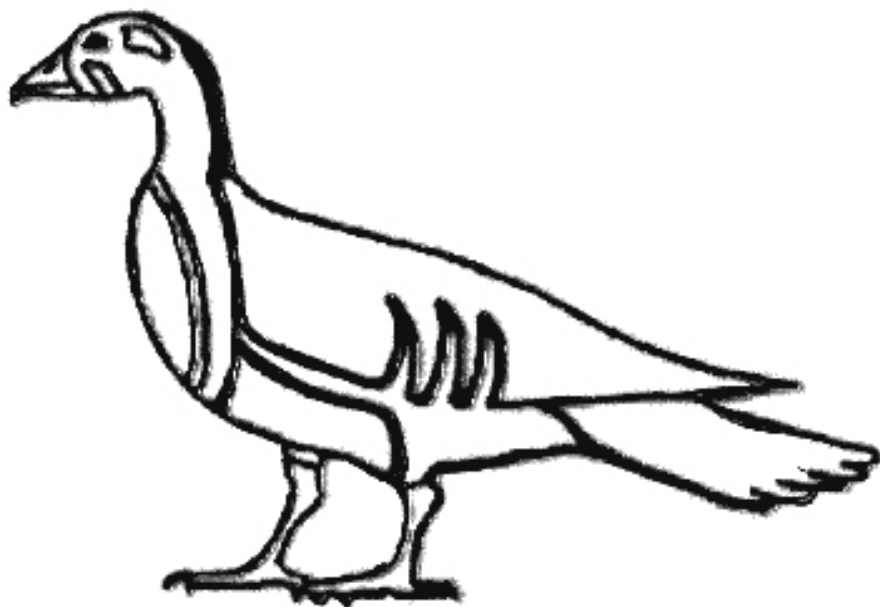
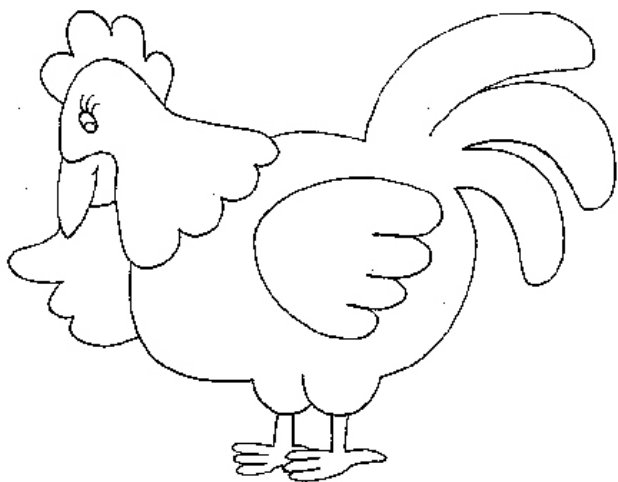
Central to Alexander's understanding of how color works is the observation that a successful geometric structure of the field is necessary to produce color that has inner light. If a field of centers is not geometrically successful, there will be no inner

light; equally, the full geometrical wholeness of the field cannot be obtained unless it is supported by wholeness of color. So, far from being an incidental attribute, color is fundamental to the discussion of wholeness.

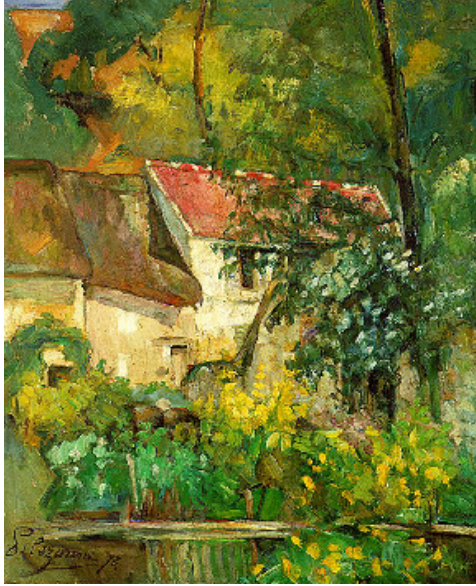


This painting by Gauguin has good geometry and therefore works well in grayscale. The success of colors is dependent on good geometry.

According to Alexander, a drawing based on 'poor geometry' will be impossible to color well. Any experiment with coloring books for children will be a sobering validation of Alexander's claim. Most of the coloring book drawings would not qualify as good geometry, indeed, most are just dreadful. I randomly picked birds as a theme. The only 'good geometry' designs I found were from a coloring book introducing the child to different species of birds (here the Egyptian goose), their shapes and markings.







Paul Cezanne

## INTENSITY OF COLOR

In working with color, it is impossible to concentrate on several different colors at once. Each color area needs to be taken as a *center* in its own right; the artist concentrating on making that center bring forth lambent light. When the artist successfully brings each color to life, the other colors around it will also start to glow. The way colors engage each other is a bootstrapping dynamic which increases the vitality of the field-like structure.

## BOUNDARIES AND HAIRLINES

Intensifying colors can often be accomplished by carefully choosing a color to serve as a *boundary* (sometimes just a hairline) between two others. The boundary color unites and separates. Typically there is a law of contrast with three values of darkness and a law of unity.



Detail of a rug  
from Tabriz

<i>FIRST COLOR</i>	<i>BOUNDARY</i>	<i>SECOND COLOR</i>
Dark	Medium	Light
Dark	Light	Medium
Light	Dark	Medium

Mayan village house



## HIERARCHY OF COLORS

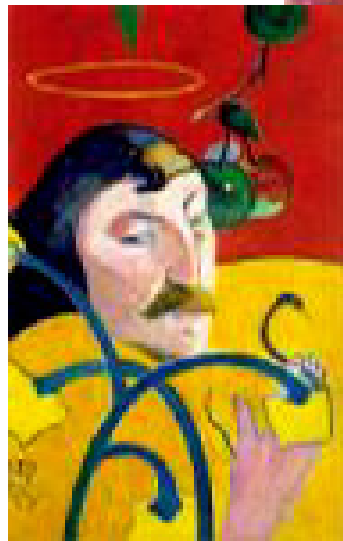
Beauty often comes from a hierarchy of colors that acts a bit like *levels of scale* in geometric terms. Here the dominant colors in a village house are brought to life by the smaller amounts of other colors. When a composition is successful, a well-ordered hierarchy of colors is present. Exceptions are rare.

## COMBINATIONS

Colors create light together in a way that parallels the way smaller centers cooperate to form larger centers through *positive space* and *alternating repetition*. When we ask what second color will interact with the first in a way that creates light, it may take some experimenting, but four variables are involved. First, what is the hue? Second, what is the amount? Third, how light or dark is it? Fourth, how grayed is it? In many cases the light comes from colors which are roughly complementary, but that is not necessarily so. In many profound cases the colors are combined in an asymmetrical way, i.e. a large amount of a pale color with a smaller amount of a deeper one. Frequently, but not always, the colors (and there may be several) will add up to white. There is no mechanical rule and no unique solution to any specific situation. However, only a few of the thousands of different possible colors will actually intensify the whole in a new interaction not visible in each of the parts by themselves.



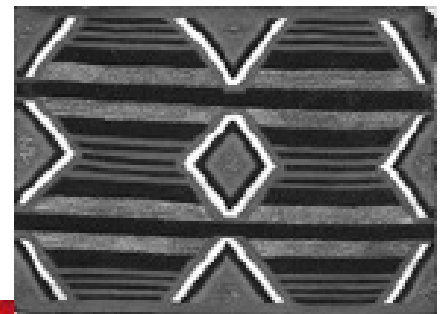
Matisse



Gauguin

## CONTRAST OF DARK AND LIGHT

The *contrast* of dark and light follows a simple rule: when the pattern of tones, seen purely as blacks, whites and grays is a beautiful one, then the colors will work. If the pattern of grayscale is not beautiful, the colors will always seem muddy. In placing colors it is useful to make a black and white sketch and make sure that the shape of the black and white areas form positive space and that a polarity springs to life.



Navaho rug





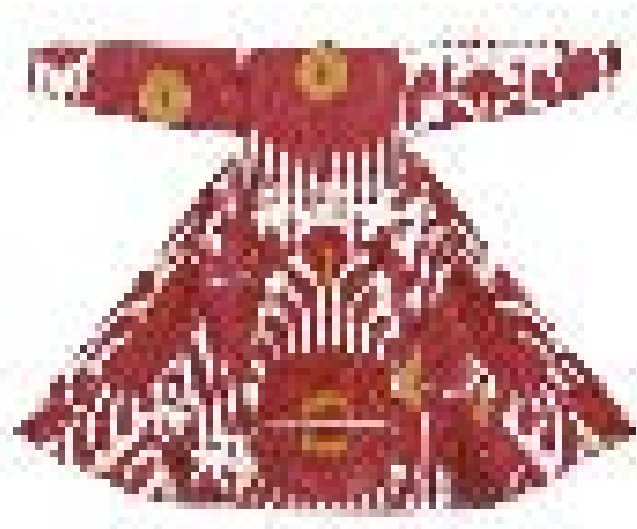
Matisse

## SEQUENCE OF LINKED COLOR PAIRS

In this gouache by Matisse, the orange at the center, small as it is, stands against the red-purple combination. The dark blue stands against the red.

When there is inner light there most often exists a definite sequential structure to the hierarchy of colors. Somewhat akin to *gradients*, the eye is guided through the object, from color to color, as it moves up and down the hierarchy.

The sequence is built out of linked pairs where each color is built as a reaction or counterpart to some other color with which it works. The pairs themselves are linked, and the network of linked pairs forms the sequence. By sequence Alexander does not mean that we literally see one then the other, but that each color ‘communicates’ mainly with one other color above it and one other color below it. A rule of thumb often followed is that we typically see a larger amount of one color and then a second color, more vivid than the first, present in lesser amount. The second color is what ‘the combination is all about.’ The color pairs form a gradient or arrow that points to the heart of a given center and gives it life.



Robe from Central Asia

## MUTUAL EMBEDDING

The mutual embedding of colors works as *deep interlock and ambiguity*. If we have two colors next to each other, a little bit of color A inside B and a little bit of B inside A create a connection and unify the field.

To generalize beyond color, each major entity in a living structure needs to contain references (shapes, colors, and motifs) of the other major entities, so that each exists somehow within the others.

## FAMILIES OF COLOR

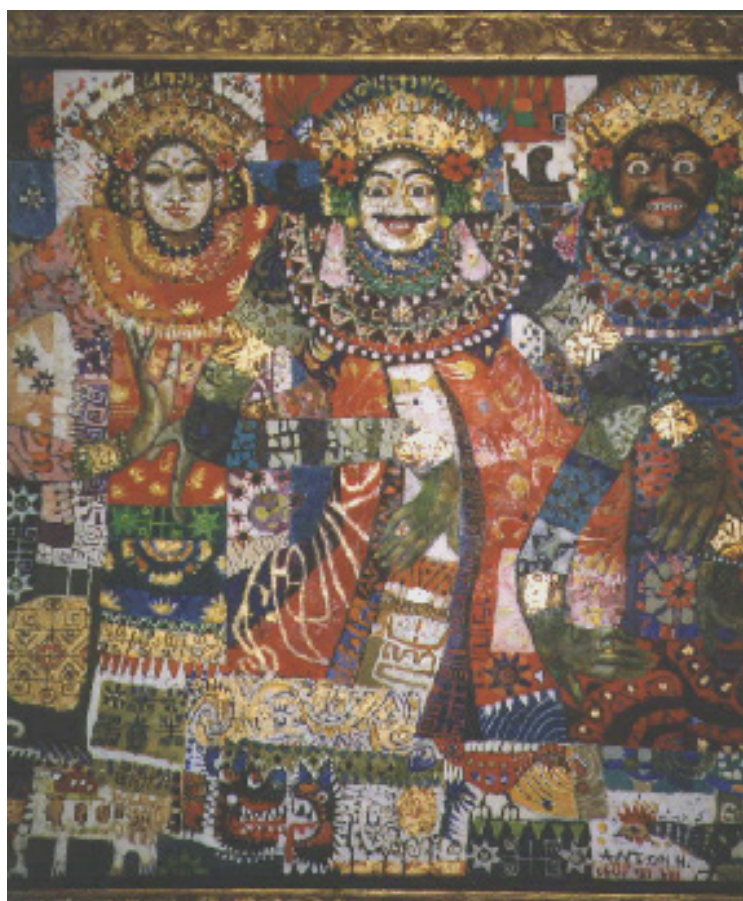
Sometimes a system of colors has a family character, like a chord progression, or a bit like the geometrical property of *echoes*. Frequently the family quality is a property of the colors themselves rather than their spatial arrangement. It seems to arise from a balance of similarity and complementarity or differentiation. Similarity occurs when the colors share some common colors that bind them together (i.e. a yellow, red, and blue, but the blue and yellow both contain traces of red). Complementarities between the colors can be a second binding force. For instance, a green could contain a touch of yellow that complements the red and a darkening of the red, so that it complements the blue. If there are half a dozen colors, difficulties are numerous, but the problems are not mysterious.



Derain

## ROUGHNESS

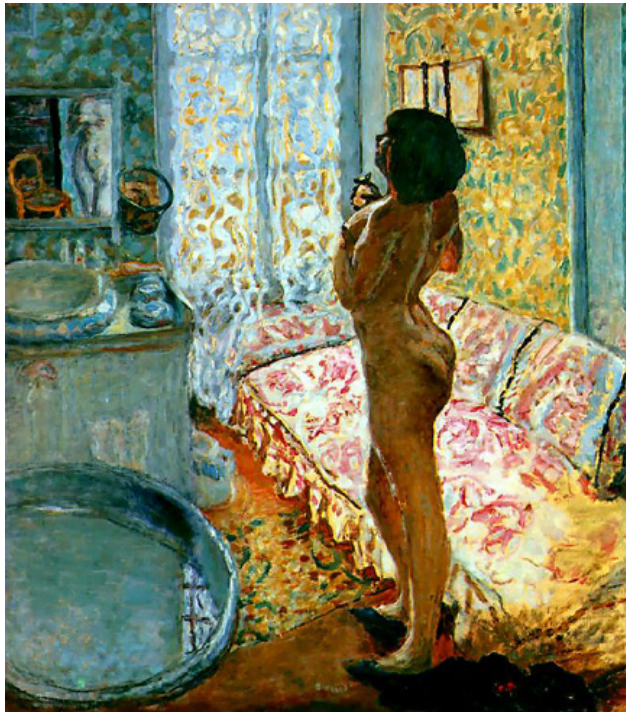
Rarely will a perfectly flat color give light. It is likely that, within an area, the color will vary from point to point so that the overall color comes from the blend, a bit like a singer keeps perfect tone by vibrato.



Bali dancers. Textile.  
Photo Ian Alexander



Book of Kells



Bonnard

## SUBDUED BRILLIANCE

As with the properties of *not separateness* and *inner calm*, subdued brilliance requires the humility of each color so that none shouts too loudly.

There seem to be two ways (sometimes combined) to obtain subdued brilliance. The first way involves the use of apparently muted colors as shown here with the *Book of Kells*. At a certain stage in the development of a colored object, the color, to be made more profound, has to be cut back, either by adding white or gray. A combination of large amounts of very light clear colors, contrasted with small amounts of densely saturated deeper colors can also help obtain a brilliance which is at the same time subdued. The other way is to rely on very intense colors which, when put together, seem muted. Gauguin and Bonnard sometimes succeeded at this. Another feature of subdued brilliance is that, frequently, the colors need not be obvious simple primaries. There can be large areas of neutral or slightly colored neutral tones of white, black, or gray.

## INNER LIGHT

Inner light is not merely a color phenomenon, but an attribute of wholeness when it 'melts' into unity. The colors form centers at the largest level, and the light will be surprising. It seems to exist beyond the structure of the field that gave it birth.



Sitka, Alaska

Color in building, a lost art in much modern construction,  
still exists in many traditional towns.

*“Paradise Lost?” I said. “Paradise  
stolen, paradise raped, paradise  
infected, paradise owned,  
developed, packaged.  
Paradise sold.”*  
David Lodge, Paradise News

Amusement Park, Texas. Photo Charles Adams



Anywhere, USA



La Defense, France



Anywhere, USA



Xinzheng, China. Photo Paul Noll



part 11  
paradise lost  
and found  
chapter six

---

## THE PROBLEM

---

*“The model for both politics and architecture became manipulation from the outside in rather than expression outward from an inner center.”*

Jonathan Hale



The New Yorker Magazine

Our current built environment does not serve us or the earth well. We have lost our individual freedom and knowledge to create spaces that support our activities and, to use an old-fashioned word, souls. We've lost our sense of place. The construction industry emerged

as a major player in killing the only planet we have. Decisions fueled by financial speculation are insane. Building codes prohibit sensible action. How do we move forward? Is there anything from the past we can possibly take with us?



# MEMORIES

*“It’s a poor sort of memory that only works backward.”*

Lewis Carroll

Traditional buildings are replete with lessons. The harmony and cultural fitness of traditional built environments hardly occurred by chance. Rather, they ensued from slow adaptation, which resulted in ‘informing’ relationships between the built form and the social and economic context.

What, precisely, was going on that produced such good results?

In past centuries, communities slowly developed a widely shared body of knowledge and rules for building. Although the individuals acted autonomously and without a central planning authority, they were guided by a collective idiom of meanings, materials, and forms. People knew the general types of buildings for their culture and concentrated on being innovative with the specificity of the site and their needs. This combination of freedom and order yielded sensuous rhythm and visual complexity.

Tradition, limited budgets, and common sense protected the built environment from change for the sake of change. If there was good fit the form prevailed, since there was no reason to change it. If there was a misfit the correction could be immediate and initiated by those directly affected. If the correction wasn’t good, it was corrected again until good fit prevailed. A basic yet fluid equilibrium and good fit between cultural needs (the contexts) and buildings (the forms) was maintained. Change occurred through a series of minor adjustments rather than spasmodic major ones.

Widely shared skills in the crafts and malleable building materials of wood, stone, and brick supported fine grain adaptation. Except for the larger public buildings, most buildings were built for everyday needs with modest means and without pretense. Since building activities took place within communities of interdependent people, there was respect for immediate neighbors.

