The Nature of Order

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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?"

In the world-view initiated by Descartes—and largely accepted by scientists in the 20th century—it is believed that the only statements which can be true or false are statements about mechanisms. These are the so-called "facts" familiar to everyone in the 20th century.

In the world-view I am presenting, a second kind of statement is also considered capable of being true or false. These are statements about the relative degree of life, degree of harmony, or degree of wholeness—in short, statements about value. In the view I hold, these statements about relative wholeness are also factual, and are the essential statements. They play a more fundamental role than statements about mechanisms.

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.

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.

Cartesian Scientific Observation

- Objectivity is based on being able to share results

- Observations of limited events that are tied to a limited and machine-like view of some phenomenon—creates a circumstance in which we all reach roughly the same results when we do the same experiments. This gives us a shared picture.

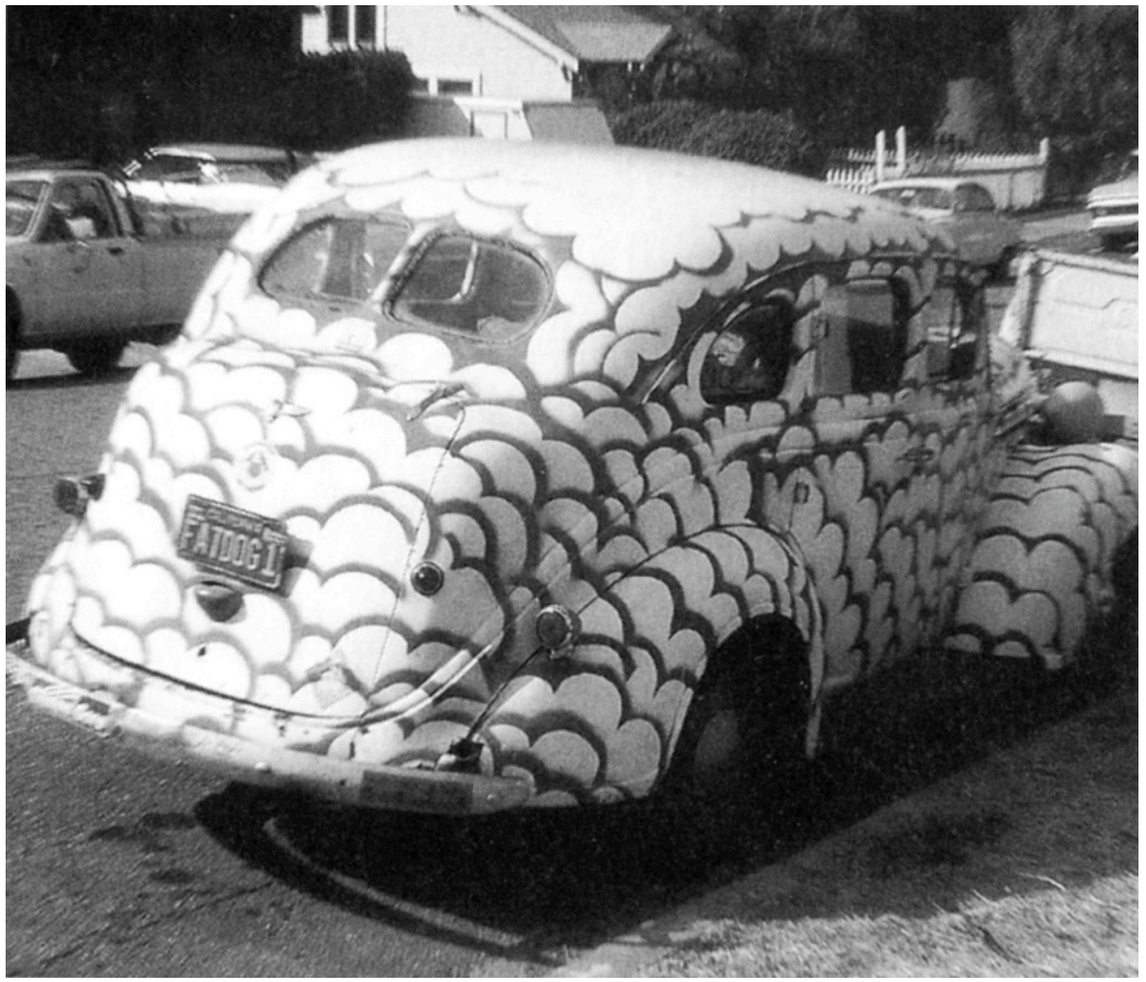
- Primarily sight, perhaps hearing, smell, and touch; and the recordings of machines

Alexandrian Scientific Observation

- The inner feelings of the observer are taken into account
- How does an observation increase or decrease the observer's feeling of wholeness
- If this sort of observation can be reliably shared, it is as "objective" as Cartesian observation
- Alexander calls it the "Mirror of Self" test

In the next bunch of pairs of photos, try to select the one with the greater degree of life


SUPERMARKET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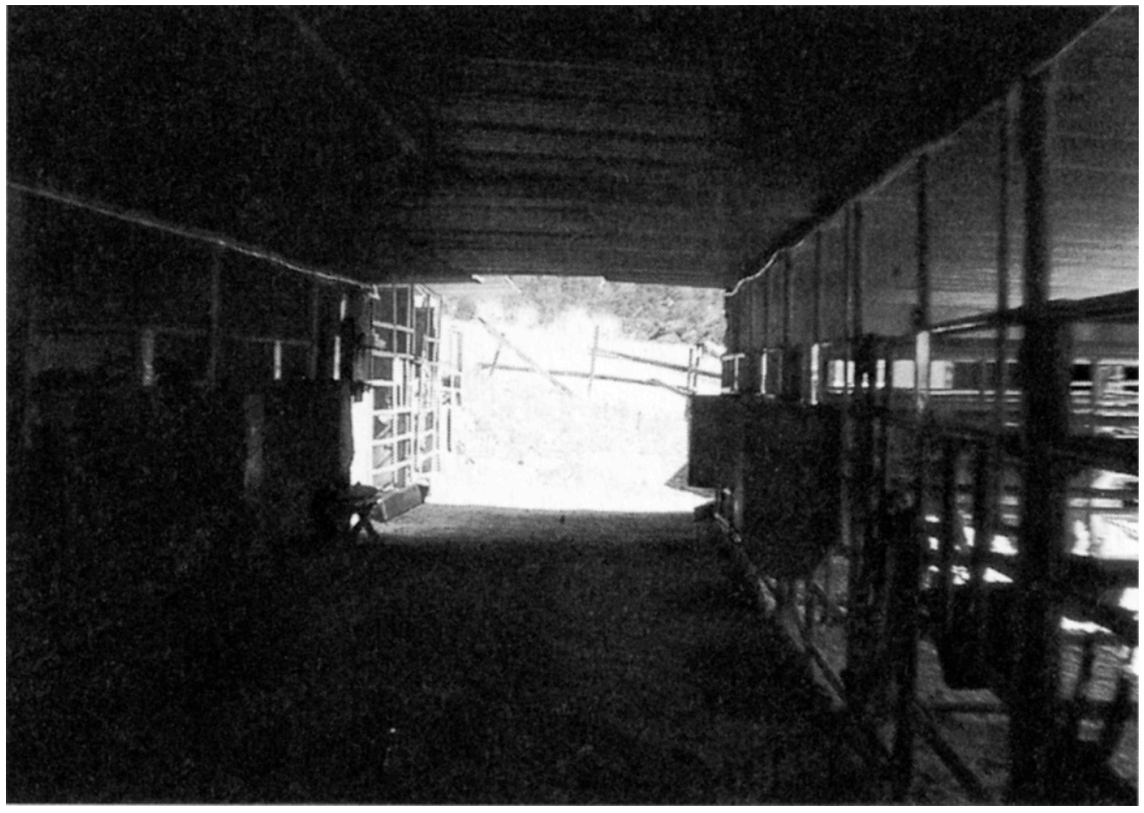

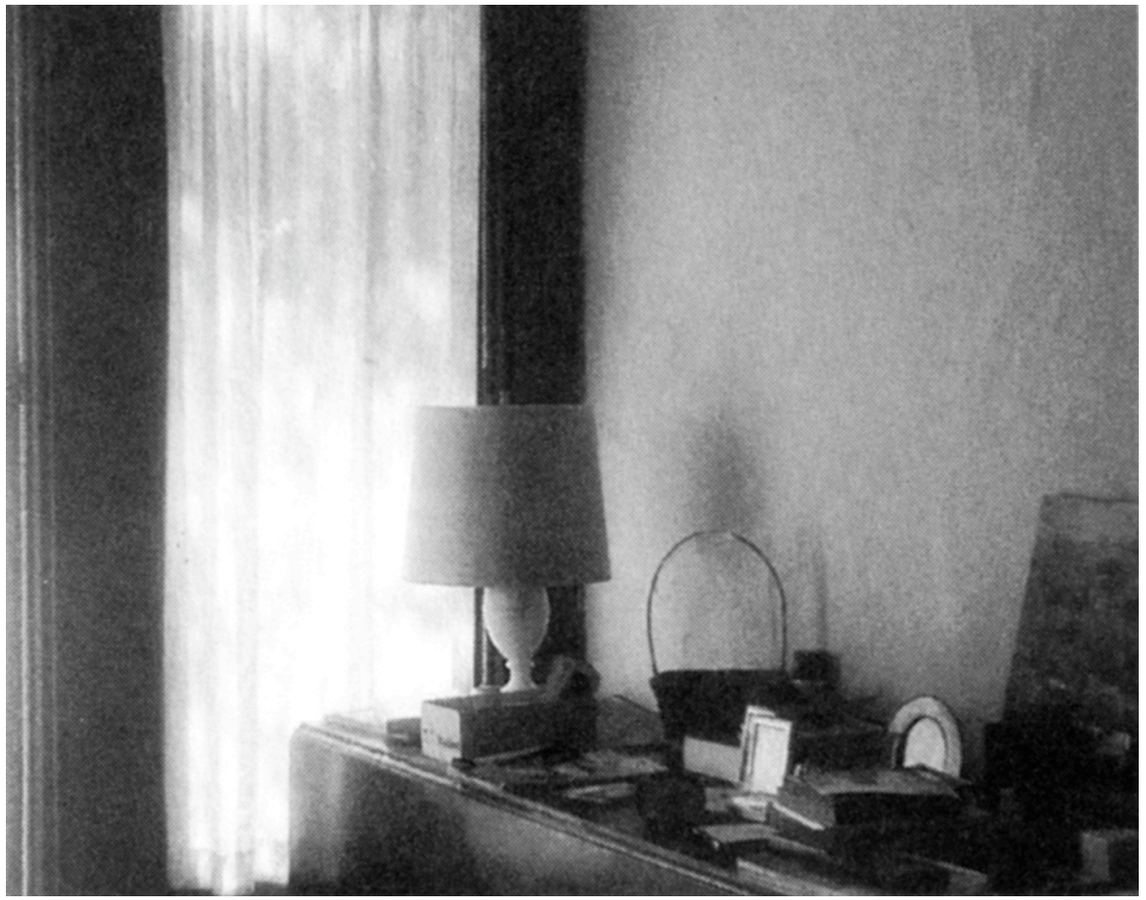

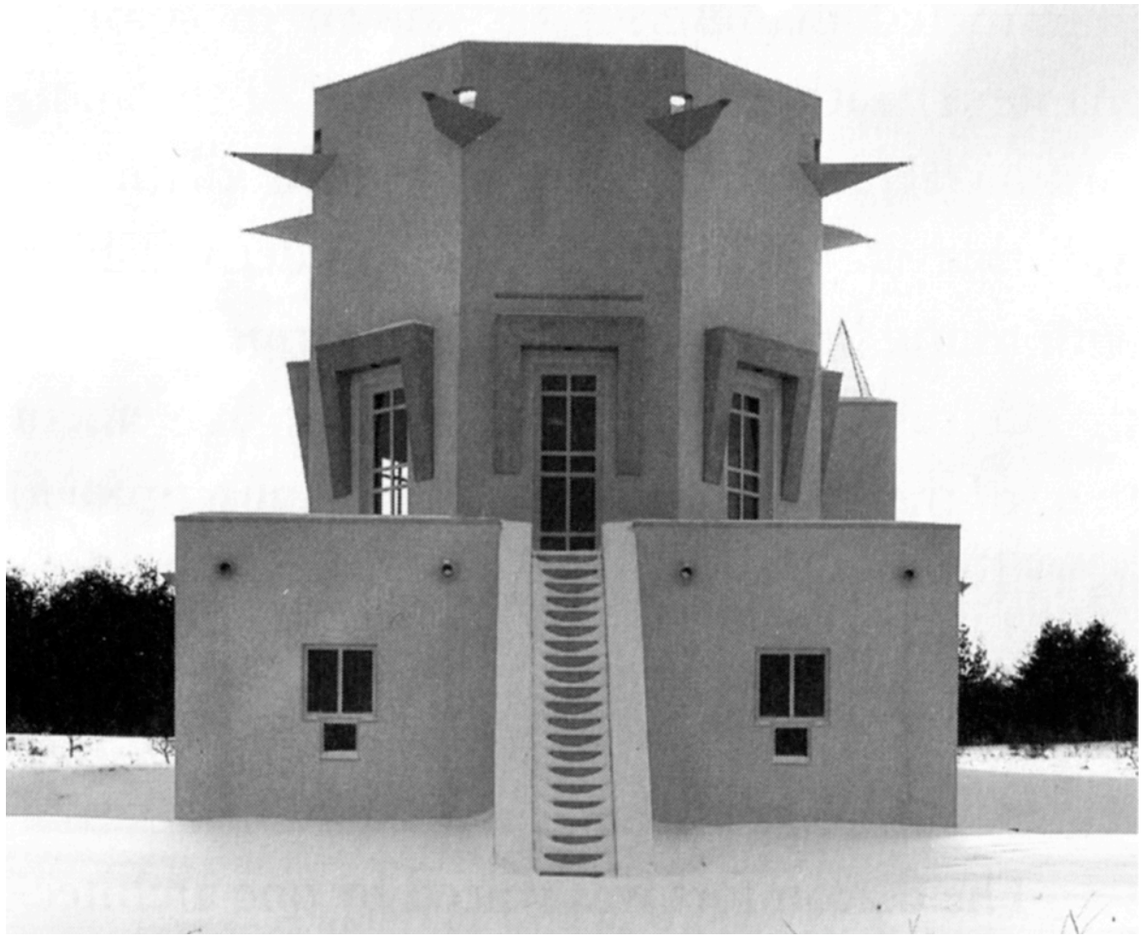

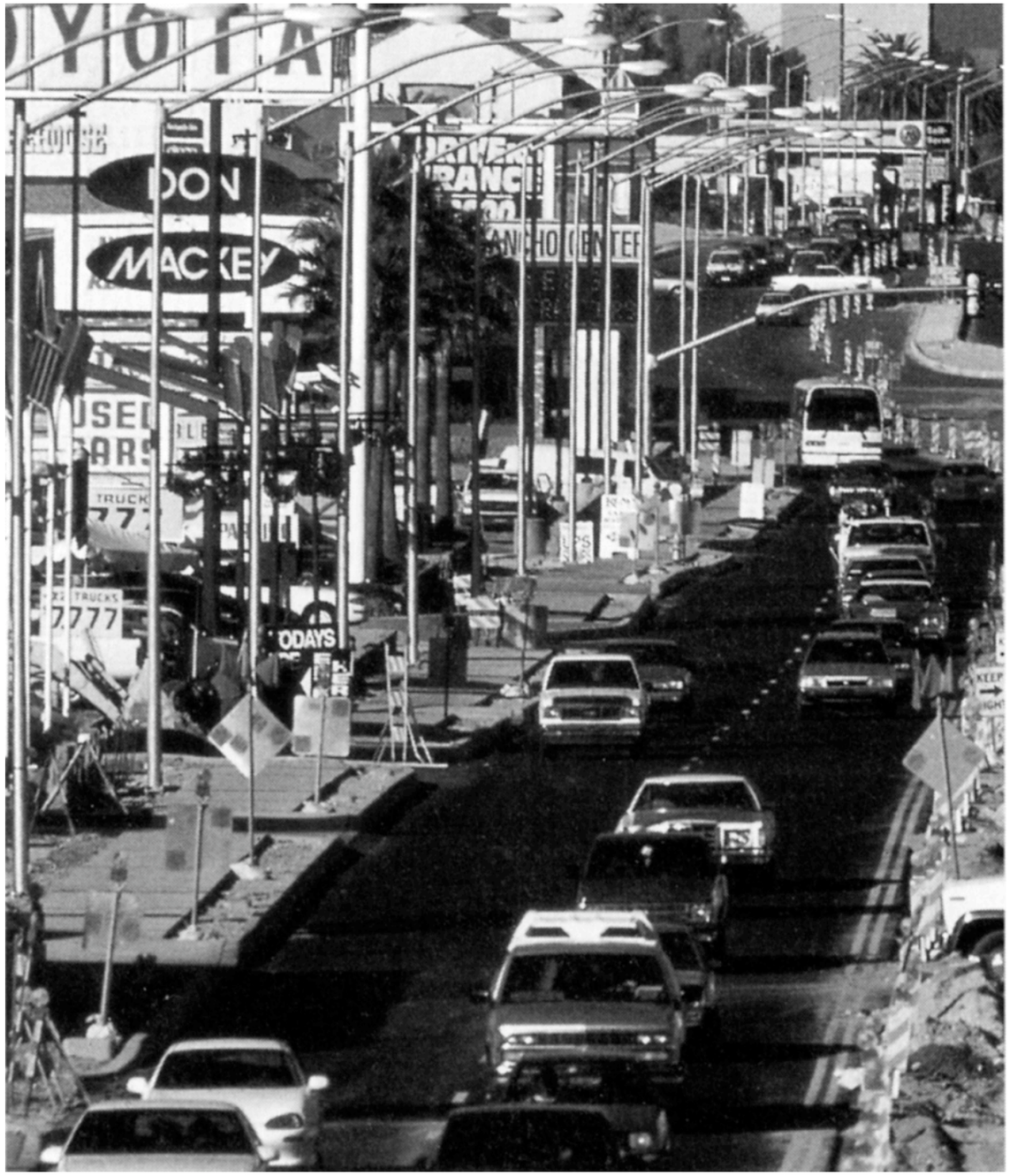
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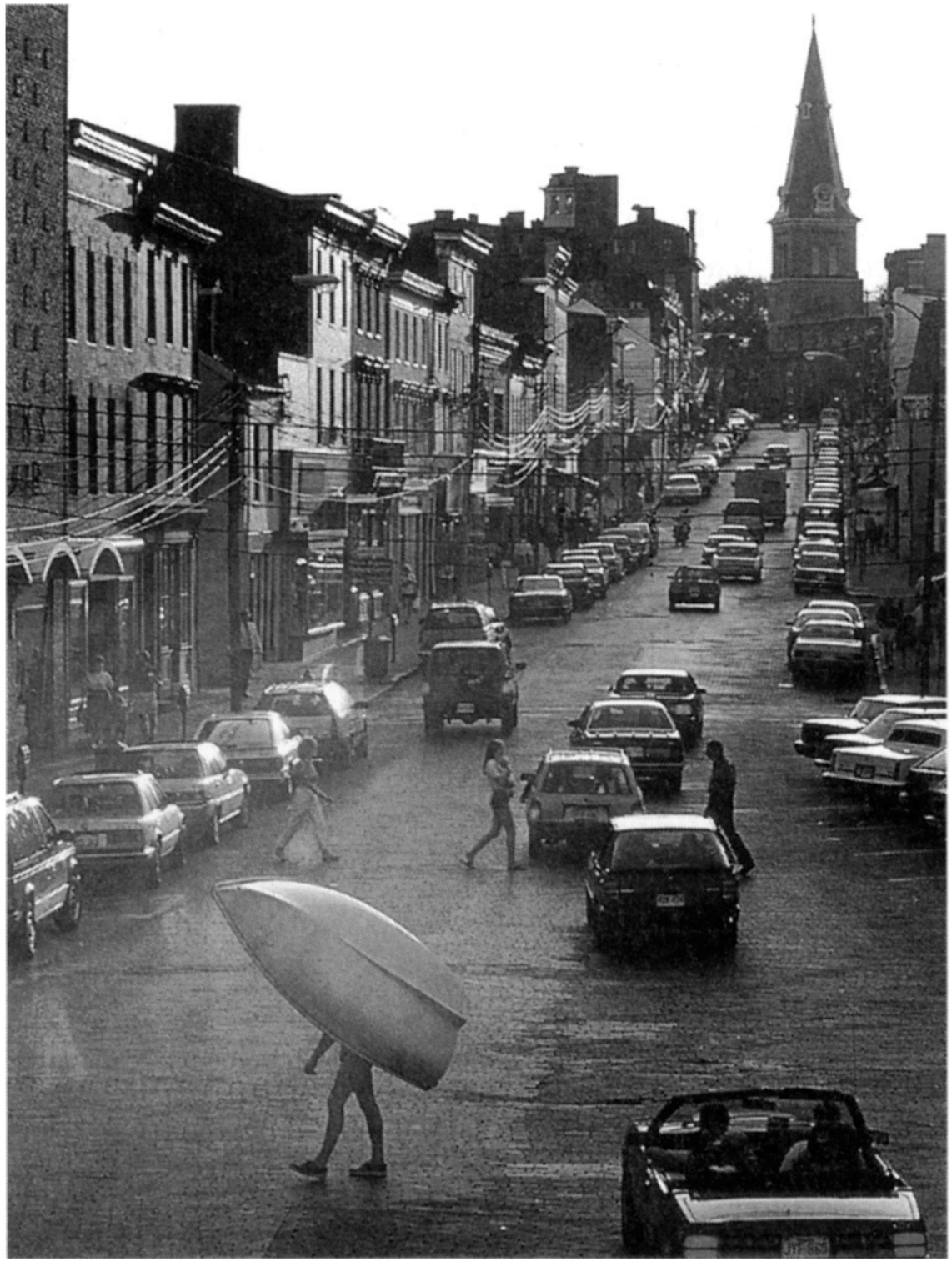
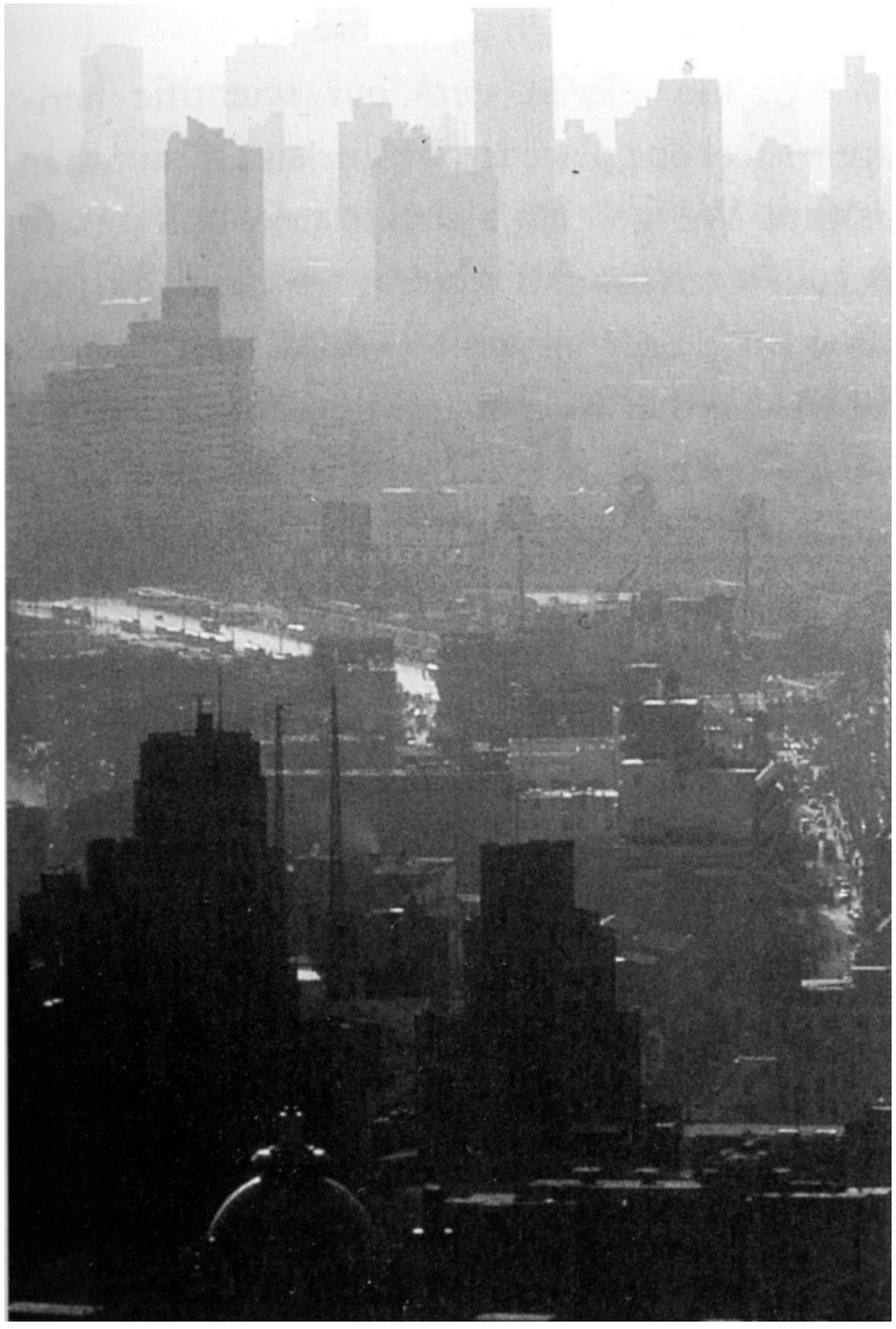




Alexander's Hypothesis

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

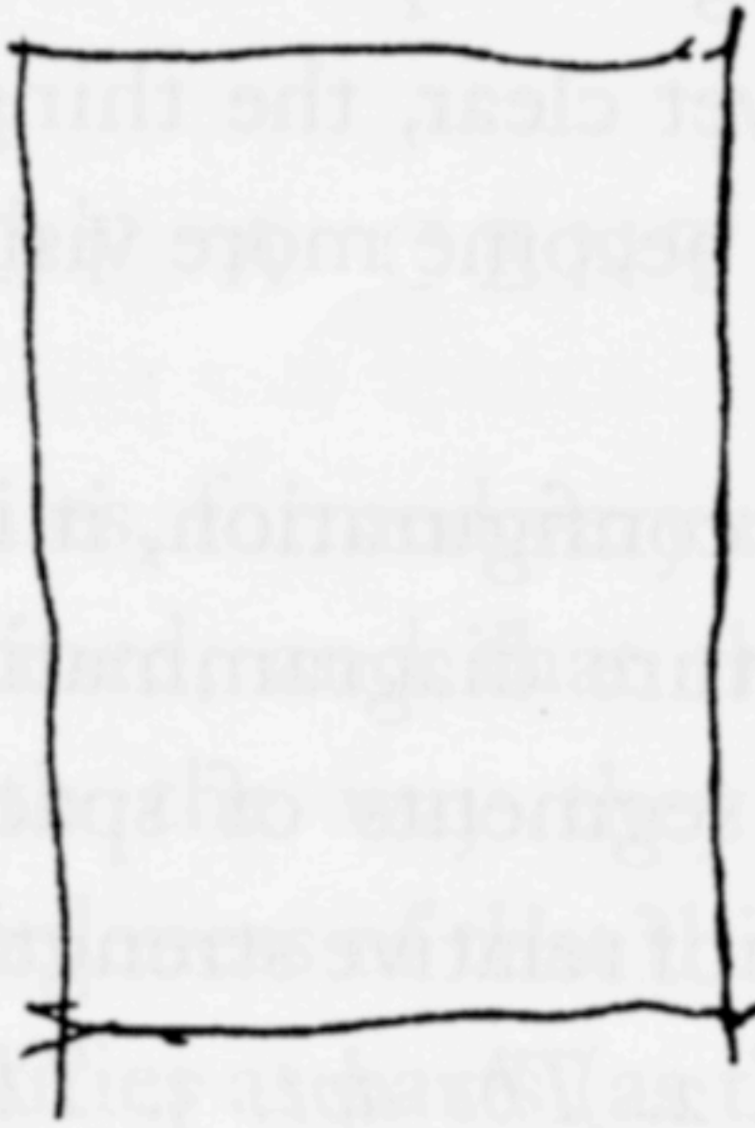
1. *Centers arise in space.*

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

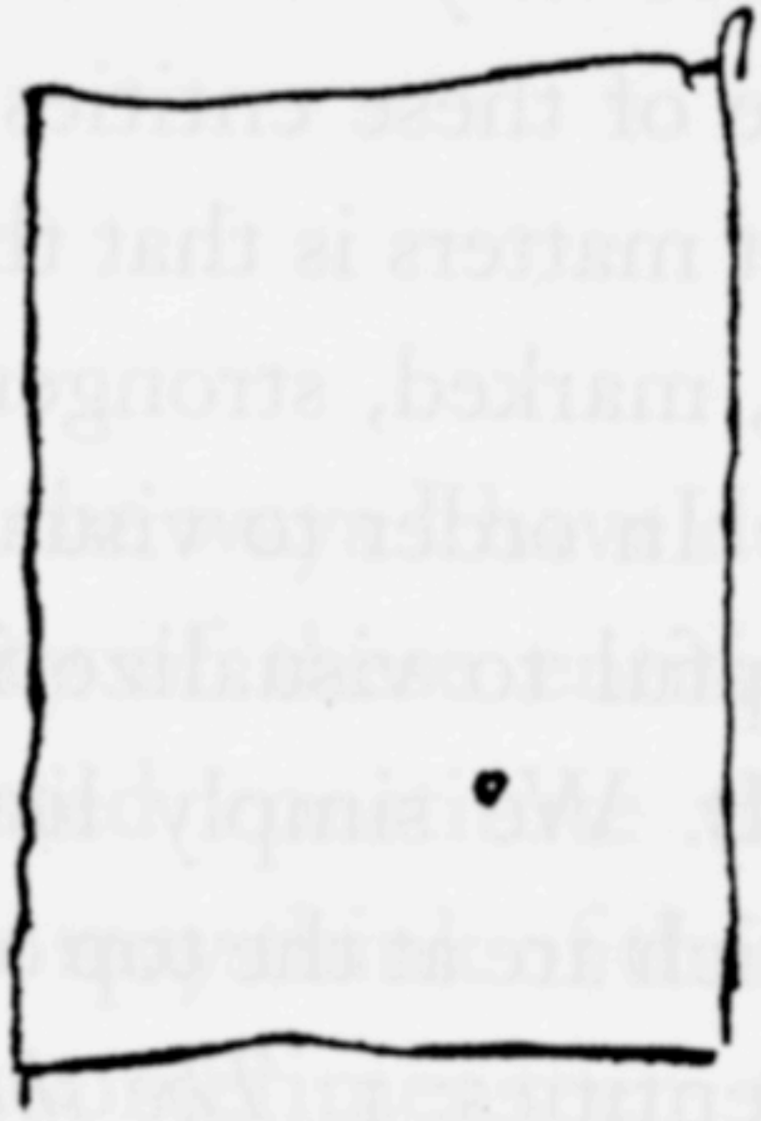
3. *Each center has a certain life or intensity. . . . This life or intensity is not inherent in the center by itself, but is a function of the whole configuration in which the center occurs.*

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.*

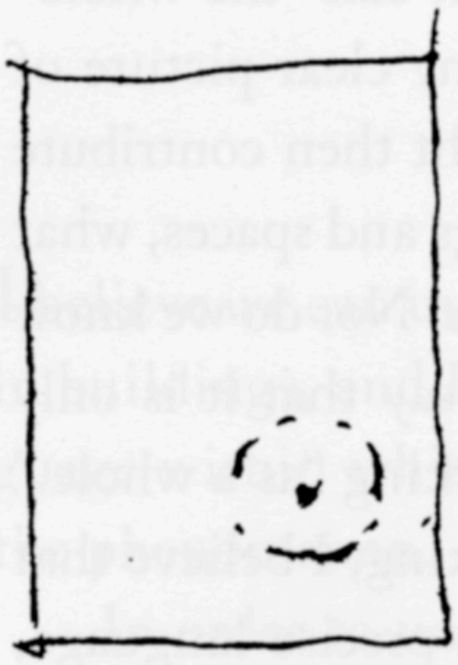
5. *The centers are the fundamental elements of the wholeness, and the degree of wholeness or life, of any given part of any given part of space depends entirely on the presence and structure of the centers there.*



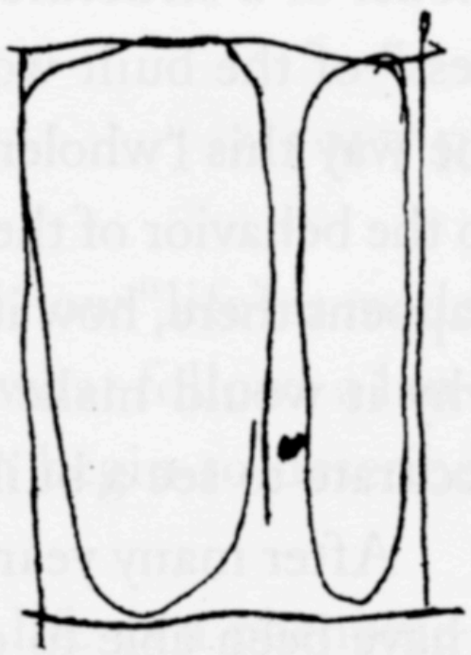
A blank sheet of paper

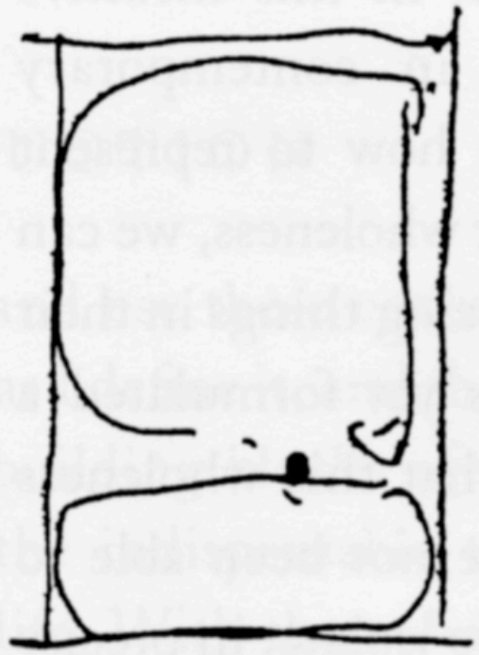


Blank sheet with a single dot

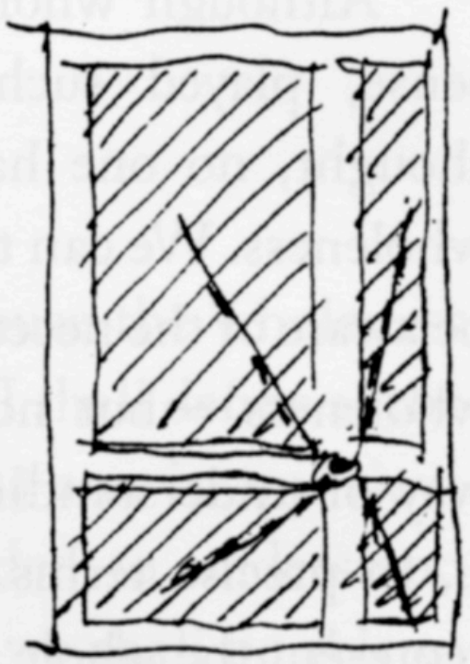


Halo round the dot

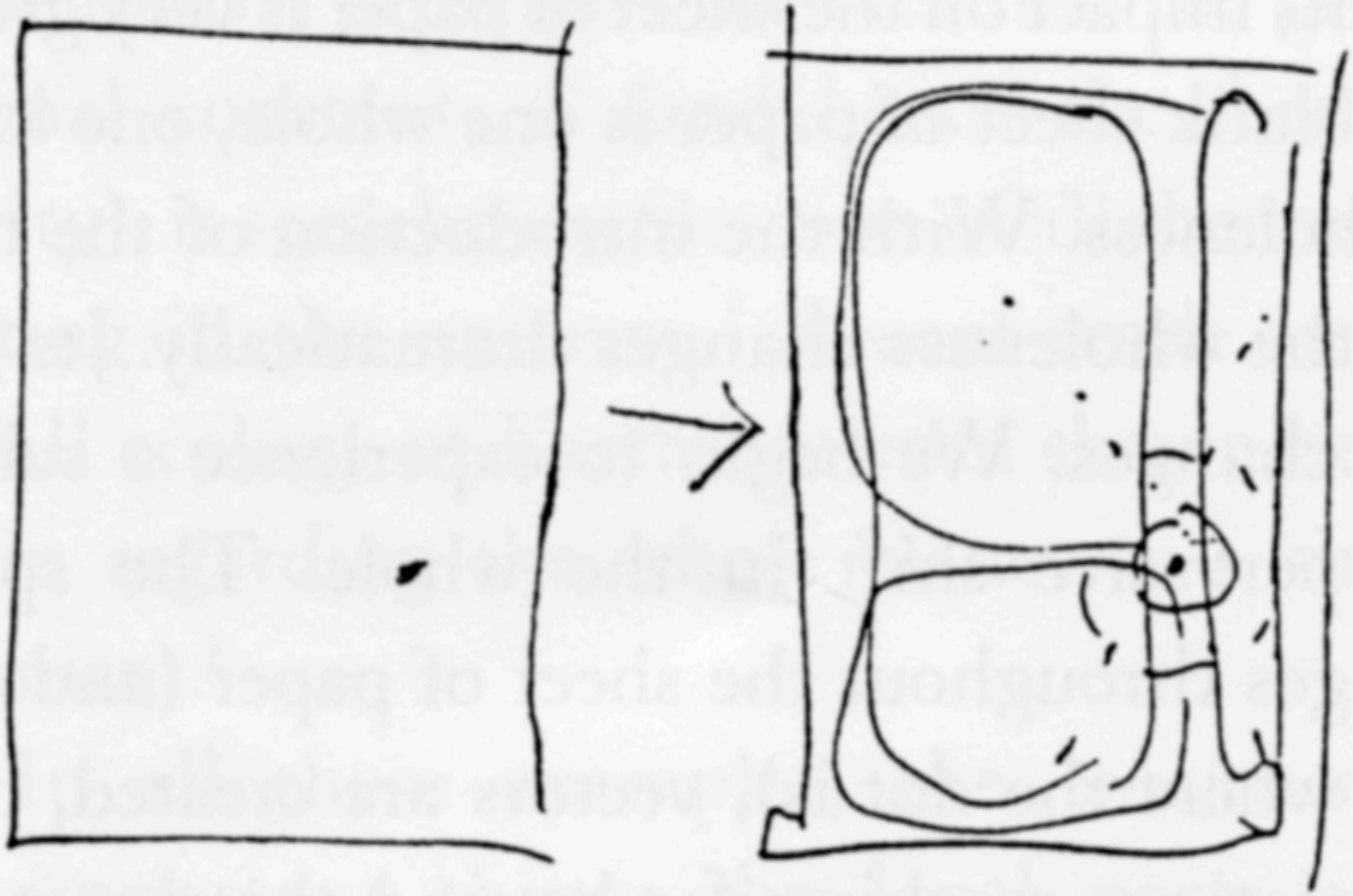




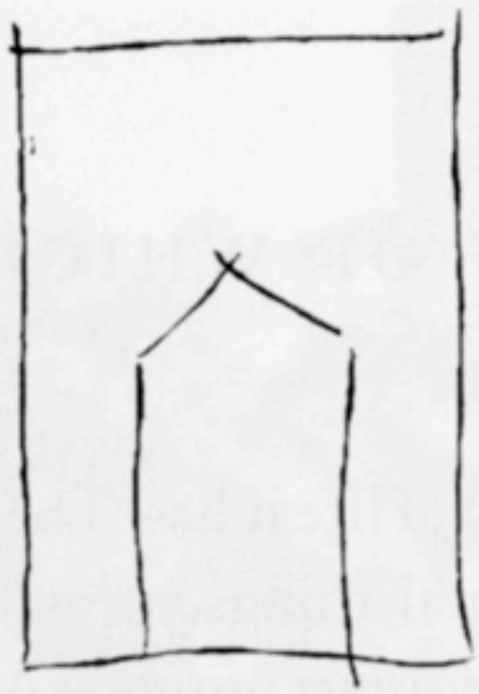
Four largest latent rectangles, creating four other rectangles in the corners, by their overlap. These are seen on the right.



