The Nature of Order

The Post-Pattern World

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The Nature of Order

- 20 years of work beyond **A Pattern Language**, **The Timeless Way of Building**
- Alexander was trying to understand the failures of pattern languages and the deeper implications of geometry on the Quality Without a Name and beauty
- General theory of beauty, wholeness, and life in 3-dimensional space
- Does it apply to software?—it applies to poetry!

The Nature of Order

Our idea of matter is essentially governed by our idea of order. What matter is is governed by our idea of how space can be arranged; and that in turn is governed by our idea of how orderly arrangement in space creates matter. So it is the nature of order which lies at the root of the whole thing. *Hence the title of this book.*

What is Order?

What is order? We know that everything in the world around us is governed by an immense orderliness. We experience order every time we take a walk. The grass, the sky, the leaves on the trees, the flowing water in the river, the windows in the houses along the street—all of it is immensely orderly. It is this order which makes us gasp when we take our walk. It is the changing arrangement of the sky, the clouds, the flowers, leaves, the faces round about us, the order, the dazzling geometrical coherence, together with its meaning in our minds. But this geometry which means so much, which makes us feel the presence of order so clearly—we do not have a language for it.

Mechanistic Idea of Order

The mechanistic idea of order can be traced to Descartes, about 1640. His idea was: If you want to know how something works, you can find out by pretending that it is a machine. You completely isolate the thing you are interested in from everything else, and you just say, suppose that thing, whatever it happens to be—the rolling of a ball, the falling of an apple, anything you want, in isolation—can you invent a mechanical model, a little toy, a mental toy, which does this and this and this, and which has certain rules, which will then replicate the behavior of that thing? It was because of this kind of Cartesian thought that one was able to find out how things work in the modern sense.

Two Devastating Results

The appearance of this 20th century mechanistic view had two tremendous consequences, both devastating for artists. The first was that the "I" went out of our world-picture. The picture of the world as a machine doesn't have an "I" in it. The "I", what it means to be a person, the inner experience of being a person, just isn't part of this picture. Of course, it is still there in our experience. But it isn't part of the picture we have of how things are. So what happens? How can you make something which has no "I" in it, when the whole process of making anything comes from the "I"? The process of trying to be an artist in a world which has no sensible notion of "I" and no natural way that the personal inner life can be part of our picture of things—leaves the art of building in a vacuum. You just cannot make sense of it.

The second devastating thing that happened with the onset of the 20th-century mechanistic world-picture was that our understanding about value went out of the world. The picture of the world we have from physics, because it is built only out of mental machines, no longer has any definite feeling of value in it: value has become sidelined as a matter of opinion, not intrinsic to the nature of the world at all.

The real nature of this deep order hinges on a simple and fundamental question: "What kinds of statements do we recognize as being true or false?"

Statements of Fact in the 20th Century

"One door frame is more harmonious and more in keeping with the life of the room than another door frame." "One door creates more life in the room than another door." "A pale yellow on this door has more life than a dark grey." Within the canon of 20th century science, these are not considered statements which can be true or false. They are thought of as statements of opinion. As a matter of principle within the 20th century mechanistic view, statements of this kind may not be considered potentially true or false.

A New Concept of Life

So—my aim in this book is to create a scientific view of the world in which this concept —that everything has its degree of life—is well defined. We can then ask very precise questions about what must be done to create life in the world—whether in a single room, even in a doorknob, or in a neighborhood, or in a vast region . . . .

Life

I claim that this quality is not merely the basis for a distinction between beautiful things and ugly things. It is something which is detectable as a subtle distinction, in every corner of the world, as we walk about, in the most ordinary places, during the most ordinary events. It is a quality which changes from place to place and from moment to moment, and which marks, in varying degrees, every moment, every event, every point in space.

Alexander's Hypothesis

I state this by means of the following hypothesis: What we call "life" is a general condition which exists to some degree or other in every part of space: brick, stone, grass river, painting, building, daffodil, human being, forest, city. *And further: The key to this idea is that every part of space— every connected region of space, small or large—has some* degree *of life, and that this degree of life is well-defined, objectively existing, and measurable.*

Centers and Wholeness

There is a class of entities which I call centers appearing everywhere in space. They appear where they do, as a result of the configuration which appears in the world. Every part of the world, at every scale, has centers appearing in it.

The system of these centers pays a vital role in determining what happens in the world. The system as a whole—that is to say, its pattern— is the thing which we generally think of when we speak about something as a whole. Although the system of centers is fluid, and changes from time to time as the configuration and arrangement and conditions all change. Still, at any given moment, these centers form a definite pattern. This pattern of all the centers appearing in a given part of space—constitutes the wholeness of that part of space. It is this structure, which is responsible for its degree of life.

Wholeness

The wholeness of a window is the coherence which binds the window together—its sill, glass, the sloping reveals, its mullions, the landscape outside, the light coming in, the soft light on the wall next to the window, the chair drawn up toward the window's light—and the arrangement of the larger entities which makes them one: the space of the window seat which binds reveals, seat, sill, and window plane; the view which combines chair, outdoor landscape, and the glazing bars into a single entity; the light falling on the window reveal and on the floor. In each case the wholeness is defined by the major wholes and the way these wholes are arranged to form still larger wholes.