## FORM, FUNCTION and METHODOLOGY

*“It seems to me that the best designs are those which accommodate the most contradictions. Looked at the other way, the most boring design is that which is directed at a simple, well defined future. A lot of New Age music exemplifies this, as does, for me, le Corbusier. They are both addressed to simple world pictures, and to simple ideas about how humans behave and what they want.”*

Brian Eno

Established building traditions worked out sensible solutions so that adaptable forms accommodated multi-purpose functions. In older homes of the ‘Old South’ in the United States, the customary large entrance halls with very high ceilings organized the social and physical space, the ‘management’ of visitors, and served as air-conditioners as well. In pueblo Indian dwellings, as illustrated in the photo of Taos,

the roof was, all at once, a roof, a water collector, a living space, a seating area for observing rituals in the plaza, and a message relay station. Additionally, the ‘step’ form created currents of warm air that heated the spaces for work and the drying of crops. The history of successful forms shows their evolution to be an accumulative process, like learning, with multiple contributors participating over the years.



Taos Pueblo, New Mexico

Today's builders tend to be crippled with a single- rather than multi-purpose orientation to building. Even the laudable efforts toward energy efficient building are unsatisfying when sustainability is

the single focus. Design is thought of as a selective process. One speaks of functionalism. The architect-as-star conducts a 'one man show' with quickly inappropriate results.



Buckminster Fuller's tensegrity structure



Corbusier's model for his Radiant City

In traditional forms, behind the finished artifact or building type are honed methodologies. In Borneo, the Sarawak have a ‘standard operating procedure (SOP)’ for their long houses—which look a bit like high-rises lying lengthwise on the ground or on stilts. A full length veranda or balcony serves as a communal living room for socializing, preparing meals, and babysitting.

The first matters dealt with in the SOP are location, water supply, anti-mosquito breeze, and plentiful game in the forest. Next the shaman checks for bad omens and performs a blessing ceremony. Such ceremonies are not mumbo-jumbo but serious acts of recognition: building is a sacred activity. Those steps are followed by felling the necessary timbers, clearing the construction site, and so forth.



Sarawak Long House. Borneo

In Japanese teahouses, along with the teahouse proper, the rituals involve an inner and outer garden, entrance bench, and so on. Since these outdoor centers must be in harmony with the beauty of the site, the precise location for construction of the teahouse is determined only after the placement of gardens,

pathways, and ceremonial waiting bench. With this understanding of context setting, a general sequence of building steps for teahouses was developed. The methodology allows for all teahouses to have similar features and yet differ. Each one is uniquely and specifically adapted to its site.



Every teahouse is unique. Japan

## MULTI-PURPOSE FORMS ARE BEST ATTAINED BY SEQUENCING

In successful building traditions, forms developed over centuries. The forms were necessarily complex and subtle in response to multi-purpose requirements. Traditional building processes avoided mistakes by determining the sequence in which centers were created. Some centers, as illustrated by the Japanese teahouse, set the context for others and had to precede them.

Such subtle and sophisticated forms are often now abandoned in favor of inferior forms touted as necessary to contemporary living. The Houtons of Old China—deftly adaptable to extended families and a wide variety of individual and group needs, rather than being fitted with modern plumbing and electricity—are now bulldozed to make room for inflexible simple-minded high-rises.

---

## ON RANTING AS A FORM OF CONSCIOUSNESS

---

*“Placelessness is the casual eradication of distinctive places and the making of standardized landscapes that results from an insensitivity to the significance of place.”*

Edward Relph

Much of *The Nature of Order* is given over to ranting. Alexander rants against his peers, the profession, the building industry, and the whole damn world. The rants are long, self-absorbed, and without perspicacity. I haven't attempted to summarize them.

Rant for rant I refer the reader to the ranter-par-excellence: James Howard Kunstler. In his first book on the built environment, *The Geography of Nowhere: The Rise and Decline of America's Man-Made Landscape*, the reader not only enjoys a cultivated art of bellyaching but is given a most instructive account of the forces—social, economic, historic, cultural, educational—that led to the ‘crudscape’ (Kunstler’s word) which is ours and of our own making. The forces are many and deep. Social beliefs affirm de Tocqueville’s 1831 observation that, if left unchecked, American individualism would lead to utter self-indulgence and an inability to find a healthy balance between public and private domains. It’s the any-jackass-who-tries-to-tell-me-what-to-do-with-my-land-can-go-to-hell attitude. Social evolution has led to a culture of litigation and lawsuits at the drop of a hat rather than community problem solving. Historic events such as the abstract and overly rational use of grids ignored the reality of the land. Economic forces such as the unchecked power of corporate America allows the ‘purchase’ of Congressional votes and legislation to support car mania, and undo sensible systems such as tramways. Educational forces—such as programs in architectural schools—separate design from construction, foster a culture of ego-mania among young professionals, and address a public so unaccustomed to good buildings that most people wouldn’t recognize one if it bit them in the you-know-what.

Ranting won't actually solve any problems but primal screams are usually the first level of consciousness. I quote a few Kunstler rants for the reader's vicarious pleasure.

*“Eighty percent of everything built in America has been built in the last fifty years, and most of it is depressing, brutal, ugly, unhealthy, and spiritually degrading—the jive-plastic commuter tract home wastelands, the Potemkin village shopping plazas with their vast parking lagoons, the Lego-block motel complexes, the “gourmet mansardic” junk-food joints, the Orwellian office “parks” featuring buildings sheathed in the same reflective glass as the sunglasses worn by chain gang guards, the particle-board garden apartments rising up in every meadow and cornfield, the freeway loops around every big and little city with their clusters of discount merchandise marts, the whole destructive, wasteful, toxic, agoraphobia-inducing spectacle that politicians proudly call ‘growth.’”*

James Howard Kunstler



Location Unknown

*“The road is now like television, violent and tawdry. The landscape it runs through is littered with cartoon buildings and commercial messages. We whiz by them at fifty-five miles an hour and forget them, because one convenience store looks like the next. They do not celebrate anything beyond their mechanistic ability to sell merchandise. We don’t want to remember them. We did not savor the approach and we were not rewarded upon reaching the destination, and it will be the same next time, and every time. There is little sense of having arrived anywhere, because everyplace looks like noplac in particular.”*

James Howard Kunstler



Location Unknown. Photo David Kolb

*“Modernism did its immense damage in these ways: by divorcing the practice of building from the history and traditional meanings of building; by promoting a species of urbanism that destroyed age-old social arrangements and, with them, urban life as a general proposition; and by creating a physical setting for man that failed to respect the limits of scale, growth, and the consumption of natural resources, or to respect the lives of other living things. The result of Modernism, especially in America, is a crisis of the human habitat: cities ruined by corporate gigantism and abstract renewal schemes, public buildings and public spaces unworthy of human affection, vast sprawling suburbs that lack any sense of community, housing that the un-rich cannot afford to live in, a slavish obeisance to the needs of automobiles and their dependent industries at the expense of human needs, and a gathering ecological calamity that we have only begun to measure.”*

James Howard Kunstler

## MINDLESSNESS

In Kunstler’s second book, *Home from Nowhere: Remaking Our Everyday World for the 21<sup>st</sup> Century*, the topic switches from how and why Americans surrounded themselves with ‘crudscape’ to trying to fix it. The book is strongly imbued with New Urbanism philosophy, and ranting continues. This time the ranting, still very instructive, describes all the obstacles which stand in the way of sane behavior. Asinine zoning laws and tax structures head the list.

I don’t know if Kunstler ever read essays by John Berger (excerpt on the opposite page), but his second book starts with the following quote and a discussion of being a clown.

*“Life in the U.S.A. gizzard had changed. Only a clown could fail to notice.  
So then, failing to notice would be a possibility.”*

Thomas McGuane

*“Orlando, Florida, is almost wholly a hallucination of the Highway Builder’s Association and of an evil corporation in the entertainment racket that will go unnamed, but whose mascot is, appropriately, a rodent.”*

James Howard Kunstler



The rodent



Mailbox in the Florida Keys. Photo Charles Adams

## JOHN BERGER ON DISNEY, FRANCIS BACON AND CONSCIOUSNESS

*“... Bacon’s art is, in effect, conformist. It is not with Goya or the early Eisenstein that he should be compared, but with Walt Disney. Both men make propositions about the alienated behaviour of our societies; and both, in a different way, persuade the viewer to accept what is. Disney makes alienated behaviour look funny and sentimental and, therefore, acceptable. Bacon interprets such behaviour in terms of the worst possible having already happened, and so proposes that both refusal and hope are pointless. The surprising formal similarities of their work—the way limbs are distorted, the overall shapes of bodies, the relation of figures to background and to one another, the use of neat tailor’s clothes, the gesture of hands, the range of colours used—are the result of both men having complementary attitudes to the same crisis.*

*Disney’s world is also charged with vain violence. The ultimate catastrophe is always in the offing. His creatures have both personality and nervous reactions; what they lack (almost) is mind. If, before a cartoon sequence by Disney, one read and believed the caption, “There is nothing else,” the film would strike us as horrifically as a painting by Bacon.*

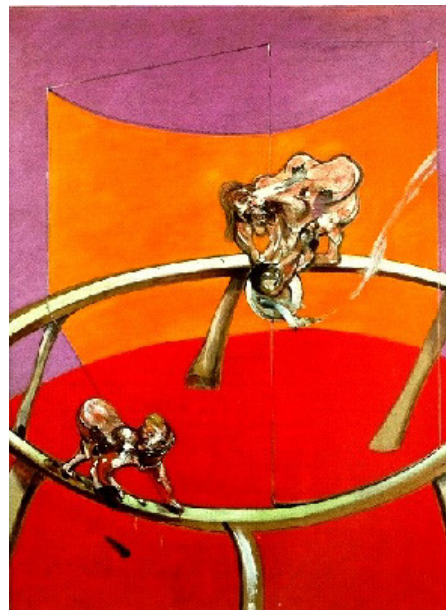
*Bacon’s paintings do not comment, as is often said, on any actual experience of loneliness, anguish or metaphysical doubt; nor do they comment on social relations, bureaucracy, industrial society or the history of the 20<sup>th</sup> century. To do any of these things they would have to be concerned with consciousness. What they do is to demonstrate how alienation may provoke a longing for its own absolute form—which is mindlessness. This is the consistent truth demonstrated, rather than expressed, in Bacon’s work.”*

John Berger

“Francis Bacon and Walt Disney,” published in *New Society*, 1972, reprinted in *About Looking*, 1992.



Disney’s *INCREDIBLES*

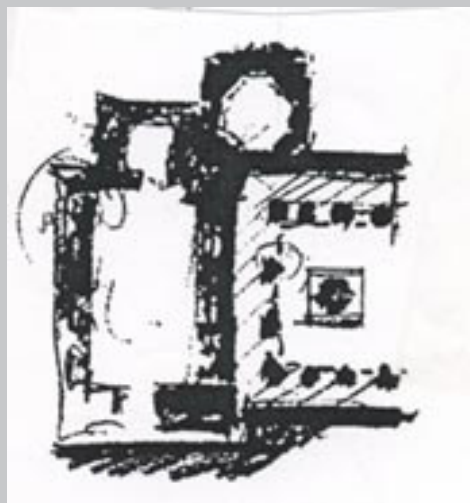
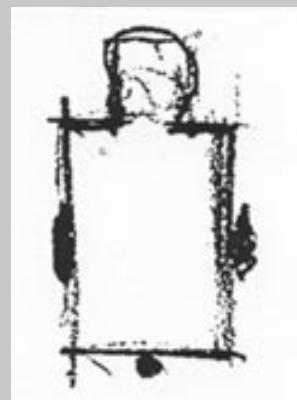
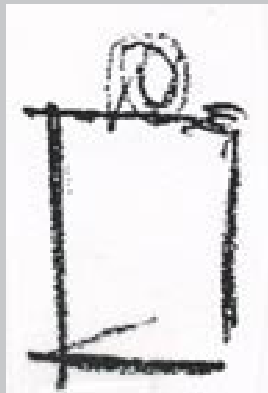
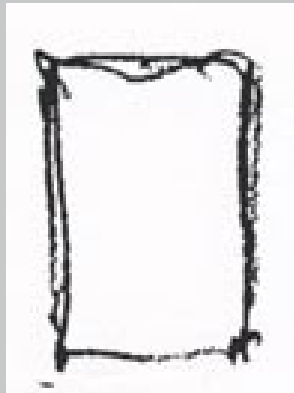


Painting by Francis Bacon



*“Architecture is always in tension between intellectual use and intuitive pattern.  
The rain has to stay out and the building has to sing.”*

Jonathan Hale



Doodle by Christopher Alexander

*“For we are not sent into this world to do anything  
into which we cannot put our hearts.”*

John Ruskin

---

## THE SOLUTION

---

*“We cannot adopt the style of the Greeks because we are not Athenians. We cannot recover the style of our mediaeval forbears because times have marched on. All we can do is to affect the manner of the Greeks or of the mediaeval masters, in other words, make pastiche. Instead we must do what they did or at least proceed as they proceeded, that is to say penetrate to the true and natural principles to which they penetrated, and if we do that our works will have style without our seeking for it.”*

Viollet-le-Duc, *Dictionnaire raisonné de l'architecture française*, 1854-1869

*“Tradition evolves with time and place while holding strongly to certain formal, cultural, and personal principles. Nostalgia seeks the security of past forms without the inherent principles.”*

Peter Calthorpe

When Alexander is asked why all the examples he refers to are of traditional buildings, he often answers that he chooses them not because they are old but because they are better. I have never felt that Alexander was on a nostalgia kick.

In many ways, traditional building systems qualify as what current science refers to as Complex Adaptive Systems (CAS). The individual agents in the system can be acting autonomously within fairly simple rules. From their interaction more complex patterns emerge and transform the system. Complexity and adaptability exist within the system, not the individual agents.

When traditions are alive and well, cultivated unfolding of wholeness yields both an unfolding of the built environment and an unfolding of a future. After all, the essence of vibrancy in culture is deviancy. As new variations bring tradition into view in novel ways, there is a requirement for honest perspective

on what has been, and therefore what is. Attempts to simply cut off the past are impoverishing.

So what do we do now? Change is now too rapid for any equilibrium or CAS to become established. There are few shared idioms among members of the same neighborhood or town. Individuals no longer build autonomously within simple rules. Knowledge about building is no longer widespread but held by a few specialists. However bright, these specialists simply cannot integrate the number of variables required for the successful design of subtle and beautiful multi-purpose forms. Systemic complexity and adaptability are not possible.

The solution proposed by Alexander is to learn everything possible from nature and tradition and then basically start all over from scratch. Given our own times, technology, and life styles, we need to create our own processes for creating adaptive and sustainable built environments.

# AN ABSTRACT SOLUTION: THE FUNDAMENTAL PROCESS

*"We are always on the planet of inexperience."*

Milan Kundera

Alexander has formulated a general and abstract procedure that underpins the creation of successful

built environments which he has called *The Fundamental Process*.

## 1. ABSORB THE DEEP STRUCTURE OF THE EXISTING WHOLE

The essential core ability for this procedure is our apprehension of existing wholeness and our talent at assessing the potential for future wholeness to be conjured forth. We must constantly revisit our sense of the whole and scan both scene and imagination for clues. We search for structure-preserving differentiations that will bring forth hidden connections and underlying potentials. These could entail creating a new center, strengthening an existing center, eliminating a center, changing a color, adding light ... who knows. Each situation will be different.

What, exactly, is to be considered as the whole when contemplating a building project? This is intuitive and requires practice. As described, wholes are nested within larger wholes. The whole may be a room to be redone, a new home to be built, a garden, a neighbourhood, town or region. Some guidelines exist for figuring out the boundaries of where one whole 'ends' and is nested within a larger whole. One such guideline is that new buildings should be built so that they 'help' the street, the streetscape typically being the next larger whole.

## 2. HAVE A GOOD CONVERSATION WITH THE SITUATION

Good conversations involve becoming aware of potentials. In a building site this might mean figuring out what to preserve, perhaps an old existing building, some vegetation, or the contours of the land. What are the prevailing patterns of wind and

rain? It also means conversing with the needs of the people who will live and work there. What activities are being housed? What people? What culture? What budget? What are the parameters that need to be taken into account?

## 3. WORK IN ORDERED SEQUENCES: STEP-BY-STEP ADAPTATION

Rough out a series of steps for the centers to be created. The two keys to successfully developing a series of steps will be, first, the ability to carry forward a feeling and, second, the willingness to postpone limiting decisions, such as precise measurements, until the right moment.

Each step will be a differentiation of the whole: from Whole =  $n$  to Whole =  $n+1$ , which becomes

the context for the next decision which results in Whole =  $n+2$ , etc. Each differentiation brings with it surprises and new information that needs to be taken on board. Re-adjustment after feedback, flexibility, and the ability to go with the flow are essential. The information needed for any given decision will not be available until the previous transformations have taken place and there is time to re-assess the evolution.

## 4. AVOID MISTAKES

Working step-by-step is absolutely necessary to avoid mistakes. Mistakes (*miss takes*) are defined as a failure to take into account all the variables present at any decision point.

Since each and every step in a sequence increases interdependence among centers, the resulting configuration will suffer from fewer mistakes than

any attempt to build from an image of an end result with an ‘all-at-once’ plan.

Without shared and tested schemata for building we are truly on the ‘planet of inexperience,’ and must work in the dark, carefully experimenting, staying with the step at hand, not knowing with any precision what the next step will be.

## 5. AT EACH STEP, CHOOSE THE MOST IMPORTANT LATENT CENTER THAT CAN INTENSIFY THE WHOLE

Early differentiations tend to have a more global morphological nature (what to preserve, where to build, rough building volumes, etc.). Next comes a middle range of alternating repetitions of large and small centers (usually the basic internal differentiations for both inside and outside). On further, more detailed levels of scale and the strengthening of latent centers can be pursued.