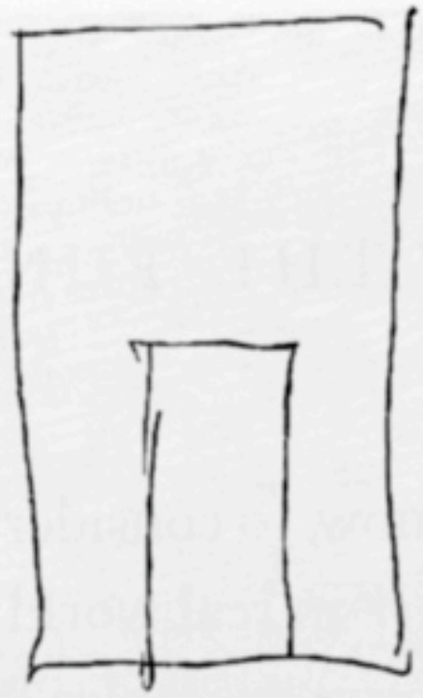
System of rays



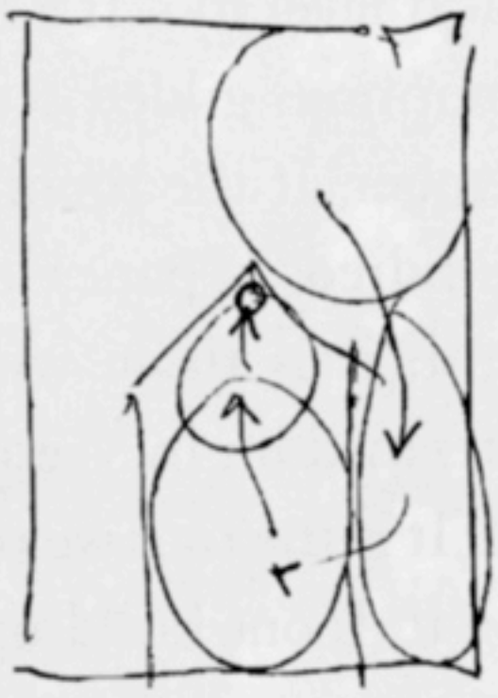
A diagram of the wholeness: here we see the system of all twenty most salient entities, overlapping each other and seen as one system. Bear in mind that this is the wholeness for a simple dot on a single rectangular sheet.



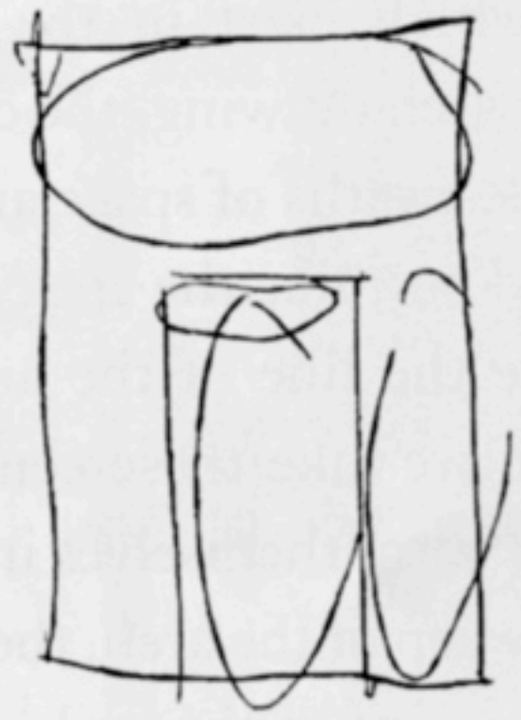
Drawing A



Drawing B



Structure of A, showing the main centers of which it is made.

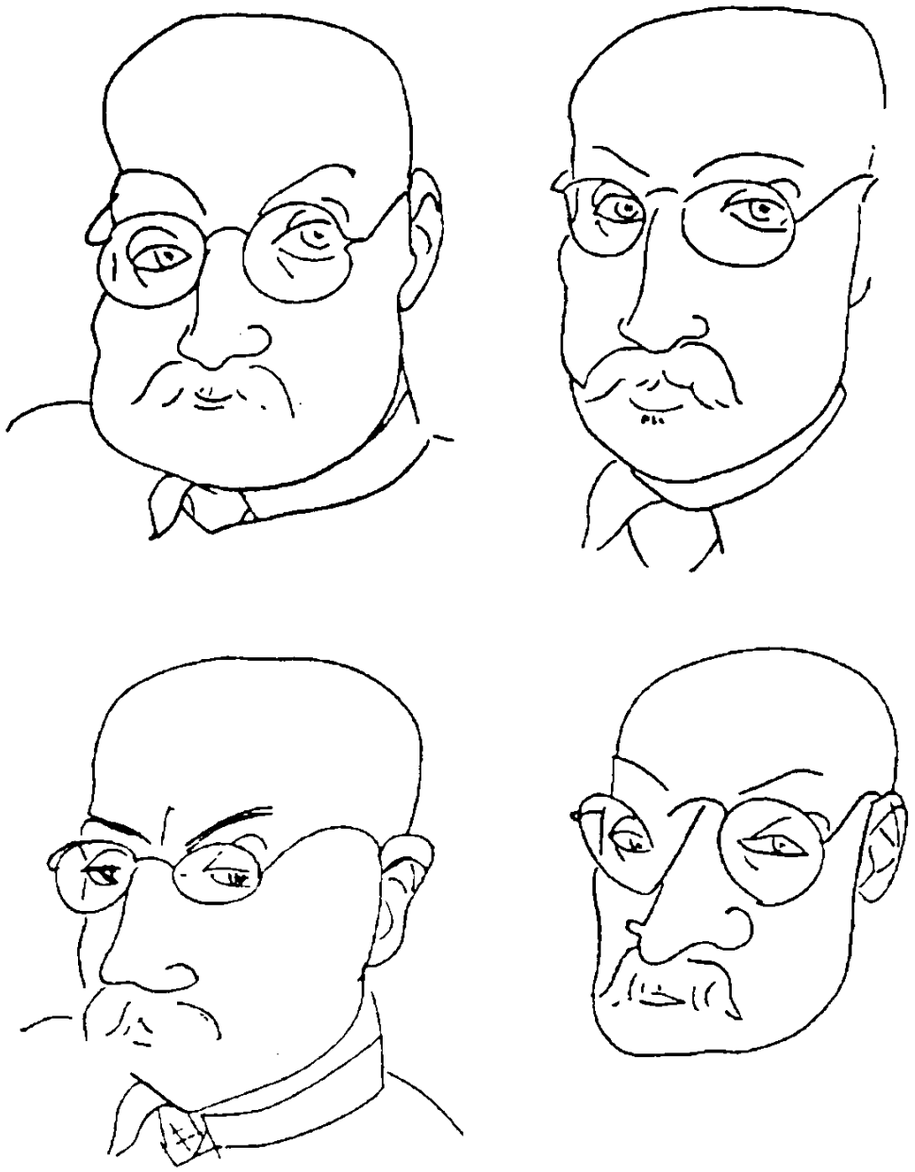


Structure of B, showing the main centers of which it is made.

Centers are a recursive structure:

centers are made of centers

Centers



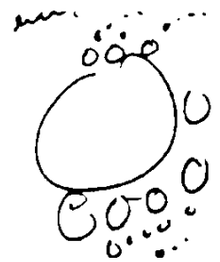
Fifteen Properties

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)



This door seems to have levels of scale, but they don't really work.

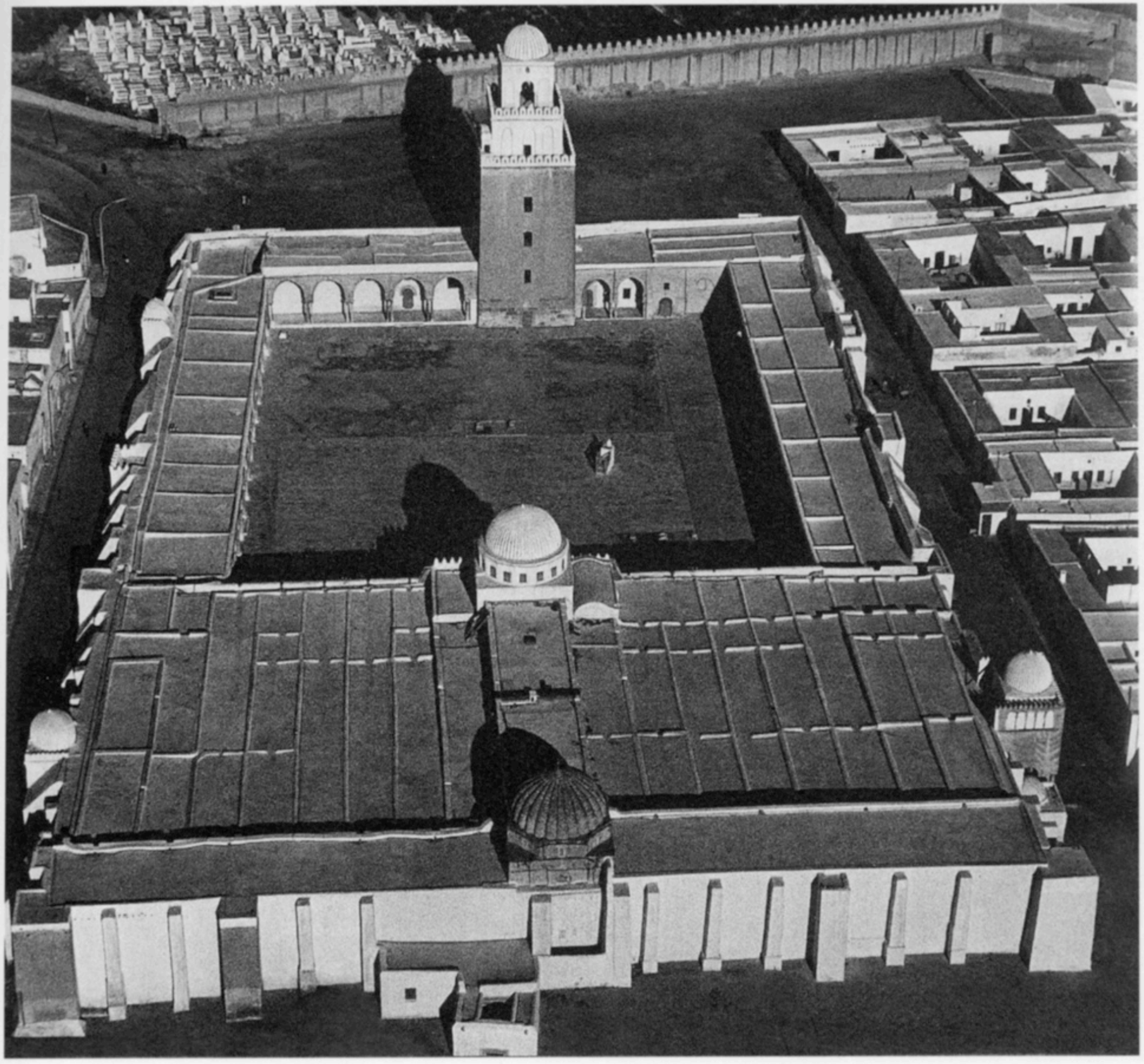
Excellent levels of scale: here the levels are beautiful, and really work.

Profound hierarchy of scale in tilework at Meshed

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 . . . .*



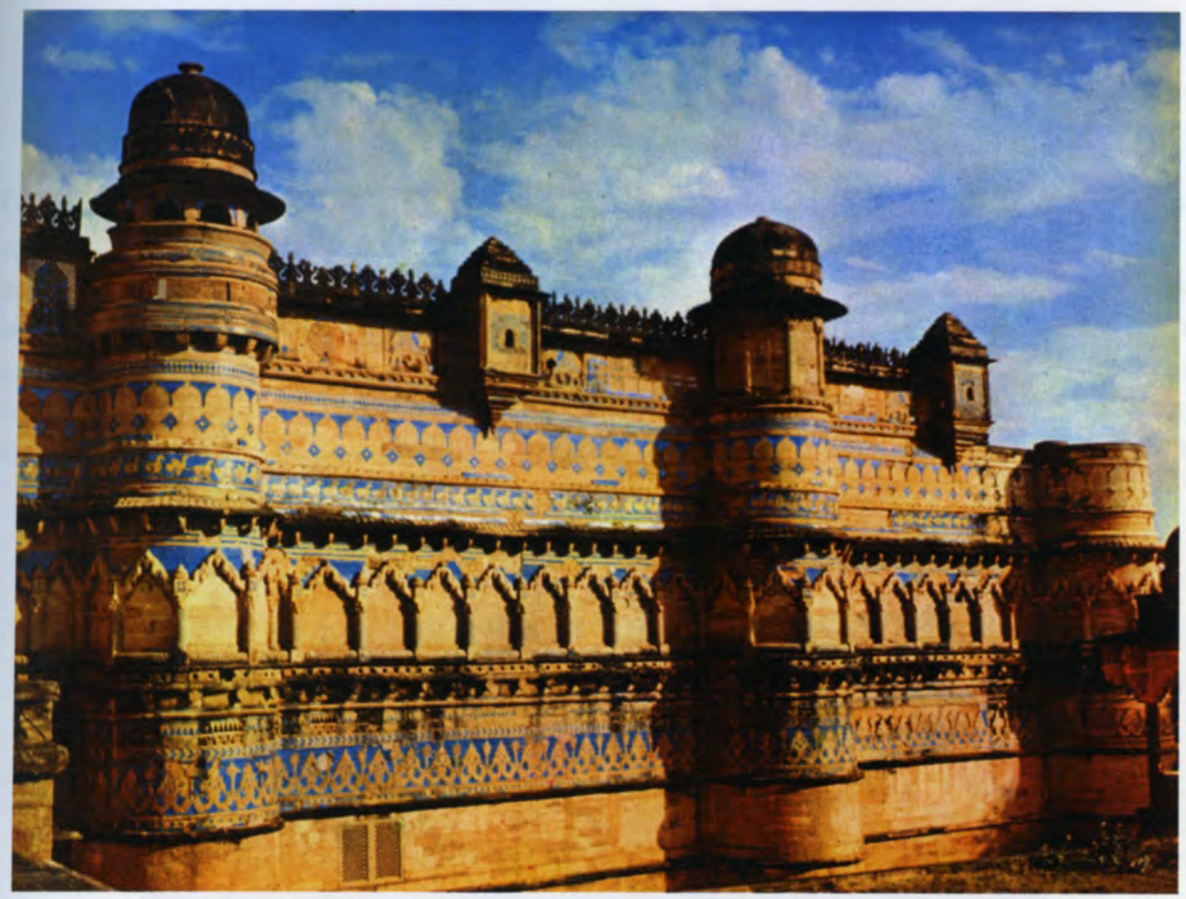
Highly positive example of centers: in the mosque of Kairouan: every part, and every part of every part, is a strong center, and the whole is also a strong center formed by the field effect of all the other centers.

A primitive Anatolian carpet embodies the powerful center caused by a field effect that begins at the very edge of the carpet, and works its way inward, radiating centeredness throughout the structure.

Boundaries

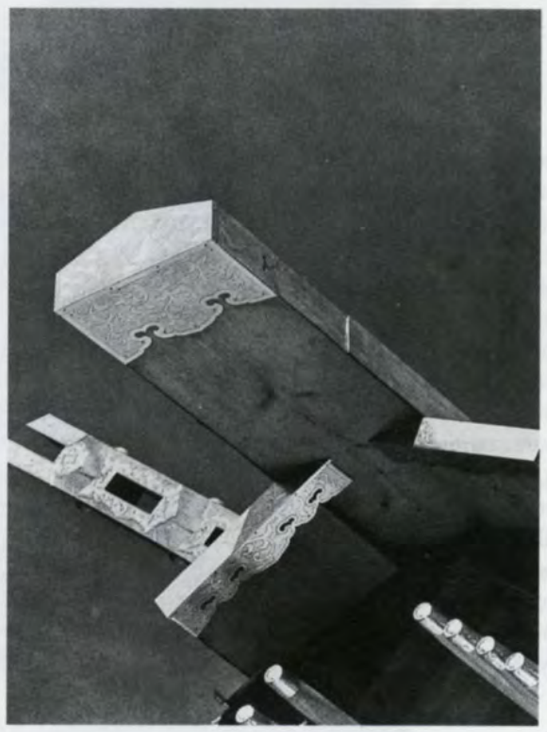
- A boundary separates a center from other centers
- A boundary focuses attention on the center
- A boundary is itself made of centers

Traditional Norwegain storehouse: a building replete with boundaries, so filled with boundaries that it is almost entirely made of them. Here the life and structure comes from the fact that the building is made of nearly nothing but boundaries.



The castle of Gwalior: the whole building front is made of boundaries, and boundaries of boundaries.

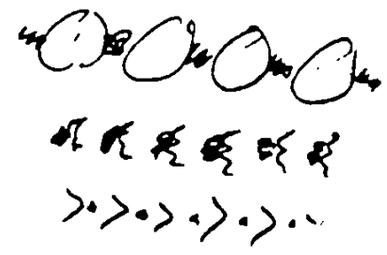
Boundary of a building made by columns and arcades. Notice how each column has its own internal boundaries at the capital and base; and how these two have their own boundaries in the line of detail which bounds them in turn.



Boundaries at the ends of the boards on the Ise shrine: a stick-like element that is, in principle, one-dimensional is bounded by a cap, to make it beautiful and to protect the end-grain.

Alternating Repetition

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



The ''chintamani'' design in a 15th-century Turkish velvet: a waving alternation of color creates a passionate life in the space.

Beautiful alternating repetition in a Greek embroidery. Centers are formed everywhere, in the repetition of the embroidered forms and in the spaces between the repetitions.

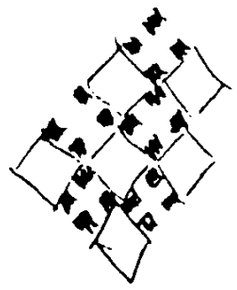
Banal repetition: there is no alternation here, there are no meaningful centers formed anywhere within the forms and spaces which repeat.

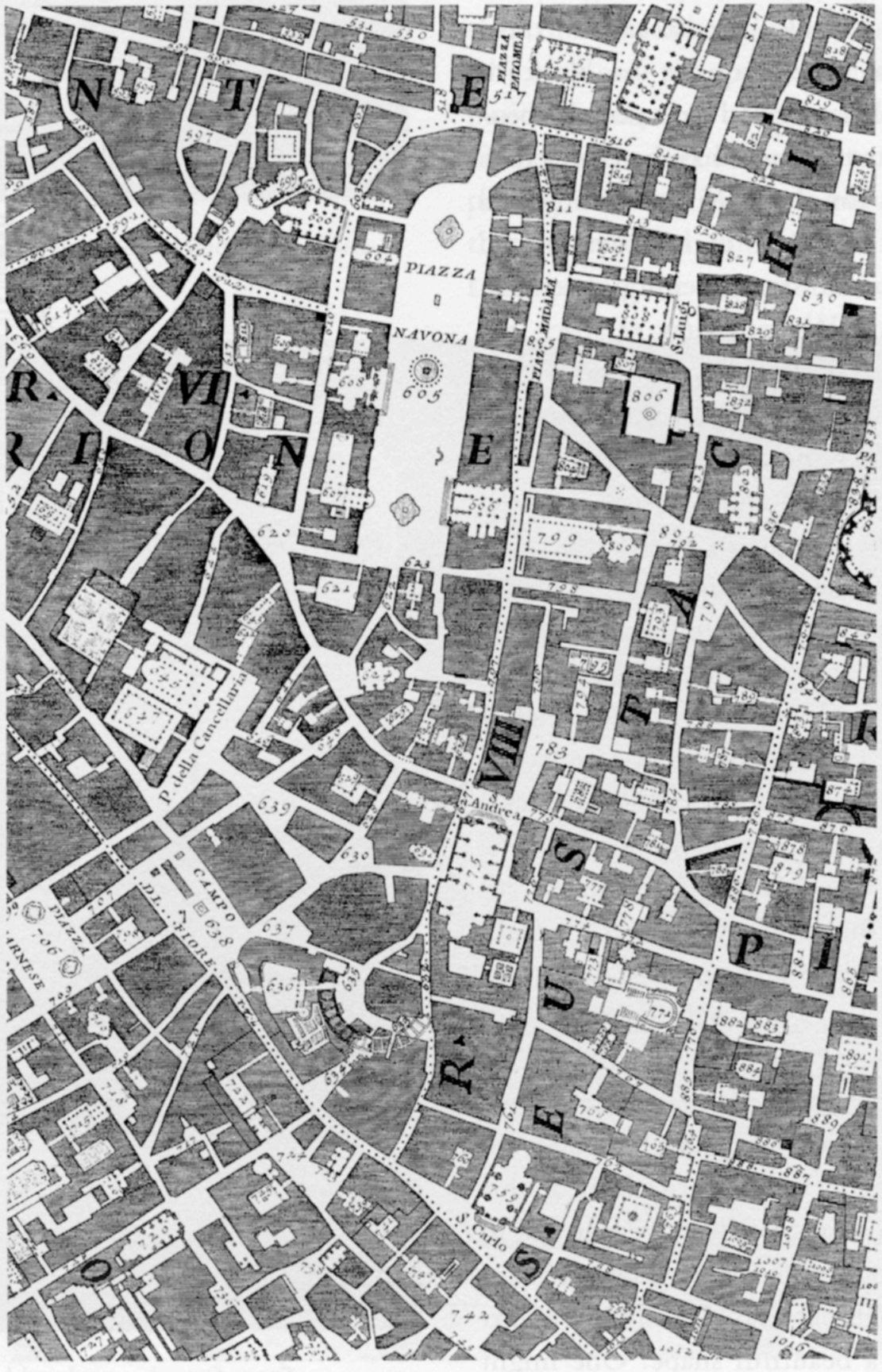
Positive Space

- 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.

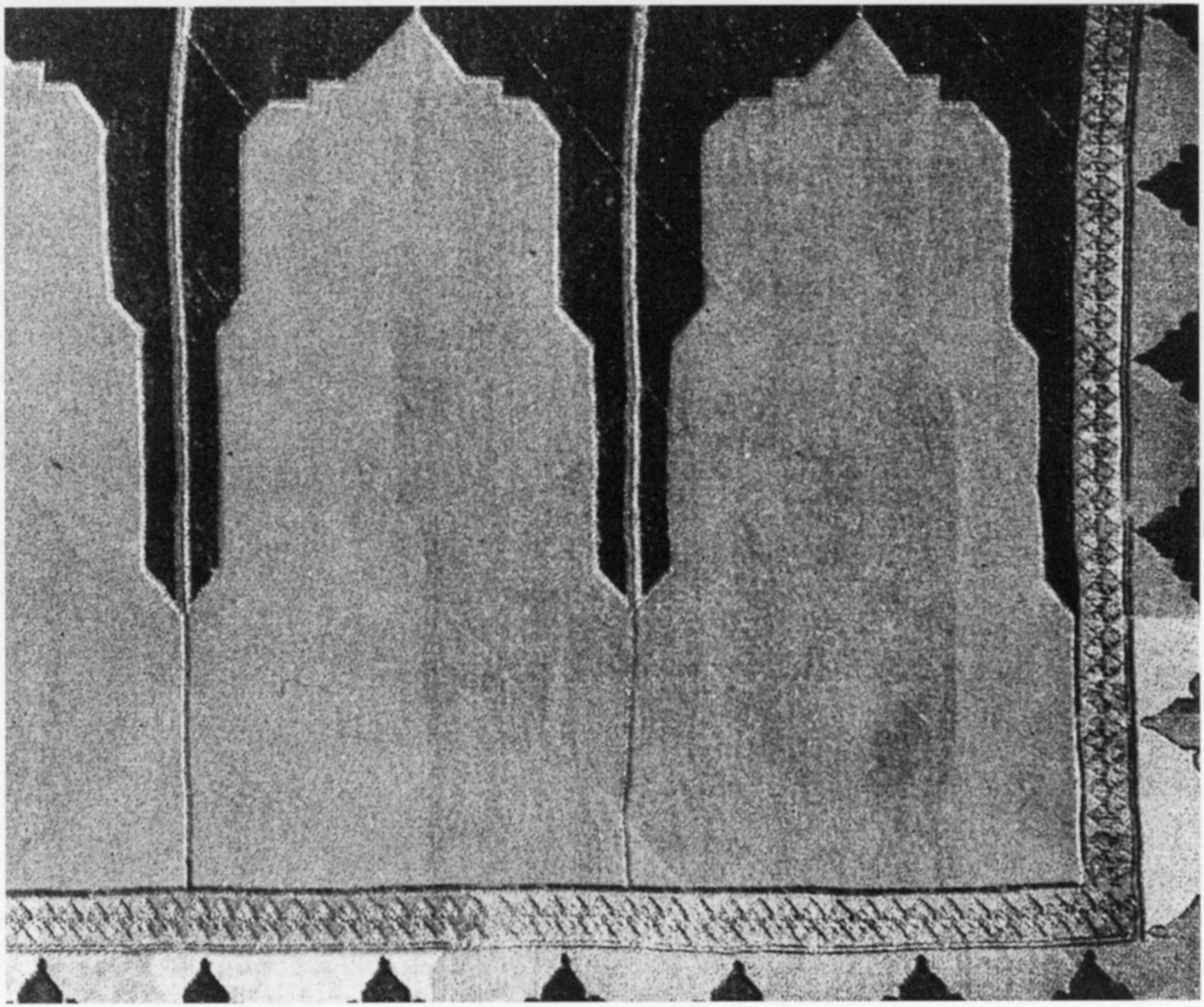
  In poor design, sometimes, in order to give an entity good shape, the background space where it lies has left-over shape, or no shape at all. It is merely left over.





The Nolli plan of Rome: hundreds of positive spaces

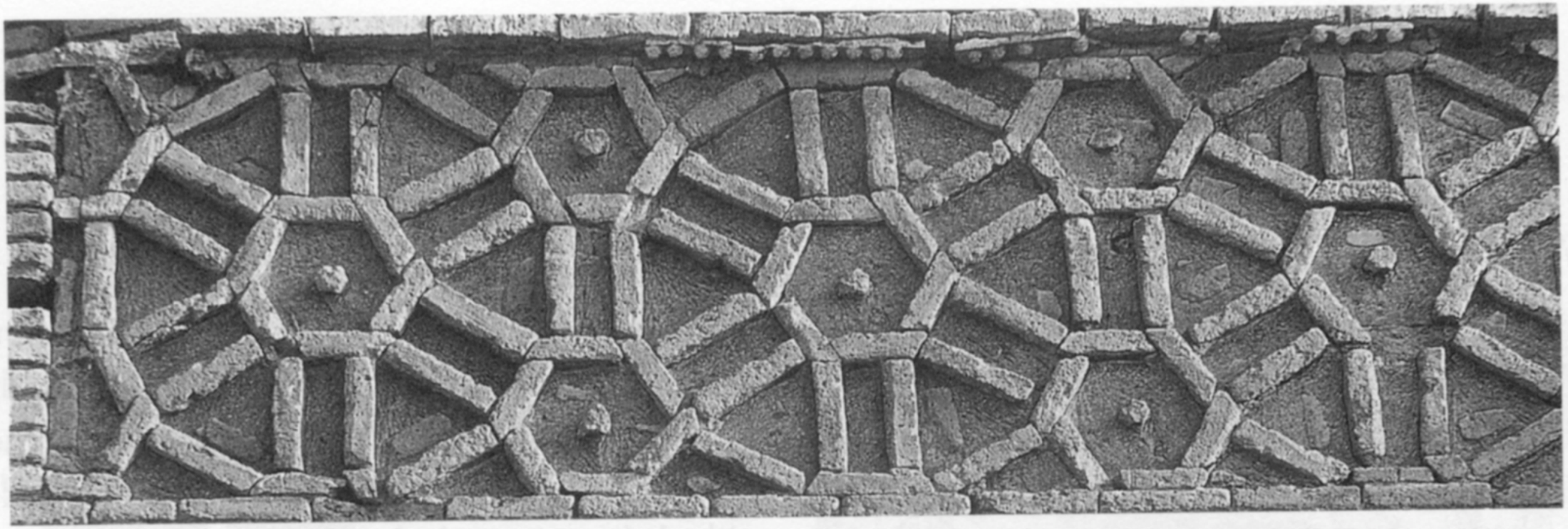
Positive space throughout the elements of the design



16th-century Turkish multiple-niche prayer carpet

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



Abbasid stone relief: what seems like a rather intricate ''tracery'' design is actually immensely solid, because the shapes — wheels and infill — are made of such simple and solid pieces. The good shape of the ornaments appears in the way that every part, every single part, has positive and definite shape, thus helping the overall organization, and making the large ''wheels'' magnificent in their resulting shape.

Japanese shrine. The shape is so magnificent, it needs no comment.