Centers

<Centers> are those particular identified sets, or systems, which appear within the larger whole as distinct and noticeable parts. They appear because they have noticeable distinctness, which makes them separate out from their surroundings and makes them cohere, and it is from the arrangements of these coherent parts that other coherent parts appear.
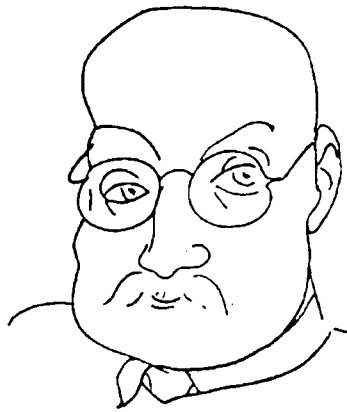
Centers

The crux of the matter is this: A center is a kind of entity which can be defined only in terms of other centers. Centers are—and can only be—made of other centers.

Centers

1. *Centers arise in space.*

2. *Each center is created by configurations of other centers.*

3. *Each center has a certain life or intensity. . . . This life or intensity is not inherent in the center by itself, but is a function of the whole configuration in which the center occurs.*

4. *The life or intensity of one center gets increased or decreased according to the position and intensity of other nearby centers. Above all, centers become most intense when the centers which they are made of help each other.*

5. *The centers are the fundamental elements of the wholeness, and the degree of wholeness or life, of any given part of any given part of space depends entirely on the presence and structure of the centers there.*
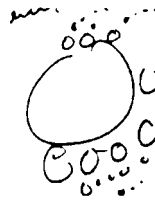
Centers

Fifteen Properties

Over a 20+ year period, Alexander examined objects for life and wholeness. He identified 15 structural features which appear again and again in things which have life:

- Levels of Scale
- Strong Centers
- Boundaries
- Repetition
- Positive Space
- Good Shape
- Local Symmetries
- Deep Interlock and Ambiguity

- Contrast
- Gradients
- Roughness
- Echoes
- The Void
- Simplicity and Inner Calm
- Not-Separateness

Levels of Scale

- Centers of all sizes
- Centers of all sizes support or help each other
- Small jumps (2:1 to 4:1 is best)
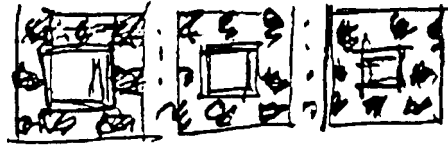
Strong Centers

- Not just centers but strong centers

- A strong center is one toward which other centers point

  . . . the eye rests on it, one keeps coming back to it, going away from it, coming back to it. In short, the entire design sets up a vector field so that every point has the property that from that point the center is in a certain direction . . . .
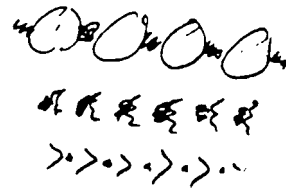
Boundaries

- A boundary separates a center from other centers
- A boundary focuses attention on the center
- A boundary is itself made of centers

Alternating Repetition

- Strong centers repeated with alternating centers
- Not simple repeating
- Pattern with variation

Positive Space

- Positive space is the characteristic of a center that moves outward from itself, seemingly oozing life rather than collapsing on itself

    We may see it like ripening corn, each kernel swelling until it meets the others, each one having its own positive shape caused by its growth as a cell from the inside.

    In poor design, sometimes, in order to give an entity good shape, the background space where it lies has left-over shape, or no shape at all. It is merely left over.
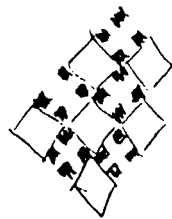
Good Shape

- Good shape is the characteristic of a center that it is somehow beautiful by itself
- A center has good shape when it is reinforced by other centers of good shape
- A center has good shape when it is made of centers of good shape

Local Symmetries

Wherever there is a local symmetry, there tends to be a center.

Living things, though often symmetrical, rarely have perfect symmetry. Indeed, perfect symmetry is often a mark of death in things rather than life.

Observe, first, that overall *symmetry in a system, by itself, is not a strong source of life or wholeness.*

In general, a large symmetry of the simplified neoclassicist type rarely contributes to the life of a thing, because in any complex whole in the world, there are nearly always complex, asymmetrical forces at work—matters of location, and context, and function—which require that symmetry be broken.
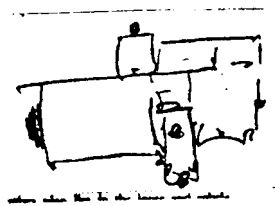
Deep Interlock and Ambiguity

- Centers are sometimes "hooked" into their surroundings
- It is sometimes difficult to disentangle a center from its surroundings
- . . . through actual interlock
- . . . through an ambiguous zone which belongs both to the center and to its surroundings
- A Go board in mid-game

Contrast

Another feature I have found repeatedly in works of art which have great life is that they often have surprisingly intense contrast in them—far more than one remembers, more than one imagines would be helpful or even possible to sustain.
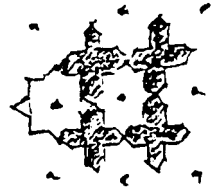
Gradients

You have noticed I am sure, as I have, that almost anything which has real life has a certain softness. Qualities vary, slowly, subtly, gradually, across the extent of each thing. Gradients occur. One quality changes slowly across space, and becomes another.

Almost always the strengthened field-like character of the center is caused, in part, by the fact that an organization of smaller centers creates gradients which "point to" some new and larger virtual center. Sometimes the arrows and gradients set up in the field give the center its primary strength.
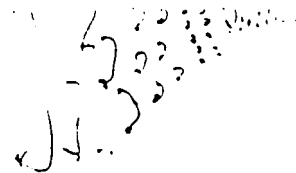
Roughness

Things which have real life always have a certain ease, a morphological roughness. It is not a residue of technically inferior culture, or the result of handcraft or inaccuracy. It is an essential structural feature which they have and without which a things cannot be whole.