Wisdom suggests taking to heart the lessons from nature and successful traditional forms. Stick to simplicity—make only those differentiations that are called for. Stay with each differentiation until it results in a configuration that is finely adapted to its situation. Make sure each differentiation is structure-preserving. Stop when you can make no further improvements.

## 6. RETURN TO THE WHOLE, RE-EVALUATE THE SEQUENCE OF STEPS, MAKE THE NEXT DIFFERENTIATION

Work as the painter works. Put on a dab of paint, step back, consider the new whole, reflect upon the

options and the next step, execute, and evaluate the result. Correct or move forward to the next step.

*THE METHOD IS ALWAYS ABOUT MAKING CENTERS AND TRANSFORMATIONS THROUGH THE FIFTEEN PROPERTIES. WHOLENESS IS ALWAYS MAINTAINED.*

## RULES OF THUMB

General rules of thumb accompany and support the Fundamental Process. Three major ones are discussed

on the following pages with case studies to illustrate the issues.

FIRST, USE *LEVELS OF SCALE* AS A TOOL FOR MAKING DECISIONS.

SECOND, WORK SO THAT THE ARTIFACT EVOKES *DEEP FEELING*.

THIRD, ENGAGE A NEW UNDERSTANDING OF *FORM AND FUNCTION*.

## LEVELS OF SCALE

A structure preserving decision informs the craftsperson about the connections to the next larger scale and the next smaller scale. When the levels of scale are within the same visual field this is not difficult or mysterious. A demonstration is no further away than the nearest clothes-conscious woman who

might put on a plain blue dress and instinctively reach for 'a little something' (say a patterned scarf of contrasting colors). The scarf, which appeals to the next smaller scale, enlivens and completes the outfit. At larger levels of scale the process is less obvious but not fundamentally different.

### EXAMPLE: CLIFF ISLAND



Cliff Island. Photo Charles Adams



Cliff Island. Photo Charles Adams

Cliff Island, Maine is the permanent home of a small community and the summer home of around fifty more families.

Ten miles offshore of Portland, Maine, this small water-bound piece of land runs a mile long and half a mile wide. Its wholeness cannot be apprehended without walking around the island and canoeing around the shores. (Photographic images are completely inadequate.)

On an initial walk-about (there are no cars), the particular pattern of the placement of houses is unlikely to attract attention. A relaxed absence of pattern is a most likely first impression. However, a focused walk-about reveals that the placement of homes is exquisitely precise. Placement has followed local cultural rules that include a) views to the sea that remains private without any public access from the water, b) privacy from neighbors, c) considerations of tide, wind, and terrain. The placement of homes on Cliff Island is quite akin to the earlier example of calcium added to the stress points of bone during growth. Each new house, in this way, preserves the organization of the island as a whole.

A tacit code or form language for building has come into existence over the years. Private homes are at a scale of roughly one-third that of the communal buildings. The homes themselves stay roughly comparable in scale and they share basic forms. The New England saltbox shape saves on heating bills. The pitched roof makes sense for snow and rain. Generous screen porches allow mosquito-free evenings. Coherent and compatible forms are seen throughout the island.



Cliff Island. Photo Charles Adams

The placement of a house informs the decision about the next level of scale down, such as how to arrange access ways to the house. Access will naturally branch off the main path which circles around the island. An absence of bulldozers encourages residents to leave the land alone through the structure-preserving solutions of bridges and walkways from the path to the houses.



Cliff Island. Photo Charles Adams

Even the small scale of garden furniture follows a loose code of leaving the land alone.

On Cliff Island, the human habitat adapts wisely, lightly, and elegantly to the natural terrain and the surrounding sea.



Cliff Island. Photo Charles Adams

## DEEP FEELING

A key lesson for all! Abandon your ego. For *Heaven's Sake*, abandon your ego. It's not about *you*. Work in such a way that it is the artifact you are creating which evokes deep personal feeling.

A significant amount of writing in *The Nature of Order* is devoted to religious buildings. Whatever

one's religious inclination, it is undeniable that religious buildings, from the most grand cathedral or mosque to the most humble shrine or sanctuary, more often than other building types, are built out of a motivation of respect and honor of that which is greater than self. For this reason alone, they are worthy of intense study.

### EXAMPLE: MADONNAS

In artifacts, the intensity of evoked feeling, just like the intensity of life, will be a matter of degree. Six Madonnas with different degrees of emotional substance are displayed here. Artists with different degrees of emotional involvement made them and they evoke in the observer different levels of feeling.

A proper experiment is for the reader/observer to contemplate the series of six Madonnas and pay careful attention to his or her subjective responses. There is no need to be concerned with comments that indicate which ones might be evaluated as good or bad. The captions can be read afterwards.



Artist Salvador Dalí pulls us into an intellectual game of surprising and complex symbolism. The painting is most interesting, yet it does not evoke deep feeling.



Tile work from the chapel in Lourdes, France. Although proficient, the work does not convey deeply religious feeling.



Poster on sale from the Internet. It draws from a Hollywood stock of symbols, gestures and facial expressions. The artist was not drawing from deep genuine feelings. Kitsch



Internet picture using trivial imagery. Note the heart-shaped eyes. Kitsch

*The Nature of Order*, does not discuss Kitsch but it's such a useful concept when introducing the concept of 'deep feeling.' *Kitsch*, a German word born in the middle of the sentimental nineteenth century, is sharply defined by novelist Milan Kundera, in *The Unbearable Lightness of Being*, as ...

"... the totalitarian aesthetic ideal of absolute denial of shit, in both the literal and the figurative senses of the word. ... The feelings induced by kitsch must be a kind the multitudes can share. Kitsch may not depend on an unusual situation; it must derive from the basic images people have engraved in their memories; the ungrateful daughter, the neglected father, children running on the grass, the motherland betrayed, our first love. Kitsch causes two tears to flow in quick succession. The first tear says: 'How nice to see children running on the grass.' The second tear says, 'How nice to be moved, together will all mankind, by children running on the grass.' It is the second tear that makes kitsch kitsch."





14<sup>th</sup> century Spain

*The Image of Woman* by Andreas Ferninger, Cologne. Dummont Schauberg Press, 1960

We encounter 'the real thing' when contemplating these two stone sculptures from 14<sup>th</sup> century Spain. The young Madonna beams out authentic love and gentle presence while the older Madonna tells us of the full human range of pathos, loss, regret, grief, and our own capacity for those emotions.

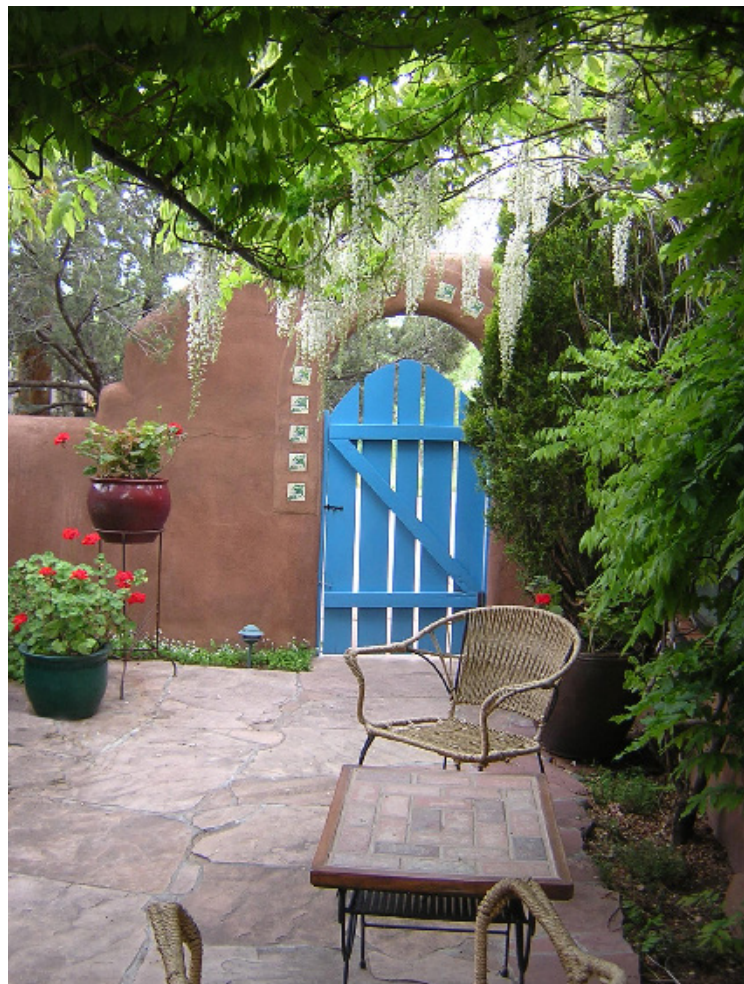


14<sup>th</sup> century Spain  
*The Image of Woman* by Andreas Ferninger, Cologne. Dummont Schauberg Press, 1960

## FORM AND FUNCTION



Before. The original courtyard. Photo Charles Adams



After. View from the home office. Photo Charles Adams

The clearest path to improved functionality comes through complete concentration on geometry.

### EXAMPLE #1 CREATING AN OUTDOOR ROOM

#### START WITH THE WHOLE

The area is a small courtyard to the east of our house, rarely used except as an occasional back entrance for the casita, a small separate building (originally a garage and tool shed that a previous owner had revamped). The casita serves as a home office. The area is a self-contained whole nested within the larger space of the house site, which, following the local Santa Fe style, is a walled compound.

#### HAVE A CONVERSATION WITH THE SITUATION

This is first spot to get morning sun, ideal for that first cup of coffee. It is right outside the door of the home office, ideal for easily fetching books and paper. Contemplating the space, a vision of an enhanced whole—a quiet outdoor place for work and relaxation—emerged.

Behind the original evergreen bushes lurked large old roots of wisteria plants that had been neglected. Charles (my better half) and I wanted to pull them up on a trellis to form a wide canopy that would support the vines, encourage blossoms, and create shade for a sitting area. The structures available commercially were very ugly, very expensive and didn't fit the space. Charles spent pocket money (\$3.50) on recycled conduit from the junk yard. We crafted a canopy that was robust enough to support the weight of the vines, flexible enough to be bent to exactly the shape wanted, and paintable.



First year of blooms. Photo Charles Adams

### STEP-BY-STEP ADAPTATION

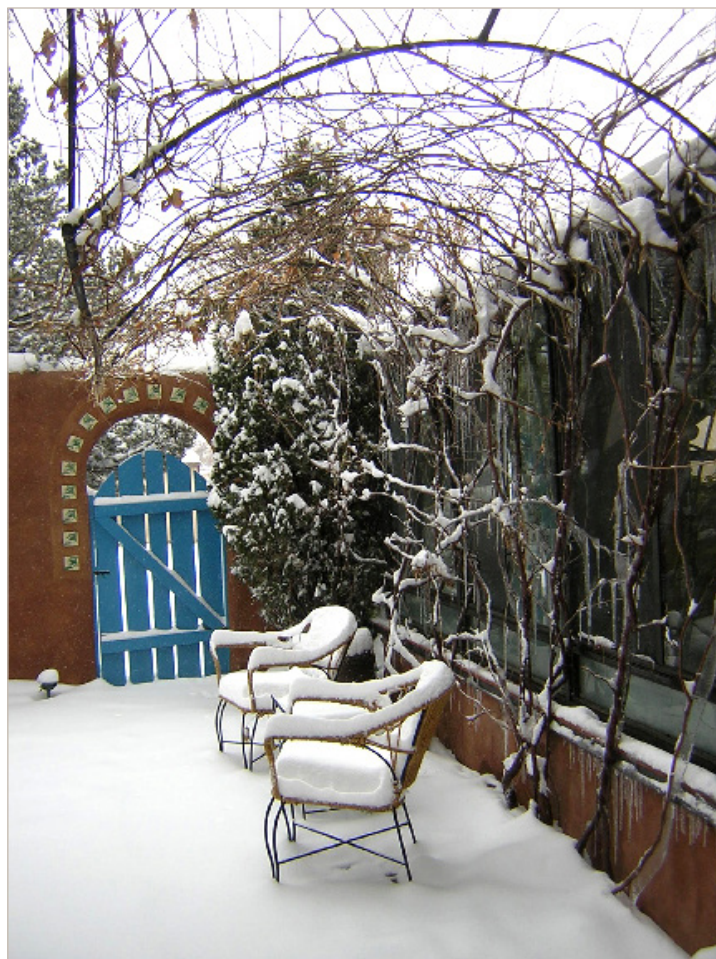
Rough out a sequence of steps and make the differentiations one at a time, getting feedback before the next move.

*n + 1. Centers.* A new center was created by the trellis in the form of a large *Boundary* along the natural but little used traffic path. A latent *Void* appeared underneath the trellis. The first differentiation had *Uniqueness* and *Fine Adaptation*.

*n + 2. Simplicity and Inner Calm.* Next, we removed the scraggy evergreen bushes. This strengthened the *Void*.

*n + 3. Roughness.* We extended and adjusted the flagstones for more living space in the quiet *Void*.

*n + 4. Levels of Scale.* New centers were added at a smaller level of scale. First came chairs and table and then tiles around the door.



The sun re-enters the main house in winter. Photo Charles Adams

## EXAMPLE #2 A COFFEE CUP

What makes for a functional coffee cup? *Good Shape* so that the cup is stable and easily held—perhaps so that cold hands find comfort in the warm cup. *A Boundary* so that a smooth rounded edge makes the cup pleasant on the lips and easy to drink from. *Levels of Scale* so that the handle is an appropriate size and strength for easy use. *Positive Space* so that the cup is attractive to look at as it sits on a desk.

The potter who sits at the wheel with the intention of making a coffee cup is free to choose. The choice is to either unfold the clay through the geometrical transformations or impose an image on the clay and make a small monster.

None of the four cups shown here evoke deep feeling but rather run the gamut from good to silly.



A disaster in form and function



An adequate cup but it is not quite as comfortable to hold or as attractive as the gray and brown cup.



A good piece from good geometry



A poor cup. The levels of scale are poor. The shape is poor. The handle will not be comfortable and will break easily.

# GENERATIVE SEQUENCES



A typical and mediocre kitchen

A *generative sequence* is the term for to a less abstract version of the fundamental process that defines the steps for a building type or a repeating element in the built environment. Each application of a generative sequence produces an individuated result, much as DNA rules give us children—similar but each one unique.

Let's take kitchens. Most kitchen designs are produced by cabinet suppliers and installers to promote sales, especially of high-end (and high profit margin) lines of cabinets. Another bugaboo—kitchen ergonomics—produces layouts for minimum steps, as if people were robots. That, too, has little to do with the livability of a kitchen.

## EXAMPLE: THE KITCHEN SEQUENCE

The generative sequence for a kitchen will work in most situations. Each rendition will be colored by personal preferences. Gourmet cooks might think a double oven is the cat's pajamas. A mother of small children might really want a kitchen door leading to an outside play area. School children might vote for room to do homework with snacks at a large kitchen table.

*Whole = n.* Establish the general size and shape of the kitchen.

*n + 1.* Differentiate the space by placing windows that create zones of light. (Light has priority and the kitchen is often placed for southern exposure in a new construction.)

*n + 2.* Differentiate again by placing a table in the best spot. The best spot is determined by natural light

and distance from traffic patterns. Even the tiniest kitchen gives priority to a place, however small, to sit comfortably.

*n + 3.* Differentiate again by creating another main focal point that interacts with the table (fireplace, grill, or favorite kitchen hutch).

*n + 4.* Strengthen the whole with a thick boundary of shelves, and counters. Fancy cabinets are far less important to the actual comfort and usability of a kitchen than natural light and a cozy place to sit (or have kids do homework). Spend money on beautiful windows instead.

*n + 5.* Differentiate within the boundary by placing appliances. In a remodel, moving a sink is often easier and less expensive than most people imagine. The least important appliance to place is the refrigerator.

---

## ON CURRENT PRACTICES

---

*“If you want to learn something, go to where the disagreements are.”*

Karl Popper

A review of modern building processes would be a book in itself, but clearly the underlying motivations of current practices are counter-productive. The financial institutions, in order to accomplish their own goals, must push homeowners into real estate speculations rather than the expenditures of money on deep comfort and living structure. Tax laws are written by and for large-scale exploitative and abusive development. Standard contractual arrangements preclude the very processes of feedback and constant adaptation which are essential to unfolding. The wrong kinds of behavior are rewarded.

It would be an interesting experiment to limit builders in only a few simple ways. What would be the consequences, say, if (a) only materials found within the immediate vicinity could be used, (b) and only the simpler building methodologies of the well-adapted forms in the vicinity could be adopted with (c) financing geared to slow piecemeal pay-as-you-go growth rather than long term mortgages, and (d) a flat fee construction contract? Those restrictions alone would foster adaptation, respect, and an echoing of building types that maintained ecological coherency without squelching freedom.

The role of CAD also looms large in the discussion of conventional practices. We forget the obvious: a computer screen can only give a partial and poor representation of reality. We allow ourselves to be taken in by these clever and useful mediators which hamper direct experience and lead to poor thinking. On the one hand, CAD is obviously powerful for simulations. On the other hand, it requires over-specification. Decisions are made arbitrarily—far from the reality of the building site—and long before the necessary experiential information is available.

Far more productive in the early stages of a project is to postpone CAD and work with qualitative verbal descriptions, rough sketches and throwaway cardboard models. This allows the conceptualization process to maintain a focus on feeling and postpone definite measurements until the appropriate moment.

The central disagreement (ignoring those who are content with the status quo) revolves around the feasibility of overhauling current practices. The stance on current practices taken by the *Congress for New Urbanism* is significant simply because the CNU is a real force in the real world. Large scale CNU projects, both green and brown site, are going forward across the land and shaping ideas as well as working habits as they proceed. The CNU feels the best approach is to work towards incremental improvements through better building codes and negotiations between stakeholders (developers, banks, end-users, and local political entities). The position advocated in *The Nature of Order* is that the stance taken by the CNU won't really fix things. Present-day practices, even improved, will still not be based on differentiation and respect for the whole. Building codes, even improved, that are mechanical and prescriptive can only result in a rather lifeless built environment.