Early Persian carpet: even the individual flowers are made up of good shapes

- High degrees of internal symmetries
- Bilateral symmetry (almost always)
- A well-marked center (but not in the middle)
- The spaces it creates next to it are positive
- Very strongly distinct from what surrounds it
- Relative compact
- Closure, a feeling of being closed and complete

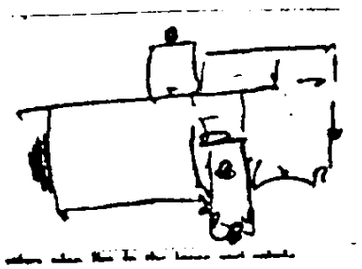
Local Symmetries

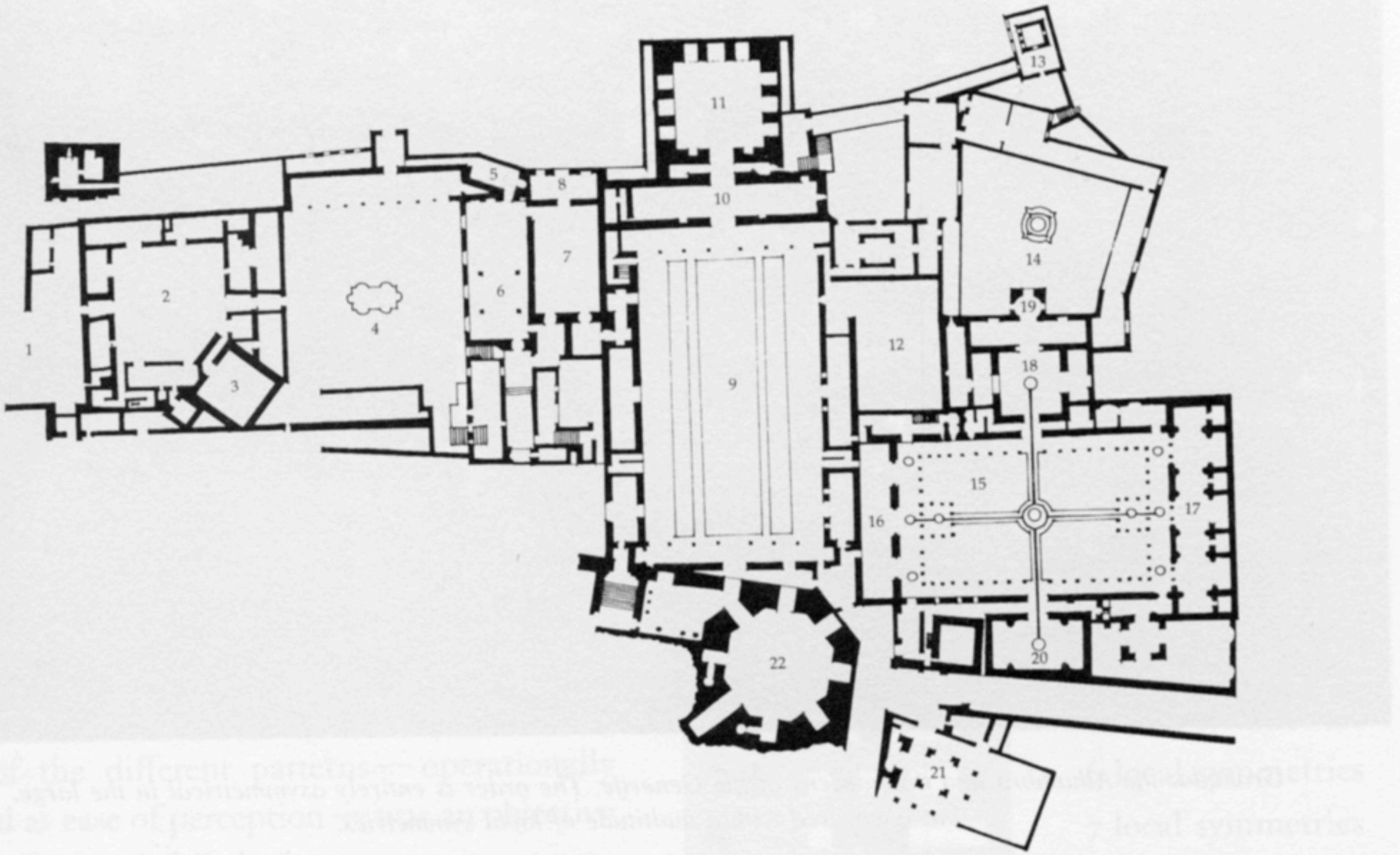
Wherever there is a local symmetry, there tends to be a center.

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.





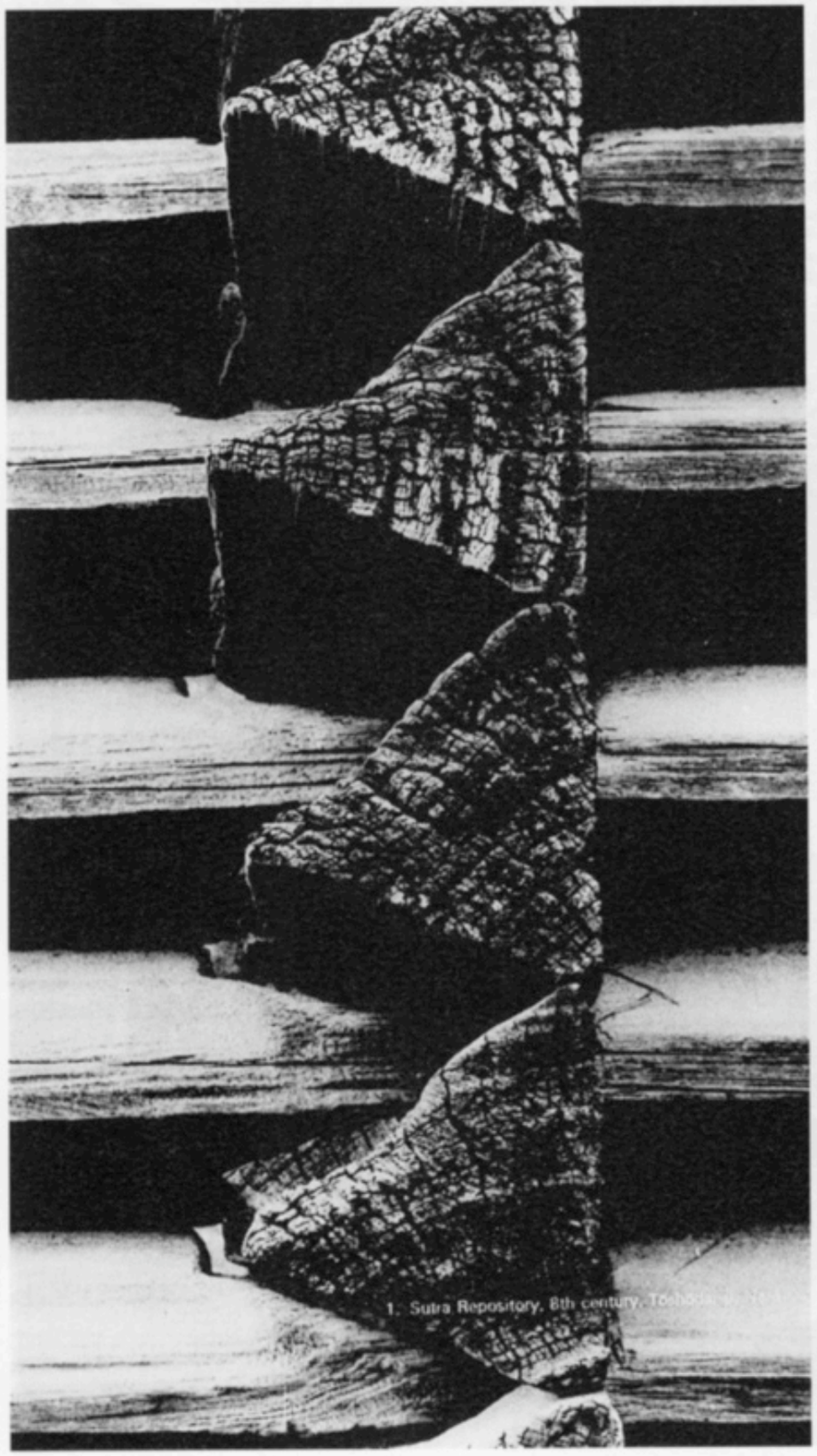
The plan of the Alhambra: the plan is a marvel of centers formed in a thousand combinations, and yet with beautiful symmetrical local order at every point in space.

Previously shown fragment of the Alhambra tilework: its local symmetries are evident

Tile-work from the mosque in Gazur-Gah

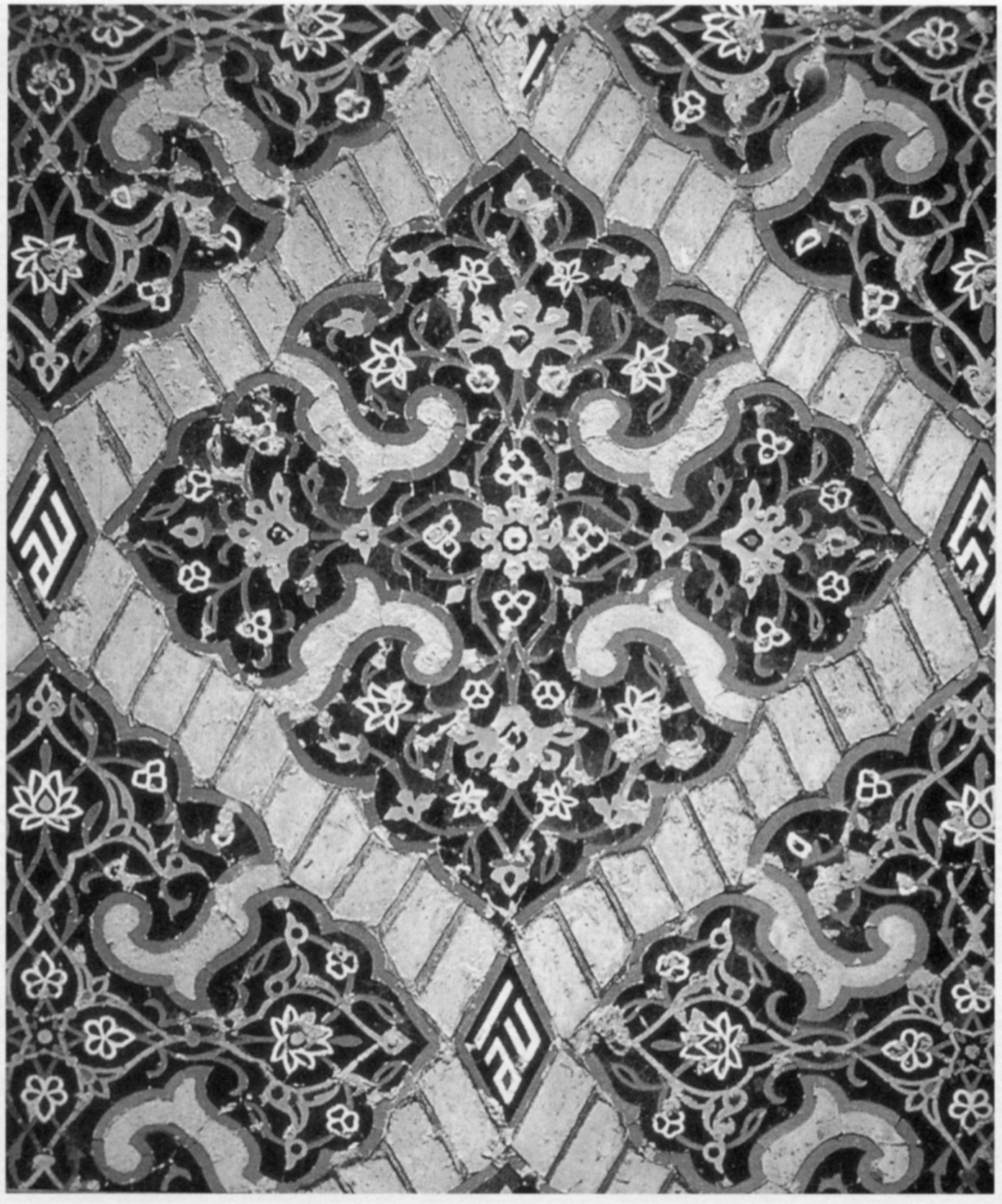
Deep Interlock and Ambiguity

- 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

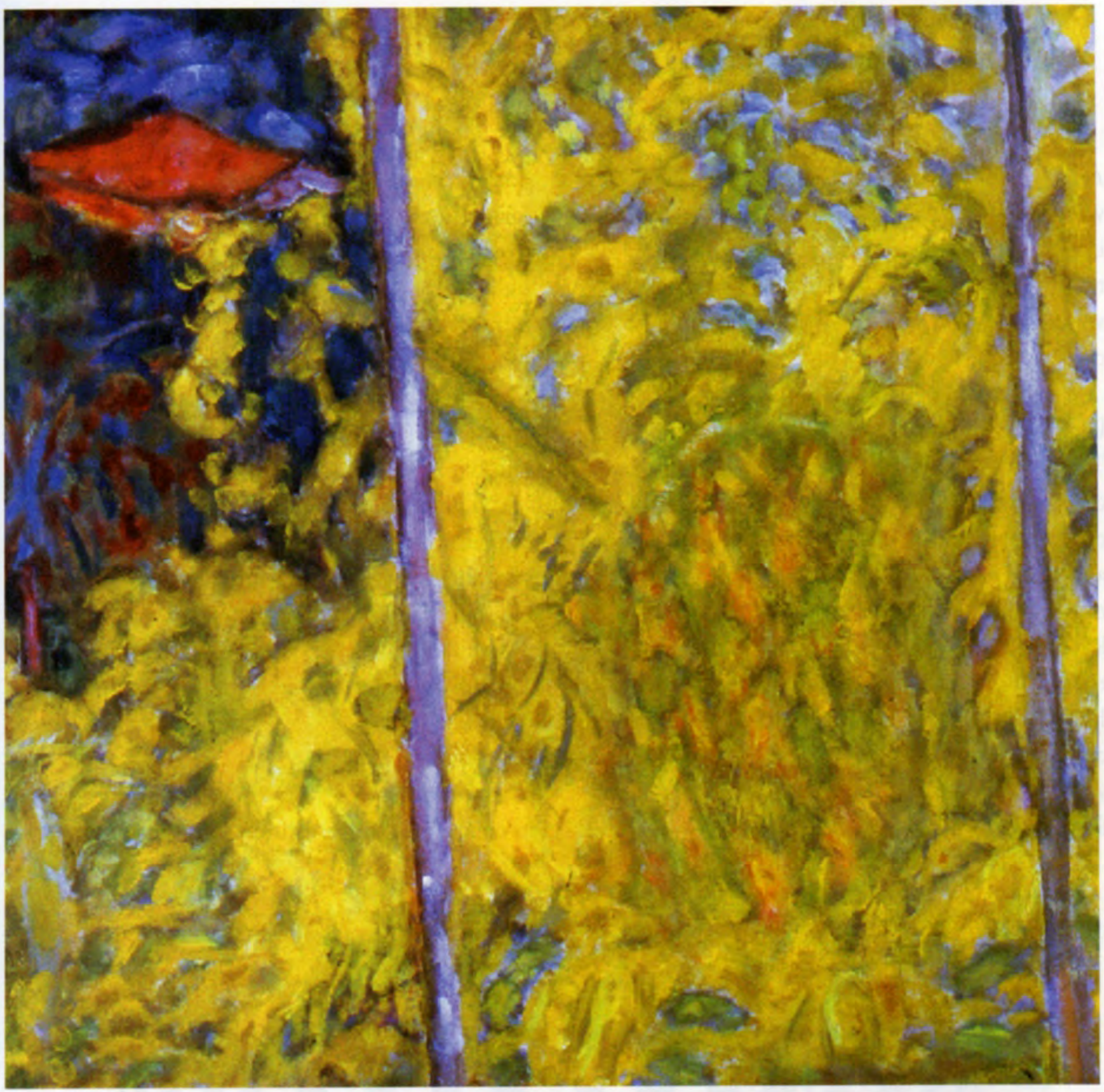


Interlock as the source of practical cohesion in a log cabin

Interlock in the carving of a wooden capital



Tile-work and brick in the 16th-century Tabriz Mosque

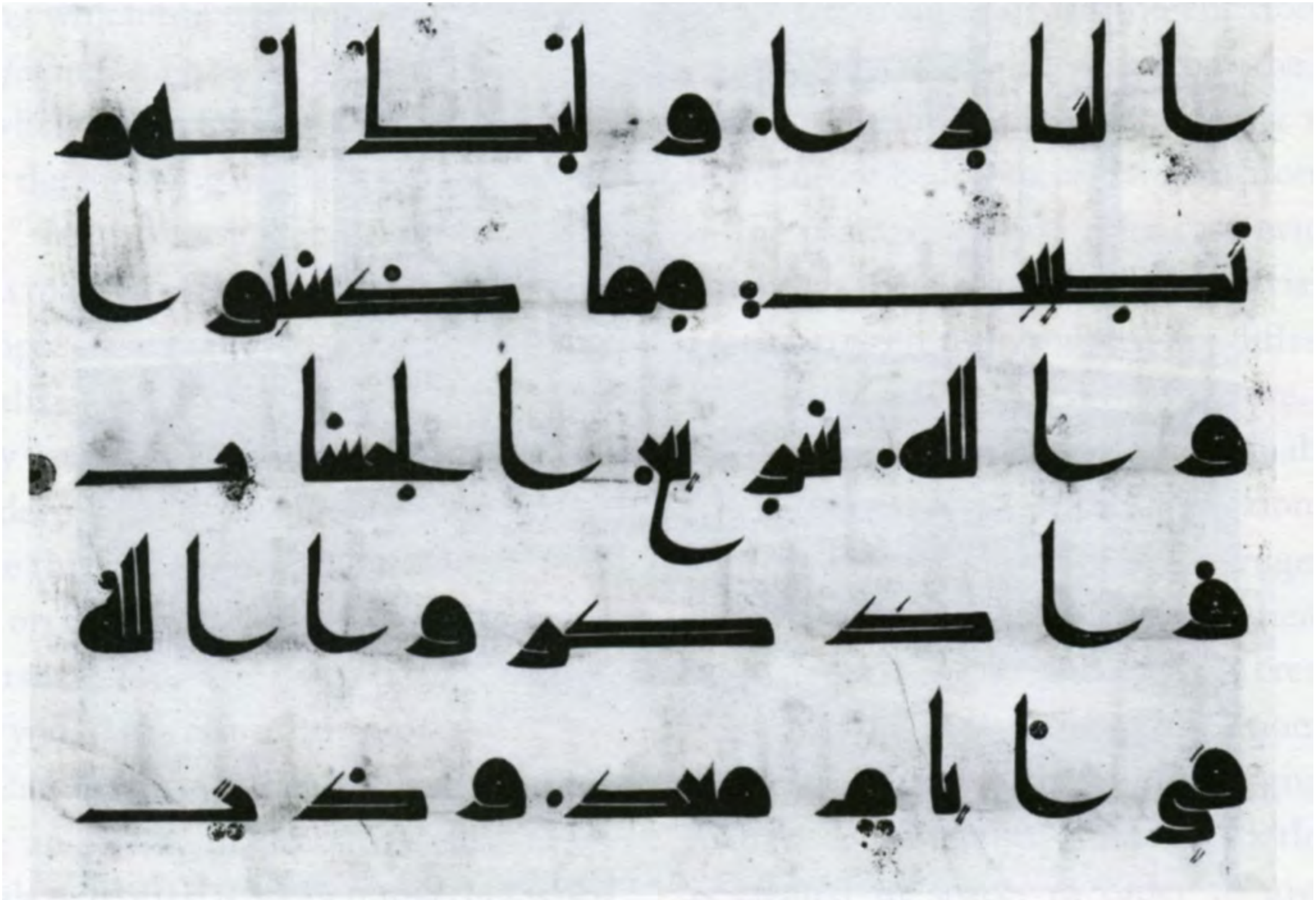


Detail from Pierre Bonnard, The Yellow Mimosa or L'Atelier au Mimosa: the interlock of strands and strands of yellow brush-strokes creates the light.

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.

Beauty comes from the extreme contrast

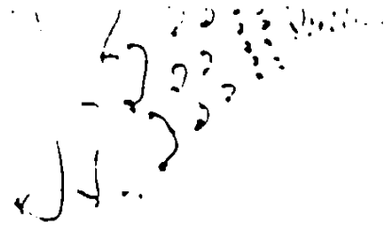


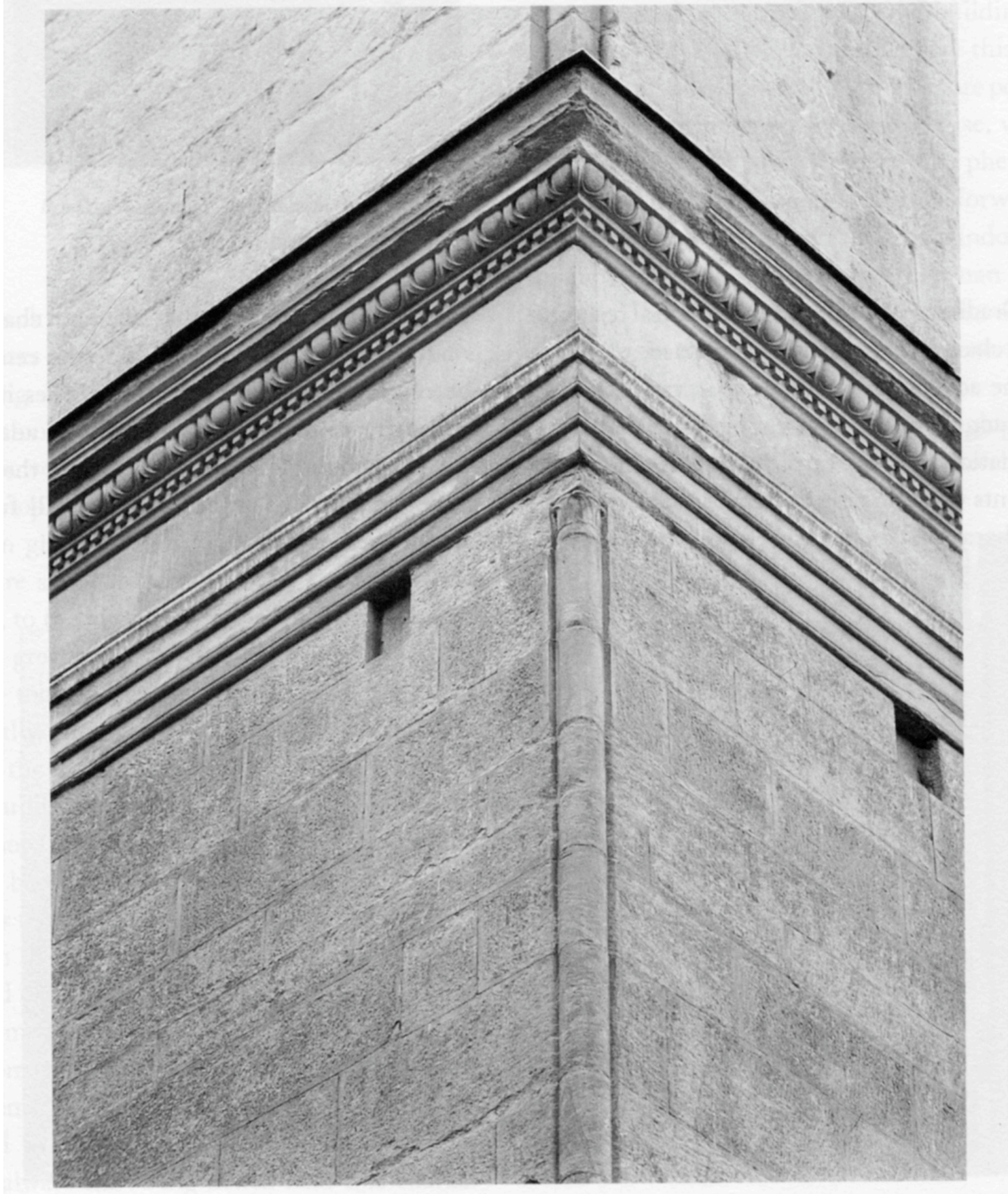
Beauty of the writing relies on the contrasting space.

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.



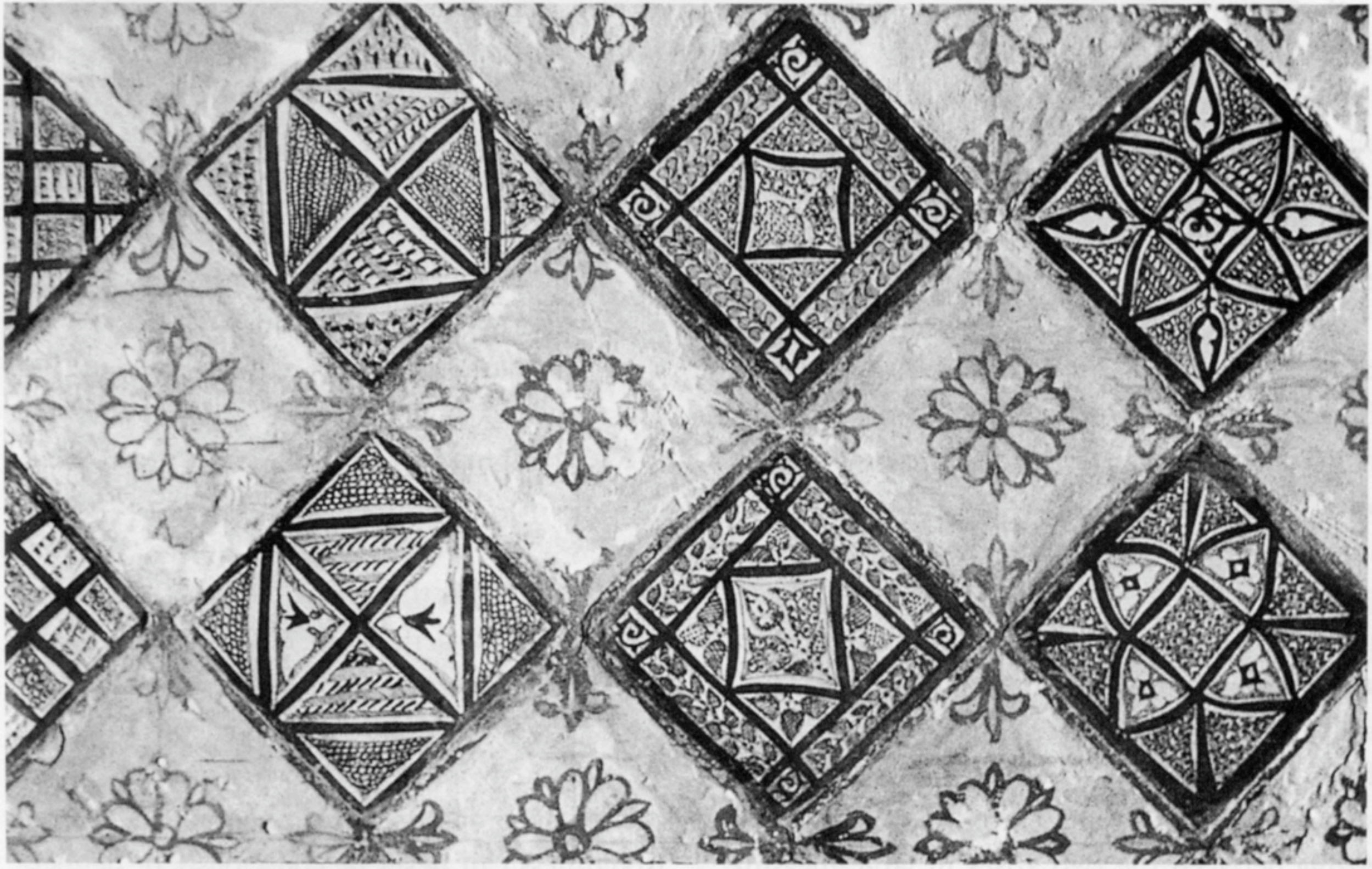


Beautiful gradients in a cornice molding

Roofs of a Norwegian stave church

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.



Beautiful roughness: the hand-painted tiles from the mosque of Kairouan

Anatolian carpet with ''inaccurate'' corners; the carpet is full of life, because the weaver was paying careful attention to the many centers in the border, and drew them, and chose them, so that all the centers would come out right.

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>

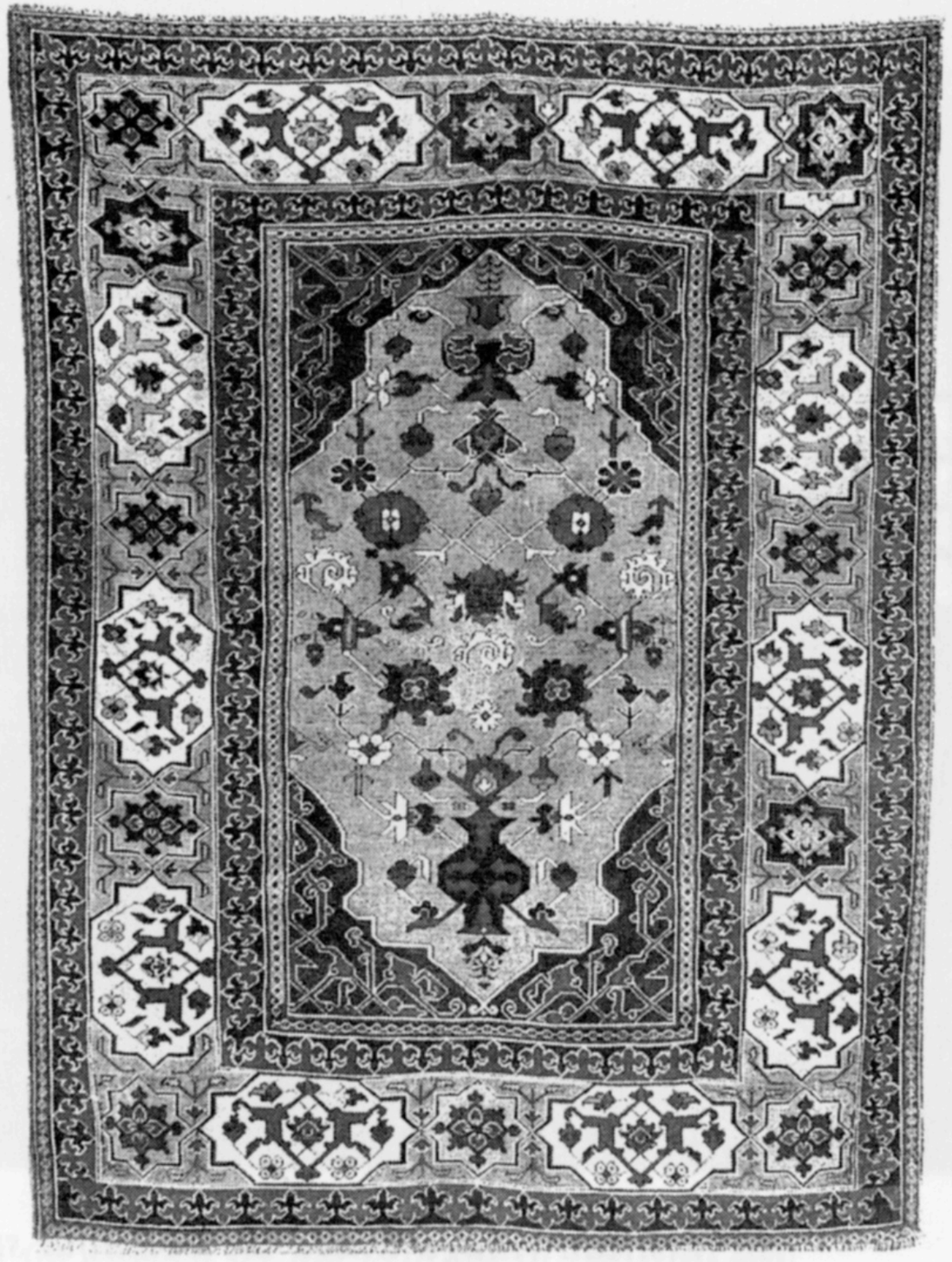
Roughness

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.

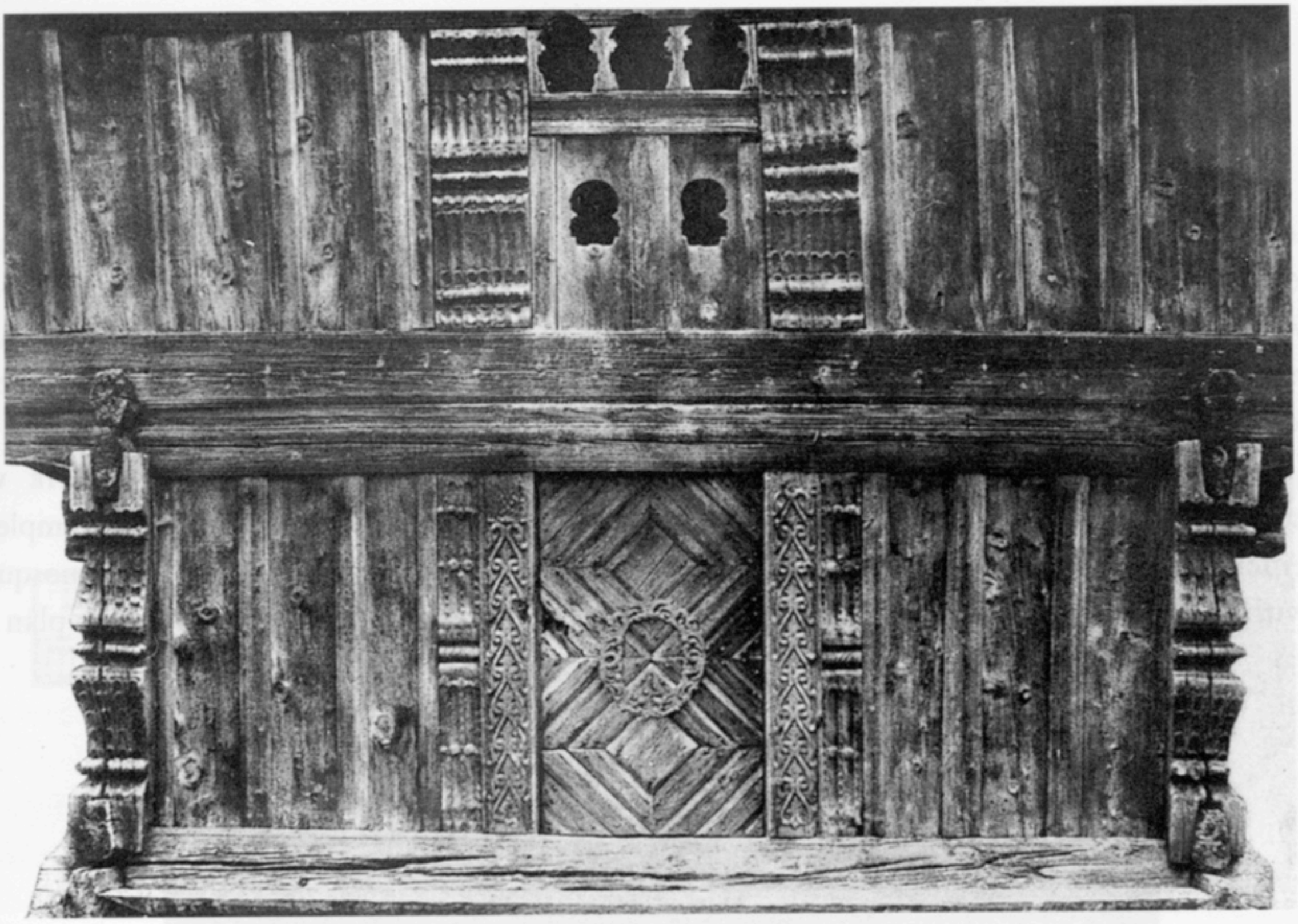
Echoes

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.*



Turkish prayer carpet: all the elements are combinations of right angles and 45-degree angles, based on the star-octagon.