Roughness

Often the border of an ancient carpet is "irregular" where it goes round the corner—that is, the design breaks, the corner seems "patched together." This does not happen through carelessness or inaccuracy. On the contrary, it happens because the weaver is paying close attention to the positive and negative, to the alternating repetition of the border, to the good shape of each compartment of the wave and each bit of open space—and makes an effort all along the border to be sure these are "just right." To keep all of them just right along the length of the border, some loose and makeshift composition must be done at the corner.

If the weaver wanted instead to calculate or plot out a so-called "perfect" solution to the corner, she would then have to abandon her constant paying attention to the right size, right shape, right positive-negative of the border elements, because these would all be determined mechanically by outside considerations—i.e., by the grid of the border. The corner solution would then dominate the design in a way which would destroy the weaver's ability to do what is just right at each point. The life of the design would be destroyed.

<continued>

Roughness

All my examples show how the seemingly rough solution—which seems superficially inaccurate—is in fact more precise, not less so, because it comes about as a result of paying attention to what matters most, and letting go of what matters less. As the power of this completed carpet clearly shows, a perfect corner does not matter nearly as much as the correct balance and positive space in the border. The seemingly rough arrangement is more precise because it comes from a much more careful guarding of the essential centers in the design.

In a man-made thing, another essential aspect of the property of roughness, is its abandon. Roughness can never be consciously or deliberately created. Then it is merely contrived. To make a thing live, its roughness must be the product of egolessness, the product of no will.

Echoes

When Echoes *is present, the various smaller elements and centers, from which the larger centers are made, are all members of the same family, they contain echoes of one another, there are deep internal similarities between them which tie them together to form a single unity.*

The Void

In the most profound centers which have perfect wholeness, there is at the heart a void, which is like water, in infinite depth—surrounded by and contrasted with the clutter of the stuff and fabric all around it.

- The altar

- The empty space at the crossing of a church or mosque

The need for the void arises in all centers. A cup or a bowl rests, as a living center, on the quiet of the space in the bowl itself, its stillness.
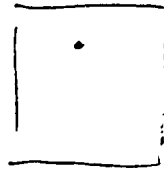
Simplicity and Inner Calm

It has to do with a certain slowness, majesty, quietness, which I think of as inner calm.

This quality comes about when everything unnecessary is removed. All centers that are note actively supporting other centers are stripped out, cut out, excised. What is left, when boiled away, is the structure in a state of inner calm.

It is essential that the great beauty and intricacy of ornament go only just far enough to bring this calm into being, and not so far that it destroys it.
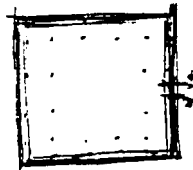
Simplicity and Inner Calm

Shaker furniture:

- *It uses very simple shapes (the actual pieces of wood have simple shapes and are usually close to the form in which they were first milled).*

- *The ornament is very sparse, but does occasionally exist to offset the classical line, with an off curve here or there, but less than in other American pieces.*

- *The proportions are unusual. Pieces are unusually long, unusually high, elongated, tall, broad, etc. They are marked by their proportions as slightly unusual or remarkable—even startling. Often this has a good reason in it (i.e. use all the space available, etc.).*

- *Many of the pieces are strange in some specific way which marks them as indeed unusual. For instance, chest with drawers opening from different sides; two beds sliding under a bigger bed; table with drawers hanging on either side of pedestal; peg boards. Always these "strange" configurations have good reasons and come from an uncompromising steadfastness to function, following the thing to its logical conclusion, refusing to be deterred by convention. An extreme freedom.*

Simplicity and Inner Calm

- *Pieces were colored—beautiful colors, most often worked into the wood (not paint), and coded, yellow, blue, red, green, etc., each for its specific type of furniture. Yet they were always severe. What this means is the essence, but very hard to pin down.*

- *Finally, everything is still, silent.*

Not Separateness

What Not Separateness *means, quite simply, is that we experience a living whole as being at one with the world, and not separate from it—according to its degree of wholeness.*

This is, finally, perhaps the most important property of all. In my experiments with shapes and buildings, I have discovered that the other fourteen ways in which centers come to life, will make a center which is compact, beautiful, determined, subtle—but, without this fifteenth property, are still often somehow strangely separate, cut off from what lies around it, lonely, awkward in its loneliness, too brittle, too sharp, perhaps too well delineated—above all too egocentric, because it shouts "Look at me, look at me, look how beautiful I am."
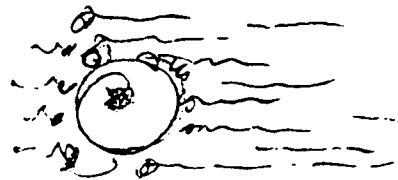
An Empirical Test for Comparing the Degree of Life of Different Centers (Mirror of the Self)

- *Which of the two seems to generate a greater feeling of life in me?*

- *Which of the two makes me more aware of my own life?*

- *Which of the two makes me feel a greater wholesomeness in myself?*

- *Which of the two is more like my best self, or which of the two seems more like a picture of the self?*

- *Which of the two makes me feel devotion, or inspires devotion in me?*

- *Which of the two makes me more aware of God, or makes me feel close to God?*

- *How do I observe the rising and falling of my humanity: Which of the two causes a greater rising of my humanity?*

- *Which of the two has more feeling in it or, more accurately: Which of the two makes me experience a deeper feeling of unity in myself?*

Unfolding

- In nature, order unfolds smoothly
- In general, order emerges from a process which is integral to the thing being created
  - a painting emerges through a seemingly random process of adding and altering paint
  - a wood carving emerges through a seemingly random process of removing and smoothing wood

Structure-Preserving Transformations

A structure-preserving transformation strengthens existing centers by doing one or several of the following:

- adding new centers that reinforce existing ones

- strengthening or developing one or several existing centers into a more complex, stronger center

- removing weak or dysfunctional centers

The process, in general, adds one or several of the 15 characteristics discussed earlier

Image-based Architecture and Building

Modern (and post-modern) architecture is based on coming up with a picture or image and then constructing it, usually out of components and modular parts

Alexander's Definition of Architecture

Architecture is just that stuff—material organization—which has unfolded.