Gothic shoe



Renaissance shoe

## COMMENTARY

---

# THE SCAFFOLDING OF A GENERAL THEORY A SHORT USEFUL GLOSSARY II

---

New processes for building are elaborated most deeply in Volume II, the last volume to be written and which, in several significant ways, remains incomplete. The material is a mixture of highly abstract generalizations and anecdotal case studies lacking the very necessary skeletal structure of the middle ground. Readers who plough through the specific cases offered in Volume III, or (even more enlightening) try building projects of their own, may begin to develop an intuitive feel for what is at stake here. Key vocabulary:

### *The Fundamental Process*

The fundamental process is a generic series of steps in building, similar in many respects to Chomsky's notions of deep structure and transformational-generative grammars. A composite of several versions of the process was presented here.

### *A Sequence*

A sequence refers to the declining (like the declination of a root verb) of the abstract Fundamental Process toward the realization of a specific building type, such as a Japanese teahouse or a small cottage. It can also refer to the steps outlined in the design process for any novel form: a group of buildings (campus, neighborhood, etc.) or individual building (home, school, etc.) or portions thereof such as a kitchen or office.

### *A Generative Sequence*

A generative sequence emphasizes the idea of a finite number of steps of differentiation that will engender an infinite number of renditions. This idea is akin to the operation of reproductive codes in DNA.

### *Form Language*

Form language refers to the concept (just barely sketched out in *The Nature of Order*) that (like phonemes in a language) certain forms and volumes will be chosen among others to be meaningful and will be combined in various ways within a particular cultural style. Form language is an old idea that begs for more research and publication. In the 19<sup>th</sup> century, Viollet-le-Duc briefly took up the topic offering shoes as a case in point.

“There is ... a Gothic department, with its tense muscles and precise movements: everything is sharp and precisely pointed, there is no relaxation, no flabbiness, a will is expressed everywhere in the most explicit fashion. The Gothic nose is fine and thin. Every massive shape, everything broad and calm has disappeared. The body sublimates itself completely in energy. Figures are slim and extended, and appear as it were to be on tip-toe. The Renaissance, by contrast, evolves the expression of a present state of wellbeing in which the hard frozen forms become loosened and liberated and all is pervaded by vigour, both in movement and static calm.”

E. Viollet-le-Duc, *Dictionnaire du Mobilier Français*, 1858-1875



*"We all are one."*  
Reggae singer Jimmy Cliff



The famous kizi bowl is revered in Japan for its egolessness.  
The bowl, a simple utilitarian piece of pottery, is actually from Korea.

part iii  
towards  
a cosmology  
chapter eight

---

## EPISTEMOLOGY

---

*“I have never seen anybody improve on the art and technique of inquiry  
by any other means than engaging in inquiry.”*

Jerome Bruner

By the end of his life, the philosopher Alfred North Whitehead had identified, but not resolved, a key puzzle that he labeled the ‘bifurcation of nature.’ Whitehead argued that there are two types of awareness that need to be reconciled and unified for more accurate perception. The first awareness is about the world around us and what is going on in that world. The second is awareness of our existence and ourselves.

The first type of awareness is highly developed in natural philosophy through what is popularly called the ‘Cartesian’ method. The method asks us to step back and outside of whatever we are trying to understand, engage in a mental trick of pretending that it is a machine, and then work out what mechanisms would account for the functioning of the machine. The method allows investigation and collective agreement about what is happening and has produced a wealth of understanding about the world.

However, there is a problem with the mental trick. We forget that the method is to *pretend* that the object of study is a machine. We forget that we are pretending and take the world around us to actually be mechanical. Even though we now know particles to be more like whirlpools of energy, both wave-like and particle-like at the same time, with instantaneous connection to particles elsewhere—a great undivided wholeness—we hang on to our familiar worldview. Ordinarily, we think of space-matter as inert, just dead material, blindly following mechanical laws of combination and transformation. Consequently, we think of ourselves in the same mechanical way.

The ‘Cartesian’ paradigm doesn’t sit comfortably with complex questions concerning emotions or consciousness. Impossible conundrums about ‘mind/body problems’ leave us tied in knots. The second type of awareness, out of place in mainstream science, has been essentially consigned to art, religion, fiction writing, and private thoughts.

Whitehead argued that consciousness and thought are evolutionary outgrowths of the ultimate particles of matter that constitute the human body. Therefore the potential for thought, consciousness, and self-awareness is, in a sense, inherent in the activities of the particles and their arrangement. We know the preajacent functioning of other parts of our body does condition our mind. Sense data (eyes, breathing, physical balance, etc.) qualify our cognitive process and our feelings. For Whitehead, the qualitative aspect of affective tones is inherent in bodily function and is transmuted into the aspects (shapes, colors, and spatial arrangements) of the objects we perceive. If we can agree with Whitehead that this

‘psychological field’ is as real as any other—and can accept his theory of prehensive unification (the integration of separate sense data into a single image)—then a new source of information becomes available to us.

*The Nature of Order* introduces an epistemological innovation, a method of experimentation that taps into this second awareness. The method loops back to the first type of awareness and scientific investigations because the experiments are based on empirical testing and get reproducible results. A description of the methodology is followed by a sample test.

## MIRROR-OF-SELF TEST

Two objects (any two objects) are to be compared. To keep things simple, we’ll limit the test to two

objects of the same kind, say two buildings, two chairs, or two roads, etc.



road A



road B

The person engaged in the mirror-of-the-self exercise is requested to answer most genuinely and seriously what seems to be a silly question. This means waving off whatever might be thought of as the fashionable answer or the politically correct answer. The question is:

*When comparing these two objects which of them is the best mirror of your self? All of your self: your joy and sadness, potentiality and loss, your strengths and failings.*

Many variations on the question have been tried. Another one is:

*If you were to be reincarnated as one of these two objects, which one would be most really like you—the real you?*

The two objects may both be ‘self-like’ or ‘not self-like’ but one will be more so than the other. The test investigates relativistic comparisons and degrees of likeness.

## FINDINGS

1. These experiments show that there is broad agreement as to which objects are 'self-like.' (In the four-page sample that follows the consensually more self-like [object A] is placed on the left.) Gestalt perception experiments have already demonstrated that people perceive wholeness, *Prägnanz*, saliency and centeredness in similar ways. Other experiments demonstrate that when presented with transformations that are structure preserving and non-structure preserving people agree as to which is which.
2. Recognition of self-likeness in objects evokes emotions ranging from mild pleasure to deep identification.
3. These tests work at levels independent of personal history. Although no experiments have been done, the tests might also be independent of cultural background.
4. Responses to the self-like question do not necessarily correspond to responses to the ordinary question, "*Which of these two objects do you like best?*" We get different results that surprise and shock us out of certain complacency. It seems that we are being confronted with an autonomous phenomenon that has a great deal to teach us.
5. Efforts of self-inquiry and listening to internal messages take us from a naive observation of objects to a deeper more knowing one. Experiments indicate that if you take a class of objects where you are a total amateur and engage in the-mirror-of-self efforts, you will fast-forward your learning curve about that class of objects.
6. A dual process is involved. Individuals doing the mirror-of-the-self experiment are working on recognizing degrees of self-likeness in objects and, at the same time, discovering things about their inner states. Discovering one's inner state is quite an undertaking, a bit like training in the martial arts where gathering internal information is key to mastery of the art.
7. As accurate perceptions of internal states improve, there will be a parallel refinement in the results of the mirror-of-the-self experiment. In a way, this is common sense. If you want to understand music, listen to more music. Equally, exposure to more music will develop listening skills.
8. Self-likeness is experienced as deeply personal when an object touches us in our humanity. This happens when the field of centers is authentic.

## THE BASIC ARGUMENT

The basic argument put forward is this: an increased feeling of life in ourself is the clue that an artifact is 'good' or 'authentic.' We cannot separate artifacts and our awareness of them from the fact that they have induced feelings in us. Fields of centers that have deep life have the power to increase our own life, in the same recursive bootstrapping way, because we ourselves are a field of centers.

Aliveness cannot be measured by traditional techniques. Experiencing a field of centers in terms of wholeness—the properties, unfolding, and uniqueness of adaptation—gives us one handle on living structure. The mirror-of-self test gives another. They are two sides of a single reality. The ultimate criterion for whether an artifact 'works' is the extent to which it resonates with the human self.

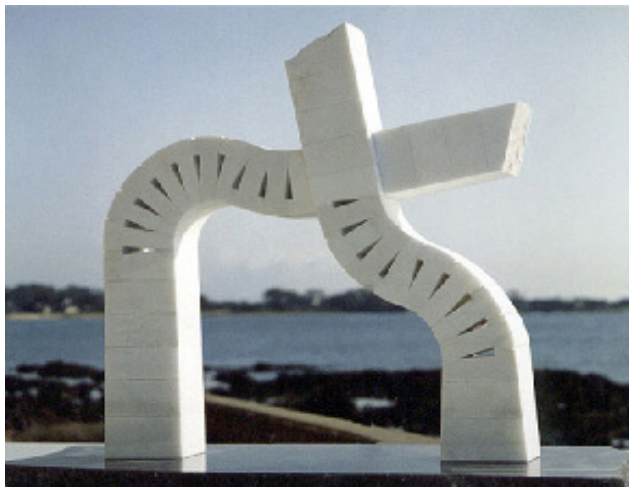
# SAMPLE THE-MIRROR-OF-SELF EXPERIMENT

*“There is no knowledge without measurement.”*

Elliott Jaques











---

 ON THE MIRROR-OF-SELF TEST
 

---



Can objects such as corn holders reflect our inner self?

*“We use the mirror image correctly,  
but speak of it wrongly, as if it did  
what we ourselves are doing with it  
(that is, reversing it).”*

Umberto Eco

Of course one can argue that the mirror metaphor is of dubious utility when probing questions of value and significance. A mirror is itself empty of significance, as Umberto Eco has discussed at length in *Semiotics and the Philosophy of Language* (1984), because it does not help unravel the predicament of perceiver and the perceived. However, I have been personally amazed at the power of this simple procedure. The story of my first experience with it is as follows.

One evening I went to a small Moroccan restaurant near the flat where I was living at the time in Luxembourg. I went there frequently and would while away the time waiting for my supper by contemplating the collection of pottery that the restaurant owner had brought from his country. I had absolutely no background in the techniques, history, or appreciation of Moroccan pottery.

I had already chosen the piece of pottery I liked best—the one I would most gladly take home with me. This pot had a lovely round shape and a deep marigold yellow glaze. However, when I seriously engaged in the mirror-of-self question about which pot was most like my real self, I finally had to settle (much to my own surprise) on a very different pot. The self-like pot was quiet, muddy brown in color with fine and rather intricate black line decorations.

I asked the restaurant owner to tell me about his collection. The marigold yellow vase was, he said, “a nice piece.” The muddy brown one was, as any connoisseur would know, “the significant piece.”

Appreciation of beauty in music, architecture, fine arts, or dance is available to all of us but it involves a long apprenticeship about learning what to notice—what to ‘attend to.’ Here is a shortcut that goes straight to the heart of it all.

---

## ON VALUE

### A POLITICALLY INCORRECT STATEMENT

---

*“Knowledge is responsibility.”*

Agatha Christie

Current political correctness requires that all opinions be viewed as having the same weight and any attempt to put value on an objective footing is suspicious. This popular stance is unproductive and a tad cowardly. If we have on hand an approach to evaluating buildings with defined criteria and testable consensus, then we should explore its usefulness.

The argument in *The Nature of Order* is that value pertains to the intensification of life and wholeness. The apprehension of such is available to anyone who wishes to exert the effort and avoid what Theodor Adorno calls *unfair intimidation*. Adorno’s own words express the idea well in this short excerpt from his *Minima Moralia: Reflections from Damaged Life* (1974).

*“What truth may objectively be is difficult enough to determine, but we should not, in our dealings with people, let this fact terrorise us. ... Anyone who, drawing on the strength of his precise reaction to a work of art, has ever subjected himself in earnest to its discipline, to its immanent formal law, the compulsion of its structure, will find that the objections to the merely subjective quality of this experience vanish like a pitiful illusion: and every step that he takes, by virtue of his highly subjective innervations, toward the heart of the matter, has incomparably greater force than the comprehensive and fully backed-up analyses of such things as ‘style’ whose claims to scientific status are made at the expense of such experience. ... In the face of this (positivism and the culture industry), reason has retreated entirely behind a windowless wall of idiosyncrasies, which the holders of power arbitrarily reproach with arbitrariness, since they want subjects impotent, for fear of the objectivity which is preserved in these subjects alone.”*

---

ON FREEDOM

---

*“Freedom is the ability to act appropriately.”*

Max Wertheimer



The Kasbah

Painting by Mounjia Abdeltif, Professor of Architecture in Algeria,  
now conducting research based on the ideas discussed here.

Throughout *The Nature of Order* invitations (bordering on exhortations) beg the readers to test things for themselves, to look inward for confirmation of the arguments presented. Alexander's pedagogy depends upon each individual's willingness to experiment and develop internal awareness.

Alexander argues that an unfolded environment free from affectations (in the sense of 'phony') will support our own freedom. He quotes Max Wertheimer's *Story of Three Days* where the hero searches and searches for a definition of freedom. At the end of the story freedom is defined as the capacity to act appropriately to any circumstance.

One anecdote about acting appropriately comes from David Nostbakken, the President of WE-TV in Canada, who was reflecting on the experience of moving his operation and staff from an office building to what had been a private home. He said, "*It had something to do with the space. The new space in the house was more true so we became more true. We became far less willing to put up with the bullshit we had put up with before.*"

The distribution of power and degrees of freedom allowed or hindered by different building codes makes for a useful comparison. The work of Besim Hakim,<sup>(15)</sup> urban planner and historian, investigates successful and unsuccessful built environments from the point of view of code—a theme that Alexander does not address. Hakim's work shows that one key to the beauty of old Muslim cities around the Mediterranean basin lies in the use of building codes that are intentional rather than mechanical. A mechanical code prescribes particular end results, say, for instance, that a house must have a set back of ten feet. A code of intention, on the other hand, embodies more abstract cultural values and cultural injunctions. For example, new home builders should respect the privacy and views of existing homes. Exactly how this is to be done is left to the people themselves. The locus of freedom resides with the individuals in their neighborhoods. It is this liberty of all direct stakeholders to engage in negotiating their own creative fine grain adaptations and to act appropriately that produces vibrancy and evanescent surprise in these cities.

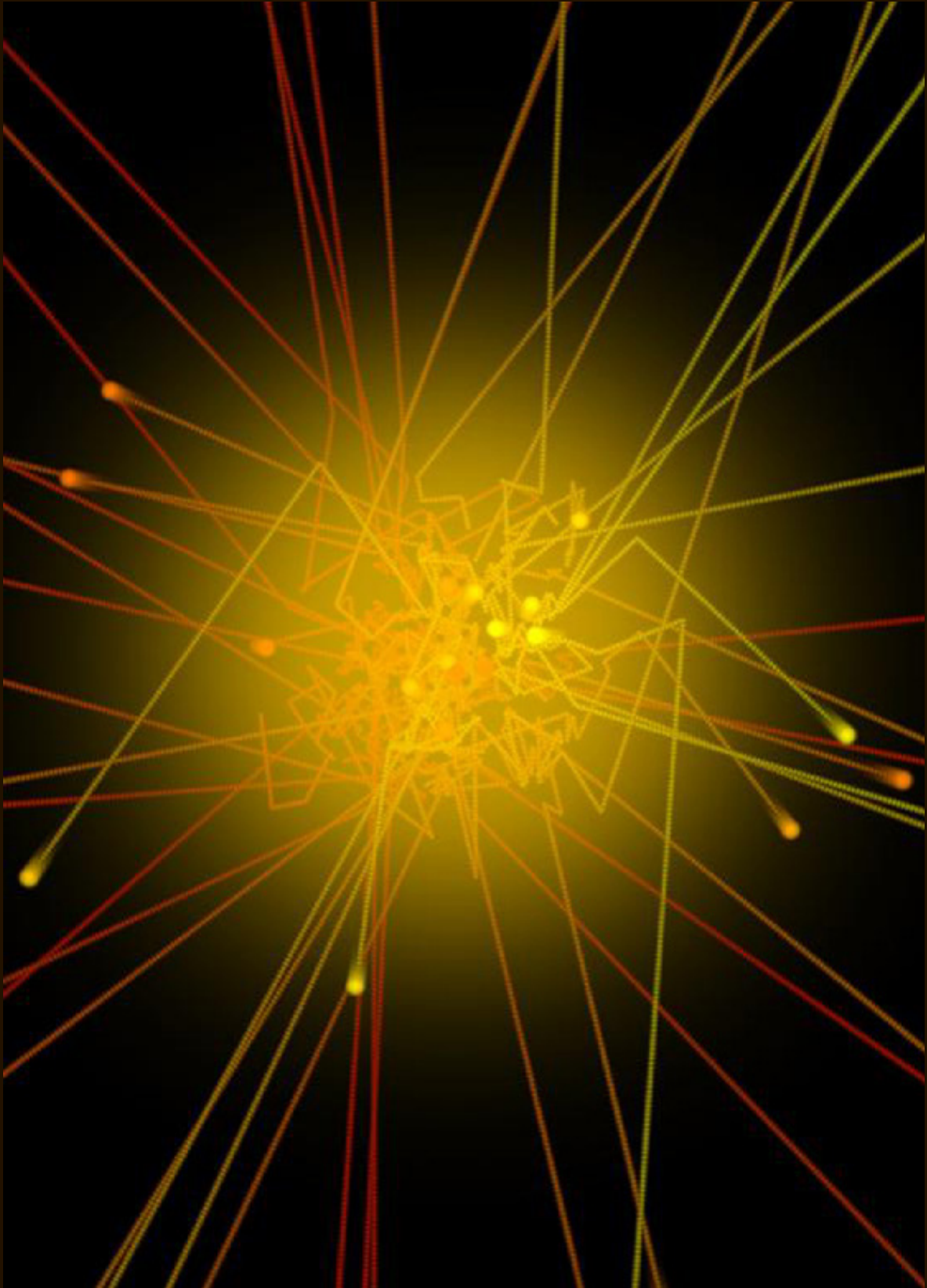
*Parkside*, a suburb of Houston, Texas, embodies the subordination of building to mechanistic laws. *Parkside* was built entirely within strict codes that prescribe heights, set-backs, color, acceptable house plans and so forth. The construction was entirely top down, market-driven, and modular. The dwellers had very little input into the forms of the spaces in which they live. The locus of freedom remains with the lawmakers, bankers, and large developers. These institutions now regularly preempt fine grain adaptation by residents. *Parkside* claims its origins in New Urbanism philosophy.