Thyangboche Monastery, Mount Everest



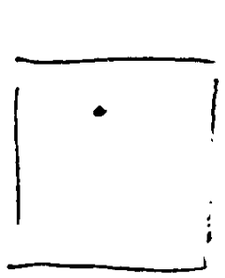
Norwegian barn door

The Void

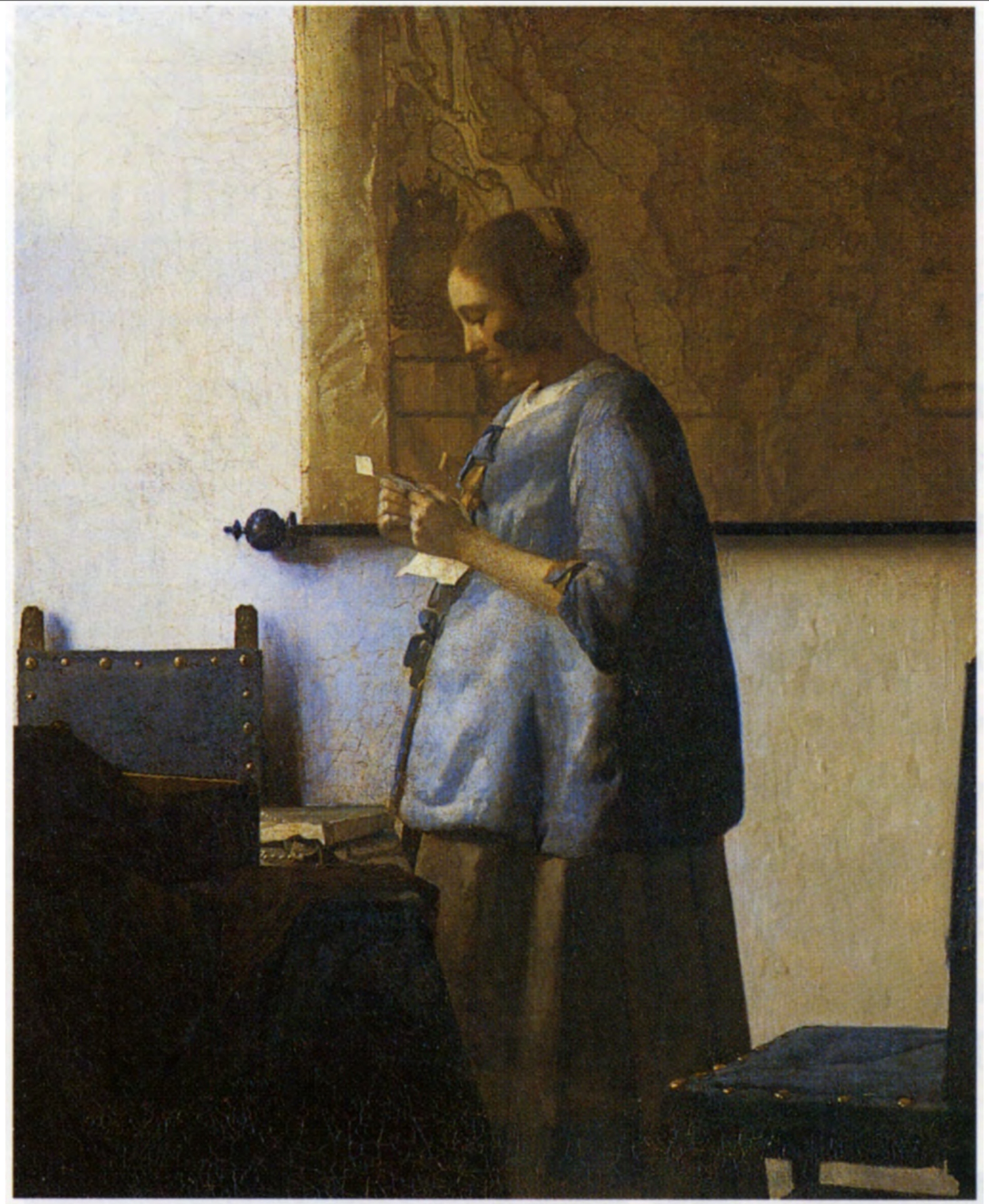
In the most profound centers which have perfect wholeness, there is at the heart a void, which is like water, in infinite depth—surrounded by and contrasted with the clutter of the stuff and fabric all around it.

- 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.



Ghiordes prayer rug

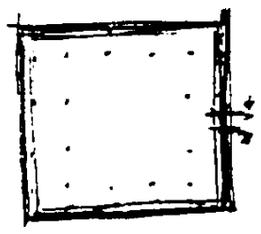


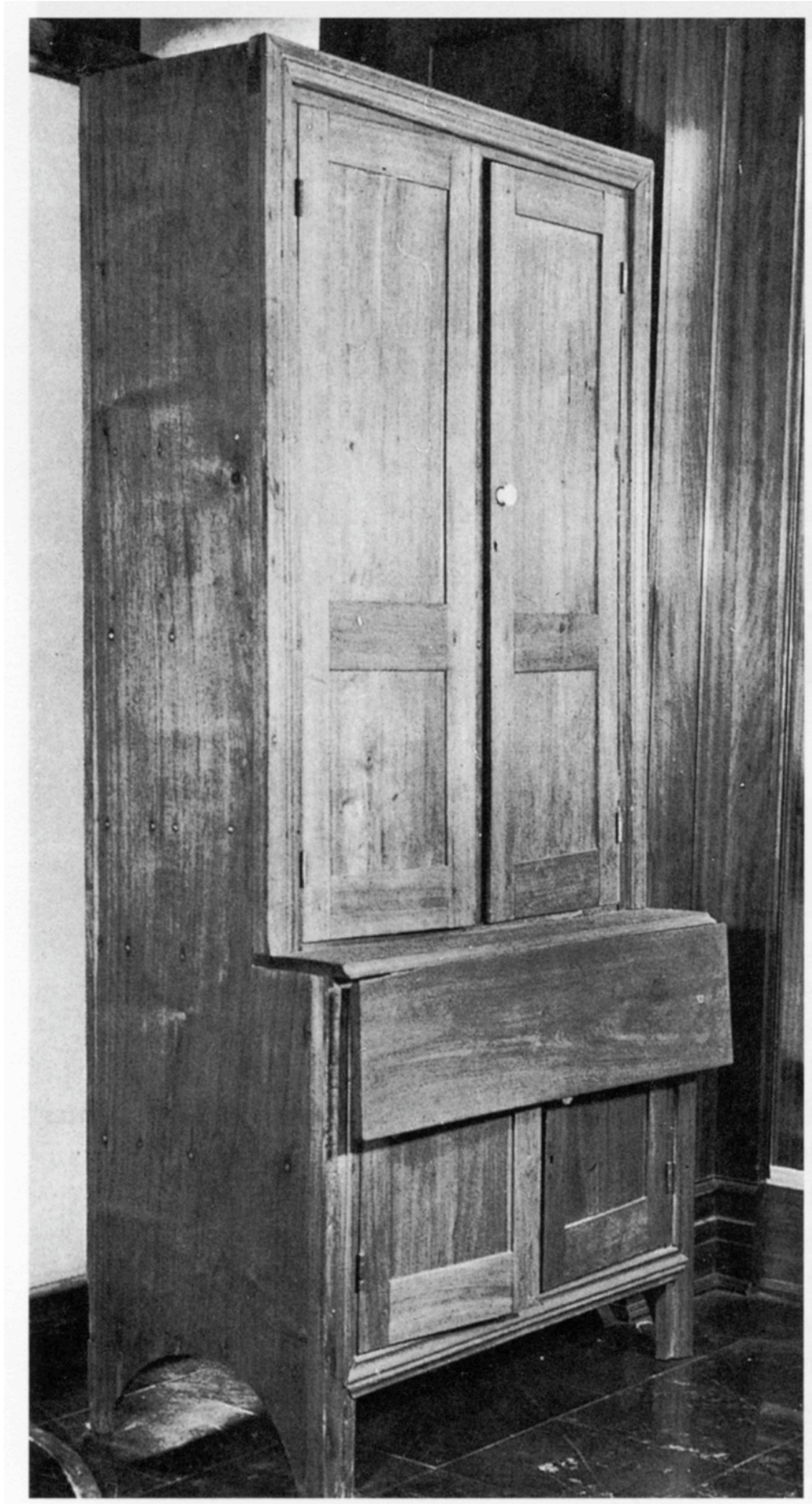
Simplicity and Inner Calm

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

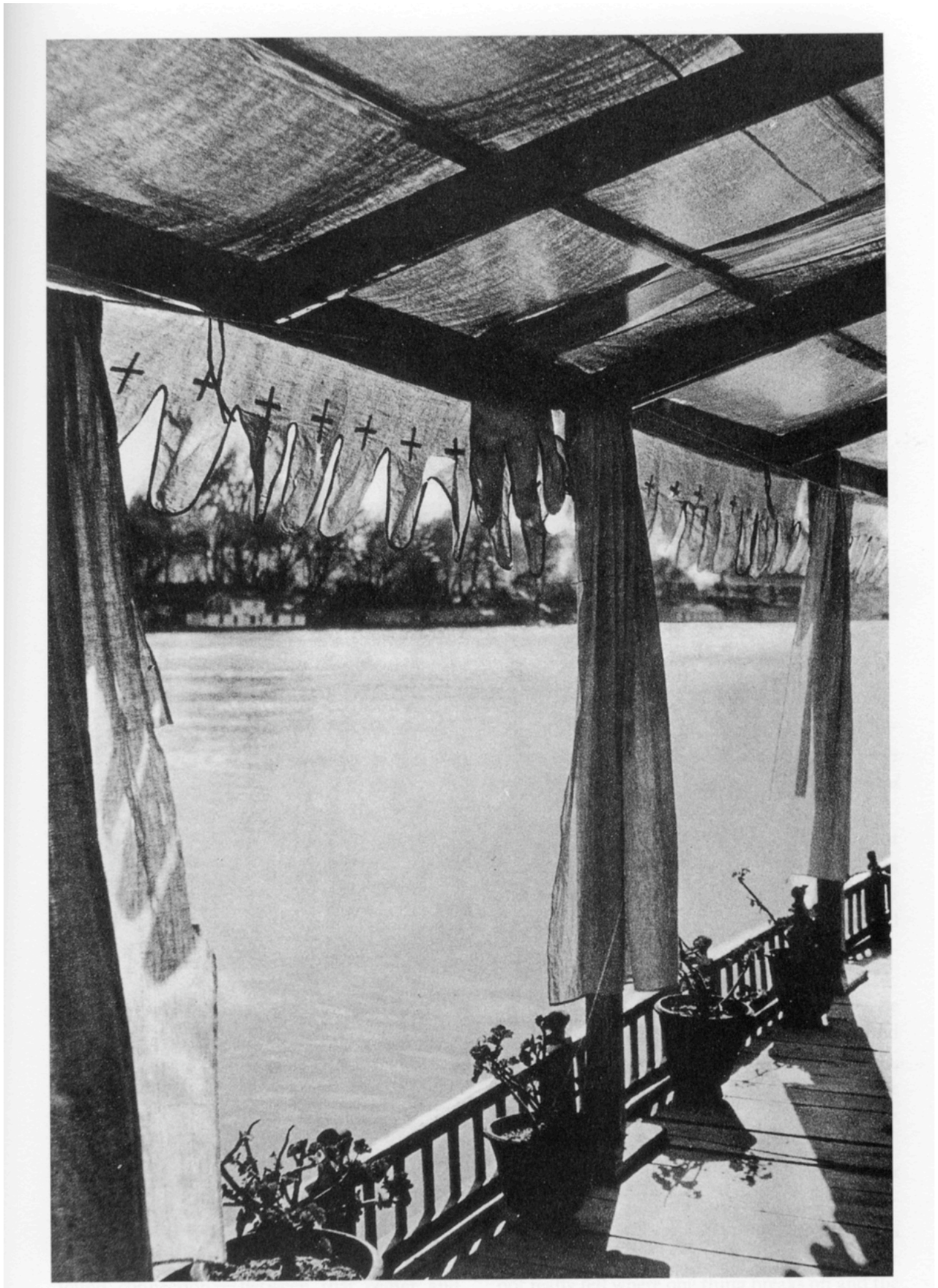
This quality comes about when everything unnecessary is removed. All centers that are note actively supporting other centers are stripped out, cut out, excised. What is left, when boiled away, is the structure in a state of inner calm.

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.





Shaker cabinet: the most beautiful inner calm



Wonderful inner calm: the veranda of a houseboat in Kashmir

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.*

<continued>

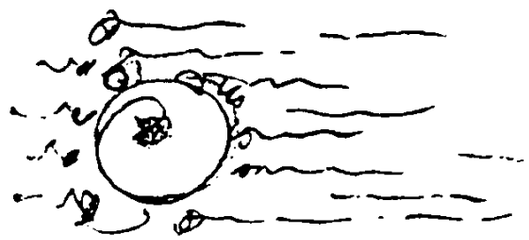
Simplicity and Inner Calm

- *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

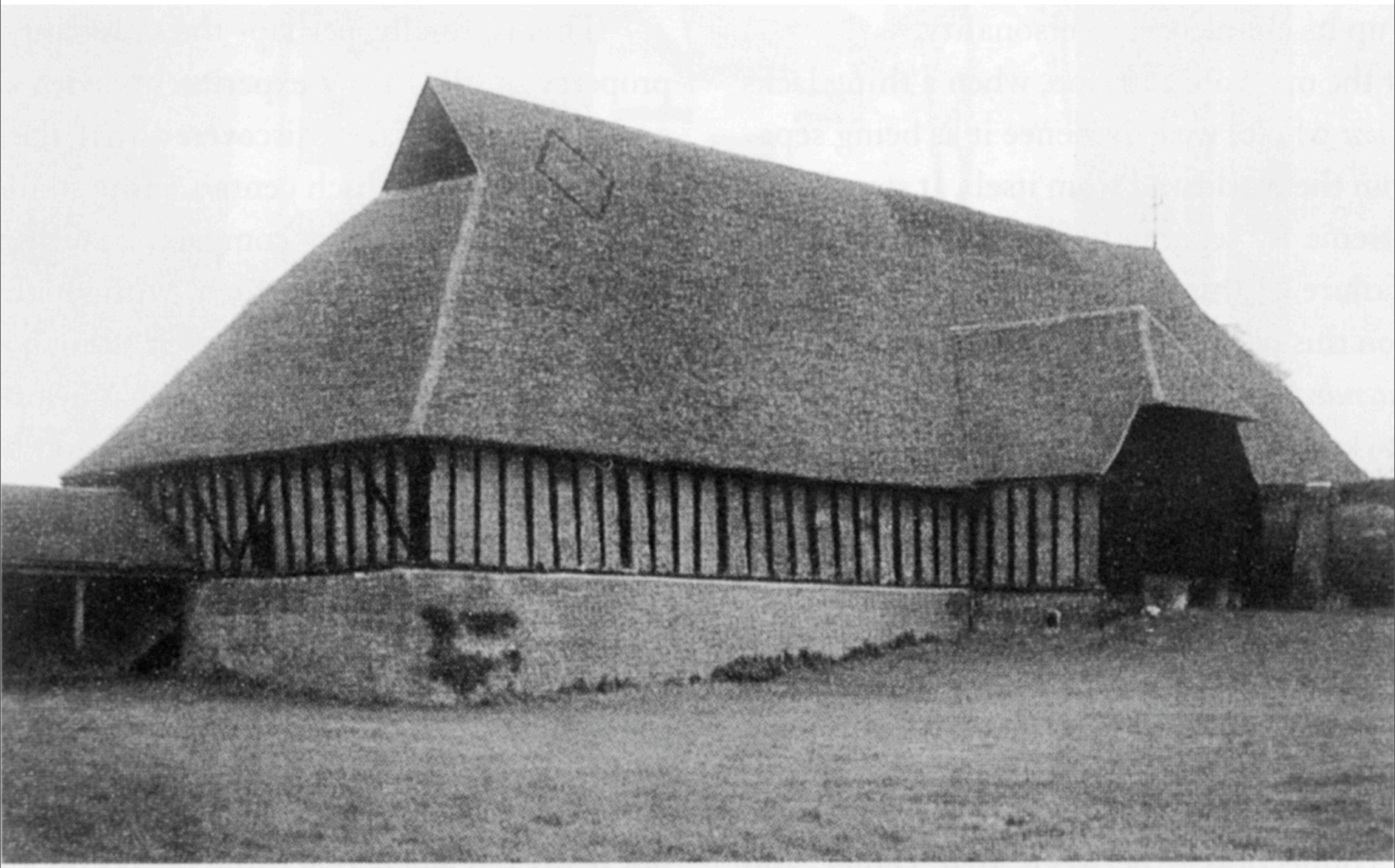
What Not Separateness *means, quite simply, is that we experience a living whole as being at one with the world, and not separate from it—according to its degree of wholeness.*

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."



Not-separateness in By the Sea, a painting by Gauguin

A path which is connected to the earth



Not-separateness in an ancient English wheat barn

The Tower of the Wild Goose, Hunan Province, China, A.D. *600.*

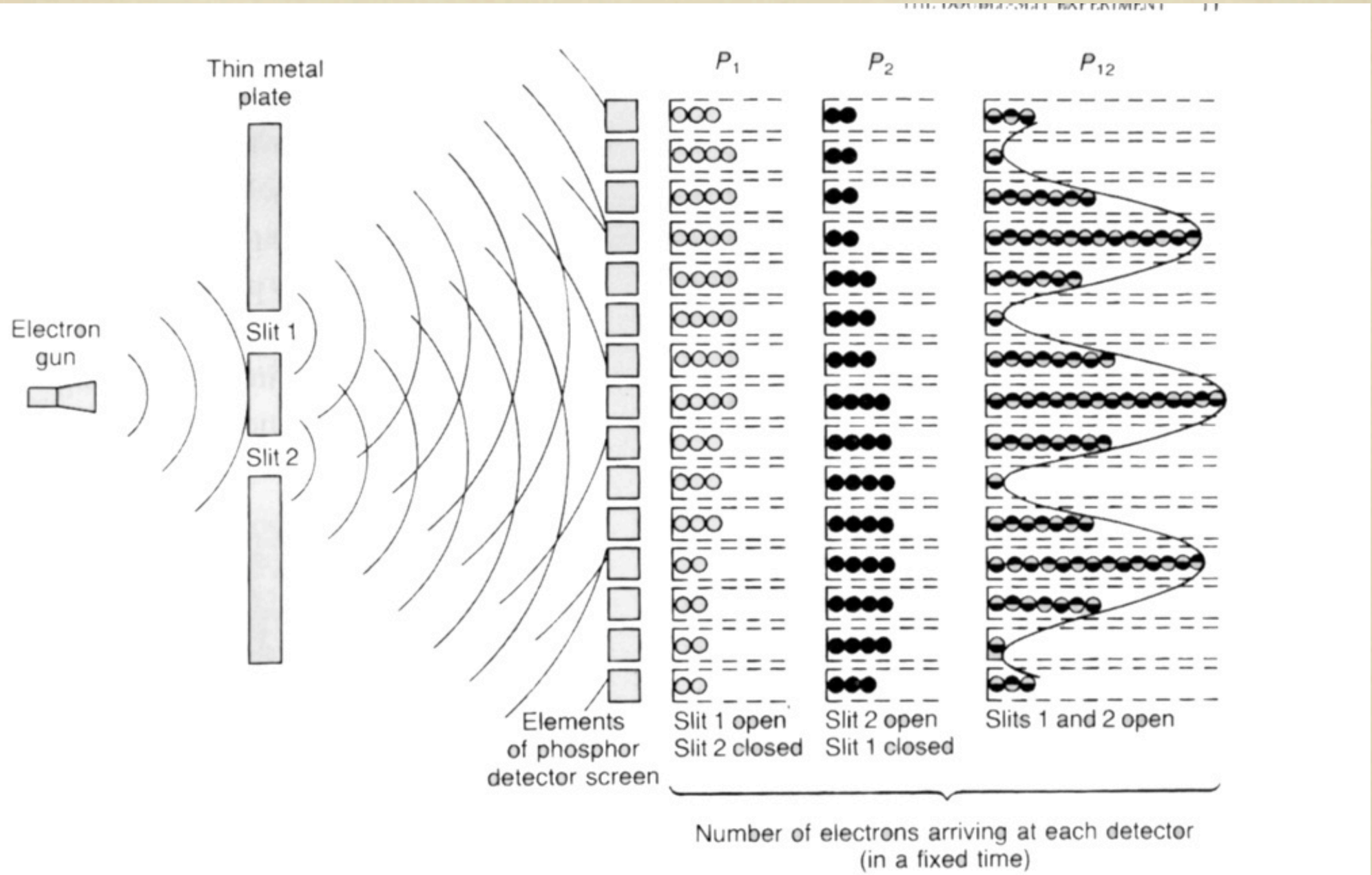
Some Scientific / Philosophical Issues

- life & wholeness versus quantum mechanics

- life & wholeness versus evolutionary biology

- rather than assuming inert space & matter and trying to understand life, the mind, and consciousness, CA posits life as the fundamental stuff and tries to understand space and matter from there

Double Slit Experiment

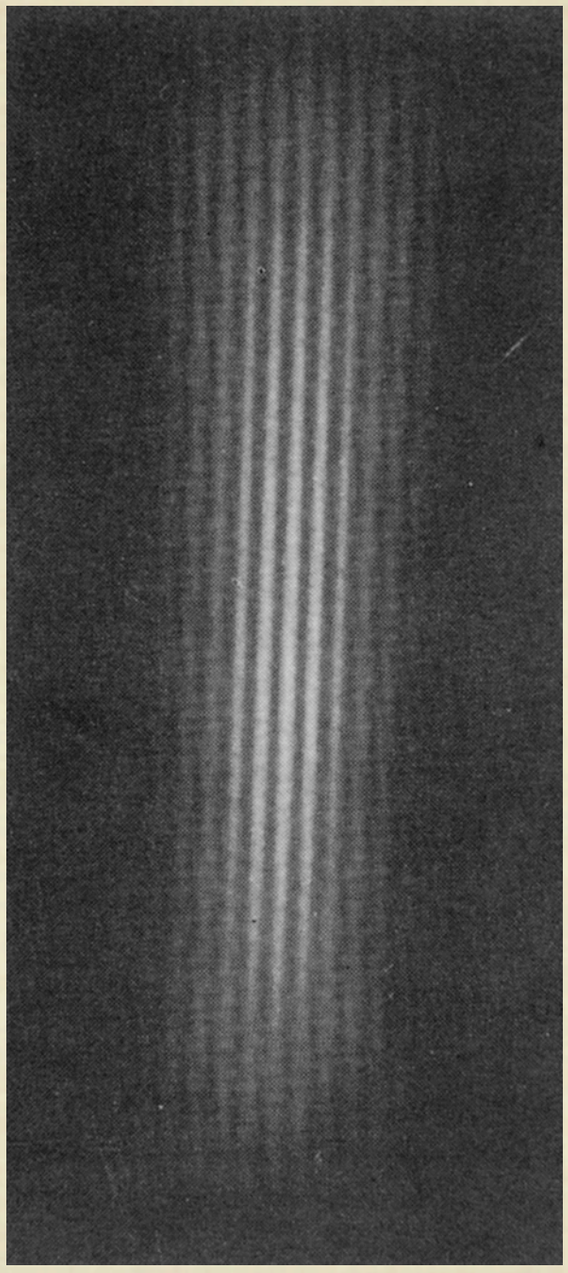


P_1 and P_2 show the distributions that arrive on the wall when slit 1 and slit 2 are open by themselves. P_{12} shows the distribution that arrives on the wall when both slits are open together.

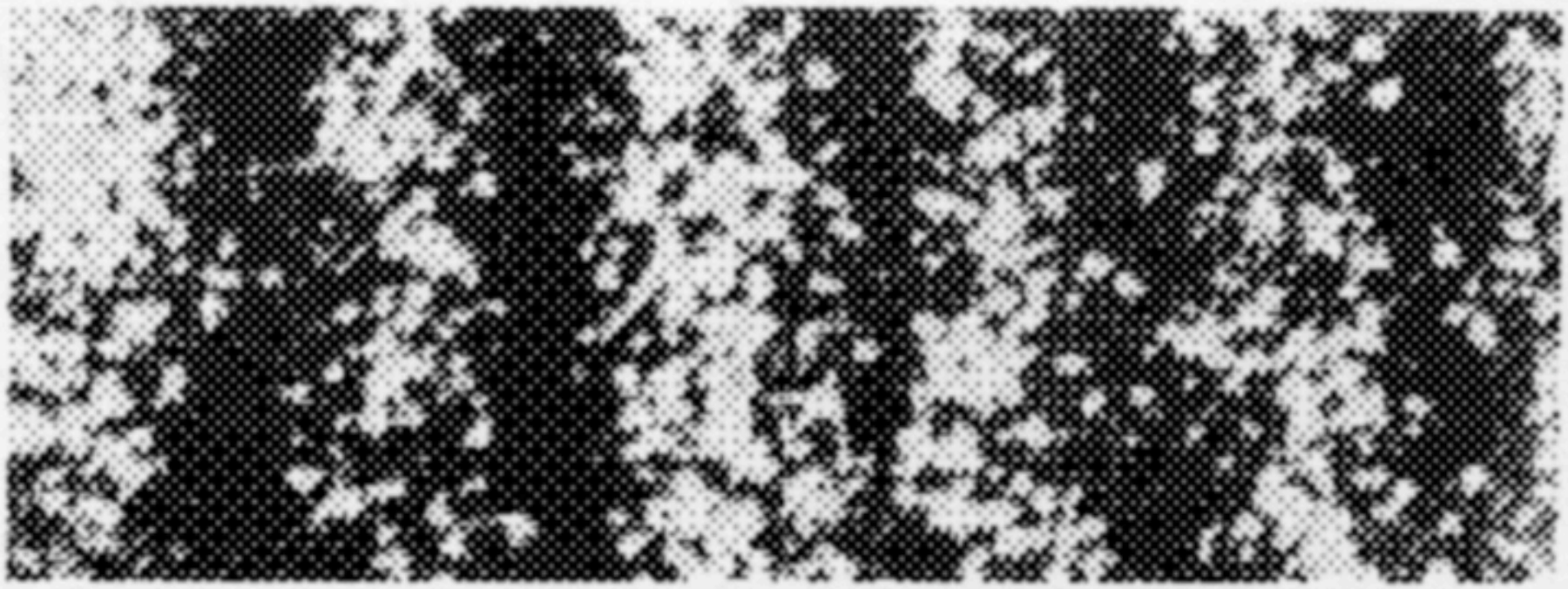
- The mechanism sends electrons essentially one at a time through the slit(s)

- When only 1 slit is open, the pattern looks like a normal distribution skewed in the obvious direction

- When both are open, the pattern looks like wave interference, but the electrons are going through too infrequently for that



Pattern looks like this (on photographic emulsion)



Enlargement of the interference fringes shows individual dots of light made by individual electrons, thus showing that electrons go one at a time, like bullets. Yet the interference fringes are caused by wave berhavior. It is this crucial point which shows that the electrons must be moving under the influence of some guiding wholeness of the configuration.

Mathematics is clear, but...

My physics students don't understand it either. That is because I don't understand it. Nobody does .... The theory of quantum electrodynamics describes Nature as absurd from the point of view of common sense. And it agrees fully with experiment. So I hope you can accept Nature as she is—absurd. In short, there is no way to visualize what is going on. The theory of quantum mechanics explains it perfectly, to unbelievable mathematical accuracy. And that is all you need to know.

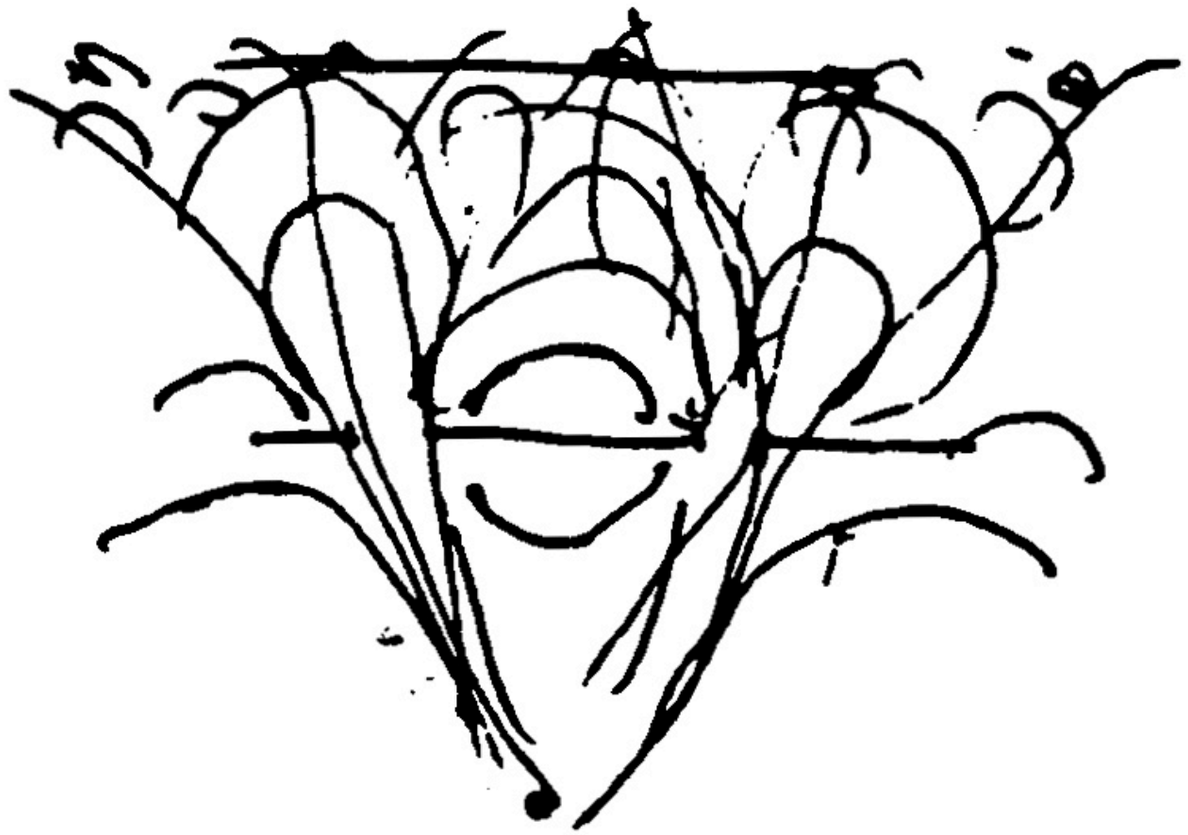
—Richard Feynman

Alexander explains it thus

We may assume that the electron's behavior is directly influenced by the wholeness of the experimental configuration. *To make this explanation work, we must assume that the electron "wants" to go in harmony with the wholeness. That is, the electron somehow sees the wholeness as a real structure and behaves accordingly.*

The wholeness of the one-slit experiment

centers
skewed to
the left



The wholeness of the two-slit experiment

centers forming an
alternating
repetition pattern

Evolutionary explanation for long sequences

- Are Dawkins's and Gould's explanations for the incremental development of the first feathered wing convincing?

- How about the complicated squirt gun mechanism of the bombardier beetle?

Does a half-formed squirt gun work at all, or there a pattern-like tendency which makes transformations toward coherent patterns (based on the 15 properties) which then tend to produce coherent mechanisms for geometric reasons—and the selective pressure then finds a use for these beautiful and coherent mechanisms to gain advantages.

According to this view, the evolving system of the genetic material ITSELF *causes evolution to follow certain pathways, not only because of selective pressure from outside, but also by virtue of its own internal dynamical ordering tendencies. The results of evolution are then to be understood [as being] mainly formed not by Darwinian selective pressure acting from outside, but by pressures created by the geometry and dynamics of the evolving genetic system itself.*

Whitehead & Bifurcation

There are...two worlds in our minds. One is the scientific world which has been pictured through a highly complex system of mechanisms. The other is the world we actually experience. These two worlds, so far, have not been connected in a meaningful fashion. Alfred North Whitehead, writing about 1920, was one of the first philosophers to draw attention to this modern problem, which he called the bifurcation of nature.

Whitehead believed that we will not have a proper grasp of the universe and our place in it, until the self, which we experience in ourselves, and the machinelike character of matter we see outside ourselves can be united in a single picture.

Mirror of the Self

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?*

Which of these is more like your own self? Which of the two objects seems like a better picture of all of you, the whole of you: a picture that shows you as you are, with all your hopes, fears, weaknesses, glory, and absurdity, and which—as far as possible—includes everything that you could ever hope to be.

In other words, which comes closer to being a true picture of you in all your weakness and humanity; of the love in you, and the hate; of your youth and your age; of the good in you, and the bad; of your past, your present, and your future; of your dreams and what you hope to be, as well as what you are.

80%

Ordinary salt shaker

Ordinary ketchup bottle

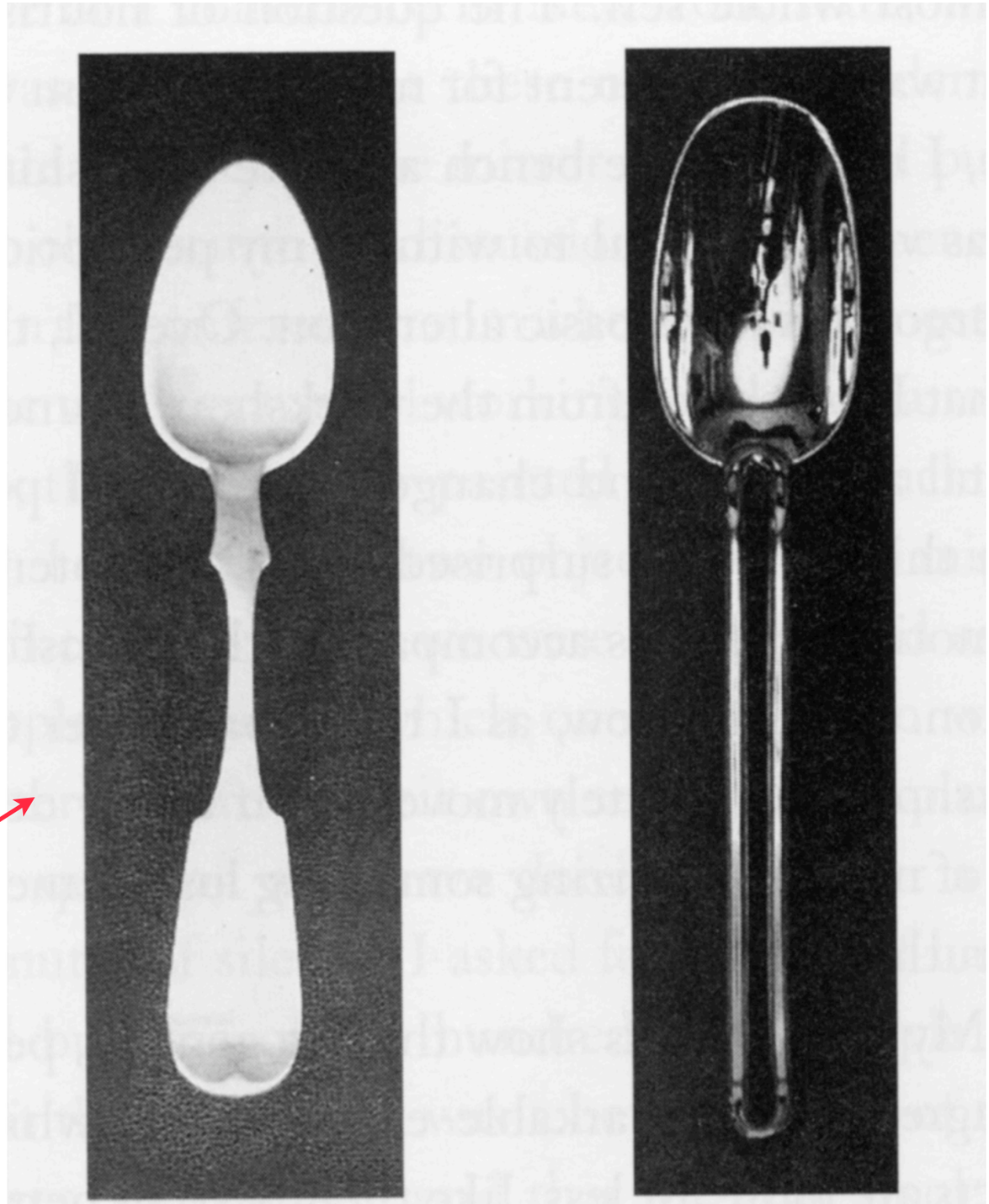
At a conference in NY in 1985,
CA uses two at-hand objects

99% (99 people of 100)

2 weeks later, the 1 comes around

Which of these two things do I prefer
to become by the day of my death?