Four Conditions Necessary for Unfolding to Happen

- **Step-by-Step Adaptation:** *The process, whether large or small, must be step-by-step, and gradual. Each part of the environment, at every stage of its planning, conception, and construction, must evolve, be developed step-by-step. The form must be created step-by-step, each step being an adaptation in which things get fitted more and more closely to a harmonious whole.*

- **Feedback:** *To guide the adaptation, at each step in the process there must be a continuous and relatively immediate feedback about whether what has been done is a living structure in sufficient degree. In human society this requires as a minimum a common shared understanding of "life". The process is then capable of adapting to this feedback, instantaneously, so that what has life can be kept and what doesn't have life will be rejected—with agreement—all while the process is going on.*

Four Conditions Necessary for Unfolding to Happen

- ***Unpredictability:*** *To make the adaptation successful, the process must be relaxed about the unpredictable character of where it goes. Unfolding cannot occur except in a framework which allows the whole to go where it must go. The dire modern passion for planning and advance control must be replaced by an attitude which recognizes that openness to the future, and lack of predictability, is a condition for success. It must be alright for the thing to become whatever it becomes, under the influence of adaptation and feedback, even though one does not know, in detail, what that thing is going to be.*

- ***Awareness of the Whole:*** *Fourth, and this is the most difficult for us, there must be an ever-present awareness of the whole, throughout the process. For the adaptation to allow wholes to unfold successfully, the unfolding must take place within a framework of true awareness of the whole.*

Fundamental Process (1–5)

1. *At every step of the process—whether conceiving, designing, making, maintaining, or repairing—we must always be concerned with the whole within which we are making anything. We look at this wholeness, absorb it, try to feel its deep structure.*

2. *We ask which kind of thing we can do next that will do the most to give this wholeness the most positive increase of life.*

3. *As we ask this question, we necessarily direct ourselves to centers, the units of energy within the whole, and ask which one center could be created (or extended or intensified or even pruned) that will most increase the life of the whole.*

4. *As we work to enhance this new living center, we do it in such a way as also to create or intensify (by the same action) the life of some larger center.*

5. *Simultaneously we also make at least one center of the same size (next to the one we are concentrating on), and one or more smaller centers— increasing their life too.*

Fundamental Process (6–8)

6.   *We check to see if what we have done has truly increased the life and feeling of the whole. If the feeling of the whole has not been deepened by the step we have just taken, we wipe it out. Otherwise we go on.*

7.   *We then repeat the entire process, starting at step 1 again, with the newly modified whole.*

8.   *We stop altogether when there is no further step we can take that intensifies the feeling of the whole.*

What of Patterns and Pattern Languages?

- The Fundamental Process needs some idea of what is being built:
  - e.g. for a fireplace you need a firebox, a fireback, splayed sides, a hearth, a throat, a smoke shelf, and a chimney
- What you are building has a cultural component because of how cultures have come to live:
  - tea for an Englishman involves sitting on chairs
  - tea for an Indian involves sitting on the floor
- Therefore one needs a set of generic centers
- These generic centers form the pattern language for the project

  The essence of it is that the generic centers must unfold from the culture.

What of Patterns and Pattern Languages?

There was always one great difficulty with the theory of pattern languages, and with the languages my colleagues and I, and others, published. Where did the patterns come from?

Much of our early work implicitly made use of the idea that good patterns were to be derived, somehow, from existing culture thus ensuring a relation to the subtleties of culture variation, and preserving things that were good and important, which had been swept aside in the onrush of techno-civilization. But there was always hanging over this process, a sword of Damocles. If—as a procedure—one takes the patterns from existing culture, then one merely reiterates what is being built. That is not necessarily good.

The unfolding process takes existing cultural patterns and moves the culture forward.

Sequences

A sequence is the ordering of an unfolding. It is a series of statements that describe the thing to be created.

Japanese Tea House Sequence

1. *SECLUDED TEA HOUSE. The tea house is in a secluded garden.*

2. *GARDEN WALL. Some kind of wall or barrier surrounds the entire garden. From inside the garden the public world is not visible, and hardly audible. If there is a family dwelling associated with the tea house, the dwelling may be part of this wall.*

3. *INNER AND OUTER GARDEN. A low barrier divides the garden into two parts: an outer garden and an inner garden. The tea house is in the inner garden.*

4. *GARDEN PATH. There is a slightly meandering path running through the outer garden, past the low barrier, and through the inner garden to the tea house.*

5. *STONE PATH. The meandering garden path is composed of mossy stepping stones, and is loosely bordered by trees and bushes.*

6. *OUTER GATE. Where the garden path meets the edge of the outer garden there is a gate, connecting the outer garden to the public walk The gate is opaque. There are no direct view of the public path into the outer garden.*

Japanese Tea House Sequence

7. *MIDDLE GATE. Where the garden path crosses the low barrier, between the inner garden and the outer garden, there is a gate called the middle gate. The middle gate is small with a roof or low door on hinges.*

8. *BRANCHING PATHS. In the outer garden the garden path may branch in several places along its length. Any given branching path may or may not lead eventually to the tea house.*