*PARKSIDE*: Recipient of the 1999 award for BEST SINGLE-FAMILY COMMUNITY

*The National Association of Homebuilders, National Sales and Marketing Council for Entry-Level Housing*



(15) Hakim, Besim. *Arabic-Islamic Cities*. London: Kegan Paul International, 1986.



Random photons escaping. Photo French Polytechnique Laëtamme

---

## THE QUEERER WORLD

---

*“The world is not only queerer than we imagine, it is queerer than we can imagine.”*

JBS Haldane

If we persist in following the need to unify the two types of awareness (inner and outer) as Whitehead suggests, we arrive at the possibility of a paradigm shift and a worldview quite different from the prevailing one.

In fact, scientific research has become increasingly distanced from the mechanical worldview and continues to advance along new lines.

- Even if, in our everyday life, we act as though objects and space were separate, we know from field theories and quantum mechanics that space is an unbroken continuum. Matter is not a material separate from space but, rather, some particular ripple or disturbance in the infinite continuum of the matter-space. The detailed structure of the matter-space continuum is under investigation, however there is agreement on the basic substance of matter-space and its ‘unbrokenness.’ Some physicists use models that are mathematically continuous. Others use models that are discrete—hence granular—at tiny levels of scale ( $10^{-33}$ cm).
- We know from Heisenberg that, at the level of photons, there is no such thing as an observer-free experiment.
- We know that science no longer makes a neat and clear distinction between living and non-living systems as in our everyday understanding of organic and inorganic. Indeed, one of the most intriguing

issues in science is just how to develop an adequate definition of life. Fritjof Capra in *The Web of Life* attempts a synthesis of current thinking. Drawing on the works of many people, most heavily from Bateson, Prigogine and Varela, he argues that a comprehensive theory of living systems lies in the synthesis of pattern and structure, form and matter, and process.

- We know from Maxwell that light is a phenomenon of electromagnetic waves. We like to think of light as something happening in space, but it is actually space itself vibrating.

Alexander’s proposal—the possibility that life itself may be an attribute of space—defines life as that property of space which increases where there is deep wholeness. That is to say, where each part is uniquely suited to its location, reflecting and helping—recursively—every other part. In this view, space is not something inert which has a fixed and definite nature. It is a structure that fosters the evolution of matter-space through a process where matter-space changes qualitatively, step by step, by way of the intensification of the centers within it.

To progress further, however, we will have to abandon the mental trick of pretending that matter-space is neutral and mechanical. It also means that our methods of observation and understanding must include ourselves and our awareness of internal information.



Buddha head. Thailand

---

## THE NUMINOUS

---

*“Annon spatium universuum,  
sensorium est entis incorporei, viventis, et intelligentis?”*

Is not infinite space  
the sensorium of a being incorporeal, living and intelligent?

Isaac Newton, *OPTICE*, 1706 (Query 20)

For centuries scientists and philosophers have grappled with the questions of consciousness and God. The theory of centers makes the emergence of consciousness plausible, because it defines a structure that becomes more and more intense as a field gets organized. It is possible that, at various levels of organization, the intensity of a field takes different form. At one level it could be what we call biological life and, at another level, what we call consciousness. In this case, matter-space could be made of Self-Stuff, the Ultimate Ground, the Original Mind, God, whatever vocabulary can be developed to talk about it.

Actually, vocabulary is a problem. Words have what Ernst Cassirer has called ‘the curse of mediacy.’ Cassirer is referring to the fact that we can’t grasp reality directly so we use symbols to represent it and try to hold on to it. But the words are bound to obscure what they seek to clarify. Alexander uses the expression the ‘I’ to emphasize the personal nature and the one-ness of this Self-Stuff, Ultimate Ground, Original Mind, that he is trying to talk about. He defines the ‘I’ as the ‘interior element’ in a work of art or nature that makes one feel related to it. What emanates from such a work of art or nature is sentience.

### TWO INTERPRETATIONS

Two interpretations weave their way through *The Nature of Order*.

In one interpretation, the Eternal Self—‘I’—Ground is always there. It is there perpetually, as the ground out of which the matter-space is made. In this interpretation, the Self-Stuff or ‘I’ is revealed more and more clearly when wholes are created in the matter-space, as if a window of some kind had been created by the whole. We can then look through this window to the ultimate soul-stuff of the universe.

The experience of looking through the window is that of the sublime feeling when confronted by great music or art. We are getting a glimpse of the ultimate, beyond the everyday world.

Along these lines, the scientist Erwin Schrödinger wrote an essay on ‘yellowness,’ in *Mind and Matter*. The argument runs like this. Two individuals shall both say the word yellow when they see a buttercup or light of 5800 angstroms. But there is nothing to guarantee that one experience of yellow is the same



as the other. If we suppose that yellowness itself is the same for everyone, then this would imply that there is some domain where 'yellowness' actually exists. For Schrodinger, there would have to be One Single Mind where 'yellowness' occurs. Individual minds would have to be part of this One Mind, and the individual minds, somehow, sometimes, have access to it.

Schrödinger's thought experiment suggests that color—especially color—of all things, might be capable of directly penetrating some Ultimate Ground. When color becomes more intense, as when it acquires inner light, it becomes a bridge and our capacity to see that Ground might be intensified.

In the other interpretation, the Eternal Self, Ground or 'I,' is not there perpetually, but is created by the field of centers as the matter-space gets organized. In this view, the universe starts out as unorganized empty matter-space of no intrinsic importance, and selfness becomes more and more established as matter-space gets organized. This is essentially

the view of Teilhard de Chardin where self-spirit is something that emerges.

The first view is more consistent with many great teachings going back to the Christian mystics and Buddhist masters, and going forward with physicists such as Leibniz, Schrödinger, and Mach. It stems, in part, from the experience that great works of art allow a glimpse of something ultimate that already exists.

The second one, closer to the proposals of Teilhard de Chardin, is more consistent with the Aristotelian idea of entelechy (self-completion). Form has no separate existence but is immanent in matter. Matter cannot exist separately from form—so matter contains the essential nature of all things, but only as potentiality. By means of form this essence becomes reality. There is no 'already exists:' it is all about 'becoming.' This interpretation seems more consistent with many of the thoughts of Gregory Bateson, Alfred Whitehead, and the recent work on autopoiesis by biologists Humberto Maturana and Francisco Varela.



## COMING FULL CIRCLE

*Ultimately, deep ecological awareness is spiritual or religious awareness. When the concept of the human spirit is understood as the mode of consciousness in which the individual feels a sense of belonging, of connectedness, to the cosmos as a whole, it becomes clear that ecological awareness is spiritual in its deep essence. It is, therefore, not surprising that the emerging new vision of reality based on deep ecological awareness is consistent with the so-called 'perennial philosophy' of spiritual traditions, whether we talk about the spirituality of Christian mystics, that of Buddhists, or the philosophy of cosmology underlying the Native American traditions.*

Fritjof Capra, *The Web of Life*

Alexander, in the end, opts for the first interpretation of the Ur-Ground and God. Personally, I favor the second and the laws of self-completion. In either interpretation, and throughout *The Nature of Order*, the art and act of building is a spiritual endeavor.

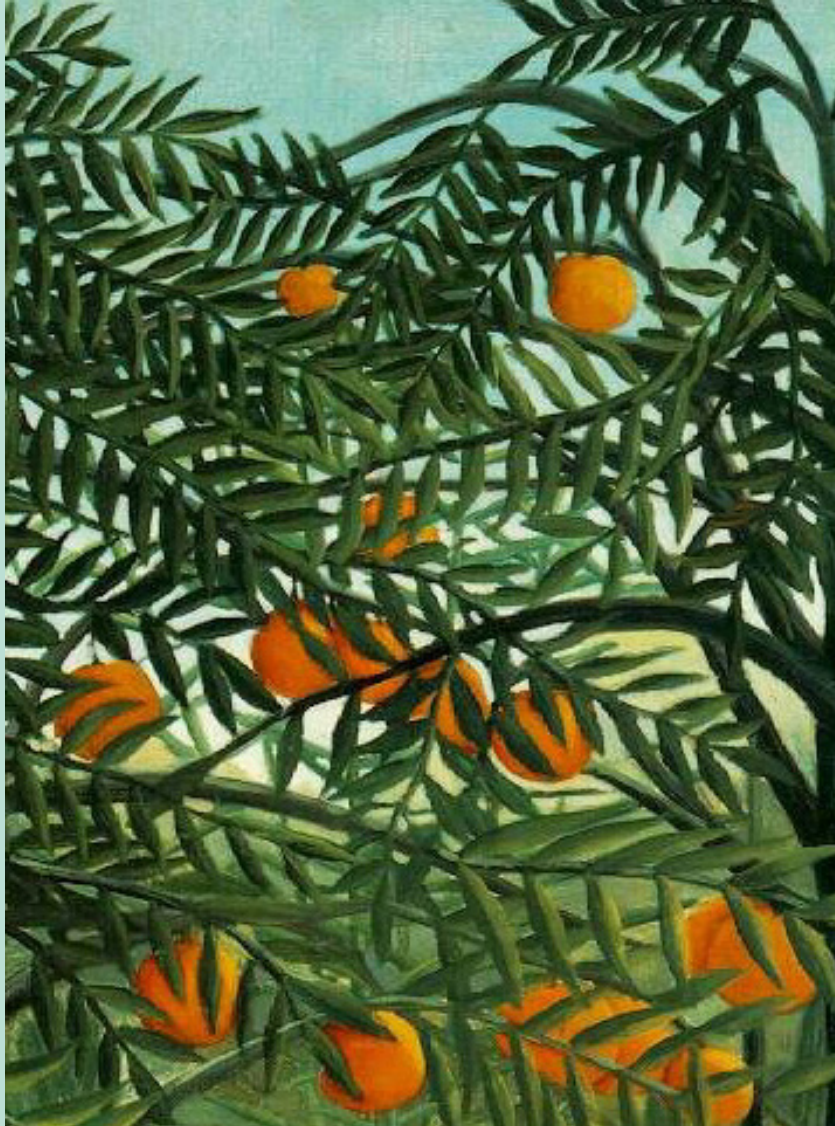
We honor our home the Earth, and our place in the Cosmos, by fostering wholeness in the built

environment. To succeed in this endeavor, we will do well to take our cue from the initial quote from Baudelaire—'let us commit to understanding the why of things and to drawing knowledge from our own delight.'

In so doing, we will soon discover that Nature is Delight's Muse.



Detail  
Book of Kells



Detail from *Dame dans une forêt exotique* by Le Douanier Rousseau

*“La vérité n’est point ce qui se démontre. Si dans ce terrain, et non dans un autre, les orangers développent de solides racines et se chargent de fruits, ce terrain-là, c’est la vérité des orangers.  
La logique? Qu’elle se débrouille pour rendre compte de la vie.”*

The Truth isn’t about a mathematical proof. If, in this spot and not in another, the orange tree grows deep roots and abundant fruit, then this spot is the orange tree’s truth.

Logic? Well, it’s up to logic to make sense of life.

Antoine de Saint-Exupéry

# part iv

## essays and conversations

---

### WHAT MAKES CHRISTOPHER RUN?

---

*“It is said of the Greek Gods that they cavorted with humans out of envy.  
For only mortals could see beauty.”*

Thomas de Zengotita

Alexander is mortal, knows it, and can see beauty—the kind of beauty that puts a lump in your throat and tears in your eyes. Run he does—like an Egyptian pharaoh obsessed with his pyramid.

I suppose that ultimately it’s the Numinous that makes him run—and his conviction that geometry and color are clues to the mystery. *“Geometrical reasons are co-eternal with God,”* are the words of Kepler. That was in 1596 and he was echoing Plato: the connection between geometry and God has quite a tradition.

Doug Paterson<sup>(16)</sup> draws an instructive connection between Alexander’s work and the reflections of Mircea Eliade on religion.

*“In examining the structural nature of sacred society, Eliade notes that ‘... the Center is precisely the place where a break in place occurs, where space becomes sacred, hence pre-eminently real. A creation implies a superabundance of reality, in other words an irruption of the sacred into the world. The axis mundi is that point where the heavens, the earth and the underworld join and marks the Center where such an irruption takes place. For religious man, such a ‘Centering’ is found in a mountain top, a tree or a point of land or is constituted in his constructions. The temple is conceived of as an axis mundi; both the town and the house are built in the image of the temple, and the shepherd roaming in a world of chaos, while tending his sheep, carries his centering, his axis mundi with him in the form of the shepherd’s staff.’ Eliade goes on to note that ‘This multiplicity of centers and this reiteration of the image of the world on smaller and smaller scales constitute one of the specific characteristics of traditional societies.’ In short, this fundamental, structural view of the world for religious man directly parallels Alexander’s notion of good order as an endless, recursive series of centers and wholes.”*

---

(16) Paterson, Doug. *Embedding Design Ideas, Principles and Processes, A Brief Structural Comparison of Alexander’s Ideas on The Nature of Order with Alexander’s Earlier Works and with Other Design-Place Theories*. Presentation for the Environmental Design Research Association, Sacramento, California, June 1, 2007.

Paterson gets it exactly right. This is precisely why there is such a felt connection between Alexander's work and traditional architecture. Even Alexander's seemingly outlandish conclusion that life is an attribute of space and that every bit of space is, to varying degrees, 'alive,' is hardly new but very traditional indeed.<sup>(17)</sup>

Here is a worldview, sensual and spiritual, where every nook and cranny, every twig and dew drop, and every cup and saucer on the shelf have spirit carrying potential. If Alexander is 'on to something' it is that. I believe lots of people are 'on to it.' They look for it in church, in the latest articles on consciousness; they feel it in the woods on solitary walks. They know it does not reside in the current living style of fast food hamburgers, credit card frenzy, and the dharma of Barbie dolls. Whether they are articulate about it or not, they are 'on to it' just the same.

Alexander continues to run, obsessed with his pyramid. He has marched past his 70<sup>th</sup> birthday and continues to follow his instincts as to where fertile ground for exploration may lie. His track record over the years has been excellent, so may he continue to follow his nose for many years to come. The rest of us can determine for ourselves our own agendas and paths of inquiry. Some of my own personal commentaries follow.

## FIVE PERSONAL ESSAYS

### FIRST ESSAY

Wholeness, as we have seen, is the 'Big Deal.' Alexander grapples with wholeness, I would argue, as an exercise in abduction looking for valuable conjectures in a Sherlock Holmes style. Conjectures allow for plausible understanding of facts which then lead to deduction. If such and such (fact x) is observable, then we should look to see if we can observe such and such other related phenomenon (fact y). Then induction allows the scaffolding of a more General Theory. The first essay ventures a very very very short summary of what we might call Alexander's General Theory.

### SECOND ESSAY

The second essay addresses the aficionados of *A Pattern Language*, written in 1977 by Alexander and five colleagues. Many of the readers interested in *The Nature of Order* have come looking for a sequel to the pattern book and have been disconcerted by the apparent lack of connection. My objective is to establish a bridge between the more formulaic patterns and the more process driven sequences. The ideas in this essay were first published in "Grasping the Ineffable: From Patterns to Sequences," *Environmental and Architectural Phenomenology*. Vol. 18 #1. Manhattan Kansas, Kansas State University. Winter 2007.

---

(17) Toward the end of his life, the physicist David Böhm became interested in the possibility that certain verb-based languages of Native Americans might be more appropriate to concepts of life and complexity such as flux and explicate/implicate order than more noun-based languages such as English. For a few years a group of scientists and linguists gathered annually to discuss this topic. During these discussions I learned that in the Tewa language spoken in the pueblos along the Rio Grande, the word 'God' could only be translated with a verb (certainly makes the image of God as an old man with a long white beard problematic, doesn't it?). I was told that in Navaho all things, including rocks, mountains, and sky are labelled as living. I asked my Navaho colleagues if there was anything that would not be considered living. They paused, reflected, conferred, and replied, "Plastic, but we're not sure."

### THIRD ESSAY

In the third essay, I revisit another of Alexander's early works, *The Timeless Way of Building*. The theme of that text was the search for a definition of the ineffable essence of profound and moving places: THE QUALITY WITHOUT A NAME. This phenomenon can also be seen as the subject of *The Nature of Order*, albeit from a different perspective.

A most curious contradiction existed during the years I worked with Alexander. Pages of compelling prose would roll off the printer. They might be on empowering the average family to design their own home, or about, say, how the natural world self-repairs, clears out debris, and spends significant energy on maintenance, and how, then, our own time allotments and budgetary decisions need to reflect nature's careful use of resources and the spending of multiples of small amounts on system repair. While this writing was going on, we were stepping over bowls collecting rainwater from the leaking roof and cardboard was stuffed into broken windowpanes. The windows hadn't been made operable in years. So consumed was Alexander by writing that he couldn't be bothered to practice what he preached. More notable perhaps (since those of us who don't practice what we preach are more numerous than all the stars in the sky), Alexander squelched anyone who dared comment on that obvious fact with his notorious, nanosecond, trigger happy, poison fumed, bilious green, razor bladed tongue. (OK, I exaggerate—but not much.)

The disparity between word and reality was acute and it was un-discussable. A strategy of 'offense is the best defense' made for a protective moat which effectively warded off unwanted distractions and uncomfortable subjects but it also blocked out critical information, discourse, and social opportunities necessary for progress. What possibly useful and constructive observations can I make? Could it have anything to do with THE QUALITY WITHOUT A NAME?