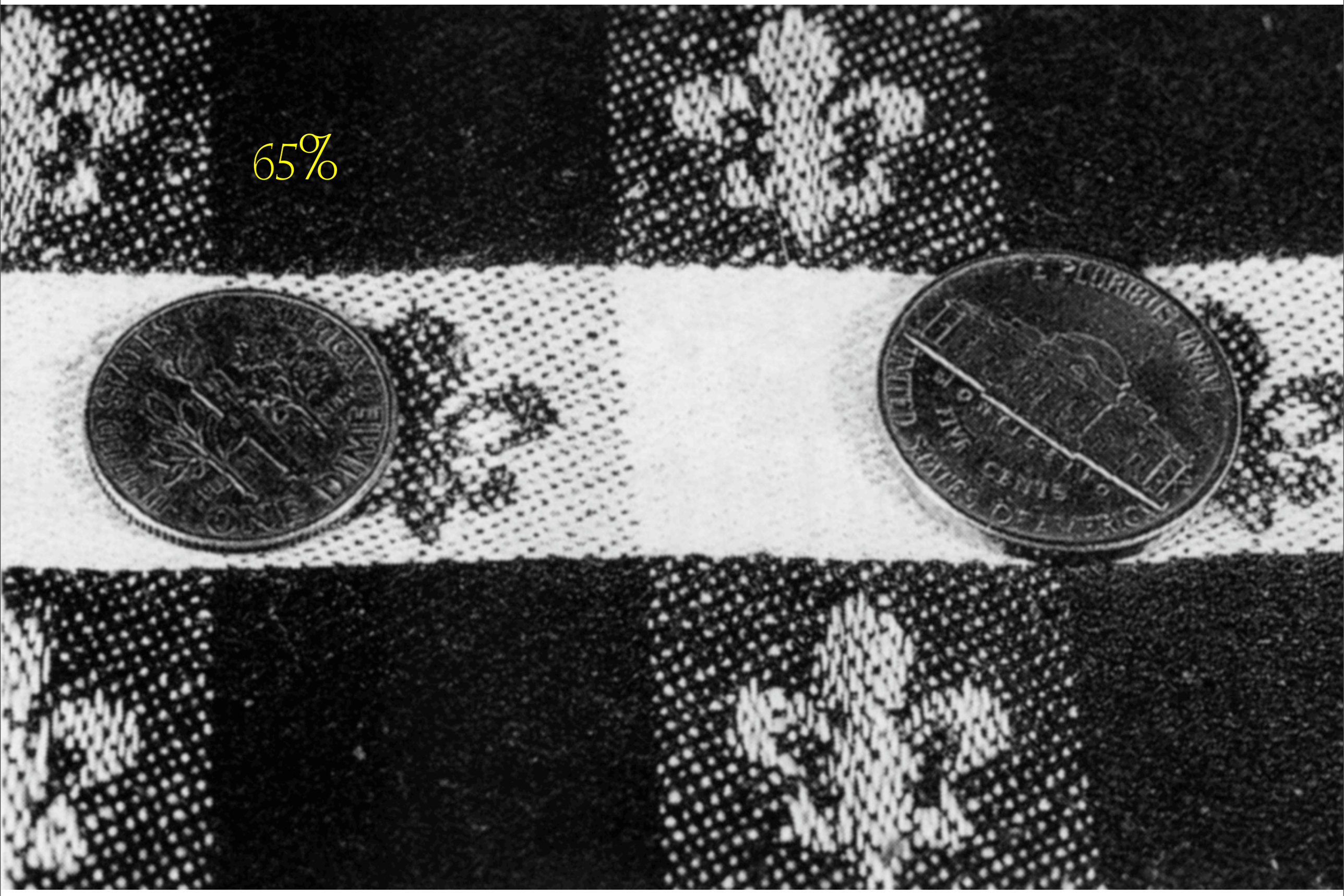
If I were to be reincarnated, which of these
two would I prefer to come back as?

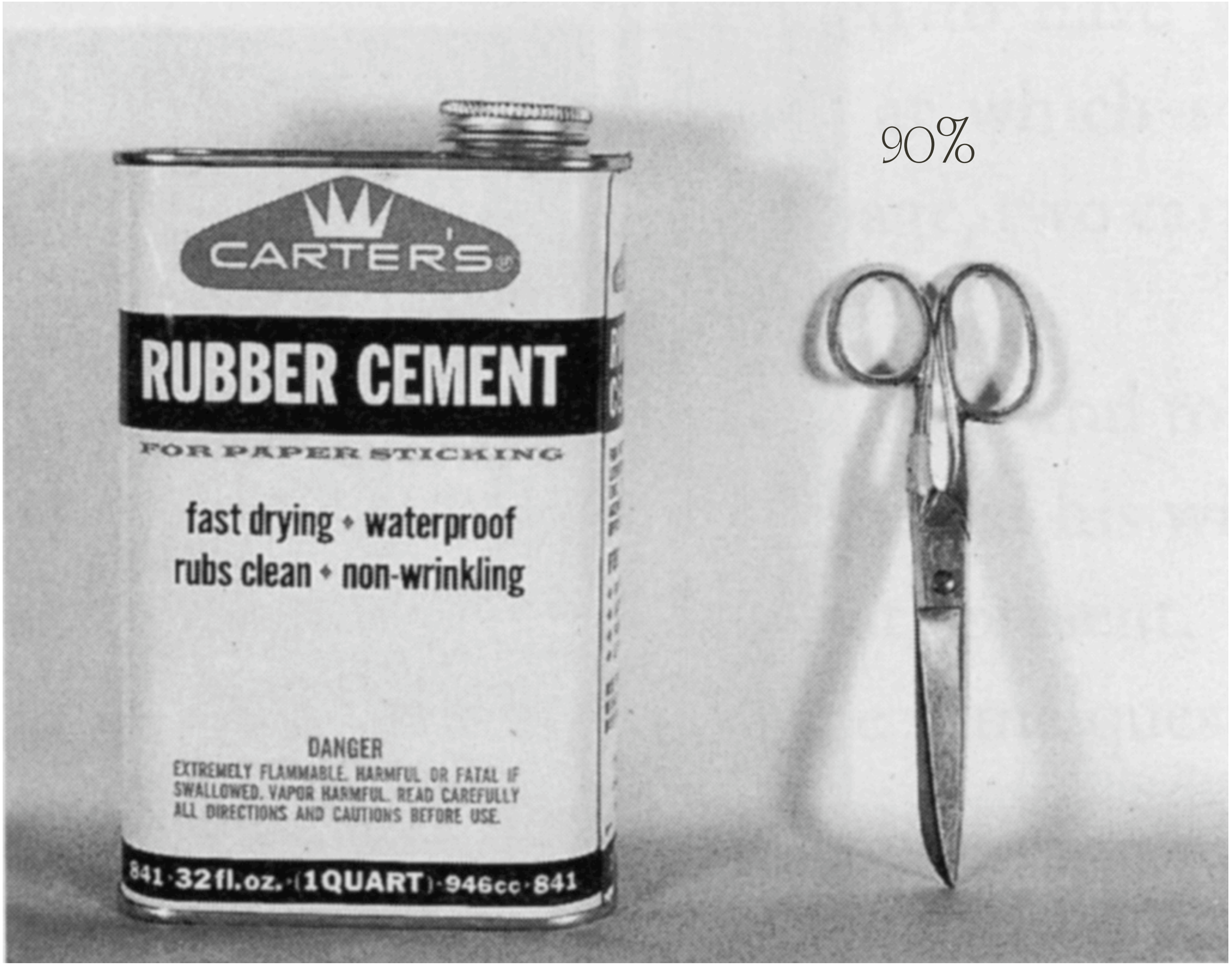


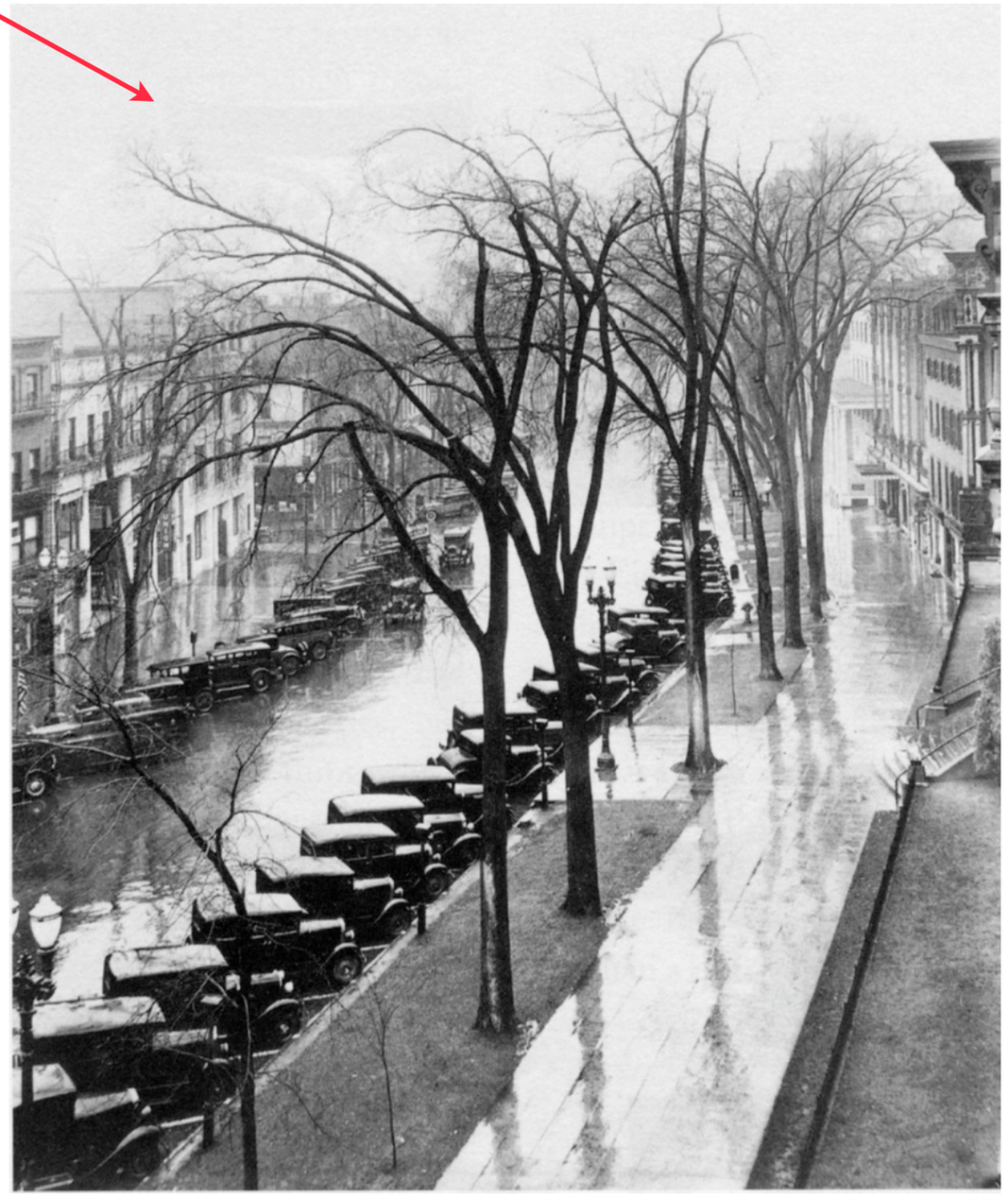
Two spoons

88%

65%



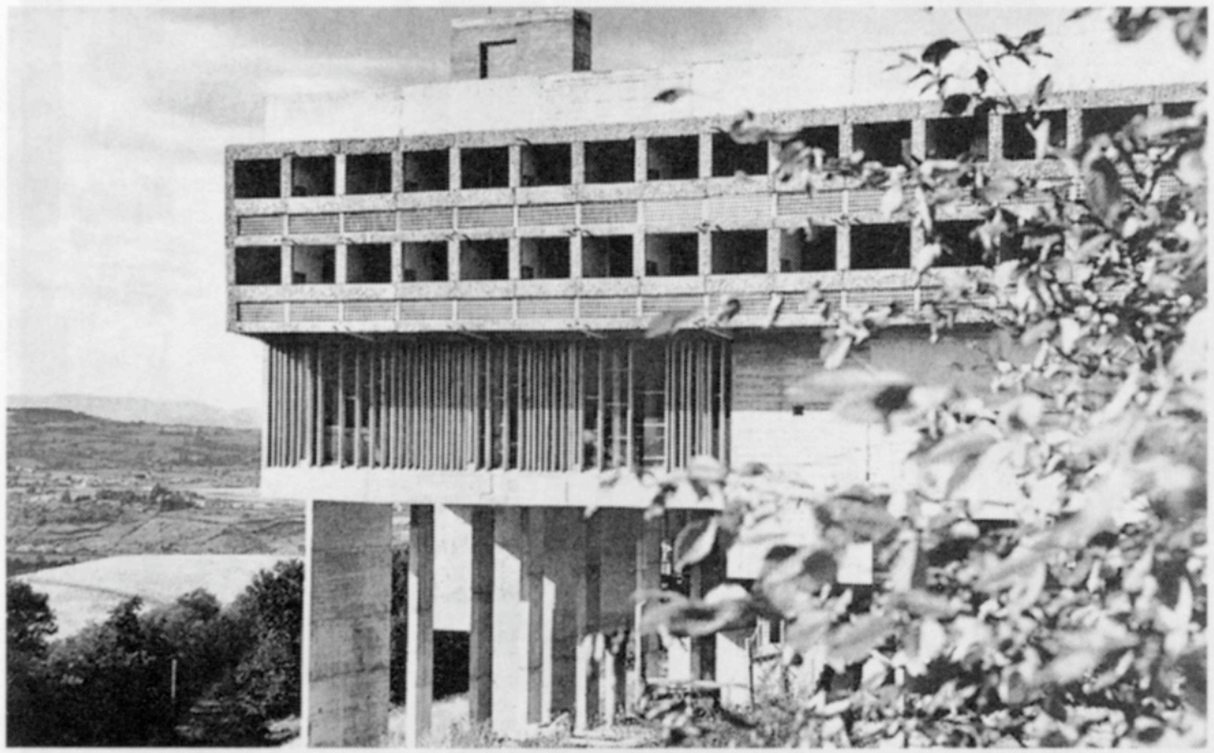

CARTER'S
RUBBER CEMENT
FOR PAPER STICKING
fast drying • waterproof
rubs clean • non-wrinkling
DANGER
EXTREMELY FLAMMABLE. HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. READ CAREFULLY ALL DIRECTIONS AND CAUTIONS BEFORE USE.
841·32fl.oz.·(1QUART)·946cc·841
90%



but this is
good, too

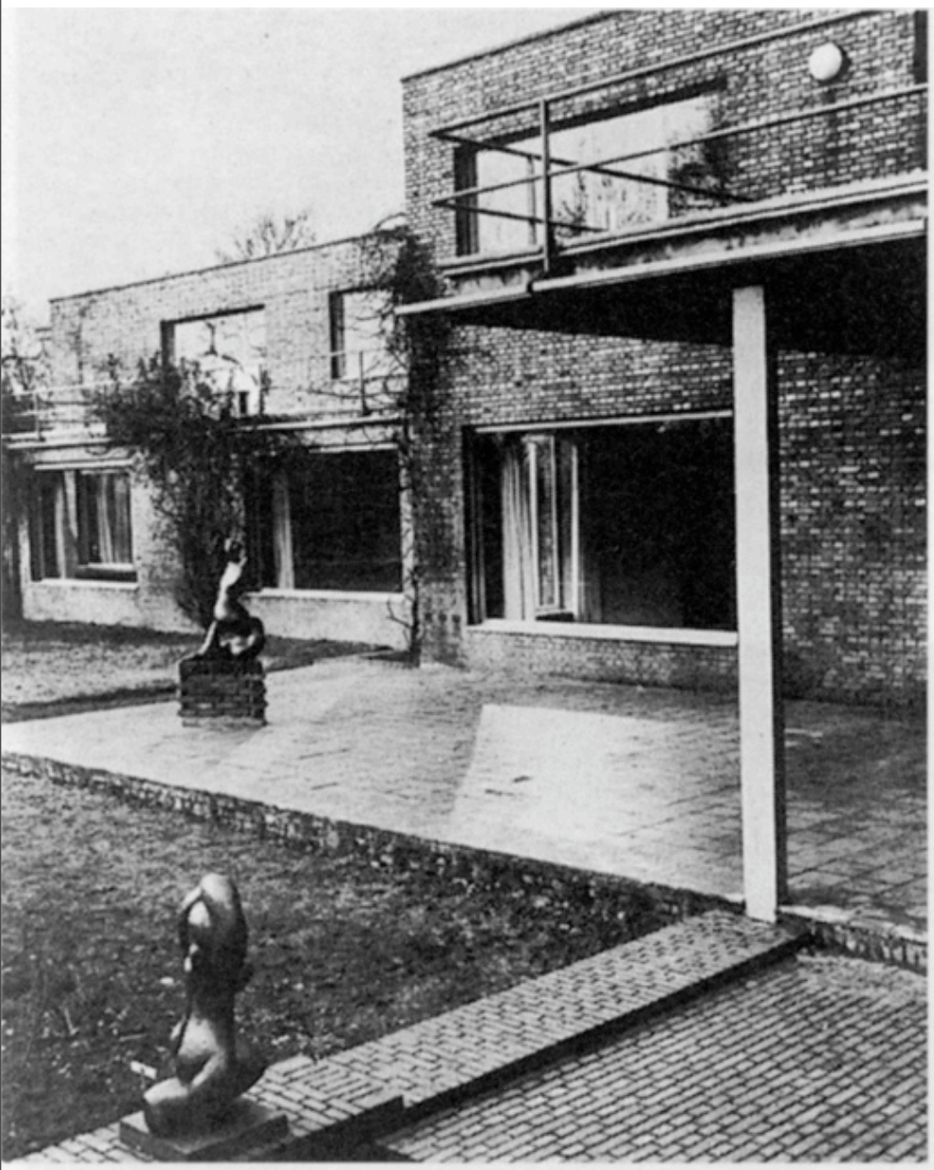
Ersari prayer rug. This one Bill liked less; but he said that it was more like his self.

Daghestan prayer rug. This one Bill liked more, but he said that it was less like his self.