9. *GUIDE STONES. Where the path branches there are guide stones set near the stepping stones. The host closes off some branches by placing a guide stone on the stepping stone at the branching point. Before the guest arrives on a given day there is only one path open through the garden to the tea house.*

10. *WAITING BENCH. In the outer garden, near the middle gate, there is a waiting bench. The bench is roughly 7 feet long, and may be covered.*

11. *WAITING NEAR HOUSE. If there is a family dwelling associated with the tea house, then the waiting bench is usually near the dwelling. If so, the waiting area may be connected with the physical structure of the dwelling.*

12. *TEA HOUSE APPROACH. The length of the path from the middle gate and waiting bench to the tea house, is rarely more than 20 feet.*

Japanese Tea House Sequence

13. *STONE WATER BASIN. Somewhere along this 20 foot path through the inner garden, between the middle gate and tea house, there is a stone water basin and running water.*

14. *RECESS SHELTER If the tea house is to accommodate long meal sessions, then there is a covered bench a few steps away from the tea house where people can sit and view the garden.*

15. *KNEELING-IN ENTRANCE. Where the stone path meets the tea house there is a window-like entrance—a small opening in the face of the tea house. The entrance is roughly 2 feet high and 2 feet wide, and 2 feet above the path. Thus a man entering must stoop down and kneel in.*

16. *TEA HOUSE HAS THREE PARTS. The tea house is made up of three parts in plan: the tea-room proper, the tokonoma, and an anteroom. The tea-room is the largest part—it is where the guests gather and the tea ritual occurs. The anteroom is a tiny area off the tea room where equipment is kept and some preparation is made. The tokonoma is a shallow alcove off the tea-room where objects, art, and flowers are displayed.*

17. *SIZE OF THE TEA HOUSE. The floor area of the tea room is limited to four sizes: 1.5 mat, 2 mat, 3 mat and 4.5 mat (a mat is roughly 6'x 3').*

Japanese Tea House Sequence

18. *4.5 MAT CONFIGURATION. In the 4.5 mat tea room, the half mat is placed in the center, and the 4 mats laid evenly around it in a spiral.*

19. *CENTRAL HEARTH. A small square hearth is fitted into the floor at approximately the center of the tea room. Guests sit on pillows around the hearth.*

20. *HOST'S ENTRANCE. The host enters the tea house through a sliding screen door. The host's entrance is always in a different wall than the kneeling-in entrance.*

21. *CEILING HEIGHT. The tea room has a roughly 6.5 foot ceiling in it.*

22. *DIM LIGHTING. There are very few windows in the tea house walls. Where there are windows they are high, near the ceiling—and placed to give a dim indirect light throughout the tea house.*

23. *TOKONOMA. The tokonoma is an alcove off the tea room, which is visible on entering the tea house. The size of the tokonoma varies with the size of the tea room. In the smallest tea-house the tokonoma is simply a curve in the wall.*

24. *TOKONOMA PILLAR. The tokonoma contains a small pillar on which an object, a work of art, or a vase of flowers may be placed. The pillar is made of wood—a kind of wood not used in the rest of the tea house.*

Sequences

A generative sequence not only guarantees feasibility and the emergence of a coherent form. It also provides the conditions in which structure-preserving transformations can occur.

For instance, in the tea house. if I try to locate the waiting bench too early, at a moment when I do not yet have the location of the middle barrier, the context for placing it does not yet exist. But more important, it is also not possible, in this case, for me to use the waiting bench and its location to preserve the structure of the rest. For the waiting bench to preserve the structure of the garden, I have to put it in at a time when the garden has developed. I can make the structure-preserving process work only if things come at the right time, in the right order.

Sequences

If there is no sequence, the fundamental process guarantees you'll find a good sequence, but it might take more work.

Design and Construction at the Same Time

If we look at any one sequence of unfolding, we may think of it as a long sequence of experiments to find out which centers should, most appropriately, unfold next, and in what way they will unfold best, to do the most, for the emerging wholeness. As far as possible, we do this with real life experiments, full size simulations so that one by one we check the various features. Whenever we cannot do real life size experiments, we do the most realistic simulation we can to check experimentally whatever aspect we are trying to fix.

As the features get fixed one by one, the whole takes its form. This is the practical way in which the unfolding happens.

The experimental nature of this activity is vital. I find that while I am working, I am often wrong ten times for every one time I am right. This is why the experiments are so essential. You cannot tell what next step has the biggest effect on the life and wholeness of the larger whole, without trying things out. This trying out is the human equivalent of the feedback which nature accomplishes in even smaller increments during every physical process. And of course, because you are finding out, you must be wrong some of the time, even much of the time. In many cases, it is by being wrong, by trying things out and seeing how they do not work, that you first get a realistic sense of how to do it differently, and right.

This is always so, and is fundamental to all success.

Deep Feeling

In the end, it is the quality that a building can generate deep feelings in people that matters most.

People are able to judge the whole, to see and experience the whole, by paying attention to the question: Is it increasing my own wholeness? Is it increasing the feeling I experience when in contact with the thing? Is it becoming like a mirror of the self? Is it becoming like the soul? More succinctly, the extent to which a thing is coming to life, can be steered by the extent to which it has deep feeling.

. . .

Being guided by the whole, and being guided by feeling are thus synonymous. Real feeling, true feeling, is the experience of the whole.

This principle may be formulated as an essential rule: In any building process, the way forward, the next step which is most structure preserving, is that step which intensifies the feeling most.

Feeling gives us our access to structure preserving transformations. It is the process of intensifying deep feeling in the whole which is thus the key of the unfolding process—whenever it is in human hands.