### FOURTH ESSAY

Warren Weaver<sup>(18)</sup> likened the foundations of science to piles driven into soft and swampy terrain. We simply stop driving the piles down, he said, when we're satisfied that they are firm enough to carry the kind of structure we want, at least for the time being. Euclid called 'axiomatic' the step on which he stood to build his system. Weaver said this bottom step is not axiomatic (in the sense of uncontestable) but simply a heuristic postulate, assumed to be true in order to obtain what we hope to find by following it to its conclusions. He spoke of an 'ultimate mysticism' lying at the bottom of this type of scientific explanation. This sounds about right for Alexander's work. The fourth essay highlights obvious areas for further work as well as some of my doubts concerning that work and just how to proceed.

### FIFTH ESSAY

The last essay is a reflection on what I think may be Alexander's greatest genius: an uncanny ability to observe and make sense of his observations. There is such a gap between his sensemaking and mainstream sensemaking that *The Nature of Order* might just fall into oblivion. For sure the work is flawed, but for sure it is full of gold. What could possibly bridge the gap?

---

(18) Weaver, Warren. *Science and Imagination*, Selected Papers. New York: Basic Books, 1967.

“As the woman stepped off the train from London and looked across the countryside, she said to the farmer,” *My, my, you and God have certainly done a marvelous job.*”

*“Ah, yes,”* said the farmer, *“and you should have seen it when God was on his own.”*



English countryside. Photo Ken Hircock

---

## SUMMARY of THE GENERAL THEORY

---

*“I think the loony idea that God is in one compartment and electrons are in the other is of very little interest. It’s just an escape from confronting a very difficult set of questions.”*

Christopher Alexander in an interview for *Science and Theology News*, 2005

The universe is a field-like structure of matter-space. Its Wholeness, Holiness, Life, increases through an on-going process of differentiation—the smooth structure-preserving emergence of necessary centers which unfold through geometric transformations and color. This field-like structure evolves through its own internal dynamics and—at high levels of organization—acts something like a window, permitting a fleeting glimpse of another ultimate Ground or God.

Man, being a high level field-like structure within the larger field-like structure can, with a bit of dint and attending power, recognize, through internal affinity, degrees of Life in objects and places. Endowed—blessed—cursed? —with free will, Man (this is all sounding a bit Catholic, isn’t it?) can choose to either muck things up or get with The Program.

The Program involves increasing the Earth’s Wholeness through Cleaning Up Our Act when it comes to building. We shall emulate Nature by figuring out sequences of action, much like DNA codes, that differentiate space and create necessary centers through geometric transformations. We shall strive through constant fine grain adaptation to make each element uniquely suited to its spot in the field-like structure. Some of the existing ‘patterns’ from old building traditions are still relevant and can be amped up into sequence format. Other sequences more appropriate for our times and technology must be worked out and tested.



Alexander’s General Theory will be seen by many not as a scientific theory based on solid methodology but rather a teaching or Doctrine which, like all Doctrines, can totter into a rather totalitarian stance. We might profitably consider Alexander’s work an algorithm about wholeness but since wholeness will always escape us in its entirety, it can only be what Pierre Rosenstiehl called a ‘myopic algorithm.’ (That is, as Umberto Eco explains: “...at every node of it no one can have the global vision of all of its possibilities, but only the local vision of the closest ones: every local description of the net is a hypothesis [abductive inference], subject to falsification, about its further course; ...blindness is the only way of seeing (locally), and thinking means to grope one’s way.”)

Personally, I’ve spent a lot of time with *The Nature of Order* and have now reached what Hugh Prather called a preference for the ‘dixie cup church.’ Once you’ve drunk in the wisdom, you can throw away the paper cup and carry on.





Entrance transition at home. Photo Charles Adams

---

## FROM PATTERNS TO SEQUENCES

---

*“Des modèles sont des véhicules dans l’espace des saviors.”*

Models are vehicles in knowledge space.

Hatchuel and Weil, *L’expert et le système*



Entrance transition



Entrance transition

Devotees of *A Pattern Language* can be understandably frustrated by the lack of ‘how-to’ material in *The Nature of Order*. The highly practical nature of successful patterns represents centuries of accumulative learning; *APL* had the fairly modest and concrete goal of compiling them into a user-friendly handbook. *The Nature of Order* is exploratory and far more ambitious in its scope. Briefly summarized here are the critical distinctions between *patterns* from *A Pattern Language* and *sequences* from *The Nature of Order*.

### *A PATTERN LANGUAGE*

IS A COMPILATION OF ARCHITECTURAL PATTERNS:  
HONED SOLUTIONS TO RECURRING PROBLEMS, COMBINATORY RULES,  
AND TECHNIQUES FOR PRACTICAL RESULTS

The pattern called ‘Entrance Transition,’ to take a simple pattern, deals with the recurring problem of getting from outside to inside. Experience shows that the entrance transition is most satisfying when there are transitions in factors such as height, direction, textures, light and shadow, which support a psychological transition accompanying the physical one. The rules for the patterns are adapted to each unique site and result in an infinite variety of renditions.

# ATTRIBUTES OF PATTERNS

## MINED

Working patterns are, in Richard Gabriel's expression, mined. Like diamonds, patterns are the result of many years of process. We don't make them—we find them, polish them, use them, and value them. Developing patterns from scratch and all-in-one-go has proven to be extremely difficult.

## MANAGEABLE CHUNKS OF INFORMATION

Whether addressed to a large scale, such as pattern #3 (city country fingers) or small scale, such as #200 (open shelves), each pattern is immediately graspable as a manageable chunk of information.

## BUILDING AND SOCIAL PATTERNS OVERLAP

Building patterns are obviously correlated to social patterns, as in #80 (self-governing workshop), or #133 (staircase as stage,) or #139 (farmhouse kitchen).

## NESTED HIERARCHIES OF SCALE

A hypertext structure supports selecting and combining patterns of different levels of scales into a coherent whole.

## MID-LEVEL ABSTRACTIONS WITH STATE AND PROCESS DESCRIPTIONS

Patterns are written as mid-level abstractions. They act as design constraints; concrete guidelines are provided while not unduly limiting the builder. Each pattern offers both a state description (a verbal blueprint of the desired result) and a process description (a recipe for action). The recipes for action are simple and direct. More like origami, they are not difficult in the way that following a blueprint is difficult.

## INFINITE RENDITIONS OF CLUSTERS OF GEOMETRY

Patterns are clusters of geometry. A pattern language is a coherent subset of patterns and combinatory rules that, like an individual pattern, can give birth to an infinite number of variations.

## DEEP BEAUTY COMES FROM NON-SIMPLE INTERACTION OF PATTERNS

The potential for the subtle complex beauty of deeply organized spaces emerges from non-simple juxtapositions and overlapping of individual patterns. No doubt, this is the aspect of working with patterns that is the most difficult. It is also the aspect that has been the least elucidated in the writing on patterns and their implementation in the built world.

# ATTRIBUTES OF SEQUENCES

*THE NATURE OF ORDER*, IN CONTRAST,  
IS ABOUT CREATING PROFOUND SPACES LARGELY THROUGH SEQUENCES.

## PROGRESSIVE DIFFERENTIATION OF SPACES

A sequence is the mindful ordering of decisions to be made. Decision  $n$  creates the context for decision  $n+1$ , which, in turn, creates the context for  $n+2$ . The net result of a building sequence is a progressive differentiation of space.

## WHOLENESS IS THE GUIDE AND THE GOAL

The process is recursive. At each decision point, we must grasp again the wholeness that exists in order to determine which next move will best call forth the latent structure.

## EACH STAGE IS STRUCTURE PRESERVING

The key is in getting the sequence of decisions right. Starting with the wholeness of a building site, understanding what to preserve and enhance will lead to initial decisions relating to where *not* to build. This is very different, say, from starting with engineering decisions about the most efficient layout for water and sewer pipes.

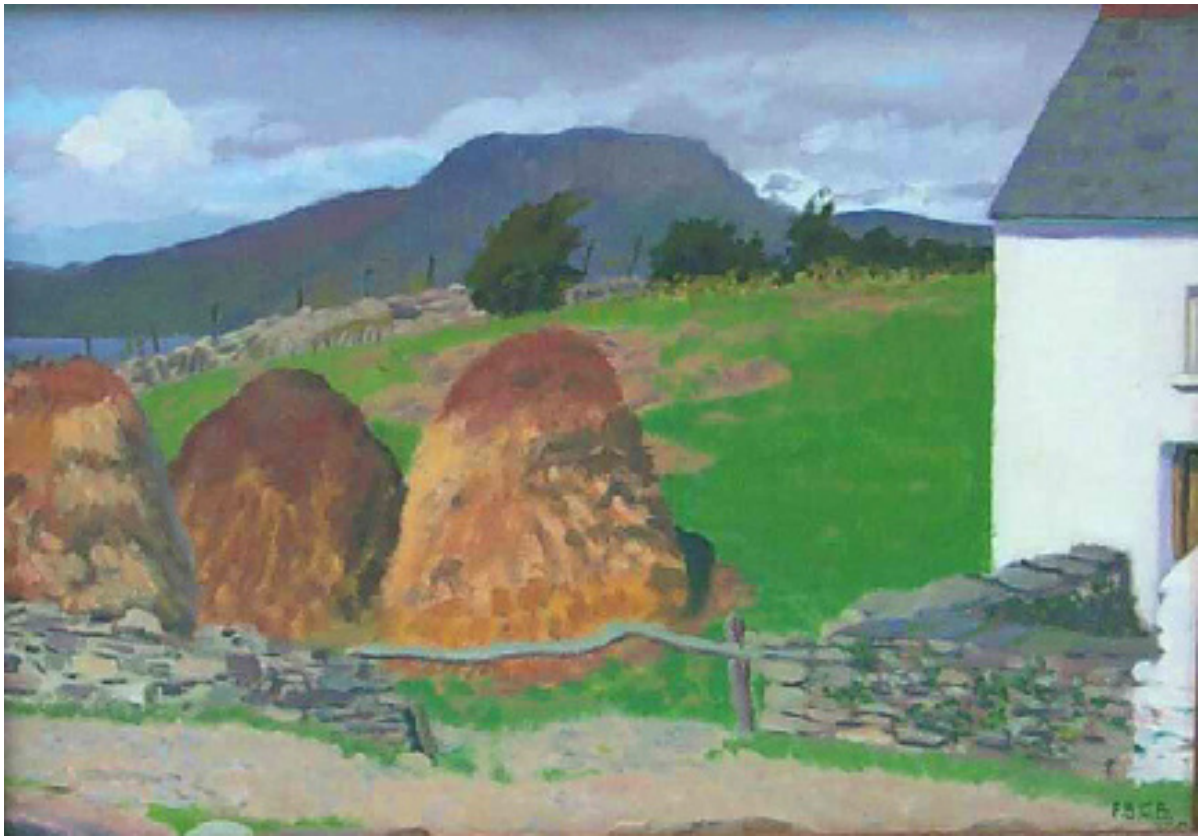
Recognizing a structure-preserving differentiation is intuitive but usually involves: *a)* minimum symmetry breaking, *b)* connecting to the next smaller and larger scale, *c)* enhancing existing centers or creating new centers and, *d)* transforming through one or more of the fifteen geometric properties.

## CENTERS BOOTSTRAPPING CENTERS

Structures that have 'unfolded' have a much higher density of connections and are therefore more robust than other structures. The whole and the part reinforce each other as centers are added and strengthened.

## UNFOLDED FORMS

Morphogenesis, the mathematics of growth and structure preservation are not fully understood. Yet, we do intuitively distinguish unfolded forms from those that are not. Shape is the consequence of growth and constant mutual adaptation between parts and whole over time. This fine-grained complexity can be obtained in no other way and it is this particular quality which arouses in us so much pleasure and wonder.



Haystacks  
Painting by British Architect Charles Bravington

---

## THE QUALITY WITHOUT A NAME & THE NATURE OF ORDER

---

*“The Buddha, the Godhead, resides quite as comfortably in the circuits of a digital computer or the gears of a cycle transmission as he does at the top of a mountain or in the petals of a flower. To think otherwise is to demean the Buddha—which is to demean oneself.”*

Robert Pirsig, *Zen and the Art of Motorcycle Maintenance*

THE QUALITY WITHOUT A NAME is the principal subject of *The Timeless Way of Building*. In this work, Alexander explores a quality of certain built environments—usually small—a garden, courtyard, workshop, maybe a room. This quality can be alluded to through such words as comfortable, egoless, relaxed, simple, timeless, not contrived, direct, unpretentious—but ultimately the quality remains ineffable: THE QUALITY WITHOUT A NAME.

*The Timeless Way of Building* is often taken as a delightfully poetic, huggable, teddy bear text. Personally, I don't take it to be an ode to motherhoodicity. I take it to be an early qualitative search for greater precision and honing in on something quite real, utterly important, but indeed elusive. *The Nature of Order* is more ambitious in scope, but can also be read as a more advanced search for precision about this quality. Perhaps the comments I'm making here will point to another path of exploration.

In all of his writings, Alexander frequently turns to traditional built environments and talks of inhabitants simply going about living their lives and creating beauty as they go. So the farmer, for example, does his farmer sorts of tasks, repairing fences and building barns, and in so doing, lovingly maintains and enhances the land. Alexander might present a photo, say, of some field in Rumania where the haystacks are structure preserving and have that *je-ne-sais-quoi* magic of THE QUALITY WITHOUT A NAME, while, alas, at the same time, the university-trained architect in Bucharest is tying his shoelaces together and ruining his country. Now, I'm inclined to agree with Alexander's assessments, but although he makes attempts at justifying his observations linking the farmer and structure preserving actions, we are left in the dark as to how exactly this happens. The whole thing ends up sounding a bit woolly.

I can't really presume to know what the Rumanian peasant is thinking, but I hazard a guess. So, it seems unlikely that he is scratching his head and pondering artsy-fartsy questions such as where the haystacks might look good, or what haystack form would most mirror his true inner self, or whether he's got his levels of scale right. More likely are concerns such as putting up the haystack so that the rain drains off and it dries quickly, not having to exert undue effort piling up the hay, and getting it to market in time. But my question is why, really, would these concerns and tasks lead to structure-preserving actions and THE QUALITY WITHOUT A NAME?

## A PERSONAL INQUIRY

*“Place is an extension of presence.”*

John Berger

*“An idea must travel all the way from the mind to the hand and that is a very long way indeed.”*

Satish Kumar

Back at my own ranch, so to speak, I put away the photos of Rumanian haystacks and my writing so that Charles and I can make progress in the continual remodeling and unfolding of our own home. I have learned that the best teacher is hands-on real-world attempts at creating meaningful spaces. Charles is a careful craftsman, abhors sloppy work, and is an ingenious problem solver. Here is the curious rub. Charles finds Alexander’s work to be rather irrelevant in the world of concrete things and actions. Yet *lo and behold* Charles can do the magic. From his hands emerges THE QUALITY WITHOUT A NAME. Charles—when it comes to actually making something—is far more Alexanderian than Alexander. So what gives?

I suspect a link between Charles and the Rumanian peasant. I re-read my cognitive science classics. I interview Charles. I observe. I take notes. Charles has his own rules of thumb. They look and sound very different, but they do not directly contradict Alexander’s *Fundamental Process*. A new angle of inquiry based on different cognitive mechanisms emerges as a possibility.

### RULE 1

Put problems on the back burner of your mind until the solution floats to the surface. An elegant, parsimonious solution can be recognized by the mental and emotional equivalent of the ‘sweet spot’ in golf. The inner voice softly clicks in: *“That will work.”*

I believe what is going on is a non-verbal, right-brain scanning which follows Herbert Simon’s description of the procedure for insight (COMMENTARY ON THE NOTICEABILITY OF UNFOLDING WHOLENESS). Through repetitive cycles the mind does an increasingly accurate reading of the nested wholes, latent structures, and forces involved in a problem. The parsimonious, functional, and least-effort solution prized by Charles (and probably the Rumanian peasant) will also be one which leaves existing structures intact.

Insight requires mulling time and deep familiarity with the spaces in question. Hired architects and contractors don’t (and can’t) have the time or the deep knowledge. They must, to ‘make a living,’ proceed in a more perfunctory fashion.

*Example.* Our home still sports its original 1930 quasi-immortal gas furnace which lives in the crawl space under the house. Over the years, previous owners added rooms without replacing the furnace. The old thing can’t really heat the extensions well enough, is utterly inefficient, and brings in outrageous heating bills. Obvious and perfunctory responses such as a new heating system or installing solar panels are big and expensive undertakings.

*Solution.* Forget the furnace and change the problem space. On the south side between the house and the compound wall along the street is a narrow strip (roughly 6 feet wide) of dead space. A string of old windows from the recycle yard are refurbished and framed as a slanting roof from the roof of the house to the top of the compound wall. A heat sink is created that warms the adobe walls of the house. No furnace. No bills. No unattractive solar panels. Just a sensitive use of sun, nice old windows and mud walls. Geraniums and cooking herbs grow year round in pots placed on a full-length, window height shelf turning the dead space into a living garden.

The solution is utterly simple and utterly precise. The geometry is good. The whole is enhanced, both the house itself and the larger scale of the streetscape, and even the next larger scale of sustainable living. Something like the darning of a sock, a weak spot was repaired and through that action the whole fabric was strengthened. This is what Alexander keeps shining on about.

THE QUALITY WITHOUT A NAME, typically matched with adjectives such as simple, profound, unassuming, is not about twee or cute or necessarily traditional. On closer examination it revolves very much around real accuracy of fit between built environment and human need. (Just think of an old pair of familiar comfortable shoes that exactly suit your feet and their movements.) The terminology from *The Nature of Order* dwells more often on ‘fine grain adaptation’ and ‘roughness.’



The heat sink project. Photo Charles Adams  
The year round herb garden heats the house in winter  
and turns the ‘dead space’ between the house and the compound wall into a living center.



## RULE 2

Resist spending money and avoid Home Depot, Wal-Mart and specialty retail stores. They just want your money and never have what you are looking for anyway. (Charles is Mr. Frugal incarnate.)

Three observations came to be connected to this rule.