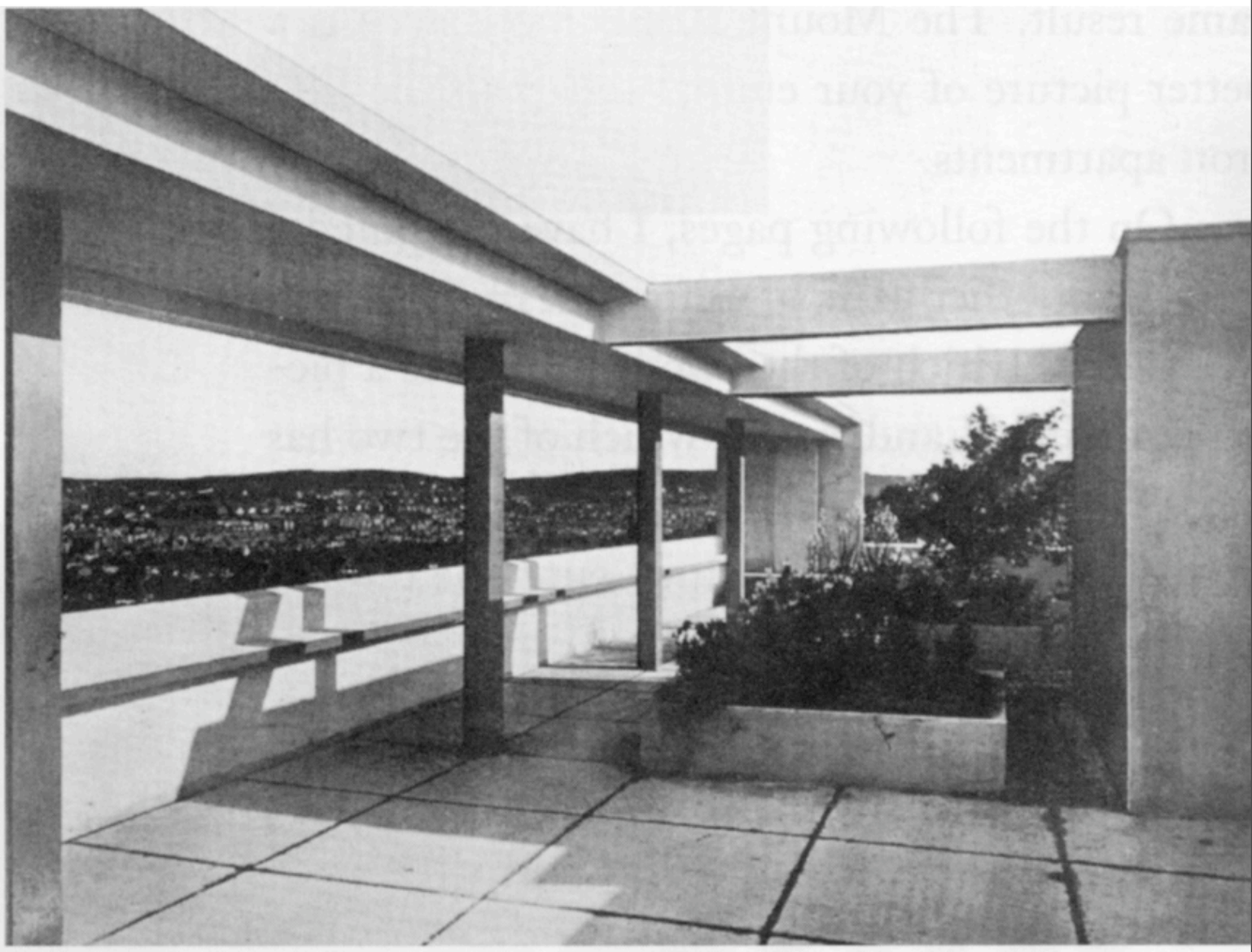


Le Corbusier

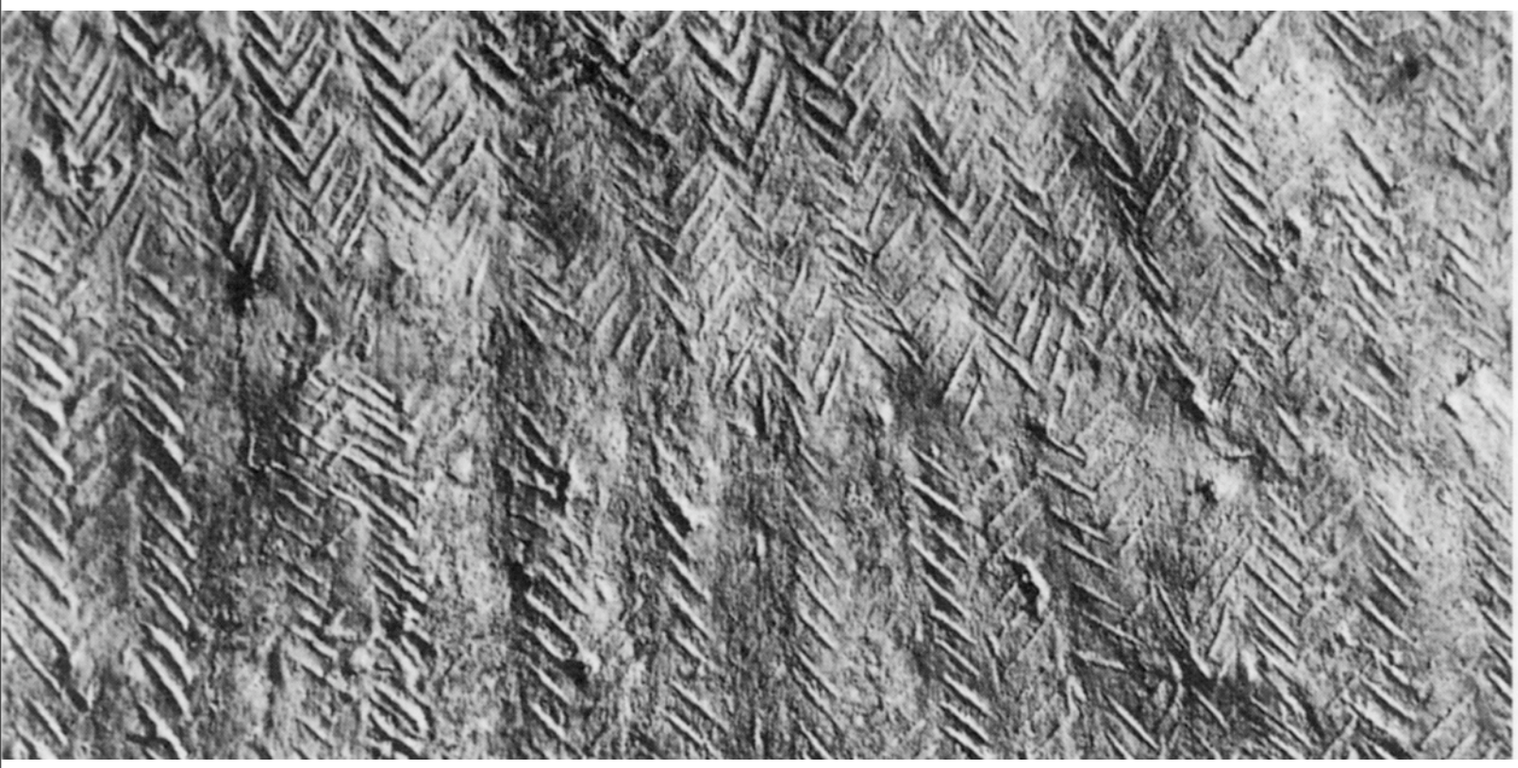
Mies van der Rohe

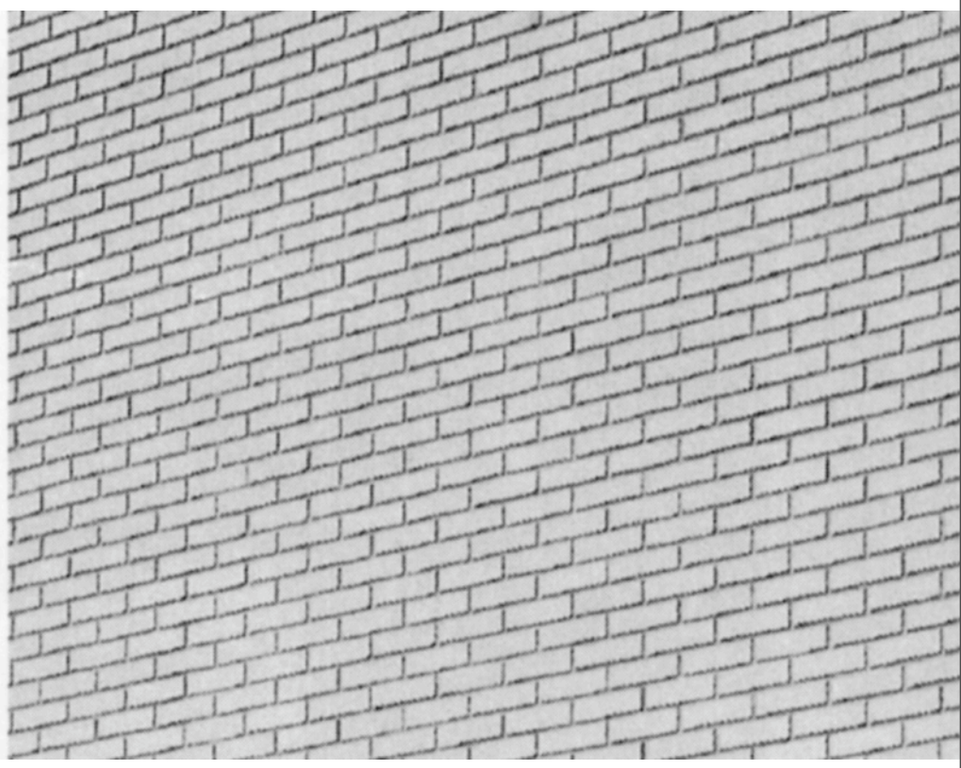


Mies van der Rohe



Le Corbusier



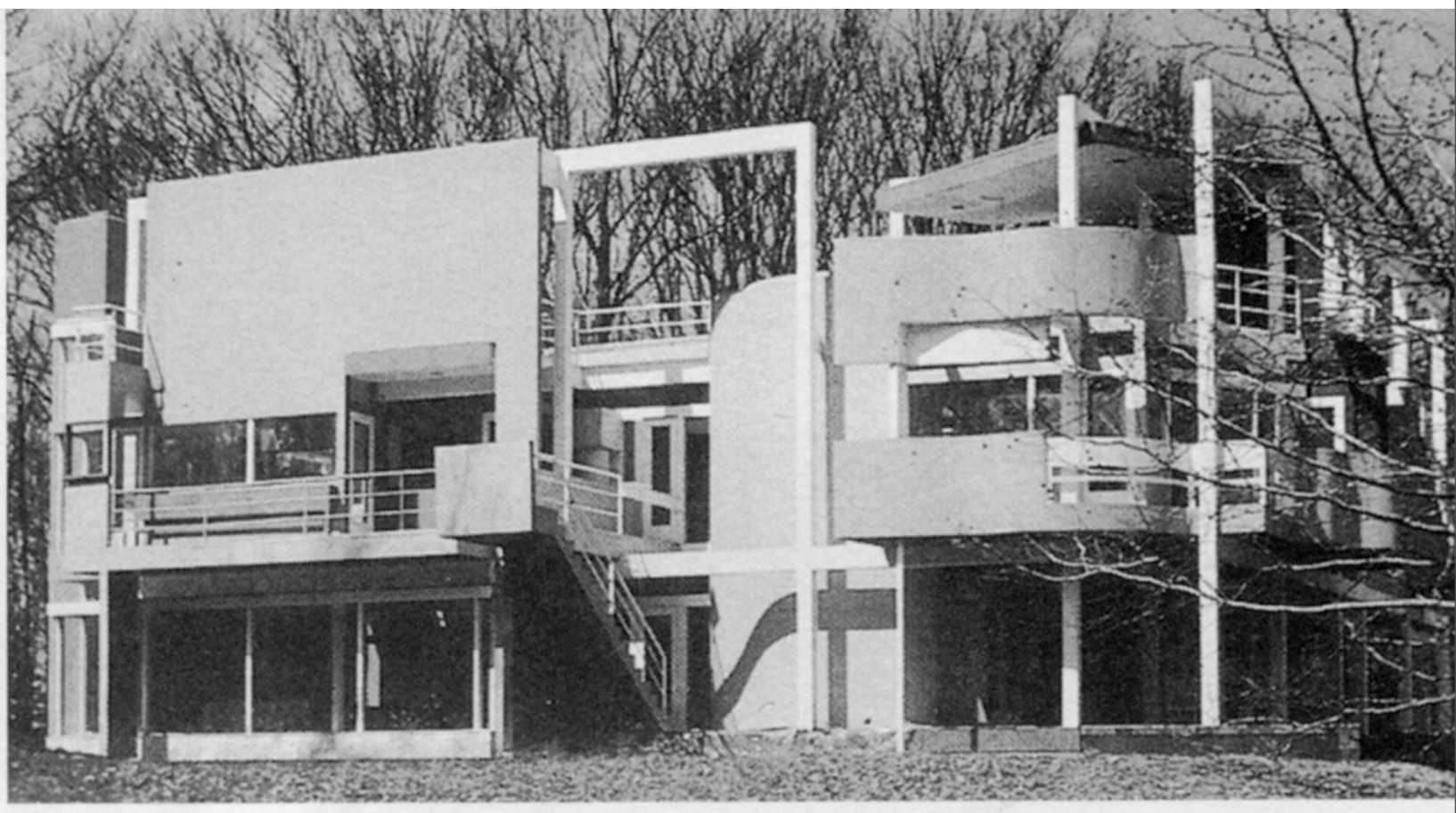


A corner building: San Francisco, Flatiron

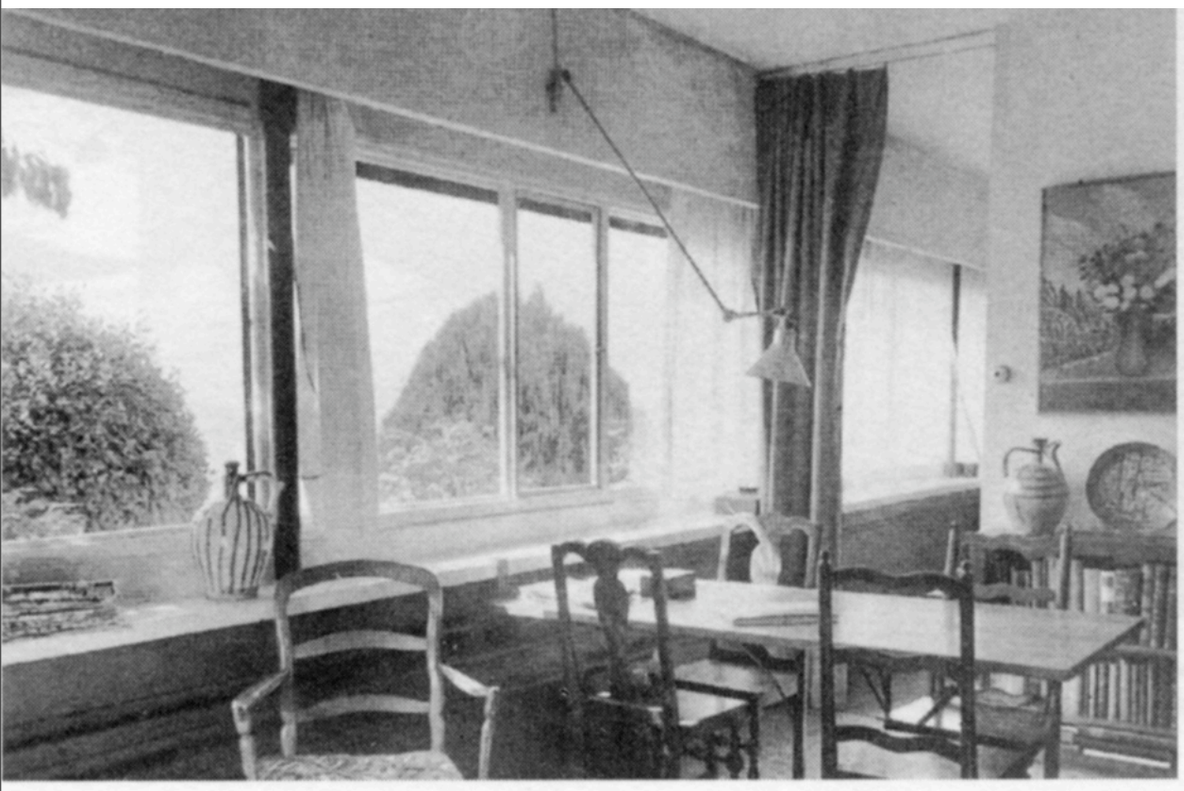
A corner building: school in Barcelona

more life ≠ beautiful

Postmodern building

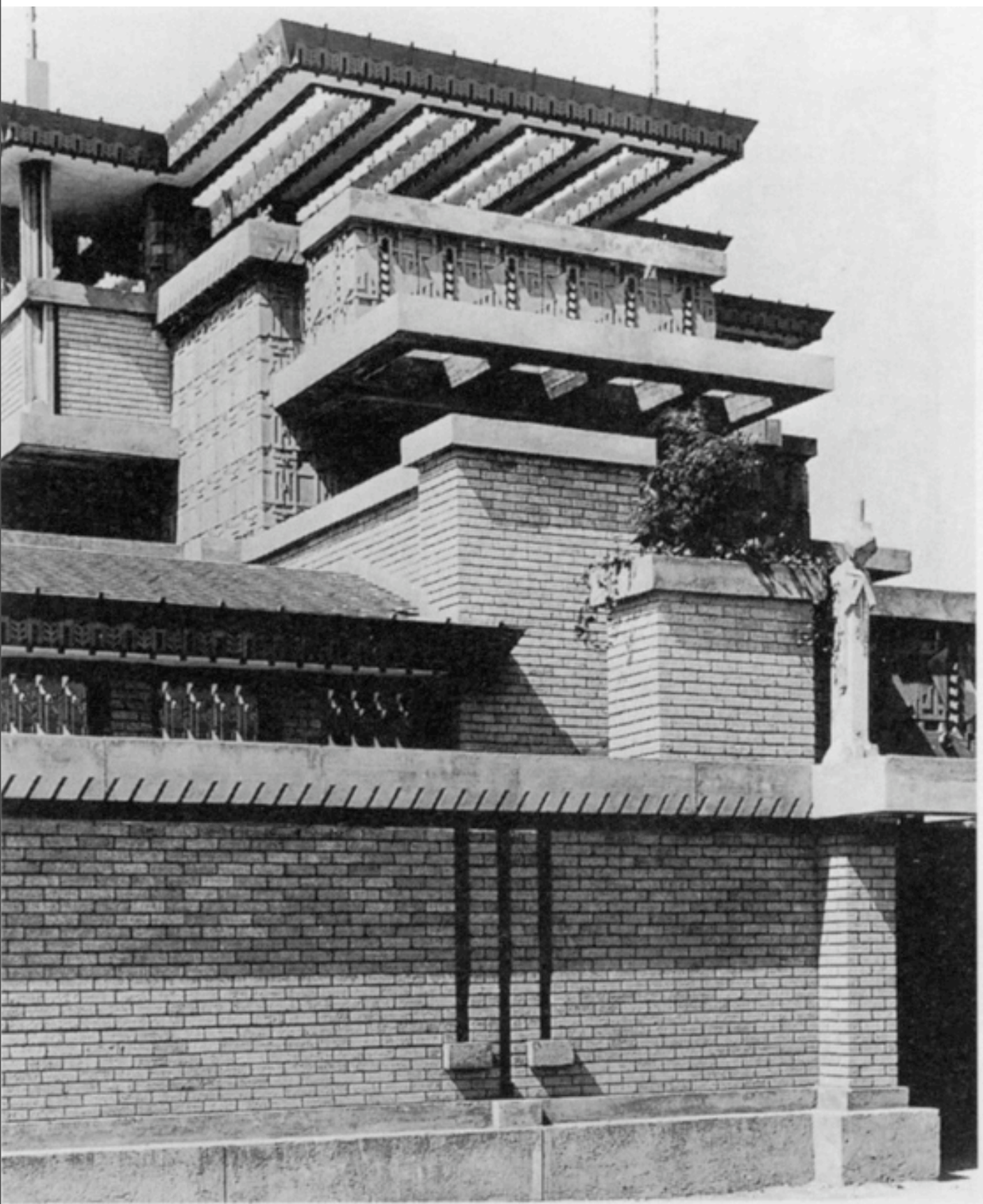


Postmodern building

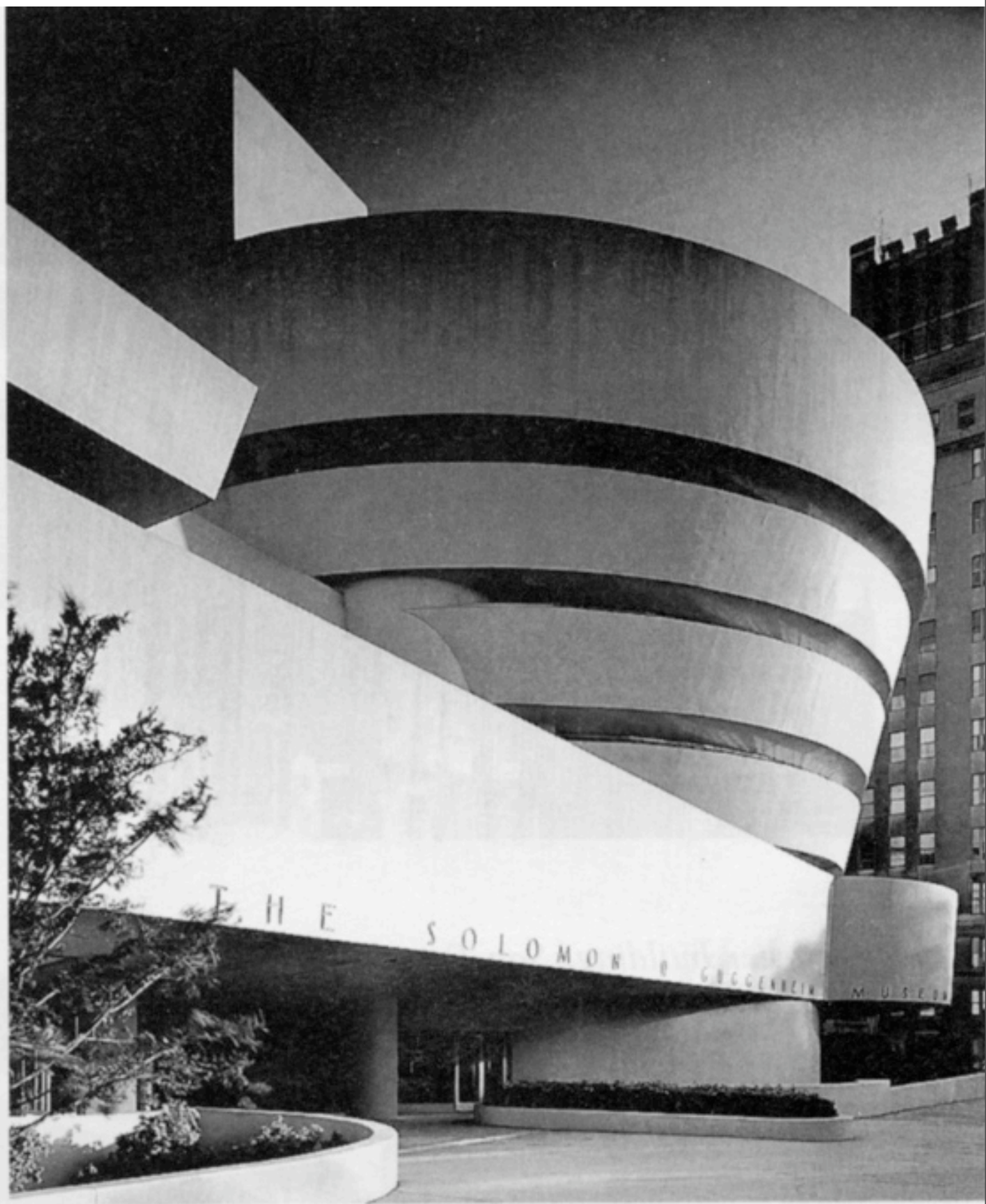


Room by Le Corbusier

Room by Le Corbusier



Building by Frank Lloyd Wright



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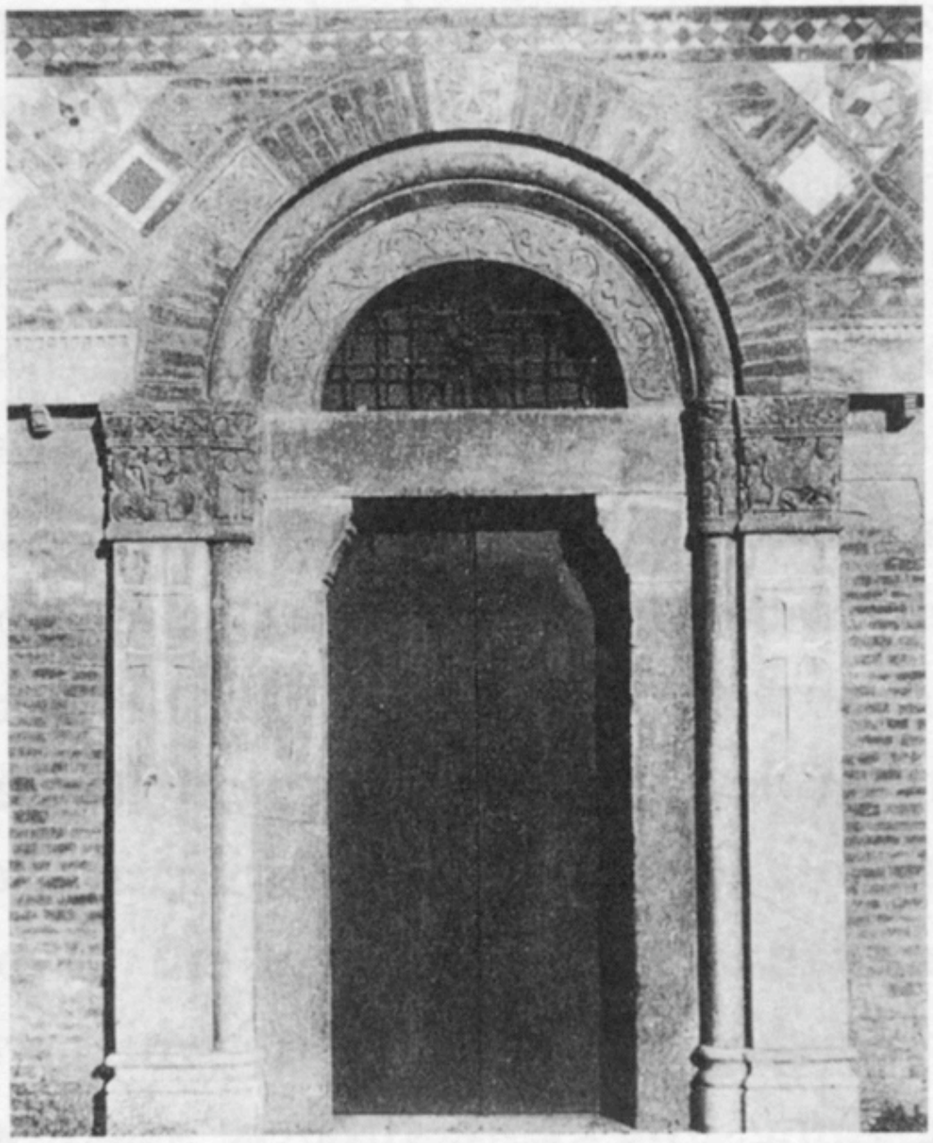
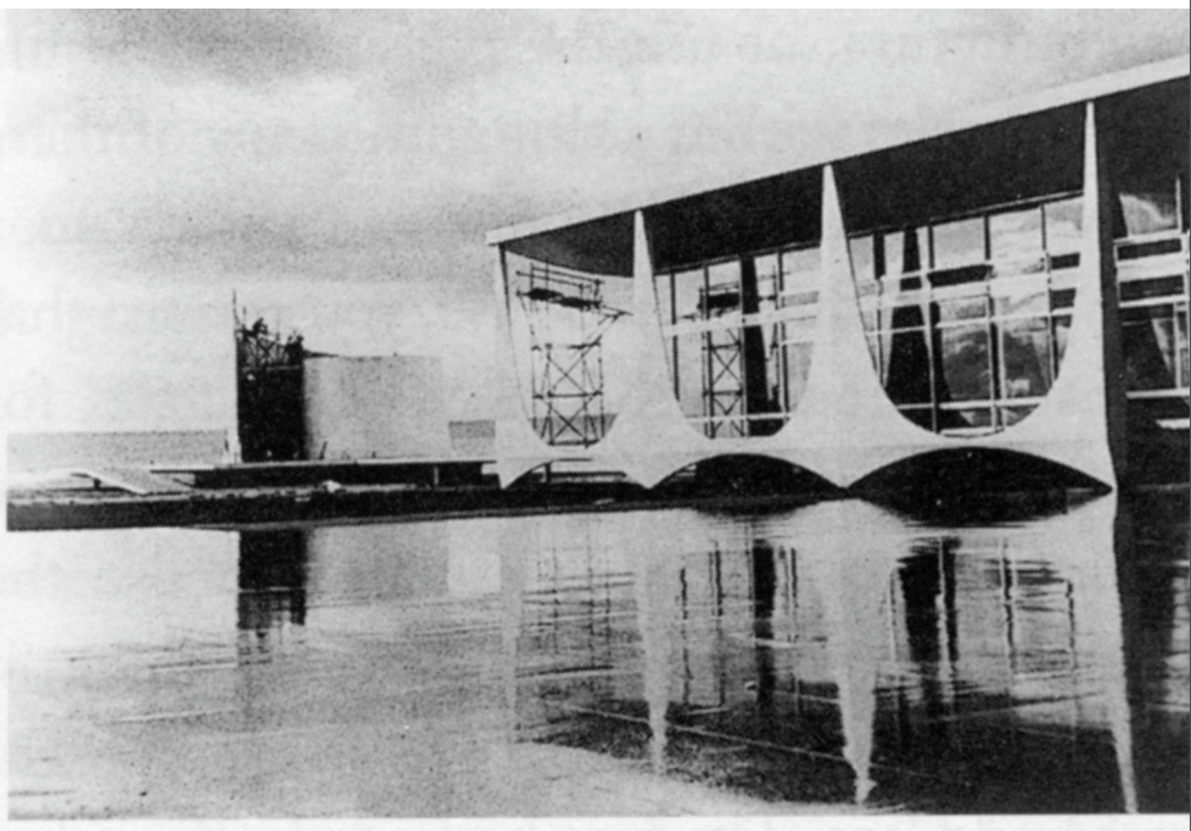


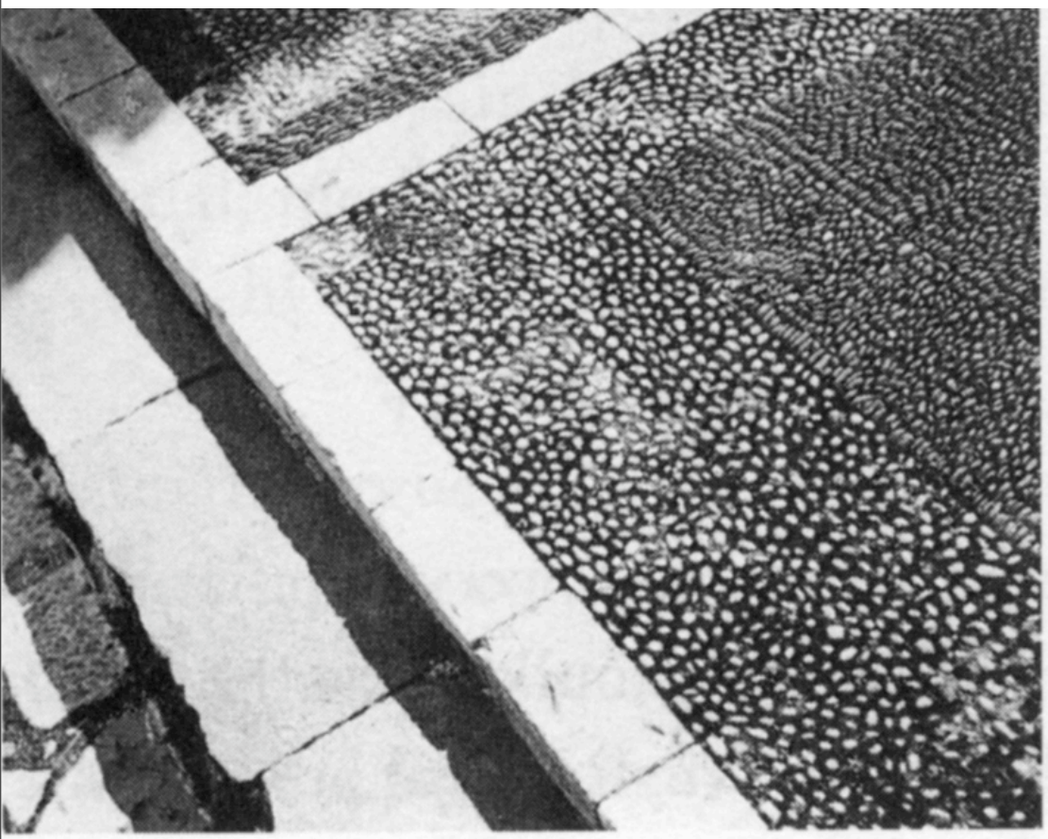
Romanesque arch, slightly more profound

Romanesque arch, slightly more obvious, less profound

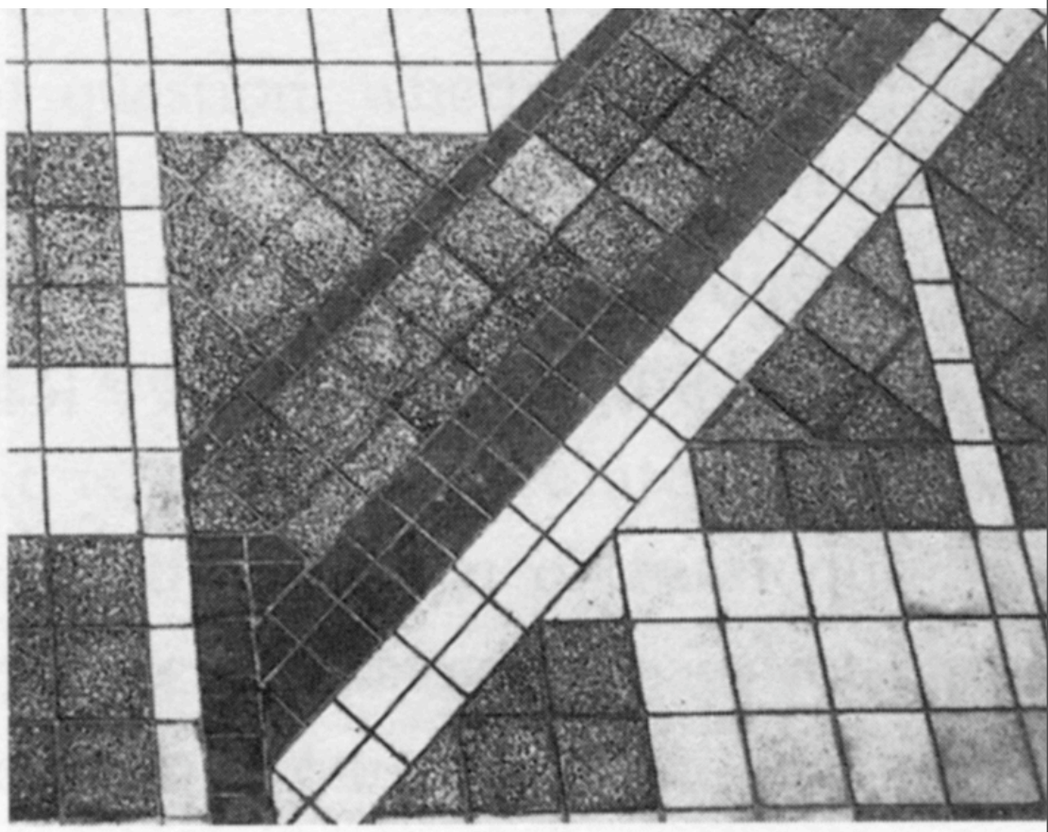
Department store, London



Capital building, Brasilia



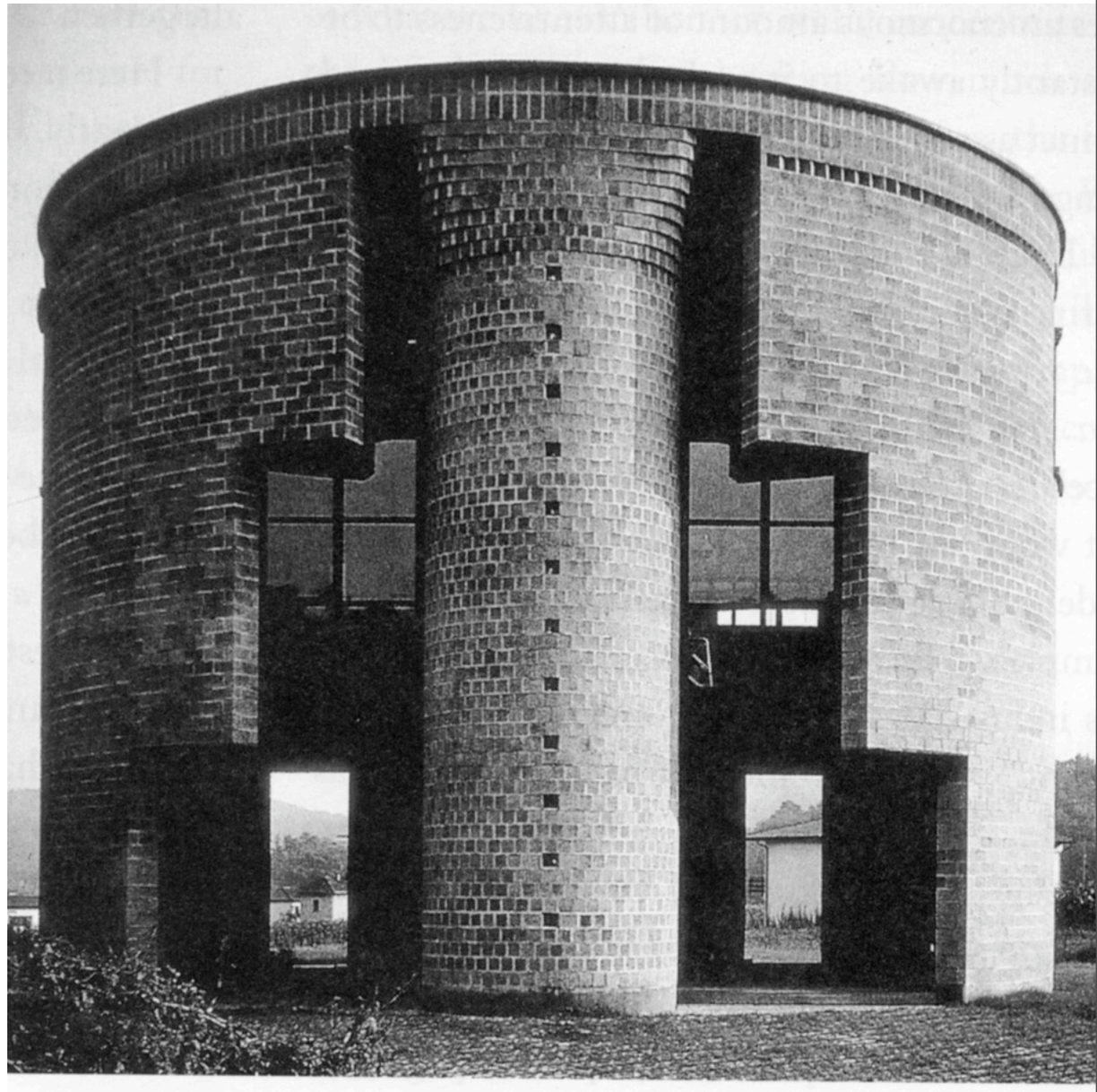
Paving which is a picture of your self



Paving with no meaning

Swedish traditional house with grass turf roof

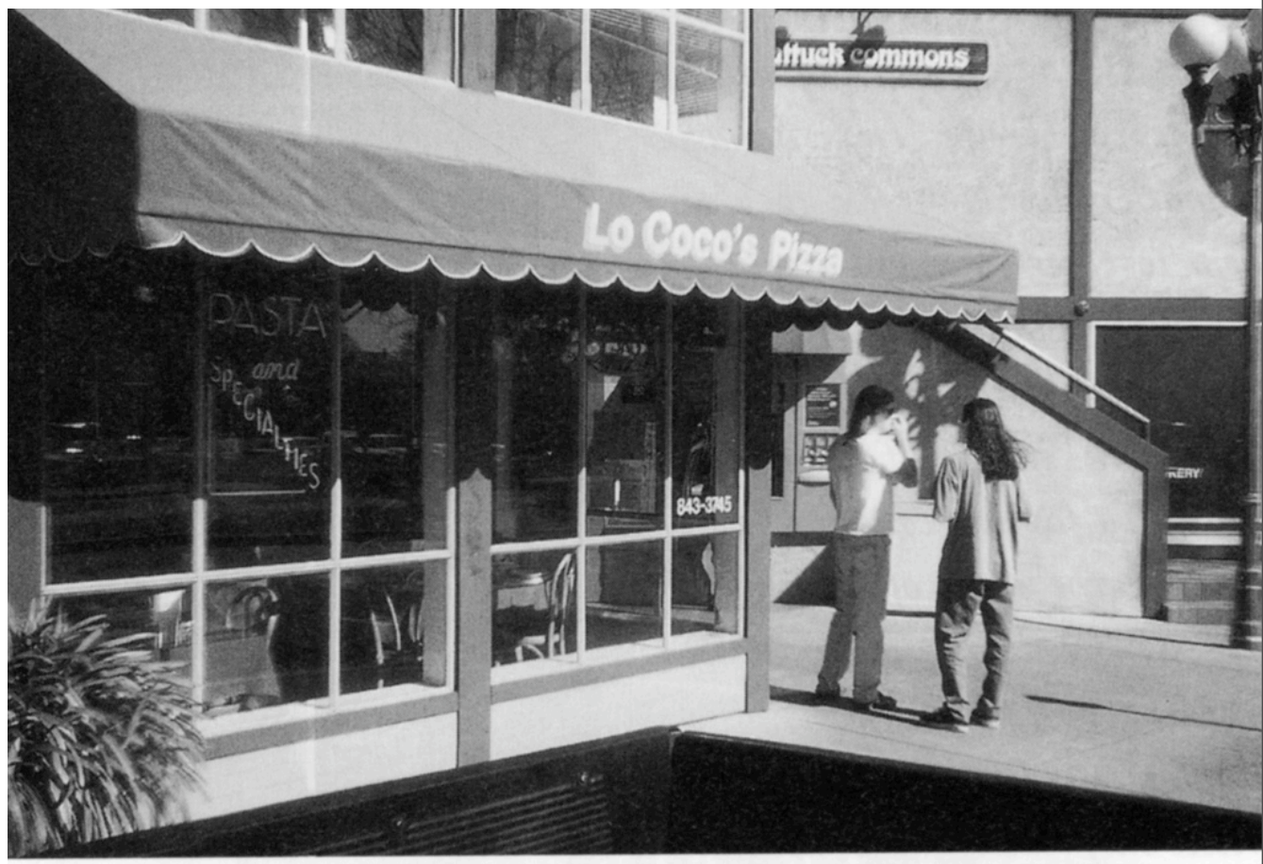
and 65% said this
one had more life



Cylindrical house by Mario Botta

in 1988, 70% of architecture
students liked this house better

Car repair shop: very simple and ordinary and close to the heart in spite of its rugged, grimy quality



A restaurant in Berkeley: nice, clean, the kind of thing people are supposed to like. Yet it is far, far from the heart.

more life ≠ traditional architecture

more life ≠ more complex

Danish cottage: informal structure has relatively more self

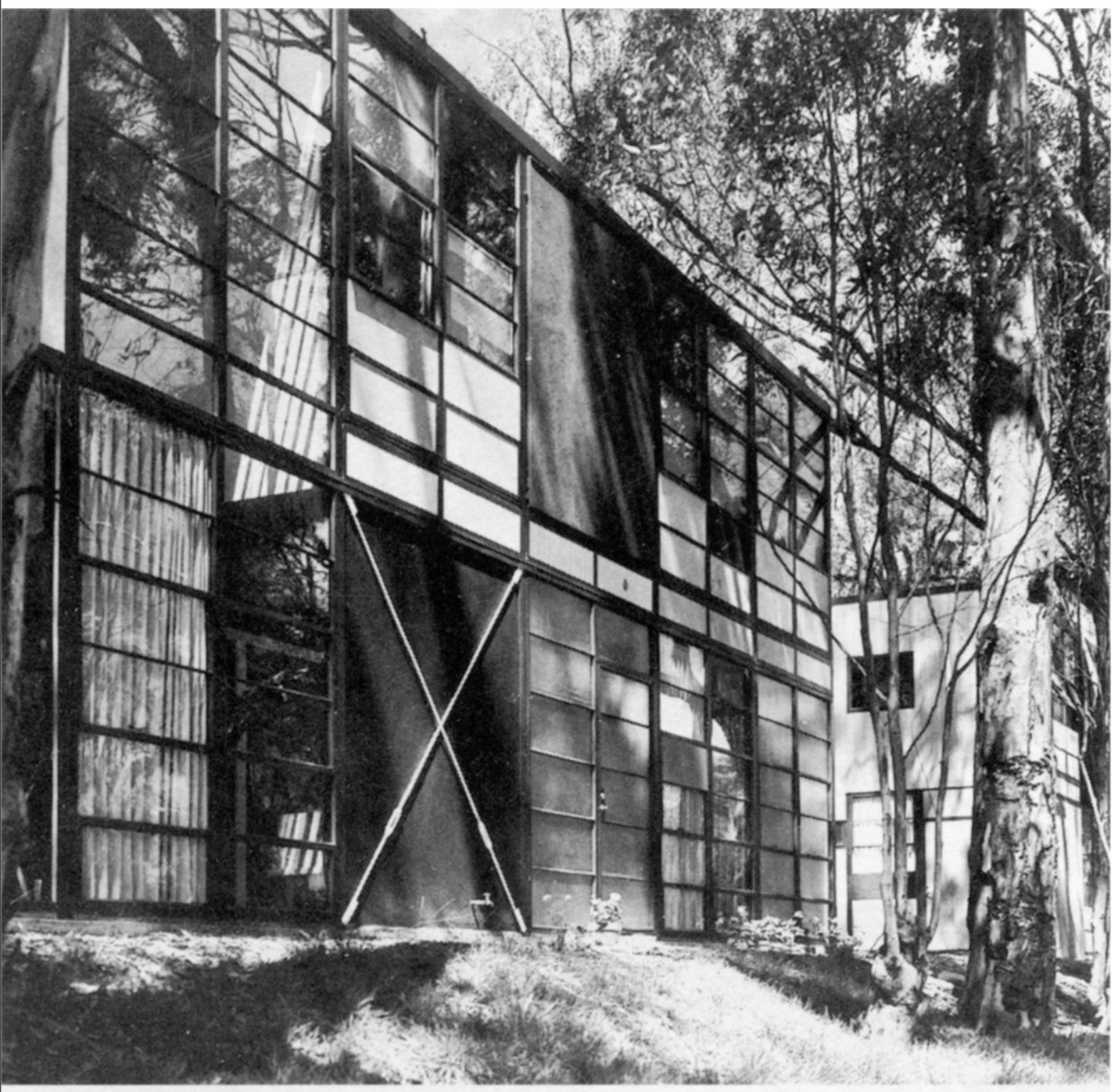
more life ≠ more formal

Les Invalides: highly formal structure has less self

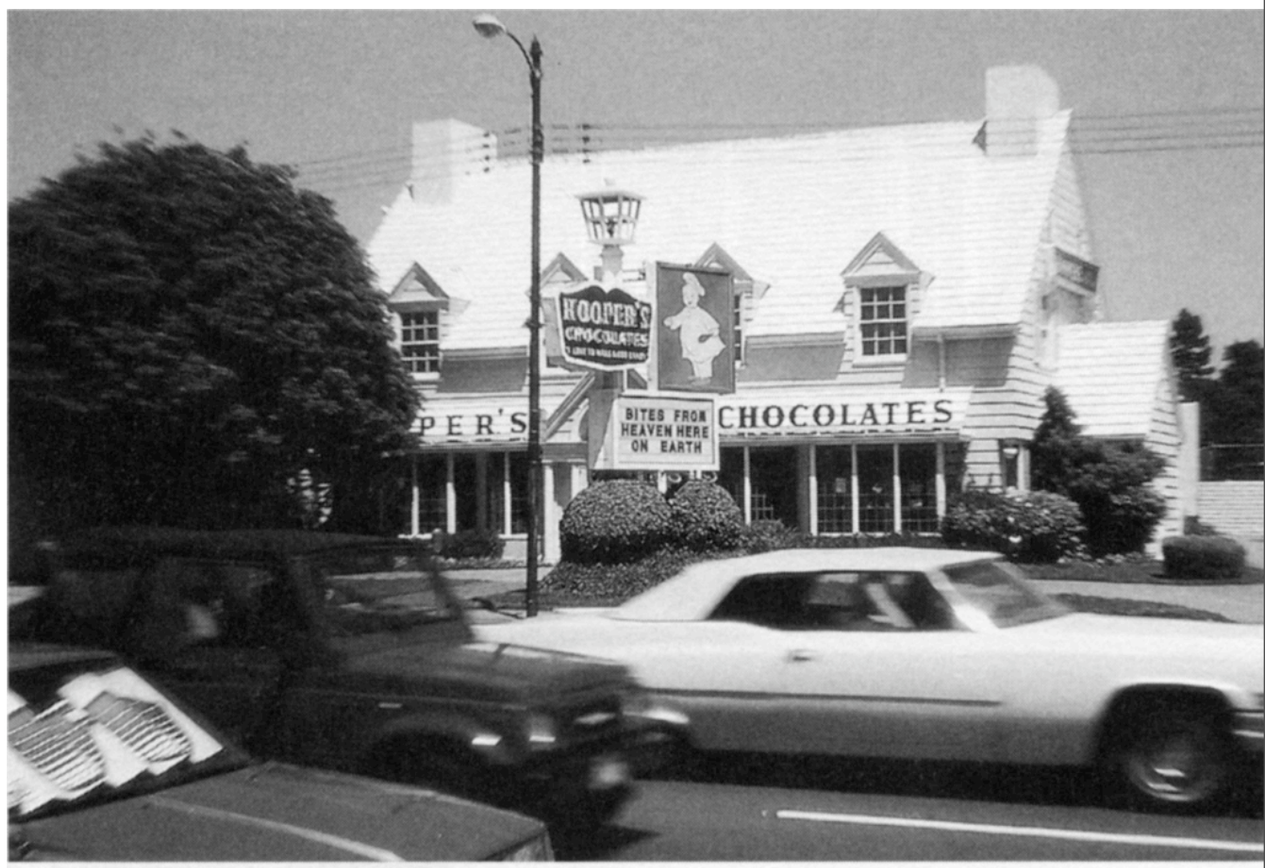
Hardwicke Hall: the more formal structure has more self

Informal hippie architecture has less self than Hardwicke

more life ≠ more informal



The Eames house: in this case the less ornamented has more self

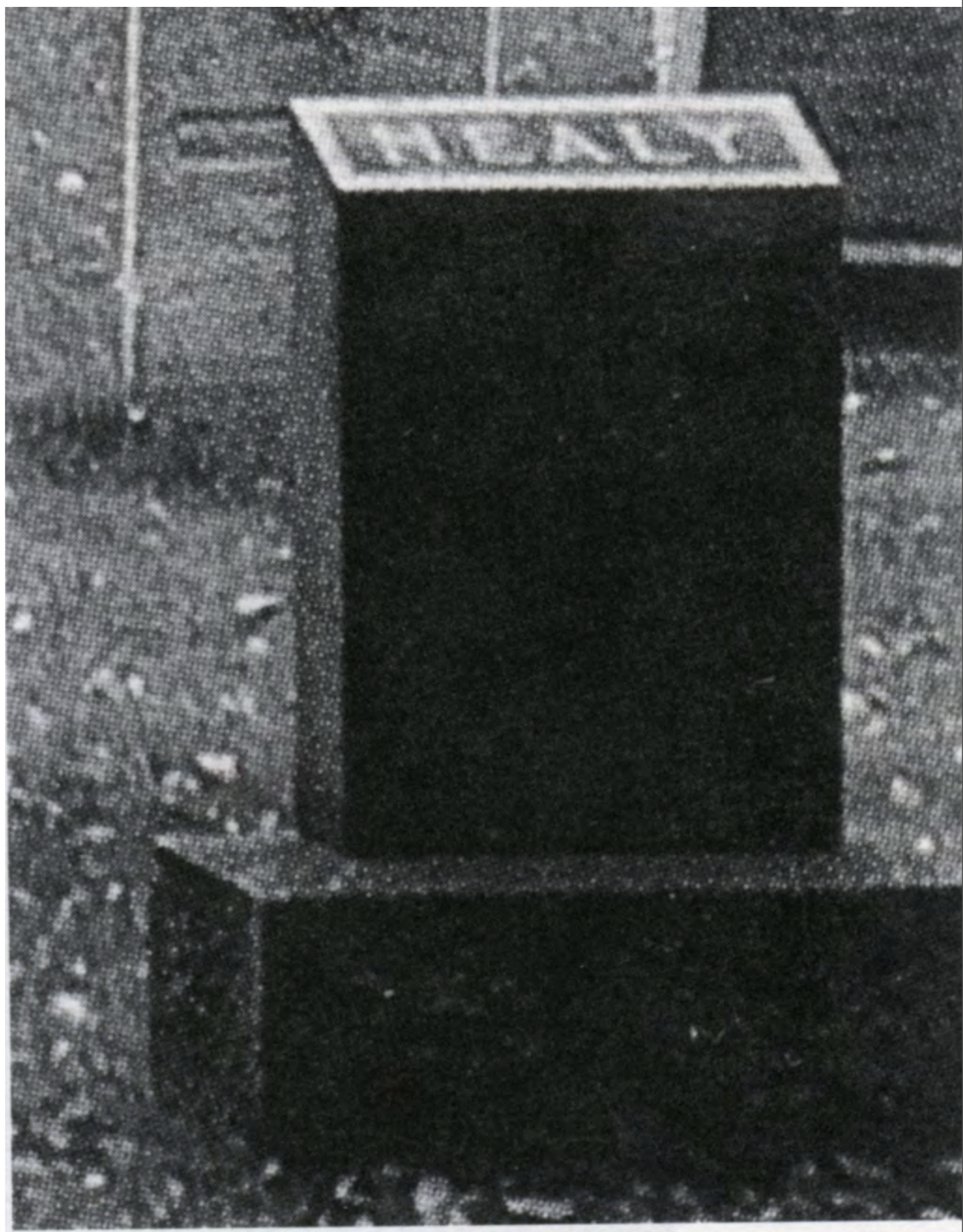


The chocolate shop: more ornamented but less self, less life

more life ≠ ornamented

The tomb of Mevlana: this highly ornamented Seljuk tomb has profound self

more life ≠ plain



Plain tombstone has relatively little self

Moroccan Archway, Henri Matisse, 1923

The Sorrows of The King, Henri Matisse, 1943

The early Moroccan painting is one of Matisse's great works; it has an immediate feeling and reaches far into the self. As a piece of the self it has power without question. The Sorrows of the King cut paper is at first alarming, disquieting. Slowly its majesty sinks in. After years of looking at it, even if the Moroccan painting is more beautiful, I believe the Sorrows comes much closer to a picture of the eternal self.