Deep Feeling

Obviously, the key issue in all these statements is the precise definition of the word "feeling," and what we mean, exactly, by saying that a structure feels right. It requires a holistic, non-emotional approach to feeling, where we ask ourselves to what extent a given structure feels right, in the sense of "possesses life," "possesses unity."

This almost rarefied and abstract feeling, going to the highest level, is something very different from rank emotionalism: and it is this which I claim correlates correctly, and universally, with functional rightness.

It is not an artist expressing or recording feeling or emotion in a work of art—it is making a building (or work of art) generate feeling in people (in me).

What Are Centers?

- In a user interface, centers include the geometrical entities . . .
  - ❧ graphical elements
  - ❧ textual design elements (titles, bullets, paragraphs, sidebars)
- . . . and whatever counts for centers in text
  - ❧ see, for example, **The Nature of Poetic Order**

What Are Centers?

- In the actual software it depends on what we consider to be the equivalent of geometry, space, and structure:
  - ⌁ text—the source code itself
  - ⌁ the program run trace (see "Space: The Final Frontier," **C++ Report**, March 1998)
  - ⌁ diagrams that correspond to the code

Centers: Source Code

```
int gilligan(int j) {
    for (int i = 1; i < j; i++) {
        if (i % 2 == 0) {
            cout << i;
        }
    }
}
```

Centers: Source Code

```
int gilligan(int j) {
    for (int i = 1; i < j; i++) {
        if (i % 2 == 0) {
            cout << i;
        }
    }
}
```

- Structural elements
    - Boundaries
    - Positive Space
    - Good Shape
    - Local Symmetries
    - Gradients
    - Not Separateness

Centers: Source Code

```
int gilligan(int j) {
    for (int i = 1; i < j; i++) {
        if (i % 2 == 0) {
            cout << i;
        }
    }
}
```

- Structural elements
  - nested centers
  - Levels of Scale
  - Local Symmetries
  - Deep Interlock
  - Gradients

Centers: Source Code

```
int gilligan(int j) {
    for (int i = 1; i < j; i++) {
        if (i % 2 == 0) {
            cout << i;
        }
    }
}
```

- Spatial factors
  - Positive Space
  - Good Shape

Centers: Source Code

```
int gilligan(int j) {
    for (int i = 1; i < j; i++) {
        if (i % 2 == 0) {
            cout << i;
        }
    }
}
```

- *<Centers> are those particular identified sets, or systems, which appear within the larger whole as distinct and noticeable parts.*
  - ❧ Levels of Scale
  - ❧ Strong Centers (reinforce each other)
  - ❧ Repetition
  - ❧ Deep Interlock
  - ❧ Gradients
  - ❧ Echoes
  - ❧ Simplicity and Inner Calm

Centers: Source Code

```
procedure playBallGame()
    begin
    char key;
    integer ballsLeft;
    procedure playABall()
            begin
            integer count;
            procedure checkPosition()
                    begin
                    integer x, y;
                    y := ball.yposition;
                    . . . .
                end
            . . . .
        end
    end
```

- Alternating Repetition of data and procedure description

Centers: Source Code

```
class Shape {
public:

    .  .  .  .
    Color getColor() const;
    Point getLocation() const;
private:
     Point location;
     Color color;
    .  .  .  .
};
```

- Local Symmetry

Centers: Source Code

```
class Shape {
public:
   .  .  .  .
protected:
   .  .  .  .
private:
   .  .  .  .
};
```

- Gradients

Centers: Diagrams

```
┌─────────────────────────┐
│                         │
│        PhoneCall        │
│                         │
└─────────────────────────┘
```
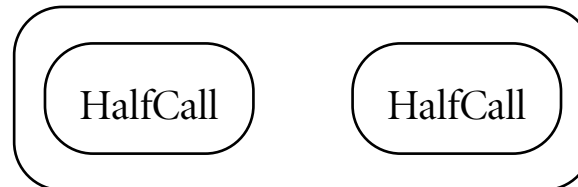
- Gerard Meszaros, "Pattern: Half Object + Protocol," PLoP 1995
- A single class named **PhoneCall**
- *Sometimes, however, a concept exists in both spaces . . . .*
- Latent centers

Centers: Diagrams

HalfCall   HalfCall

- Local Symmetry

- Strong Center

- Levels of Scale

- *Divide the object into two interdependent half-objects, one in each address space, with a protocol between them . . . . Define the protocol between the two half-objects such that it coordinates the activities of the two half-objects and carries the essential information that needs to be passed between the address spaces.*

Centers: Diagrams
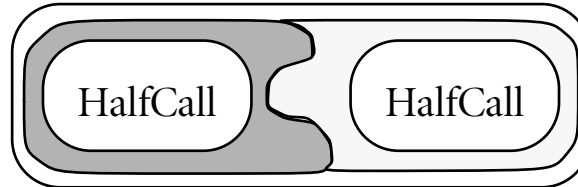
- Local Symmetry
- Levels of Scale
- Boundaries
- Deep Interlock and Ambiguity
- This is were Meszaros left it, but isn't there a latent center in the middle?