First, the nature of creative thinking and innovation are at the heart of things. During a conference in France on higher education and internet technologies, Dominique Cardon,<sup>(19)</sup> representing France Télécom, noted that the R&D experts in companies look at how to make things cheaper (and thereby enhance the bottom line) and how to address ‘average’ problems. Real innovations, he said, come almost entirely from end-users who are passionate about solving some idiosyncratic and specific problem. The same applies in architectural firms where even ‘custom-made’ will be a collage of tried and true, cut and paste ideas. For them, genuine innovation is simply too costly in time and mental effort.

Second, a breakthrough point in the history of cognitive sciences, computer programming, and artificial intelligence modeling of human thought was the realization that learning is not concerned with comparing ‘things.’ It is about comparing *descriptions* of things. This same insight is offered by Pirsig, albeit in very different language, in *Zen and the Art of Motorcycle Maintenance*, when he says that Quality involves grasping the difference between what an object is and what it means. Only in-depth knowledge of a craft allows for truly exploring and exploiting the qualities inherent in any material.

Third, as cognitive scientist Herbert Simon so clearly tells us, innovations require domain expertise and are rarely achieved by a novice. Charles, of course, has a history. He grew up with a Dad constantly re-inventing the family home and was handed a hammer by the age of eight. At one point, later in life, to keep body and soul together, he took a job making stage sets for television and movies. Domain expertise. He knows tools and materials.

*Example #1.* I want to frame a dozen photographs. Taking them to the specialty store for frames is too costly, so I consider buying supplies from the frame shop and doing it myself. The most simple framing material will still run around \$60 a photograph. Charles then mentally scans for comparative *descriptions*. J-Bead (used to edge sheetrock) is in the form of a J (frame-like), cost only pennies, can be cut with tin snips, painted, and easily assembled into frames.

*Example #2.* When I write, I like to spread out and be able to evaluate options for page layouts. If I monopolize table space or floor space, it gets in the way of other household activities and I have to keep picking things up when I would rather leave them spread out until I’m done.

I wondered if one wall in the home office could be used for a storyboard. Commercial storyboards in local art supply shops were expensive, not terribly practical, and not ideal for the space we have. A comparison of *descriptions* led to a jaunt down to the heating and air conditioning place in the industrial zone where we

---

(19) Colloque IUR: *Innovations, Usages, Réseaux*, Montpellier, France, November 2006. A copy of Dominique Cardon’s presentation was forwarded to me by André Demailly during our ongoing discussions.

bought a sheet of galvanized steel (and additional steel edging) that would cover the top half of the wall. The bottom strip of edging was fastened to the wall first so that the sheet could slide in and lay flat against the wall. We edged the rest and painted it the same color as the wall. From the sign shop, which makes large signs that go on the side of buses, we acquired a bag of left over pieces of magnetic sheets which could be cut down further into small squares to hold the pages and artwork. The storyboard works.

It does seem that innovation occurs in the passionate solving of a particular problem through domain expertise and novel use of existing materials for a fine grain 'fit.' These innovations focus on functionality and ignore affectation. The solutions are simple, use only the necessary differentiations, and result in a space that is completely personal and possesses THE QUALITY WITHOUT A NAME.

The frugal factor is, in fact, a pushing of limits, rejecting the facile labels of retail consumerism and collaborating more directly with the situation and the materials. The frugal factor also adds the additional depth of contrast between basic simple materials and a few spots where money is spent. Beauty rarely comes from uniformly throwing money at things.

### RULE 3

#### Oh No. Please. It's conceptual.

Of course we live in an increasingly mediated world. We keep stylized food from stylized vendors in stylized high-end designer kitchens. The objects that surround us are increasingly 'conceptual gestures' rather than real. I'll relate just one experience with the 'conceptual.' For a while we were wandering around town looking for a working bucket (can't get simpler than that). Most retail store buckets are flimsy molded plastic containers which can't hold weight and, anyway, the handle pulls loose and cuts your hand. The bottom sits directly on the ground so that after a scrape or two, you've got a hole. *Home Depot* sells them in their company store color of bright orange. Other stores sell the more fashionable Martha Stewart style two-color bucket which comes in a coordinated set with matching (equally conceptual) garden hose.

Finally, a contractor friend gave us the secret address for a real bucket. The pub attached to the town brewery gives away their empty pickle buckets. The wholesale pickle dealer (in kinship with the Rumanian peasant) is in the business of moving move pickles around and therefore makes a sensible bucket with good geometry. It's sturdy, sits on a base, and has a smooth wide handle that fits the human hand. Objects that have the magic of THE QUALITY WITHOUT A NAME actually work. They're functional rather than mediated, stylized and symbolic.

This same phenomenon was described in different terms by John Berger. "*At the beginning, the existent was what confronted man. ... Necessity is the condition of the existent. It is what makes reality real. And today's system's mythology requires only the not-yet-real, the virtual, the next purchase. This produces in the spectator, not, as claimed, a sense of freedom (the so-called freedom of choice) but a profound isolation.*"<sup>(20)</sup>

Job briefs, contracts and building codes are also mediation. They confine the action space. The Rumanian peasant and Charles (the do-it-yourselfers) are not confined by job briefs but are directed by the process of the task itself. Quitting time is determined by the natural flow of the work, not the clock. The 'job brief' evolves

---

(20) Berger, John. *The Shape of a Pocket*. New York: Pantheon Books, 2001.

with the task. The left over stone or tile gets used—often as small-scale ornament. Alexander repeatedly emphasizes the fact that design and building are not divisible tasks and that standard contracts get in the way. He is talking about feedback loops and control structures. I imagine that it goes a lot farther than that if one is to reach THE QUALITY WITHOUT A NAME.

#### RULE 4

### Serendipity is my copilot.

For sure, sequence is a powerful notion. Decision  $n+3$  does become the context for decision  $n+4$ . For sure, foundations precede the roof. However, in between foundation and roof, the sequences that give the texture and flavor to a place are not as neat as Alexander proposes. Serendipity (the lucky find of a good supply of only one of several possible building materials, or a visiting friend who has a special skill) is a determining factor in key decisions and in the sequence of actions. For our heat sink, the unplanned find of five good windows and an old wrought iron door at the recycle yard determined the final shape of the space. THE QUALITY WITHOUT A NAME always returns to the uniquely adapted, and much of that is fortuitous.

#### RULE 5

### Quality is an event.

Robert Pirsig, in *Zen and the Art of Motorcycle Maintenance*, suggests that Quality is really an event. Quality-as-event occurs when the usual division between Subject and Object (maker and object) fades. It's quite obvious when you're looking for it (noticeability). In a pottery studio, some 'listen' to the clay with all five senses and all their sensibility. The ones who fail to listen also fail to create anything of interest. Or, see how Quality 'tells' in the look on the face of a real craftsman totally involved in what he is doing versus the hired contractor completing a task with one hand and arranging the next job on his cell phone with the other hand.

THE QUALITY WITHOUT A NAME has the 'deep feeling' of complete humanity that only comes through the fusion of subject and object. Indeed, we lose part of our humanity when we divorce product and process. The assembly line worker in a factory often sees only bits of a process and remains alienated from the product. Likewise, there will be nothing of our own human creative process vested in the saccharine get-well card purchased at the department store. Only when we continue to live in and be nourished by those spaces and places, gardens and work stations, that we lovingly create, does divorce not take place.

### A SLIGHTLY BITTER QUALITY

I understand now, years later, why all the examples in *The Timeless Way* are of relatively small spaces. It is because such magic is rare. I pay close attention to these spots when I stumble upon them. There is a room in my friend Mai's house—a small room just off the kitchen with a very low ceiling and tiny fireplace. The house is old adobe and adobe places have a subtle smell. They smell of the earth. The acoustics are different in adobe houses—nothing echoes. The whole room is taken up by a big table and ten chairs. There is one low lamp over the table. In this room there is enough maneuverability to comfortably get in and out of the chairs but not one inch more. Mai, a Chinese-American, is a superb cook and serves things the Chinese way: big bowls and plates of food and 'help-yourself' instructions. What do I notice time and time again at meals-with-friends-at-Mai's? People hang out there, relaxed and unguarded for hours on end. The experience

of being in the room is a bit like a cradle or perhaps like the advertisements for a woman's bra—the cup that holds you gently. The magic of this room wasn't planned. It came together, a serendipitous accident of extreme precision.

The last phrase of *The Timeless Way* is that THE QUALITY WITHOUT A NAME has a slightly bitter quality. The bitterness has to do with a depth of space that makes us aware of time and life passing. In *The Nature of Order*, Alexander calls one chapter which speaks of the same quality "*The Goal of Tears.*" What I have come to realize is that places that have that magical depth of presence require a level of involvement and loving care that I never saw Alexander actually practice.

*The Nature of Order* is replete with photographs and detailed descriptions of buildings designed by Alexander. I have visited some of those buildings and although I believe I understand what he was reaching for, I felt he never quite pulled it off. In a few spots where (it seemed to me) that the work came close to THE QUALITY WITHOUT A NAME there was additional input. In the Visitor's Center at West Dean in Sussex, England, the stone, brick, and flint facades come close to that magic quality. It turns out there was a most unusual foreman who knew local craftsman who could still do things the old way and bring an aesthetic sensibility otherwise unanticipated.

What Alexander's buildings do offer is an exceptional series of experiments of direct interest to anyone actually building and exploring ways to come closer to profound spaces. Discrepancy between theory and practice is endemic to human endeavor and shortfall of actual attainment never diminishes the significance of the reach.



Alexander's office in his country estate in England. He did fabulous work on designing office furniture that was ergonomically sound and adaptable to available spaces, individuated needs and preferences. As for himself, he continued to work off of a cardboard box of inadequate height that contributed to chronic neck pain. Photo Jenny Quillien

*“Man can only be creative in relation to problems which he seeks to solve.”*  
E. H. Gombrich



Christopher Alexander in 2001. Photo Jenny Quillien

---

## ON FUTURE WORK

---

*“You never change things by fighting the existing reality.  
To change something, build a new model that makes the existing model obsolete.”*

Buckminster Fuller

Alexander has made a life investment in the creative process along the lines laid out by Jerome Bruner in *Essays for the Left Hand*.<sup>(21)</sup> First, a detachment from the commonplace: one detaches from the world in order to commit oneself to replacing conventions with new constructs. After this commitment of self to the task, the work becomes a balancing act between passion, which gives a superior degree of attention, and a decorum that counters enthusiasm with a love of form. Both an etiquette toward the object of passionate effort and a respect for the materials involved are maintained. The creative movement, according to Bruner, is rounded out by the freedom to be dominated by the object. Bruner is pointing out to us that the locus of liberty in this kind of creative work lies between the creator and the task.

Alexander's creative work was indeed done in detachment from the commonplace, in fact in detachment from everybody—the field of professional architects and lay audiences. Bruner spells out the advantages to working in isolation, but isolation starves work of insights originating from others and deprives it of the tempering that comes from real world testing. So now what?

## FROM OLD TO NEW PREDICTIVE KNOWLEDGE

*“Groping comes before grasping and seeking before seeing.”*

E. H. Gombrich, *The Sense of Order*

*APL's* patterns are predictive mid-level abstractions which successfully support the planning and execution of a project (new entrance way, placement of a window, etc.). *NO's* sequences, in my own very limited experience (certainly no basis for implying anything other than personal experience), don't work that well—at least not yet—as planning models.

---

(21) Bruner, Jerome, *Essays for the Left Hand*. Harvard: Harvard Press, 1979.

During my years with Alexander, we did try out a few draft sequences on volunteers. People found them counter-intuitive, boring and just not helpful. They also didn't come up with very good designs. One exception was Howard David, a practicing architect well versed in Alexander's way of thinking. Howard did—almost—have to be tied to a chair to undergo the drudgery. (People said that following sequences felt sort of like filling out tax forms.) However, after an hour, he had designed a one-room cottage and confessed that he could not have done so well with an hour's work doing a design the old way. Howard's design as well as the other experiments remained paper exercises.

The easier end of future experimentation may be to continue taking existing patterns which are relevant to today's world and reconstructing them as sequences and then testing them. So far, only a handful of patterns have been revamped as trial sequences (such as a neighborhood, kitchen, one-room cottage). The tougher tasks might be working out sequences from scratch for building forms that fit our current life styles and technologies.

It could turn out, however, that these early sequences are not only deficient but simply wrong-headed. Perhaps Alexander takes the biology metaphors too far, and attempts work at the wrong level of abstraction. A more fruitful path might be to take our cues from the short 1975 monograph on the University of Oregon. This draft sequence for the long-range planning of a university campus did not focus on forms at all but rather on the social and cognitive processes required for healthy design (rules for participation, diagnosis, co-ordination, scale, and maintaining focus on the dynamics of whole to part and part to whole).<sup>(22)</sup>

## POSTDICTIVE KNOWLEDGE

*"Never block the path of inquiry."*

Charles Sanders Peirce

If existing sequences are not yet compelling as planning tools, I do find that sequences can work well backwards, as a basis for a Sherlock-Holmes-style analysis of what has already taken place. Although the fifteen properties do not tell a craftsman what to do next, they also seem useful as a postdictive validation that the unfolding of a space has been proceeding well. If this is correct, then detailed accounts of what really transpired in a successful building could constitute invaluable information about wholeness.

Alexander is more than generous with detailed accounts of what happened during construction projects. Do these stories help? Alexander tells us what he wants to tell us but do the stories convey what we need to know? Is it even possible for him to tell us what we need to know? Frankly, I'm not sure. To explore this further, I handed Charles Volume II and asked him to read the sixty page blow-by-blow description of building a private home for the Upton family and tell me what he learned. The answer—that the house was built for really unusual clients—seemed disappointing at first; but it led to an engaging discussion.

How can we, in a recounting of events, actually pinpoint and convey the essential features? I don't think it is a trivial question. In the example of creating a sheltering trellis described in Chapter Seven, I had to 'tidy up'

---

(22) I'm indebted to architect Dil Green for an engrossing discussion on this topic. The reference is to *The Oregon Experiment* (1975) by Alexander, Silverstein, Angel, Ishikawa and Abrams.

the telling of the tale in order to fit a smooth, presentable sequence of unfolding. The real sequence of events more closely resembled a shaggy dog story. In talking this over with Charles (as we sat under same sheltering trellis), he said, “*Well what is this spot really about? It’s as much about how the blue gate talks to the patch of blue sky over there as anything else. And maybe it’s about ‘here’ in the southern Rockies where we live outdoors much of the year. You wouldn’t build this kind of structure in mosquito infested Indiana or sweltering Phoenix. Does your sequence include those factors?*”

If a sequence is more like a ‘cleaned-up’ version of a set of steps taken, much in the way a scientific write-up of an experiment is always more rational and tidy than the real events, then maybe we risk throwing out the baby with the bath water. A sequence attempts to ‘map a territory’ (i.e., the steps in creating a small cottage) just like a cooking recipe maps the steps to, say, a chocolate cake, so that another person can create on their own a new cottage (or cake). What would a really useful detailed sequence look like?

I have been struck by the fact that the talented builders and craftsmen with whom I have discussed Alexander’s new ideas actually don’t find them all that enlightening. The ‘territory-as-mapped’ by Alexander just doesn’t speak to them. In listening closely to the conversations between these artisans and builders who have now become close friends, there is a quality of discourse absent in Alexander’s big books.

These conversations take place within a community of practitioners who are conversant both with the trades and with the subtle complexities of ‘here’—this climate, these local materials, this social milieu. Although all the craftsmen in this community of friends certainly can and do appreciate how solutions range from very limited applications to universal relevance, most discussions favor the concrete reality at hand. Some conversations examine direct implementation, others discovery or experimenting, and others look at re-defining a problem space. An acknowledged and honored diversity of skills and backgrounds is an unspoken part of the scene. The conversations entail honest autobiographical disclosures concerning matters of immediate mutual curiosity, and command respectful listening motivated by self-interest. As Charles summarized: *The discussions are rarely at the abstract rational level of ‘How are fish caught?’ but are more genuine descriptions of ‘How I caught this fish this day in this spot.’ The listeners, with enlightened self-interest, use the information to ask themselves the question, ‘How can I (too) catch a fish?’*

## TRANSFERABLE KNOWLEDGE

*“I am the Master of Trinity College and what I know not is not knowledge.”*

quoted by Alfred North Whitehead in *Modes of Thought*

*“In the varied topography of professional practice, there is a high hard ground overlooking a swamp. On the high ground, manageable problems lend themselves to solution through the application of research-based theory and technique. In the swampy lowland, messy, confusing problems defy technical solution. The irony of this situation is that the problems of the high ground tend to be relatively unimportant to individuals or society at large, however great their technical interest may be, while in the swamp lie the problems of greatest human concern. The practitioner must choose. Shall he remain on the high ground where he can solve relatively unimportant problems according to prevailing standards of rigor, or shall he descend to the swamp of important problems and non-rigorous inquiry?”*

Donald Schön, *Educating the Reflective Practitioner*



In 1986, philosopher Hubert Dreyfus and computer scientist Stuart Dreyfus<sup>(23)</sup> compared computer expert systems with human expertise. What they found may be applicable to the situation at hand. They found that experienced human experts do not operate through applying a sequence of rules but act on their intuitive grasp of ‘an entire constellation of facts.’ However, when asked for input for the construction of ‘sets of instructions,’ the human experts stated the rules they had learned as beginners but which they themselves had stopped using. The same phenomena takes place within the medical practices. A doctor’s perspicacity at diagnosis develops as a skill of experience with a vast constellation of facts and indications. There is no effective way to ‘transfer’ this kind of knowledge to the next generation of practitioners.