Which of these is more like your own self? Which of the two objects seems like a better picture of all of you, the whole of you: a picture that shows you as you are, with all your hopes, fears, weaknesses, glory, and absurdity, and which—as far as possible—includes everything that you could ever hope to be.

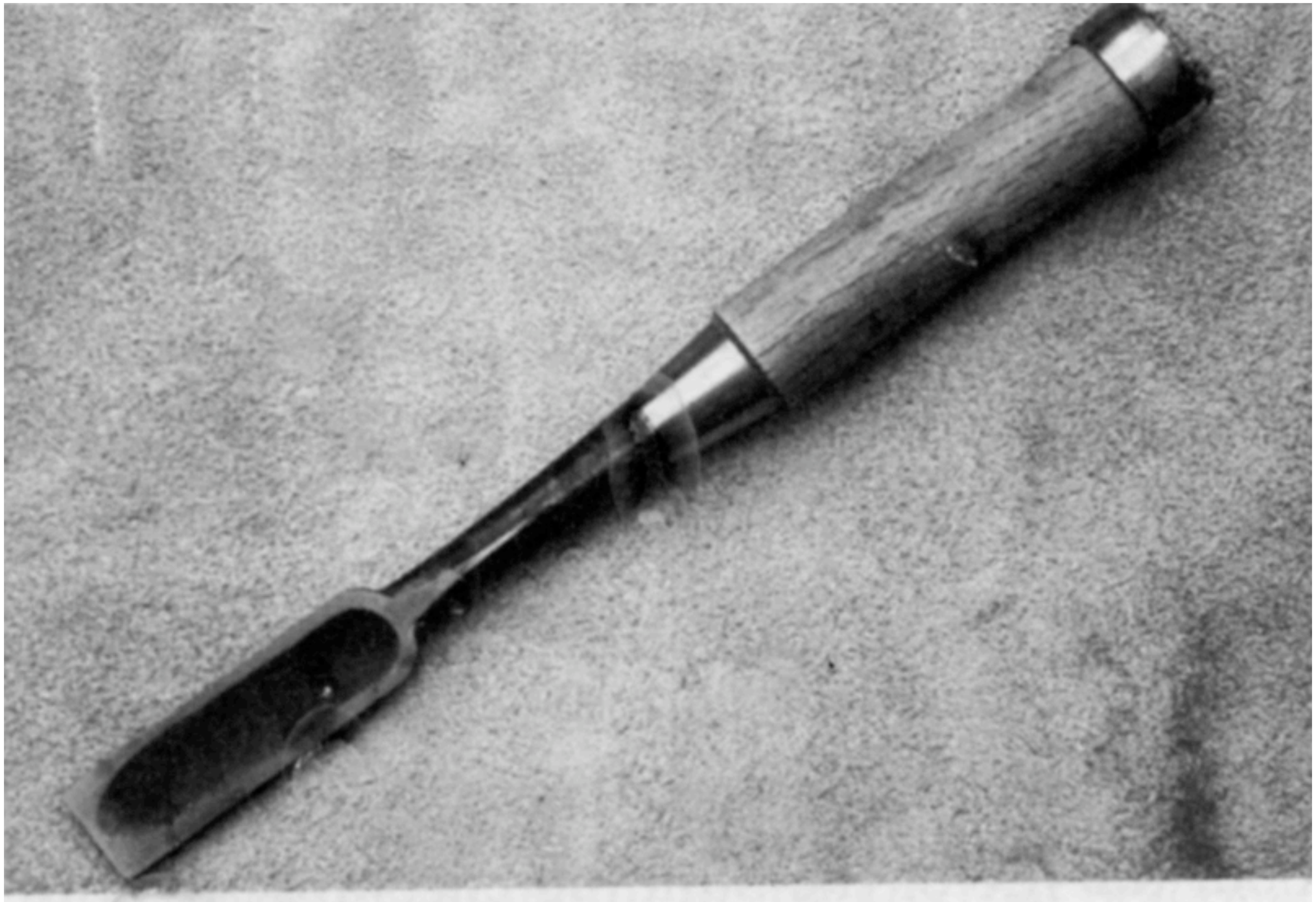
In other words, which comes closer to being a true picture of you in all your weakness and humanity; of the love in you, and the hate; of your youth and your age; of the good in you, and the bad; of your past, your present, and your future; of your dreams and what you hope to be, as well as what you are.

Flowered Carpet

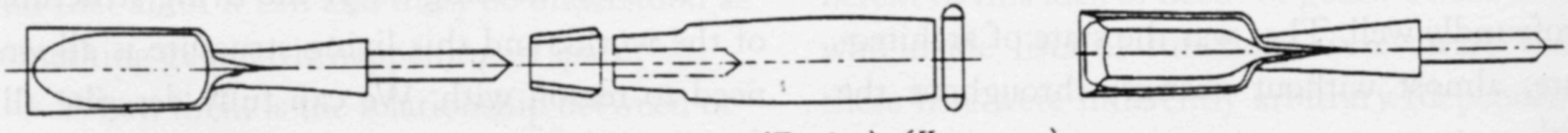
Waving Border Carpet

Ornament and Function

- Centers "help" each other create life and wholeness
- Structural aspects of a device also help each other to perform that device's function(s)
- The structural aspects are all centers, and need to be in a configuration that creates life and wholeness



A Japanese chisel of mine



The centers in the chisel

- The cutting edge of the blade is a center
- The handle is the right shape and size for a hand
- The tip of the handle is bound with a steel band so that if you hit it with a hammer it doesn't split; the band is a center
- The steel binding where the wooden handle accepts the steel shaft is another center
- The steel shaft is a center; it makes a firm connection between the blade and handle

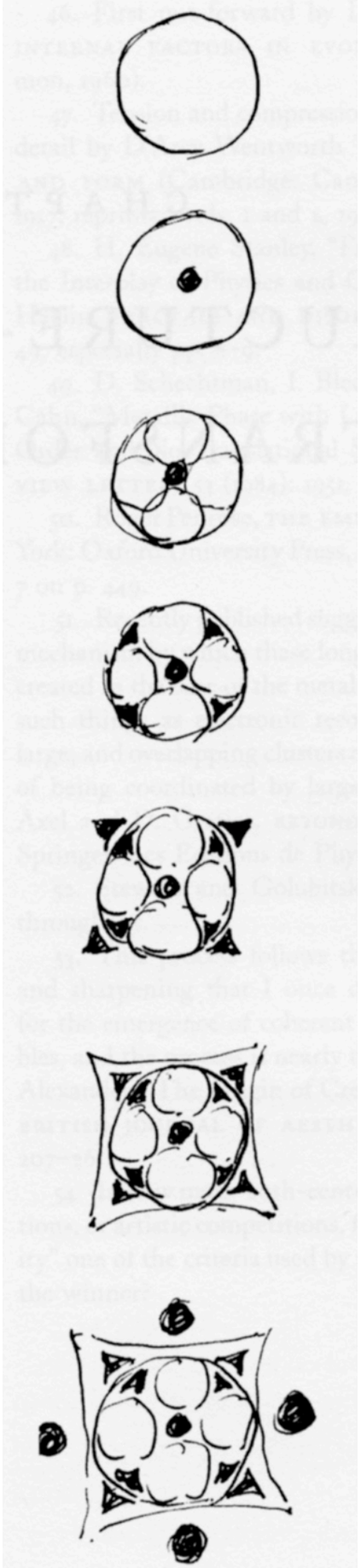
- The pieces of wood in the handle where it joins the shaft are centers; they make the connection capable of resisting bending

- "In a well-made chisel, the geometric centers correspond exactly to the centers of action (i.e. the way the chisel interacts with the world when we use it): how it cuts the wood, holds in the hand, gets hit by the mallet, and so on"

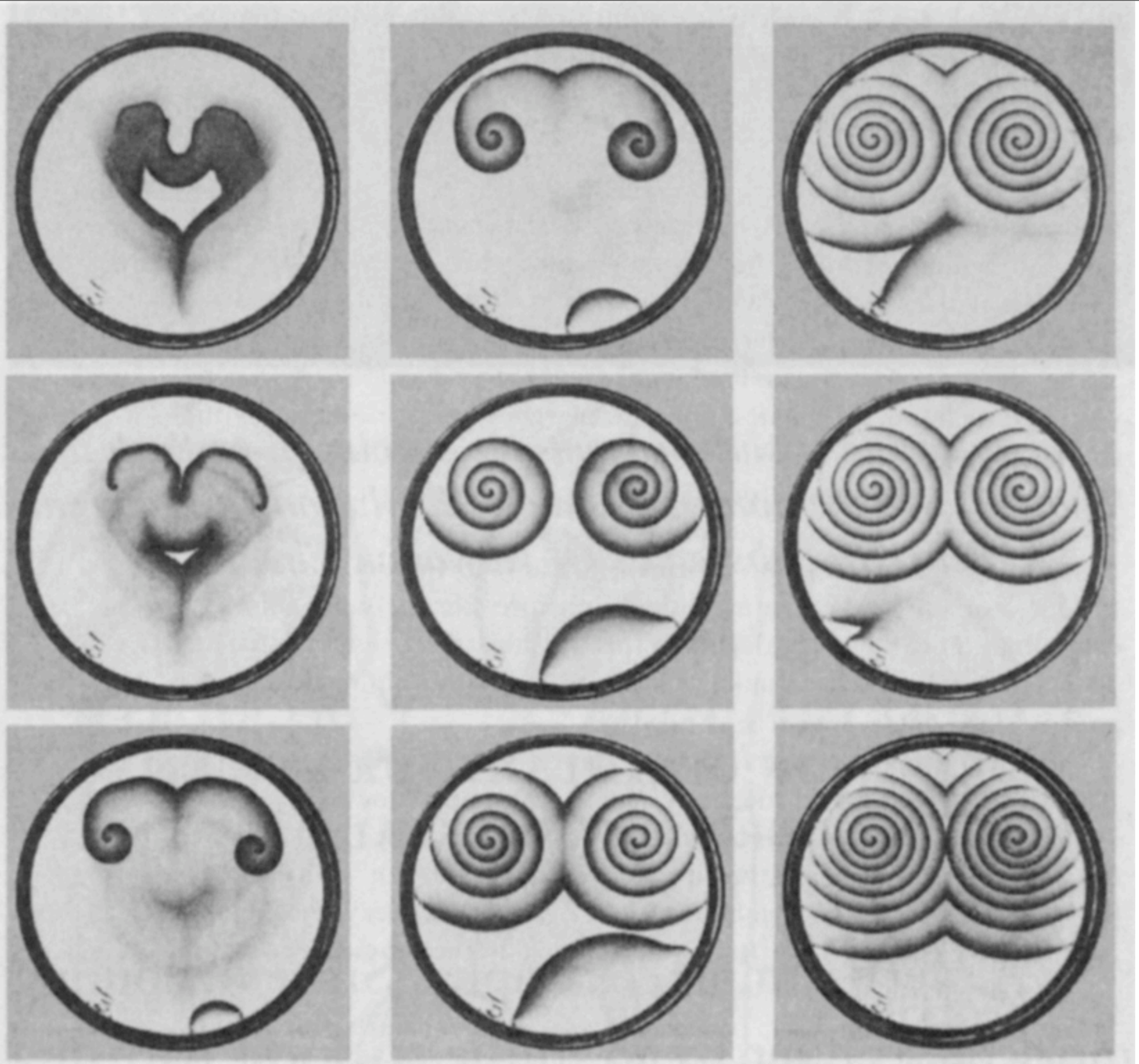
Unfolding

- 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

Unfolding is a living process, like crystal development, biological growth, evolutionary elaboration.



It is a process of differentiation, or symmetry breaking



The Belousov-Zhabotinski reaction: waves in a chemical system

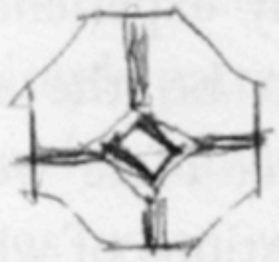
Structure-Preserving Transformations

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

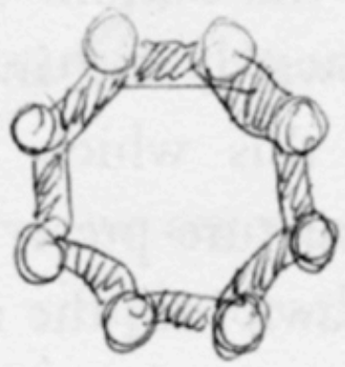
- adding new centers that reinforce existing ones
- strengthening or developing one or several existing centers into a more complex, stronger center
- removing weak or dysfunctional centers

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

Transformations of an Octogon



structure-preserving	8
don't know	0
structure-destroying	0



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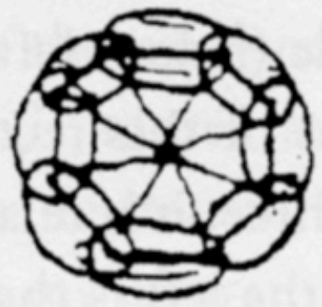
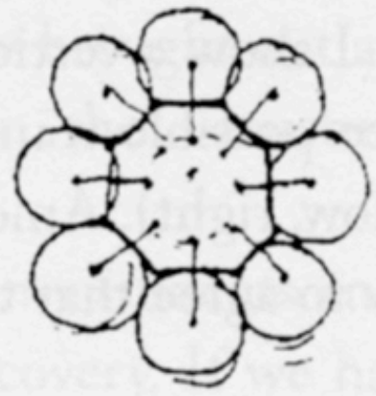
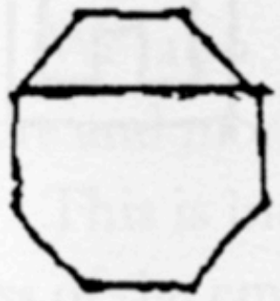
don't know	0
structure-destroying	0



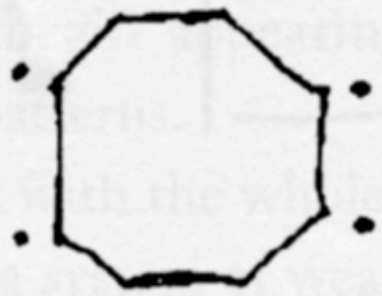
structure-preserving	7
don't know	1
structure-destroying	0



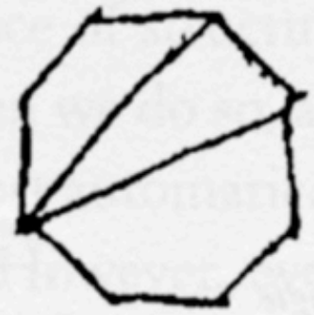
structure-preserving	8
don't know	0
structure-destroying	0



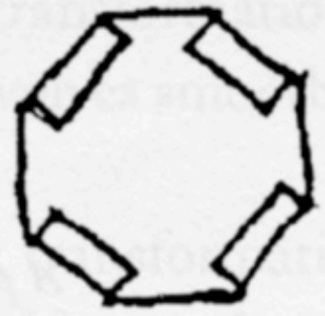
structure-preserving	0
don't know	3
structure-destroying	4



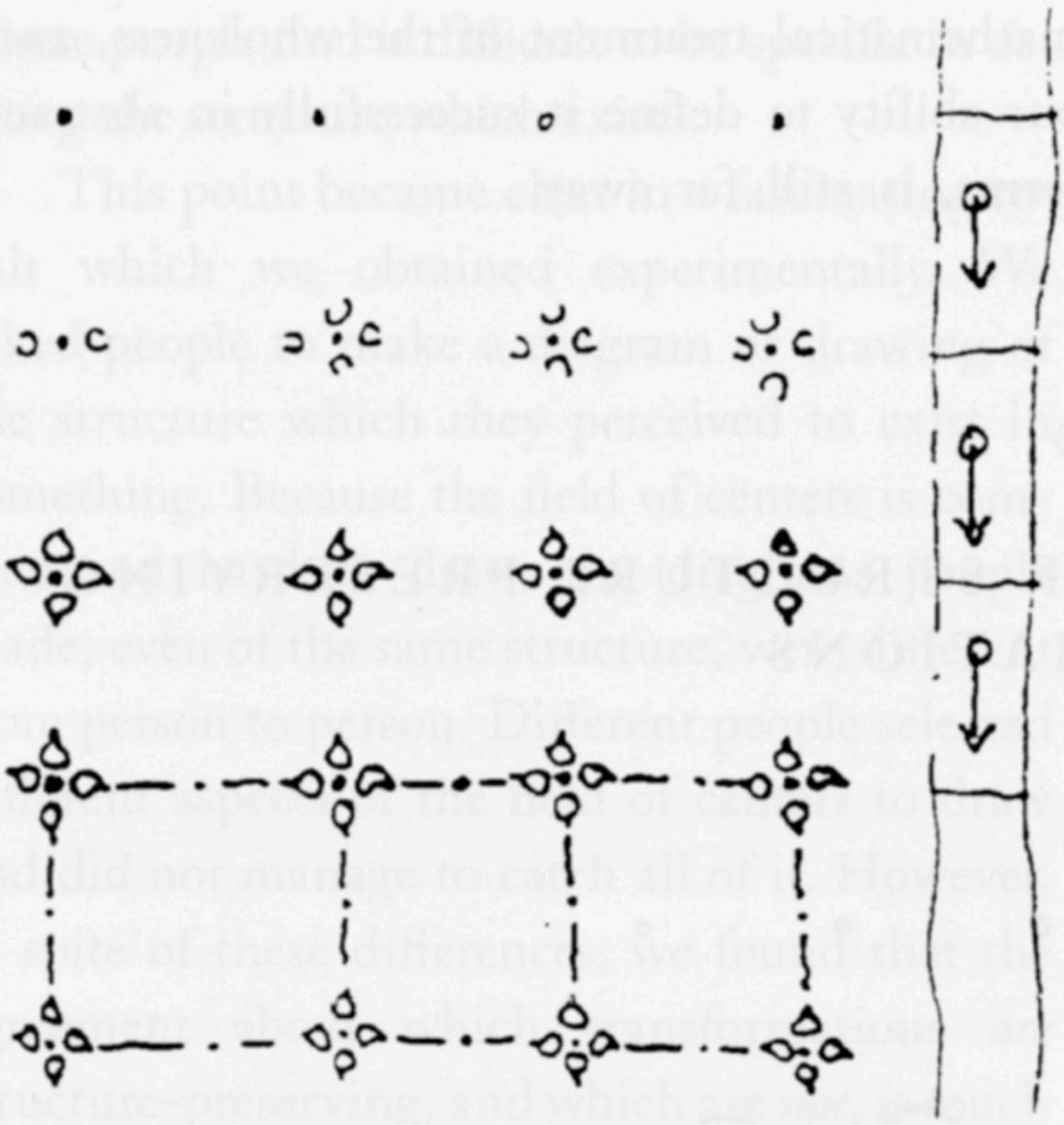
structure-preserving	4
don't know	4
structure-destroying	0



structure-preserving	0
don't know	0
structure-destroying	8

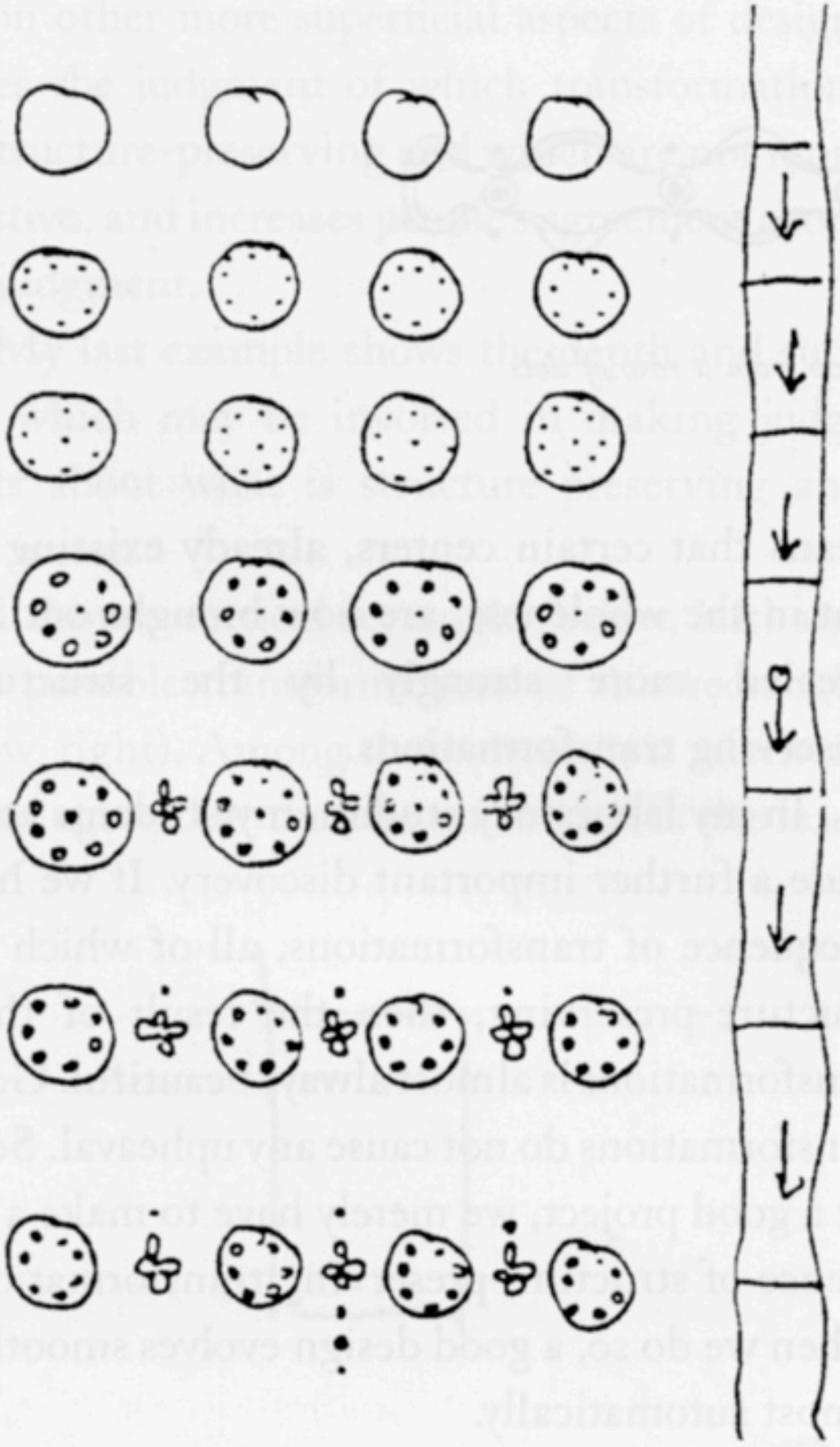


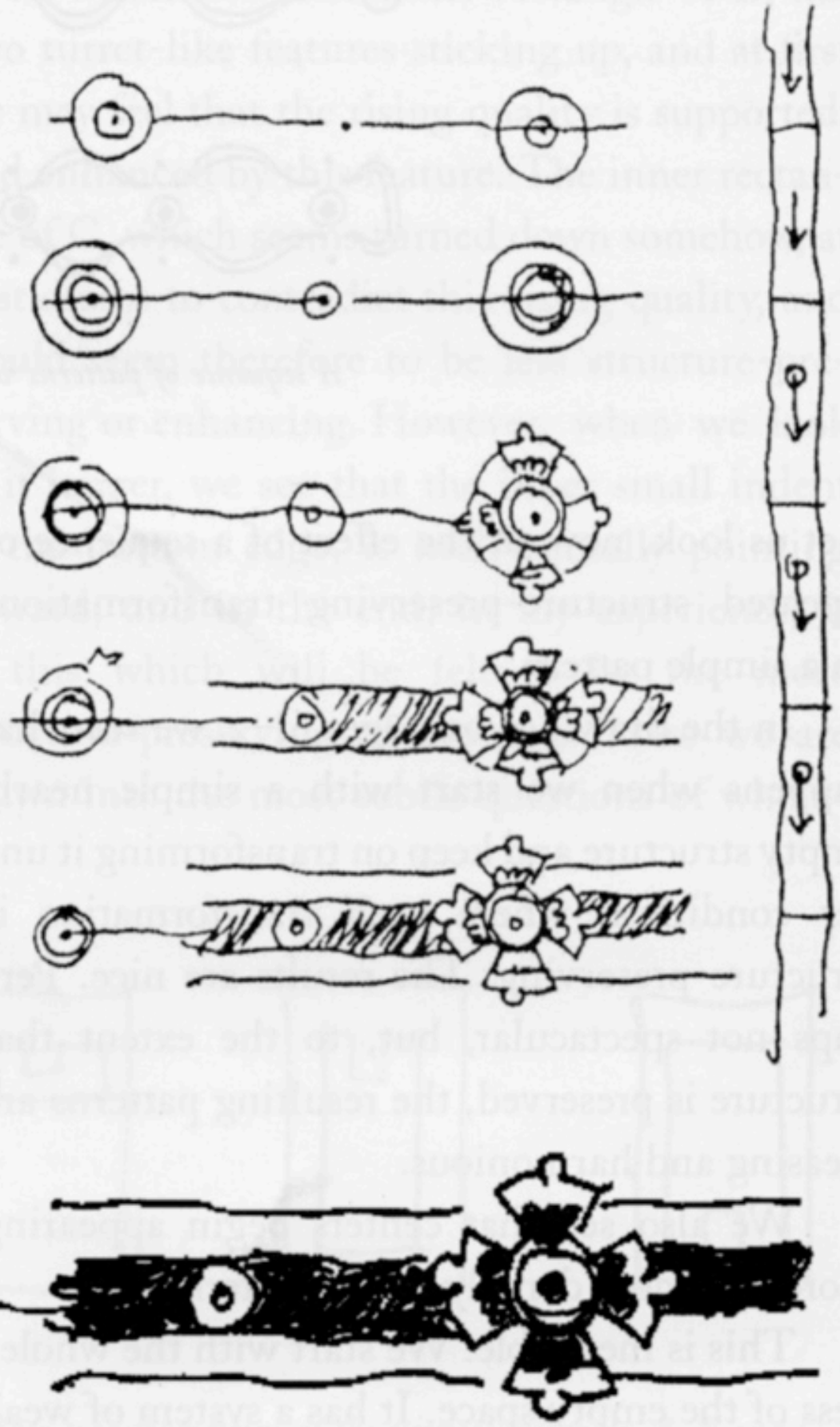
structure-preserving	5
don't know	3
structure-destroying	0



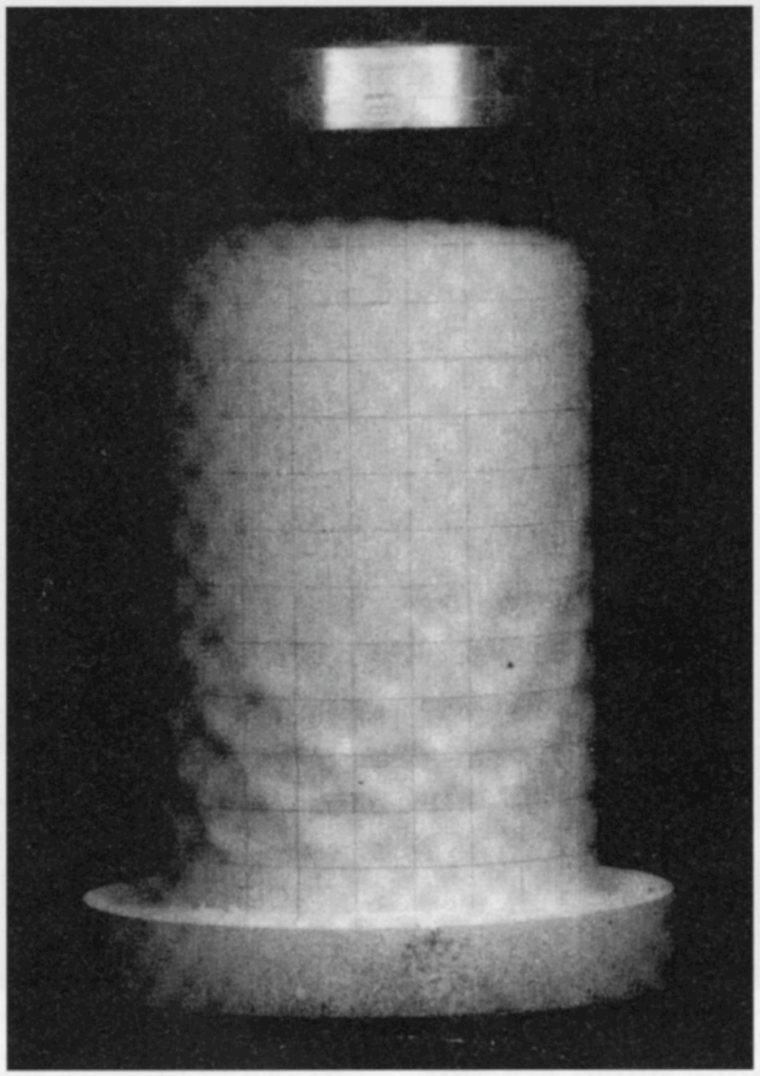
A sequence of structure-preserving transformations

A sequence of structure-preserving transformations





Symmetry Breaking



Buckling of a hollow cylinder when compressed

When just crushed, the infinite rotational symmetry group is replaced by a finite one of large order, even though just 1 dimple—1 weak spot — is popped.

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.*

<continued>

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 Differentiation Process

- At any given moment in a process, we have a certain partially evolved state of a structure. This state is described by the wholeness: the system of centers, and their relative nesting and degrees of life.

- We pay attention as profoundly as possible to this WHOLENESS —its global, large-scale order, both actual and latent.

- We try to identify the sense in which this structure is weakest as a whole, weakest in its coherence as a whole, most deeply lacking in feeling.

- We look for the latent centers in the whole. These are not those centers which are robust and exist strongly already; rather, they are centers which are dimly present in a weak form, but which seem to us to contribute to or cause the current absence of life in the whole.

- We then choose one of these latent centers to work on. It may be a large center, or middle-sized, or small.

- We use one of more of the 15 structure-preserving transformations, singly or in combination, to differentiate and strengthen the structure in its wholeness.

- As a result of the differentiation which occurs, new centers are born. The extent of the 15 properties which accompany creation of new centers will also take place.

- In particular we shall have increased the strength of certain larger centers' we shall also have increased the strength of smaller centers. As a whole, the structure will now, as a result of this differentiation, be stronger and have more coherence and definition as a living structure.

- We test to make sure that this is actually so, and the the presumed increase of life has actually taken place.

- We also test that what we have done is the simplest differentiation possible, to accomplish this goal in respect of the center that is under development.

- When complete, we go back to the beginning of the cycle, and apply the same process again.

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.

The classic example of a generative sequence occurs, of course, in biological morphogenesis, where sequence is well known. When an embryo grows, it must grow in a certain order—a preordained order. If the events were to occur in another order (or if artificially altered to force events to occur in another order) the effects would be disastrous. Instead of orderly form, we would get chaos, monsters.

Simple Sequence Example

- Locate the garden in the best and most beautiful place
- Locate the house so that it helps and supports the garden

Apartment Buildings in Pasadena

- Map the context and surroundings
- Decide basic arrangement of project and its outdoor space to enhance surrounding projects and the neighborhood
- Decide basic arrangement and position of main garden
- Calculate numerical parameters (size of areas devoted to buildings, parking, and driveways)

- Locate parking and driveway
- Decide on location of building footprint and define rough shape of building volumes
- Refine the garden shape in relation to the building and adjacent gardens
- Lay out details of parking
- Division into apartments

- Place and shape apartment entrances

- Design details of garden

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).

The "I"

When I am part of the making of a building and examine my process, what is happening in me when I do it, myself, in my effort, is that I find that I am always reaching for the same thing. In some form, it is the personal nature of existence, revealed in the building, that I am searching for. It is "I," the I-myself, lying within all things. It is that shining something which draws me on, which I feel in the bones of the world, which comes out of the earth and makes our existence luminous.

What must I do to put this self-like quality into the house, the room, the roof, the path, the tile?

Often I can feel the possibility of this in a thing before I start to think, or design, or plan, or build, or before I start to paint. It is the sublime interior, the right thing. I first feel existence shimmering in reality, and I then feel it deep enough in the thing I am looking at and trying to make, to know that it is worth capturing in concrete and wood and tile and paint. I can feel it, nearly always, almost before I start. *Or, rather, I do not let myself start until I can feel this thing.*

This thing, this something, is not God, it is not nature, it is not feeling. It is some ultimate, beyond experience. When I reach for it, I try to find—I can partly feel—the illumination of existence, a glimpse of that ultimate. It is always the same thing at root. Yet, of course, it takes an infinite variety of different forms.