Centers: Diagrams
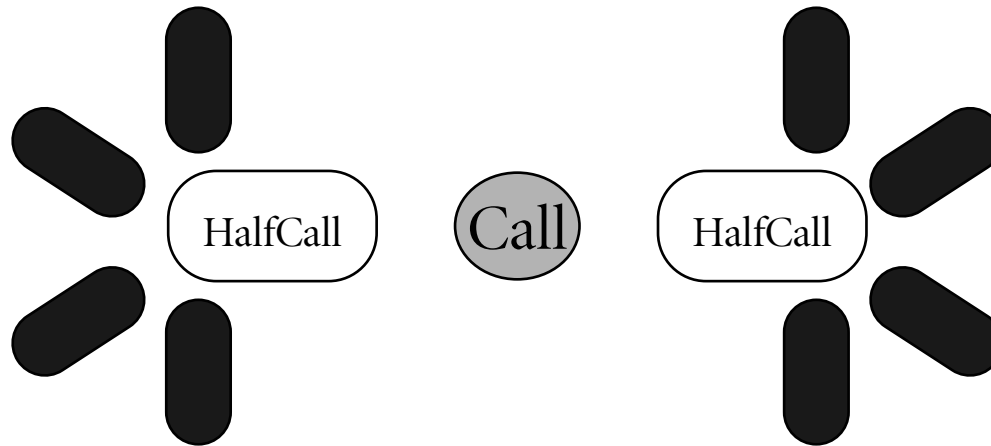
- Strengthens the centers
- Adds an explicit boundary (Call)
- Improves Local Symmetries
- Retains Deep Interlock and Ambiguity
- It is composable

Centers: Diagrams

- Conference calls, multi-way calls

Lourdes₁ †

There are miracles that nobody survives
Observers of to remember where or when
And these are the only true miracles
Since we never hear about them
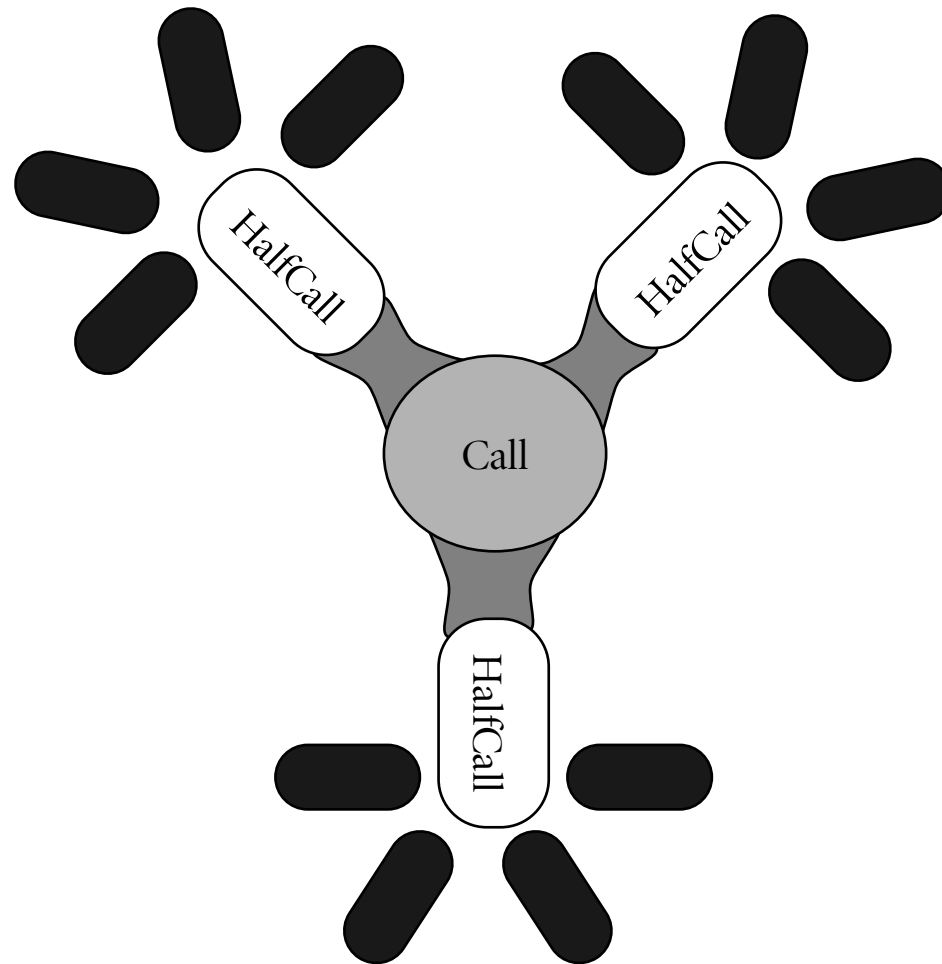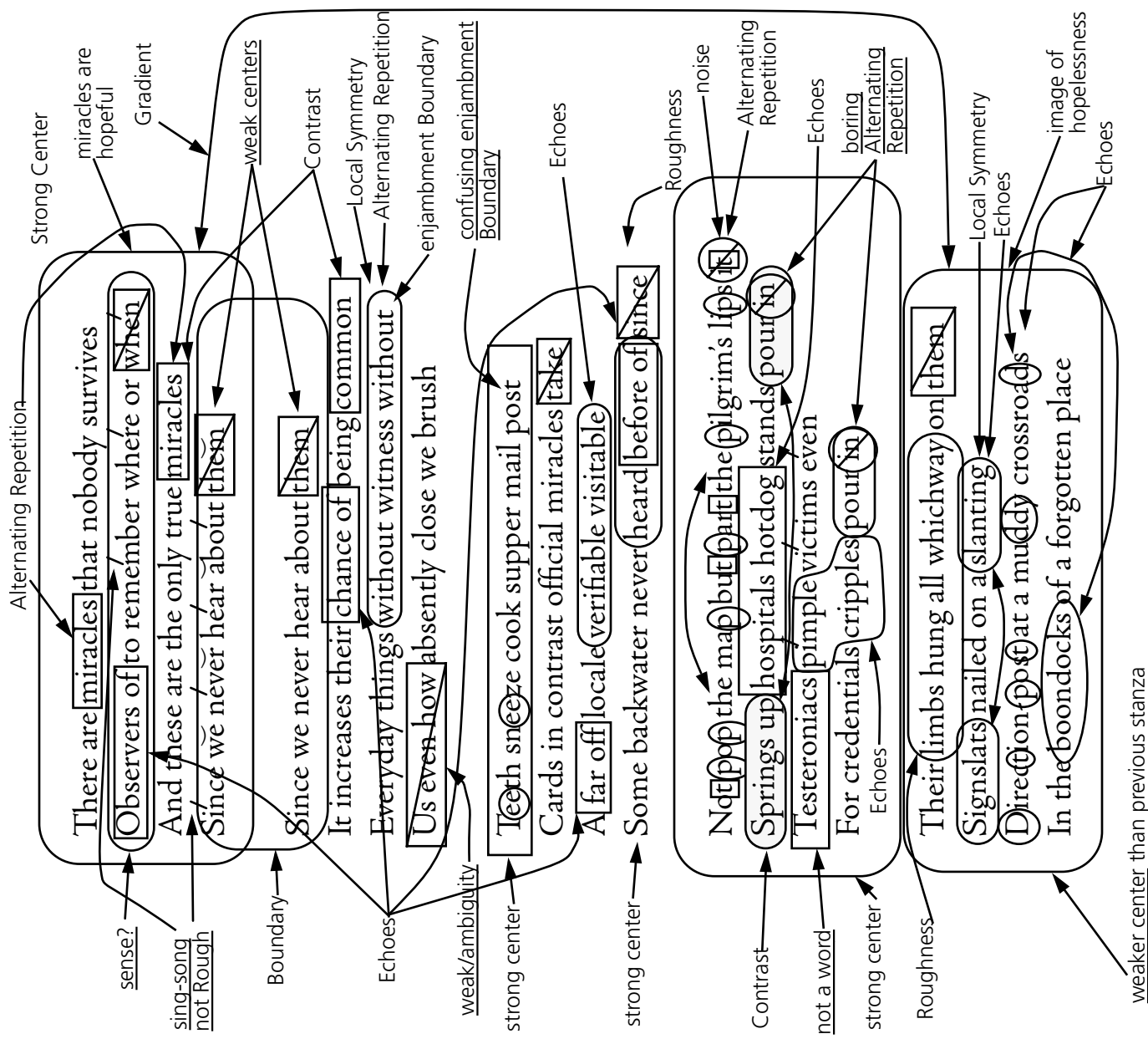
Since we never hear about them
It increases their chance of being common
Everyday things without witness without
Us even how absently close we brush