A reflective practitioner seems to be acting on probabilities gathered from experience. Sequences, cooking recipes, musical scores, or dance steps are really nothing more than memory aides. The real actions are based on experienced guessing, abductive inferences at a very concrete level. You can know the dance steps but still must constantly guess at what the band and your partner will do next. The more experienced you are with your partner and the band, the more precise and fluent will be your own actions. Similarly, the carpenter really ends up guessing what the wood and humidity will do next. If we make an analogy between Alexander’s sequences and a musical score, the question is “*Can you play it?*” The answer seems to be “*No.*”

Certainly, in the last few years as I began hands-on attempts at creating places, I have come to appreciate how knowledge can be embedded in action and only accessible to a learner through action. Donald Schön makes this comment on the teaching of architecture. “*In the architectural studio, the paradox inherent in learning to design places the student in a predicament. He is expected to plunge into designing, trying from the very outset to do what he does not yet know how to do, in order to get the sort of experience that will help him learn what designing means. He cannot make an informed choice to take this plunge because he does not yet grasp its essential meanings, and his instructors cannot convey these to him until he has had the requisite experience. Thus, he must jump in without knowing—indeed, in order to discover—what he needs to learn.*”<sup>(24)</sup>

## NEATIES VERSUS SCRUFFIES

*“As far as the laws of mathematics refer to reality, they are not certain,  
and as far as they are certain, they do not refer to reality.”*

Albert Einstein

In the programming world, it is said that there are two kinds of people: Neaties and Scruffies. The Neaties are after the power to cleanly represent. Alexander, with his formative training in mathematics, yearns to be a Neatie. *Ah, my kingdom for the pure, measurable, irrefutable code which represents all and proves the existence of God while we’re at it.* Mentioned in the introduction is the need to find ways to measure and weigh as well as map and model. How can we converse more precisely about such basics as ‘centeredness’ and ‘intensity of a field?’ The presentations of the fifteen properties indicate avenues of further research with mathematical underpinnings. This is Neatie speak.

---

(23) Dreyfus, Hubert and Stuart Dreyfus. *Mind over Machine*, New York: Free Press, 1986.

(24) Schön, Donald. *Educating the Reflective Practitioner*, San Francisco: Jossey-Bass, Inc. 1987.

Neatie speak must play a central role in future work. Alexander did, just as Warren Weaver described, drive the foundation piles of his understanding down into soft terrain just far enough to carry the kind of structure necessary to proceed. However, without better measurability and unitization of phenomena, the fifteen properties could easily turn into New Age woo-woo gizmo words. *Madame Soleil offers tarot cards, feng shui and unfolding for your life enhancement.* Progress will involve standards, conventions, communicability and consensus building through measurement.

Personally, by inclination and by background, I tend to the Scruffie side. Scruffies are less uptight when it comes to the power to represent. They know the map is not and can never be the territory. They enjoy evocative power. Poetic metaphors propel us forward into open-ended results. If a poet can, with well-turned lines, evoke the intimacy of a secluded garden and in so doing allow others to access their own creative powers to design and build a garden, that is evocative power. Perhaps the best of Alexander's work is evocative.

I am even Scruffie enough to value, very highly, advances in the art of 'muddling through.' Stewart Brand's *How Buildings Learn* offers utterly practical ways of at least doing less badly. When working out plans for a building, envisage several plausible scenarios of use and find the robust plan that can adapt to several possible futures. Spend more money on the slowly evolving parts (load bearing structures and working service guts) and less on the easy to change interior layout and 'stuff' such as appliances. Go for locally available materials that are easy to replace. Hold in esteem not only the 'high road' buildings (cathedrals and parliaments) but the 'low road' buildings, with low price tags and rent, which house the start-ups and creative fringes.

Let's find leverage points for doing less badly. James Kunstler reviews how using Henry Georges' approach to taxation has raised the bar in a number of towns. Banking and mortgage arrangements that encourage folks to not roll over houses but stay in the same home and make it better lead to a natural upward spiral of piecemeal improvement. The founder of the *Congress for New Urbanism*, Andreas Duany, is fond of saying that his entire career has been looking for ways to take Alexander's work and "plug it in" to reality. Duany's reasons that people frequently don't like to think too hard, and will (and are forced to) just follow instructions. So, Duany argues, let's change the instructions. Less bad codes can seriously raise the bar. Nirvana maybe not, but less bad. Perhaps the most promising leverage point would be to experiment with less mechanical codes and different loci of freedom.

Upward spirals of change are the way to go.



New Yorker Magazine

---

SENSEMAKING:  
MY PERSONAL INTERPRETATION OF  
*THE NATURE OF ORDER*

---

*“How can we know the dancer from the dance?”*

Yeats

As Thor Sigstedt eased himself into a chair to chat about his reactions to an early draft of this book, his first words were, “*So, nobody is coming to the party.*”

This wasn't the comment I was expecting. Thor is a builder, craftsman, and artist who has included *A Pattern Language* among the dozen or so books on his shelf that qualify as true pearls of insight. He's a hands-on type of guy and I was expecting the conversation to focus on the practicalities of implementing the ideas in *The Nature of Order*. He was willing to discuss that, but he had not only read the draft, he had worked his way around relevant websites checking things out, and the significant issue seemed to him to be the paucity of general interest in Alexander's grand project.

It is true that there is nobody at the Alexander party. What could the reasons be? Expecting a wide audience to read a 2000 page four-volume humdinger is a bit of a party stopper, but the turgid *Das Capital* didn't stop Communism. It is true that there is, behind all the words of sweetness and light in *The Nature of Order*, a faint but unnerving whiff of potential totalitarianism—although a lot of people would have to read it first to even get to that question. Thor wondered whether we could learn anything from the success of such organizations as the *Quivira* coalition that brings ranchers and environmentalists together for constructive debate or even *Alcoholics Anonymous*. These organizations, he said, are programs of attraction rather than promotion, and that helps explain their success. They are not in your face as zealous missionaries. Well, maybe, but there aren't enough people at the Alexander party to either entice or conscript converts to The Program. It is true that even Alexander's staunchest fans admit that Alexander himself is a party stopper and his own worst enemy: sometimes Othello (brilliant, expansive, warm), sometimes Iago (paranoid, selfish, cruel). It is undeniable that patrons, clients, and colleagues have steadily chosen to walk away rather than put up with *l'enfant terrible*. Yet, even this alone doesn't seem enough of an explanation.

And then, so many other parties are going on. The *New Urbanists* have throngs of people at their party. *Sustainable*s and *Greens* have a party. *Intermediate technology* draws a crowd. Grassroots neighborhood committees are forming across the land. *Presencing* and *U Theory* groups congregate and on and on. Parties everywhere. Even the classic villains, bankers and developers, are turning out to be human and well aware that the paltry ideas of the building industry need an overhaul. There really is ‘a crack in the cosmic egg.’ Alexander’s work has so much to offer all of them. And they have so much to offer Alexander. And ... and ...

My personal interpretation of *The Nature of Order* is that it is a chef d’oeuvre in sensemaking, that is to say, a framework for noticeability and knowledge creation. My conviction is that Alexander’s work points towards a workable alternative to the insanity of current practices and an enrichment of the well-intentioned but overly mechanical approach of the *New Urbanists*. We need not subscribe to Alexander’s personal religious convictions, but for sure we need a ‘Gaia-like’ framework for action that respects the earth’s sentience and vitality. Alexander’s work is missing hooks, or Velcro—something that will anchor it in human space. For insight into why it just isn’t catching on, I re-visited the classic writings of Karl Weick on sensemaking.<sup>(25)</sup>

## SENSEMAKING

Sensemaking is both a prerequisite and a driver in innovative thought. To paraphrase Weick, sensemaking emerges from amplifying weak signals and looking for contexts in which small details can be put together into a coherent whole. Alternating rhythms between facts and explanations augment their substance and as the particulars start to hold together, levels of explanation allow more and more precision in deductions. Indeed. Thirty years of going back and forth between observable facts and possible explanations has led Alexander to present new categories which can be named and connected to existing categories so that other facts which had gone unnoticed become noticeable.

However, and here is the crux of the matter, Weick goes on to tell us that sensemaking is ultimately social. People must work together to flesh out intuitions. It takes lots of people to notice, to be surprised by coincidences and to invent contexts in which the noticed makes sense. Sensemaking is constructing models which both represent reality and direct collective actions. Sensemaking is connected to how we identify ourselves and our place in the scheme of things.

If we return for a moment to the patterns from *A Pattern Language* (which has, by the way, the highest sales of any book on architecture in the USA), we see that patterns have a very long genealogy. They both translate and incarnate ways in which we all see the world. They are mini cosmologies which include aesthetics and culturally proper ways to live and interact. The patterns never belonged to Alexander. They belong to humanity and come from centuries of sensemaking. Multitudes of contributors. Alexander and his team had the good sense to research them and write them down.

*The Fundamental Process* and *Generative Sequences*, which Alexander proposes as a basis for the ‘new world order,’ is a brilliant attempt at sensemaking, however the work was done in isolation. His sequences have no genealogy, no roots, are few in number, remain coarse-grained and untested. Of course they are. It is just not a one-man-show kind of job.

---

(25) Weick, Karl. *Sensemaking in Organizations*. Thousand Oaks: Sage, 1995.

As sensemaking tools (patterns and sequences are, of course, sensemaking tools) take on a life of their own, they become independent and self-supportive. A cooking recipe, to make a simple analogy, becomes commonly owned and independent of the original inventive chef. In kitchens everywhere little local twists are given to widely shared recipes. Building traditions are, of course, no different. Wikipedia, with its laws of intention for participants, open contributions and editing, sharing of programs and platforms is a marvelous example of how collective sensemaking can be enhanced by current technology.

As sensemaking tools continue to take on a life of their own, they thicken with the sedimentation of human interaction. They become culture as surely as *Country Two Stepping* and *Salsa* are the dancing steps of the New Mexican culture of celebration. And when things start flowing rightly, as we become fluent, we are unable to “*know the dancer from the dance.*” As sensemaking tools evolve they create inter-subjectivity. As a collectivity accepts them, the isolate “I” becomes “we.”

The mythos leads the logos. The ideas come first. There must be a nucleus of ideas around which the participants and possibilities can organize. I don't think Alexander's work will be best served by fighting the status quo or by acolytes taking it as Holy Writ and dancing in a circle chanting ritual mantras. A mythos, yes, but let's not be ensnared by it. The mythos will be best served through a more free-wheeling willingness to simply get up and try it. Ideas, like steel, need to be tempered. The viability of Alexander's work will ultimately stand or fall on sociability. It takes a party.

---

# CONVERSATIONS

---

*“Philosophy is a conversation among friends.”*

Plato

Plato has a point. We progress in our thinking through conversations with friends. A friend will be constructive, respectful and straightforward. I completed a first draft of this book and then chose friends of very different backgrounds to review the manuscript. Three of these friends knew *The Nature of Order* very well, while the others had not read it. The conversations with them have led to a better book.

Besim Hakim, historian and urban planner, reviewed *The Nature of Order* for INTBAU.<sup>(26)</sup> He lives in the not too distant town of Albuquerque so we've been able to enjoy teas and long walks discussing Alexander's work and the force in the world that comes under the label *New Urbanism*. Besim's work is on the history of building codes in the old Muslim cities around the Mediterranean basin. I've included the briefest introduction to his work in the COMMENTARY ON FREEDOM.

Richard Scott is an instructor in drafting and design at the University of California and a landscape architect. As we reviewed Alexander's work, Richard said, *“I feel like I'm walking around with this great big secret.”* He attempted using *The Nature of Order* with his students, but quickly abandoned the reading assignments. Students found the material convoluted and were unable to distill the critical points from the secondary. They didn't 'get it.' They didn't get 'the secret.' Not from the book, anyway. The principles did become meaningful to students when Richard took them on walkabouts, keeping the language simple and focusing discussions on the absolute essentials for students learning design:

- *Recognize image-driven forms from unfolded forms.*
- *Don't touch the computer or attempt a drawing until you can 'tell a story' about the experience you want someone to have.*
- *Make only the absolutely necessary differentiations and make those in the most simple way. If you can't explain why you are doing something then don't do it.*
- *Ask yourself if the change you propose enhances what is there already or detracts from it.*

David Seamon, Kansas State University, editor of the *Environmental and Architectural Phenomenology Newsletter*, and frequent commentator on Alexander's work, nudged me into a serious reading of Henri Bortoft and Edward Relph. David's writings are a marvelous resource for all discussions on the topic of *place*.

André Demailly, University of Montpellier, France, was my thesis advisor in the late 70s and our conversations have continued over these many years. Not an Alexander reader, André approached the manuscript from our shared interest in epistemology, cognitive science, and complexity theory.

---

(26) *The International Network for Traditional Building, Architecture, and Urbanism*. An organization under the patronage of the Prince of Wales.

Anne Fullerton represented not only the general reader without much background in the field, but the lucky general reader with the joys and responsibility of a large tract of inherited land that the family wants to develop, though not in the standard crass way. We discussed how unfolding and wholeness could help in articulating the kind of project her family could enthusiastically embrace.

Thor Sigstedt, Santa Fe inventor and craftsman, knew and appreciated *A Pattern Language*, but had not read *The Nature of Order*. We exchanged views on the ‘in-tuneness’ of the creator and the need for a party.

Philip Balcombe, without any previous encounter with Alexander’s work, generously put his patient Jesuit-schooled, Quaker-practiced eye and mind to checking and testing the final draft for the general reader.

Mikesch Muecke, my editor and publisher at Culicidae Architectural Press, provided invaluable support and advice. He understood not only the ins and outs of publishing but the content as well.

And of course ...

Charles Adams, my constant companion, guided me through the work of Charles Sanders Peirce and introduced me to the books on form language by Robert Plant Armstrong. From his own work in musicology and the history of science, Charles read me choice passages from Whitehead, Newton, and Plato. As described, when not writing or teaching, we work together on the continual unfolding of our major emotional, social, and physical center—home.



Jenny Quillien. Photo Charles Adams

Laboratory of Anthropology, Santa Fe, New Mexico

P.S. Note to Readers

At the end of *How Buildings Learn*, Stewart Brand made the comment that books learn as well as buildings. Only feedback allows for progress and it was unfortunate that authors never included an address since publishers were ill-equipped to forward messages. Stewart Brand is right and I will follow his lead. Comments and questions can be sent to [jquillien@cybermesa.com](mailto:jquillien@cybermesa.com)



---

# BIBLIOGRAPHY

---

Alexander, Christopher. *The Nature of Order*. Berkeley, California: Center for Environmental Structure, 2003-2005.

- Volume I *The Phenomenon of Life*
- Volume II *The Process of Creating Life*
- Volume III *A Vision of a Living World*
- Volume IV *The Luminous Ground*

---

Adorno, Theodor. *Minimal Morali, Reflections from a Damaged Life*. London: Verso, 1984.

Alexander, Christopher, Murray Silverstein, Shlomo Angel, Sara Ishikawa, Denny Abrams. *The Oregon Experiment*. New York: Oxford University Press, 1975.

Alexander, Christopher, Sarah Ishikawa, Murray Silverstein (with Max Jacobson, Ingrid Fiksdahl-King, and Shlomo Angel). *A Pattern Language*. New York: Oxford University Press, 1977.

Alexander, Christopher. *A Foreshadowing of 21<sup>st</sup> Century Art: The Color and Geometry of Very Early Turkish Carpets*. New York: Oxford University Press, 1993.

Alexander, Christopher. *Notes on the Synthesis of Form*. Cambridge: Harvard Paperback, 1964.

Alexander, Christopher. *The Timeless Way of Building*. New York: Oxford University Press, 1979.

Armstrong, Robert Plant. *The Affecting Presence*. Urbana, Illinois: University of Illinois Press, 1986.

Berger, John. *The Shape of a Pocket*. New York: Pantheon Books, 2001.

Bortoft, Henri. *The Wholeness of Nature: Goethe's way towards a science of conscious participation in nature*. New York: Lindisfarne Press, 1996.

Brand, Stewart. *How Buildings Learn: What happens after they're built*. New York: Penguin Books, 1994.

Bruner, Jerome. *Essays for the Left Hand*. Cambridge: Harvard Press, 1979.

Capra, Fritjof. *The Web of Life: A New Scientific Understanding of Living Systems*. New York: Anchor Press, 1997.

Eco, Umberto. *Semiotics and the Philosophy of Language*. Bloomington: Indiana University Press, 1984.

Gombrich, E.H. *The Sense of Order: A study in the psychology of decorative art*. London: Phaidon Press, 1984.

- Hakim, Besim. *Arabic-Islamic Cities*. London: Kegan Paul International, 1986. Currently available from Books on Demand at [www.umi.com](http://www.umi.com).
- Hale, Jonathan. *The Old Way of Seeing: how architecture lost its magic (and how to get it back)*. Boston: Houghton Mifflin, 1994.
- Krafel, Paul. *Seeing Nature: deliberate encounters with the visible world*. White River Junction, Vermont: Chelsea Green Publishing Co., 1999.
- Kunstler, James Howard. *The Geography of Nowhere: The Rise and Decline of America's Man-Made Landscape*. New York: Touchstone Books, 1993.
- Kunstler, James Howard. *Home from Nowhere: Remaking Our Everyday World for the 21<sup>st</sup> Century*. New York: Touchstone Books, 1998.
- Pearce, Joseph Chilton. *The Crack in the Cosmic Egg: Challenging Constructs of Mind and Reality*. New York: Julian Press, 1988.
- Pirsig, Robert. *Zen and the Art of Motorcycle Maintenance : An Inquiry into Values*. London: Vintage, Random House, 1974.
- Relph, Edward. *Place and Placelessness*. London: Pion Press. 1976.
- Schön, Donald. *Educating the Reflective Practitioner*. San Francisco: Jossey-Bass, Inc. 1987
- Schrodinger, Erwin. *Mind and Matter*. Cambridge: Cambridge University Press, 1958.
- Sebeok, Thomas A. *The Play of Musement*. Bloomington: University of Indiana Press, 1981.
- Thompson, D'Arcy Wentworth. *On Growth and Form*. First published in 1917. Cambridge: Cambridge University Press, 1992.
- Weaver, Warren. *Science and Imagination. Selected Papers*. New York: Basic Books, 1967.
- Weick, Karl. *Sensemaking in Organisations*. Thousand Oaks: Sage, 1995.
- Willis, Delta. *The Sand Dollar and the Slide Rule*. Reading, Massachusetts: Addison-Wesley, 1995.

## Images

All known photographers have been credited and, whenever possible, personally contacted. Images without credits are from the internet and public domain.