Teeth sneeze cook supper mail post
Cards in contrast official miracles take
A far off locale verifiable visitable
Some backwater never heard before of since

Not pop the map but the pilgrim's lips
Springs up hospitals hotdog stands pour in
Testeroniacs pimple victims even
For credentials cripples pour in

Their limbs hung all whichway on them
Signs slats nailed on a slanting
Direction post at a muddy crossroads
In the boondocks of a forgotten place

Annotations: Strong Center · miracles are hopeful · Gradient · weak centers · Contrast · Local Symmetry · Alternating Repetition · enjambment Boundary · confusing enjambment Boundary · Echoes · Roughness · noise · Alternating Repetition · Echoes · boring Alternating Repetition · Local Symmetry · Echoes · image of hopelessness · Echoes · Alternating Repetition · sense? · sing-song not Rough · Boundary · Echoes · weak/ambiguity · strong center · strong center · Contrast · not a word · strong center · Roughness · weaker center than previous stanza

• Poetry example of centers on the page

Process

Is Alexander's Unfolding Process best exemplified by The Bazaar?

- Start with an initial implementation

- Enable a self-selected federation of volunteer developers

- Allow each developer to work on whatever he or she likes at whatever pace he or she likes

  - ❧ *Step-by-Step Adaptation: The process, whether large or small, must be step-by-step, and gradual. Each part of the environment, at every stage of its planning, conception, and construction, must evolve, be developed step-by-step. The form must be created step-by-step, each step being an adaptation in which things get fitted more and more closely to a harmonious whole.*

- Release frequently to a loose federation of volunteer developers who are also users

- Choose the components that work best

  - ❧ *Feedback: To guide the adaptation, at each step in the process there must be a continuous and relatively immediate feedback about whether what has been done is a living structure in sufficient degree. In human society this requires as a minimum a common shared understanding of "life". The process is then capable of adapting to this feedback, instantaneously, so that what has life can be kept and what doesn't have life will be rejected—with agreement—all while the process is going on.*

The Bazaar

- The process continues until it naturally dies out, when all required features are present and in use, and all bugs have been removed by thousands of eyes
  - ❧ *Unpredictability: To make the adaptation successful, the process must be relaxed about the unpredictable character of where it goes. Unfolding cannot occur except in a framework which allows the whole to go where it must go. The dire modern passion for planning and advance control must be replaced by an attitude which recognizes that openness to the future, and lack of predictability, is a condition for success. It must be alright for the thing to become whatever it becomes, under the influence of adaptation and feedback, even though one does not know, in detail, what that thing is going to be.*

- The federation of developers is self-selected, and as it happens, only those who can and who care select themselves, because their work is judged by the best of those who care about the system being built
  - ❧ *Awareness of the Whole: Fourth, and this is the most difficult for us, there must be an ever-present awareness of the whole, throughout the process. For the adaptation to allow wholes to unfold successfully, the unfolding must take place within a framework of true awareness of the whole.*

Conclusions

You tell me:

- Are the ideas of **The Nature of Order** reasonable?

- Do they apply to software—or only to art and architecture?

- Is the process of unfolding just another plea for iterative development, or is it more akin to The Bazaar?

- Was the Cathedral once built by The Bazaar?