I believe it is in the nature of matter, that it is soaked through with self or "I." The essence of the argument ... is that the thing we call "the self," which lies at the core of our experience, is a real thing, existing in all matter, beyond ourselves, and that in the end we must understand it, in order to make living structure in buildings. But it is also my argument that this is the nature of matter. *It is not only necessary to understand it when we wish to make living structure in buildings. It is also necessary if we wish to grasp our place in the universe, our relationship to nature.*

Centers as beings

Emergence of a “being” from the field of centers

The faintly glowing quality which can be seen in a thing which has life

Color and Inner Light

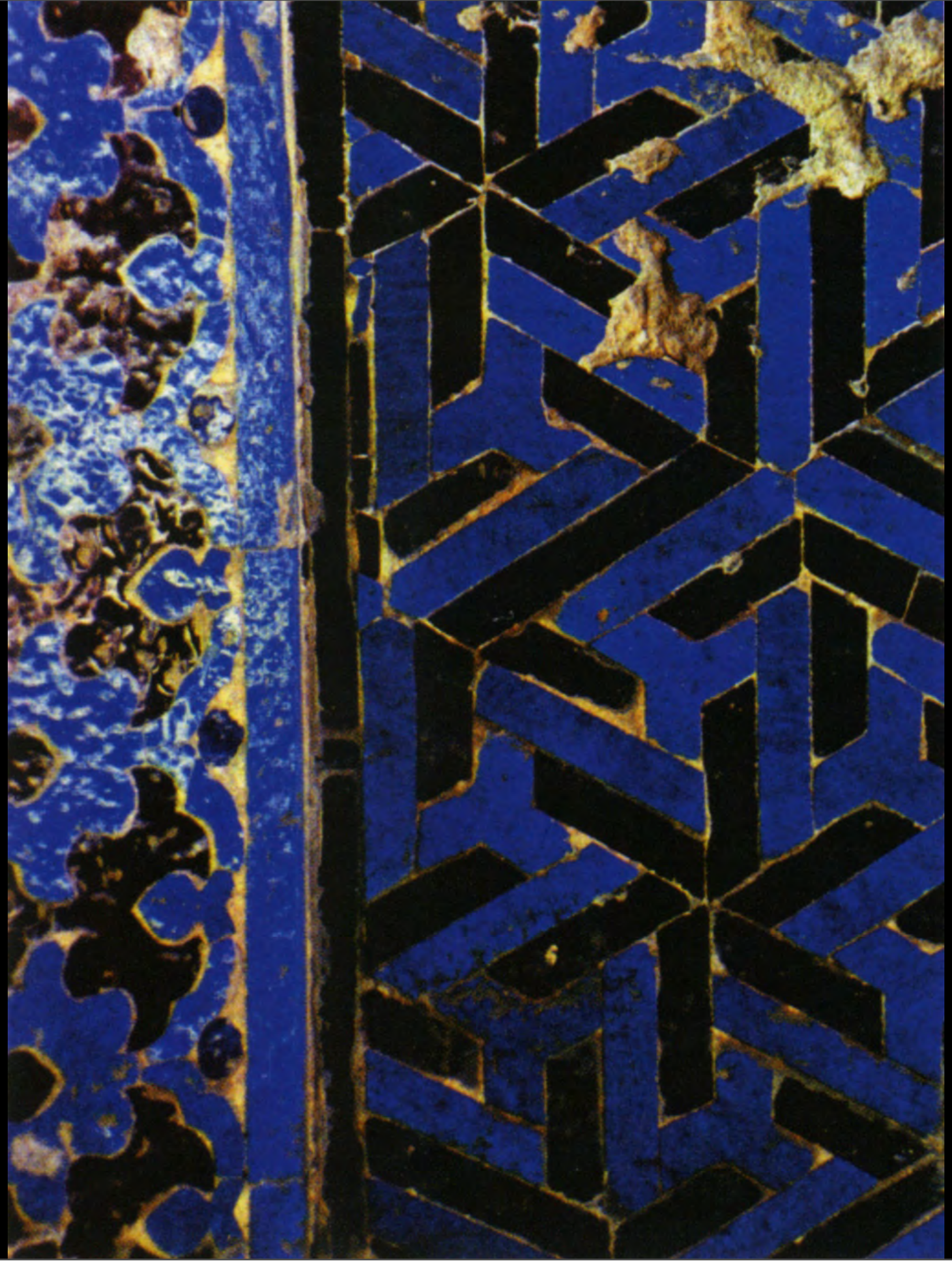
...I shall try to show directly, visibly, as nearly as I can, the I itself. *I shall do this by showing you color, and, in particular, a certain kind of color which I believe allows the I to be seen. Of all the phenomena I know, this is the one which comes closest to letting us see the I directly, as if we were actually looking at it. It is what I call the phenomenon of inner light.*

Inner Light

Tuesday, March 2, 2010

No Inner Light

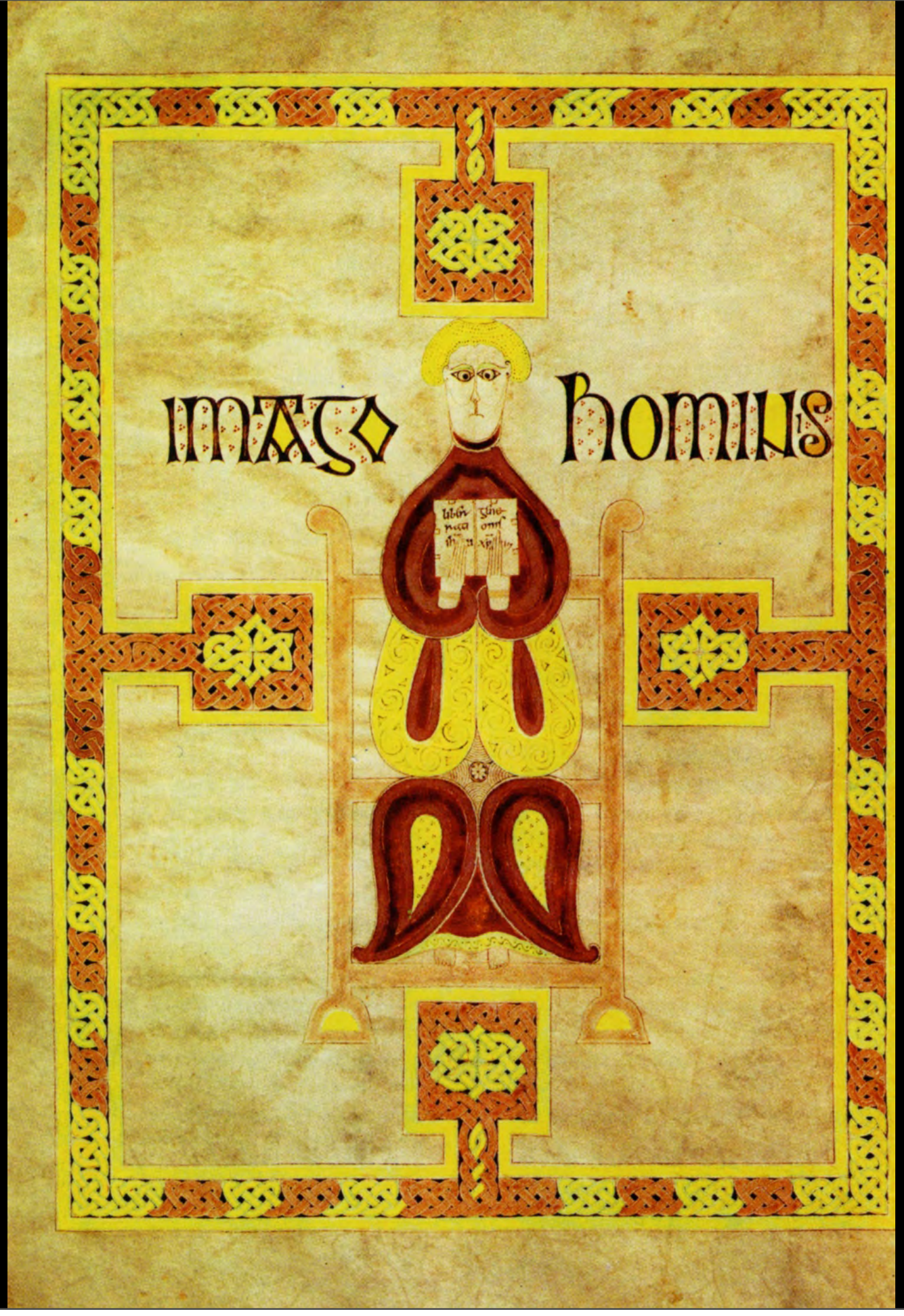
Inner Light



No Inner Light

Inner Light

Inner Light



Inner Light

The 11 Color Properties

- Hierarchy of Colors
- Colors Create Light Together
- Contrast of Light and Dark
- Mutual Embedding
- Boundaries and Hairlines
- Sequence of Linked Color Pairs
- Families of Color
- Color Variation
- Intensity and Clarity of Individual Colors
- Subdued Brilliance
- Color Depends on Geometry

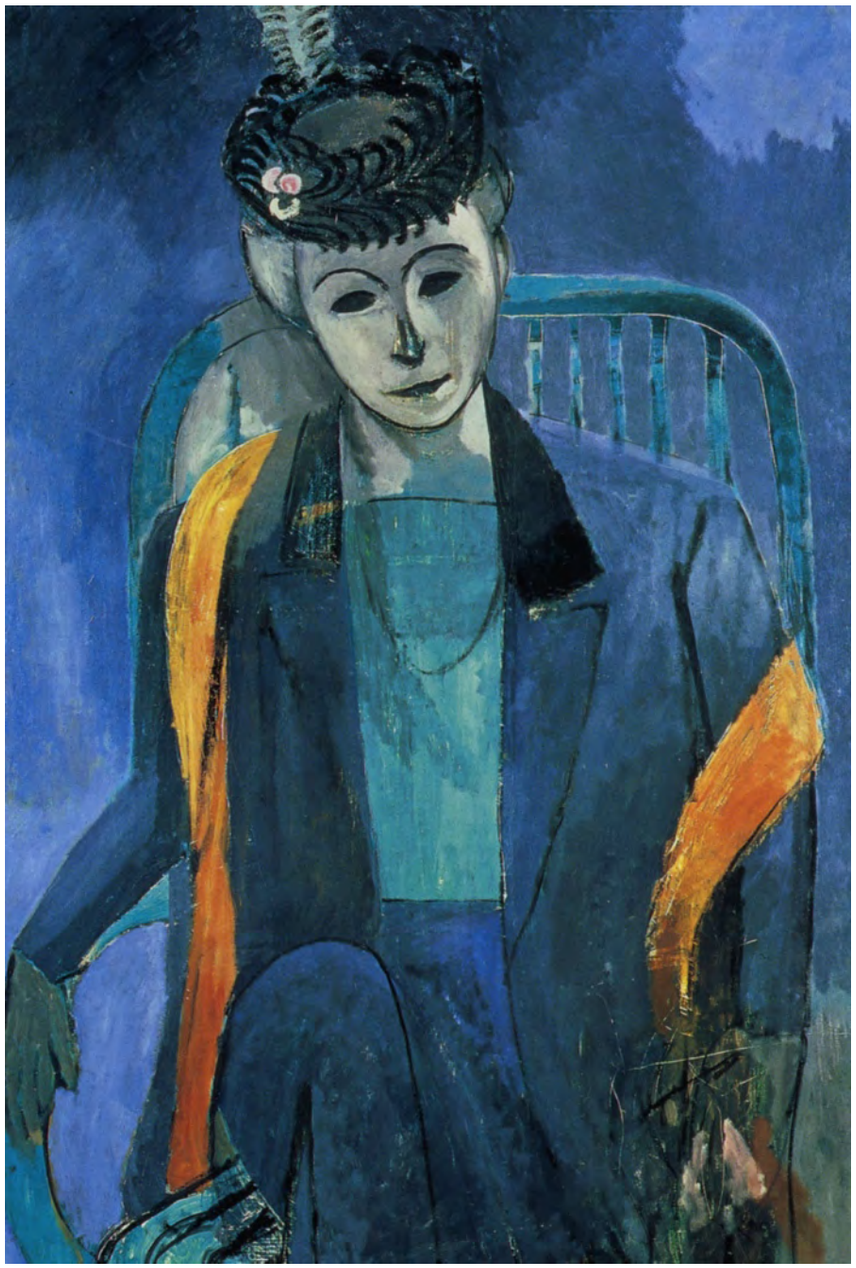
Hierarchy of Colors

Levels of Scale

unequal amounts
of different
colors

Colors Create Light Together

Positive Space
Alternating Repetition



Matisse

Contrast of Light and Dark

Contrast

Mutual Embedding

Deep Interlock & Ambiguity

Boundaries and Hairlines

Boundaries

Sequence of Linked Color Pairs

Gradients
The Void

gold → white
gold → violet gray
violet gray → red
red → yellow (collar)
red → black shoes
black shoes → black writing
in yellow gold

Families of Color

Echoes

...the colors come from a single family. It appears they have all been mixed in the same gesture, the same proportional feeling.

Color Variation

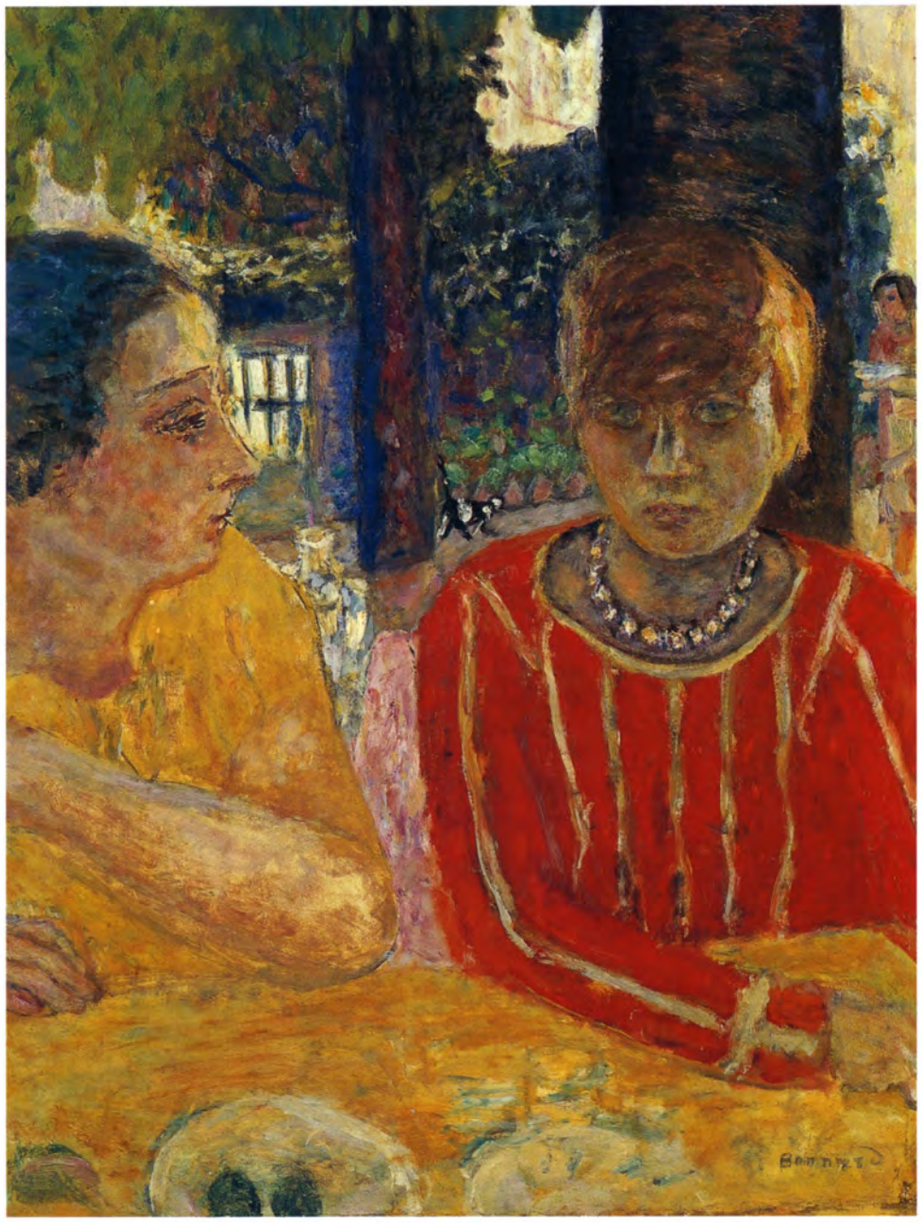
Roughness

Intensity and Clarity of Individual Colors

Strong Centers
Good Shape

Subdued Brilliance

Let us say that the color is too garish. To make it more profound we have to cut it back. We have to subdue the influence of the whole thing. We quieten it, gently. We quieten it a little more.



Then, when we are just to the edge of feeling that we have taken away its brilliance, we put something back—and all of a sudden the color really shines, the deep meaning shows.

Inner Calm
Not Separateness

Color Depends on Geometry

Strong Centers
Local Symmetries

The I; the Ground; the Plenum

I am going to start with the idea that the I exists physically, that there is some plenum, not part of physical space and matter, as we have modeled them in Cartesian science, but nevertheless there in fact, at every point of what we think of as space and matter.

...we postulate that there is, in the universe, and underlying all matter, a single plenum or Ground. Above all it is single, and it is personal. This plenum is the "something" which shall simply be called "I."

Psychological Explanation

The order in a strong field of centers matches some mechanisms or structures in our brains, and that's why we respond (the same way as everyone else) to it

Consciousness: a Physical Feature of the Universe

Towards the end of the 20th century, once a new picture of matter began to come under consideration in which all matter was somehow to be understood as arising from a single unbroken wholeness, for the first time clues began to to form that somehow the matter, the space-time continuum, might after all be made of animate material, not just inert stuff, but a mysterious substance, consistent in profundity and grandeur with the universe of the Upanishads.

It takes no great imagination to conceive of other possible universes, each stable and workable in itself, yet lifeless. How is it that, with so many other apparent options, we are in a universe that possesses just that peculiar nexus of properties that breeds life? It has occurred to me lately—I must confess with some shock at first to my scientific sensibilities—that both questions might be brought into some degree of congruence. This is with the assumption that mind, rather than emerging as a late outgrowth in the evolution of life, has existed always as the matrix, the source and condition of physical reality—that the stuff of which physical reality is composed is mind-stuff.

—George Wald, Harvard biologist

It would be most satisfactory of all if matter and mind could be seen as complementary aspects of the same reality.

—Wolfgang Pauli, physicist

This quality, whether it occurs in a great work or a small work, always has the same essential purpose: to make a connection to the I, to reach, in material substance, the face of God.

The Luminous Ground

- Matter-space is an unbroken continuum which includes everything, both matter and the so-called space around it, all at the same time.

- In varying degrees, any given portion of space may be more whole or less whole, more alive or less alive, more healed or less healed, connected or broken, separated or not-separate.

- Whenever we undertake an act of construction we have the ability to make the world more alive or less alive, more harmonious or less harmonious.

- Everything matters. [In contrast, in our current cosmology, nothing matters—it has no value.]

- Value is a definite and fundamental part of the universe, and of the scheme of things.

- Ornament and function are indistinguishable.

- Matter itself is not a mechanism: It is a potentially soul-like materiality which is essentially what we call self.

- If the self or the I is woken up whenever living structure appears in matter, what we think of as value may then be described as the protection, preservation, nourishment, of the precious self of the universe.

- The nature of space-matter, being soul-like, is such that the more whole it becomes, the more transparent, the more it seems to melt, the more it realizes itself, releases its own inner reality, the more transparent it becomes, the more transcendent.

- Thus art is not merely pleasant or interesting. It has an importance that goes to the very core of cosmology.

- The unfolding of the field of centers, and the unfolding of the self, is the most fundamental awakening in nature.

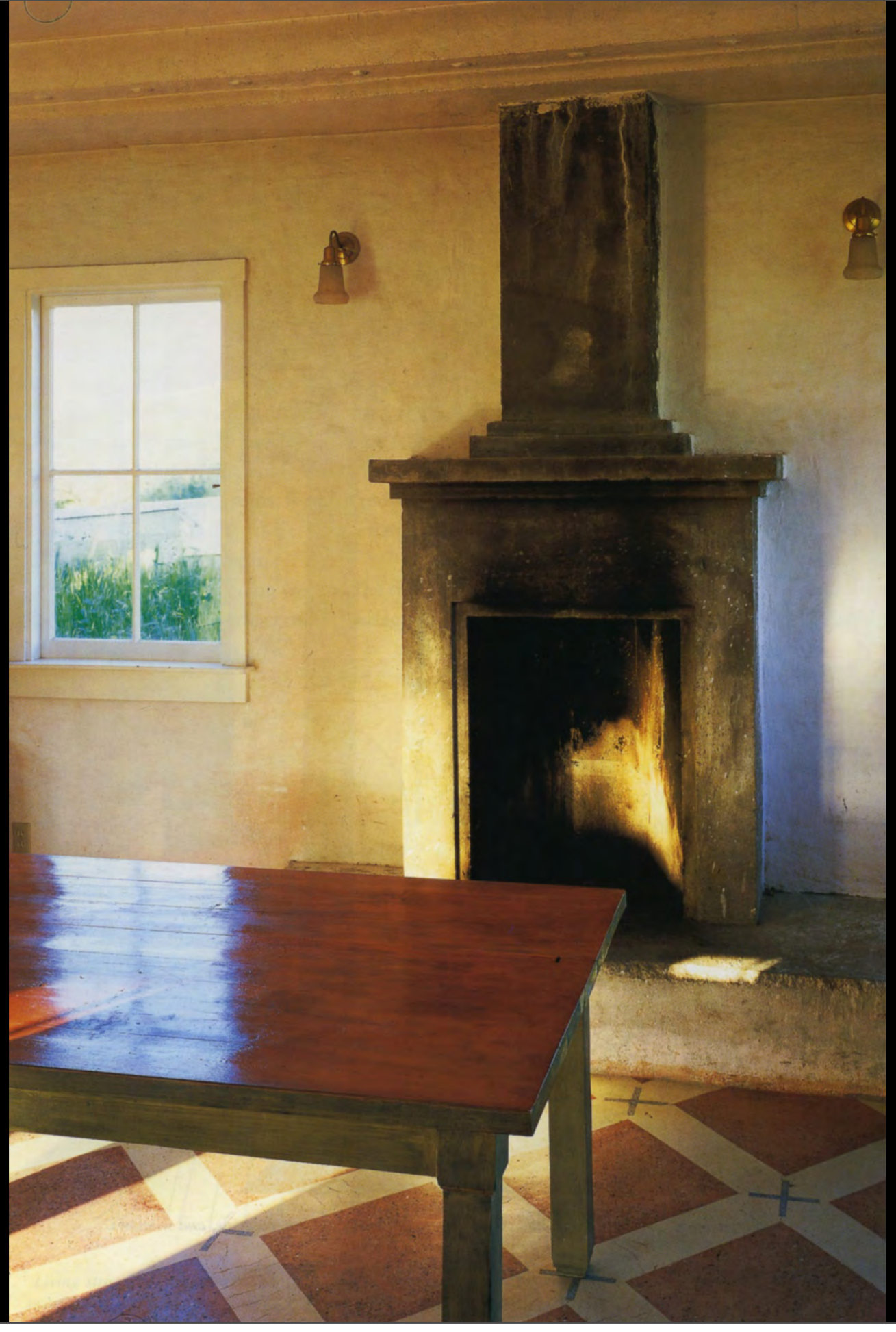
The Goal of Tears

Why is unity the same as tears? ... Unity ties everything together—including joy, happiness, and laughter, but also including loss, death, and betrayal. A thing which truly has unity partakes of everything. And through that everything, there must be sadness. The making of this sadness, then, must come through a process where land, details, rooms, form an individual whole. Always trying to tie it together, to unify it, to make it disappear.

A single material, in variations: Sadness in a beam, ornament, ceiling, columns, and windows.

The I, that blazing one, is something which I reach only to the extent that I experience, and make manifest, my feeling. What feeling, exactly? What exactly am I aiming for in a building, in a column, in a room? How do I define it for myself, so that I can feel it clearly, so that it stands as a beacon to steer me in what I do every day?

What I aim for is, most concretely, sadness. I try to make the volume of the building so that it carries in it all feeling. To reach this feeling, I try to make the building so that it carries my eternal sadness. It comes, as nearly as I can in a building, to the point of tears.



I try to shape the volume so that its volume brings tears to my throat. I can feel, in me, the eternal sadness of all life welling up, to some small degree, in me. This is very highly concrete. I cannot do it in a trivial way. I cannot literally make the building laugh and cry. And it is not gloomy either. This sadness of tears, when I reach it, is also joy. The sky over the Bay Bridge, the lights of the cars, the rain, the existence on this earth. What makes it sad is that it comes closest in the physical concrete beams and columns and walls, as close as possible, to the fact of my existence on this earth. It reminds me of it, it makes me take part in it. So when it happens, it is also a kind of joy, a happiness.

But to recognize it, I concentrate mostly on my sadness, and my tears.

Mother and Daughter, oil on canvas, Christopher Alexander, 1994

And why do I say that there is, in this picture, a quality of tears? If you look hard, I think you can see it. The bright colors, reds and yellows, are not bright. They are almost somber, worn by the cares of the world, yet seeming to have the quality of family love, or old affection. And they, too, can be rubbed away. Yes, there are tears in these geometric patches of red and yellow, in the way they work—caused, of course, by the living structure which has been created there.

"A father is someone who loves you. My dad writes books and is an architect. He likes to get me things. He likes cats a lot. He likes to read with me. My dad loves birds and he likes whales."

Lily, first grade, June 8, 1988 (daughter)

"I just want you to know that in spirit I'm with you—no matter what happens. I know we'll make it through and find our direction—hopefully the best one. Anyway, I don't ever stop loving you or caring about you every minute of the day."

Pamela, a letter, August 20, 1997 (wife)

"We were waving goodbye all the way up to the luggage scanner, leaving my father, not knowing when we would see him again. In any pain I have previously had, none came close to that of this moment."

Sophie, eighth grade, September 21, 1997 (daughter)

What Are Centers? (for us software people)

- 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;
        }
    }
}
```

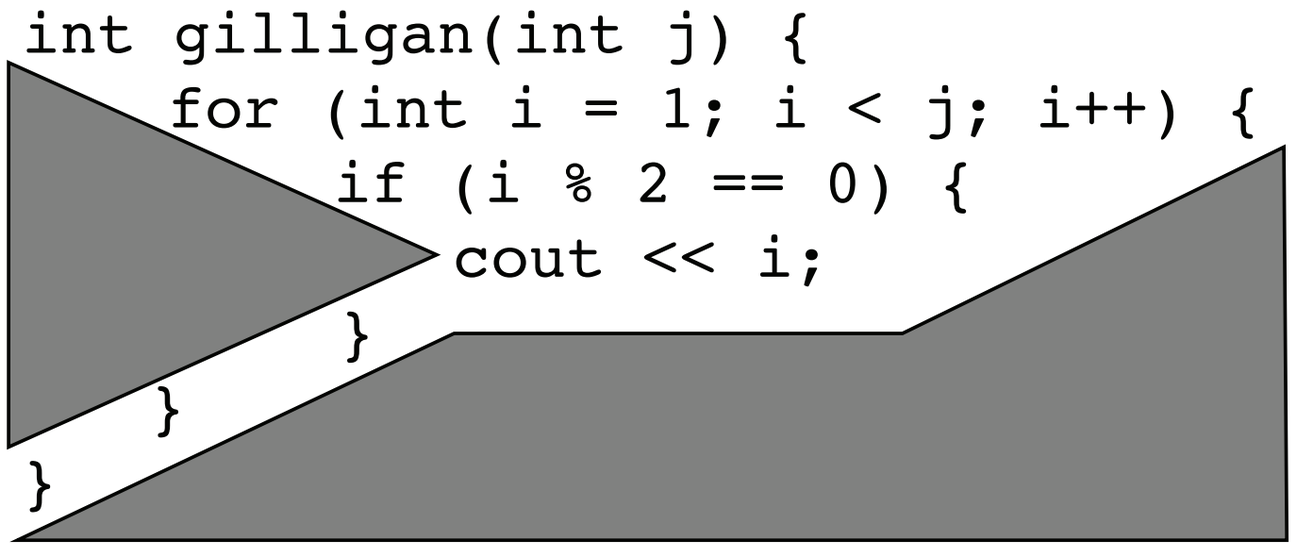
- Structural elements
  - Boundaries
  - Positive Space
  - Good Shape
  - Local Symmetries
  - Gradients
  - Not Separateness

Centers: Source Code

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

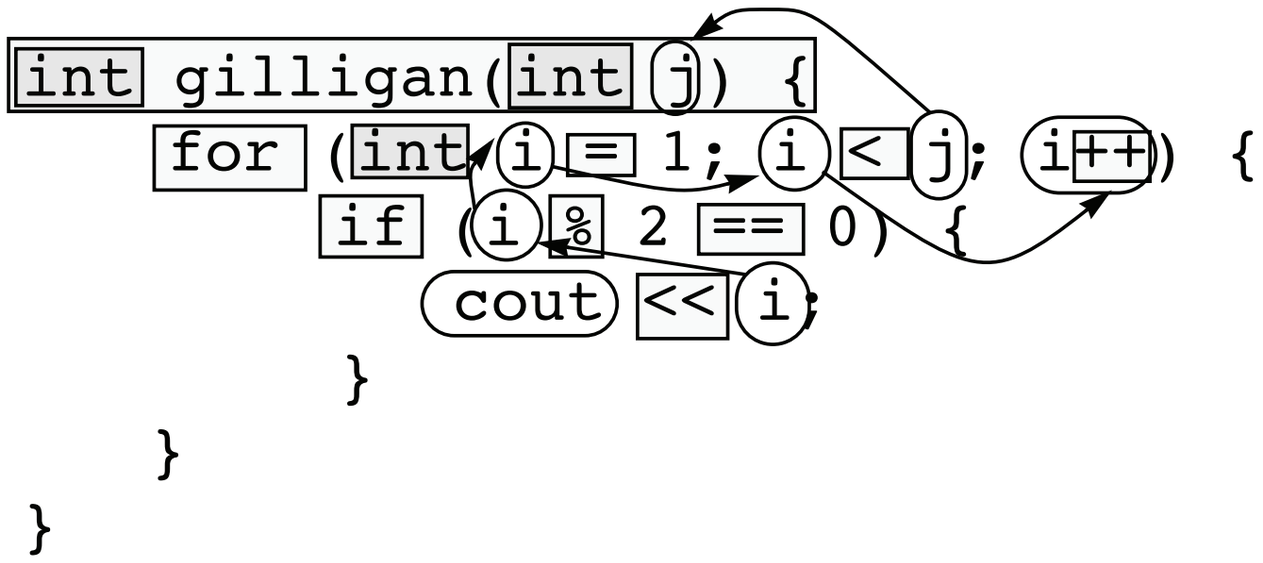
- Structural elements
  - nested centers
  - Levels of Scale
  - Local Symmetries
  - Deep Interlock
  - Gradients

Centers: Source Code



- Spatial factors
  - Positive Space
  - Good Shape

Centers: Source Code



- *<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

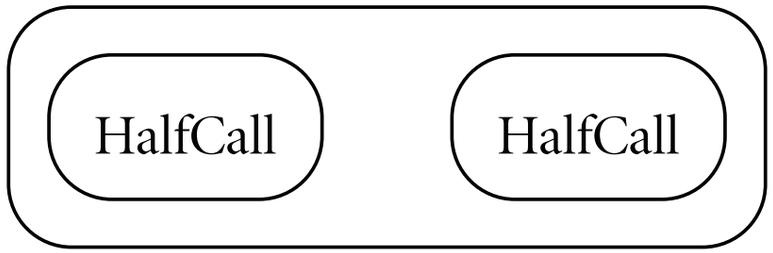
```
class Shape {
public:
   . . . .
protected:
   . . . .
private:
   . . . .
};
```

- Gradients

Centers: Diagrams

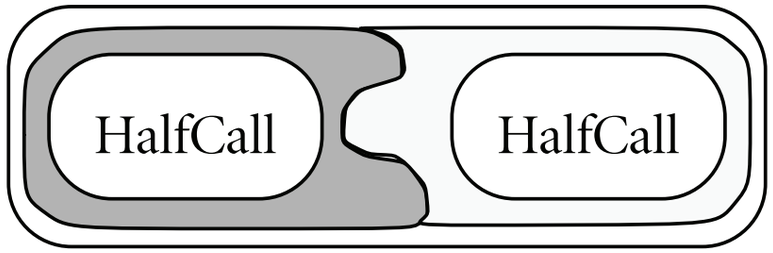
- Gerard Meszaros, "Pattern: Half Object + Protocol," PLoP 1995
- A single class named **PhoneCall**
- *Sometimes, however, a concept exists in both spaces . . . .*
- Latent centers

Centers: Diagrams



- 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.*

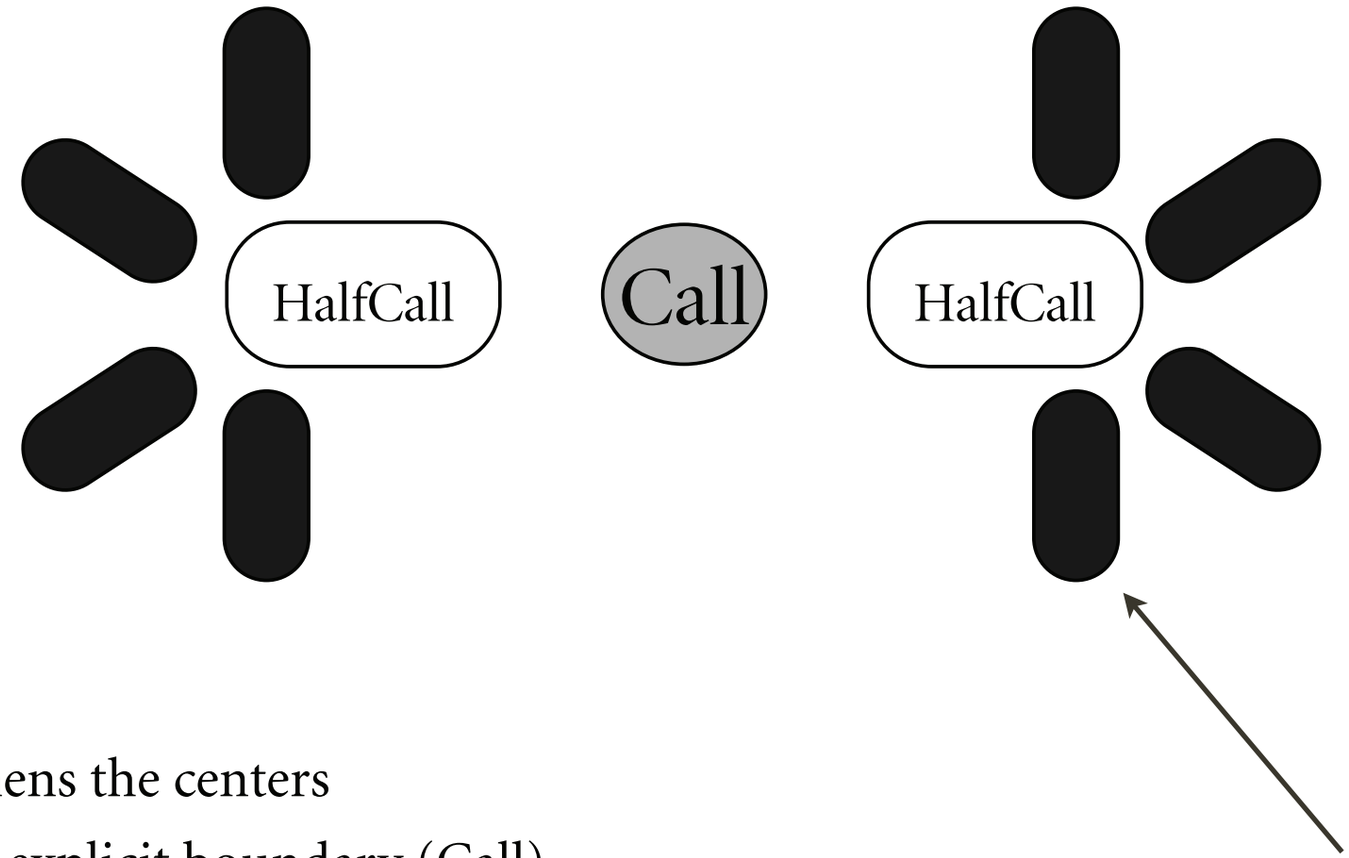
Centers: Diagrams



- 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?

And also at the two ends?

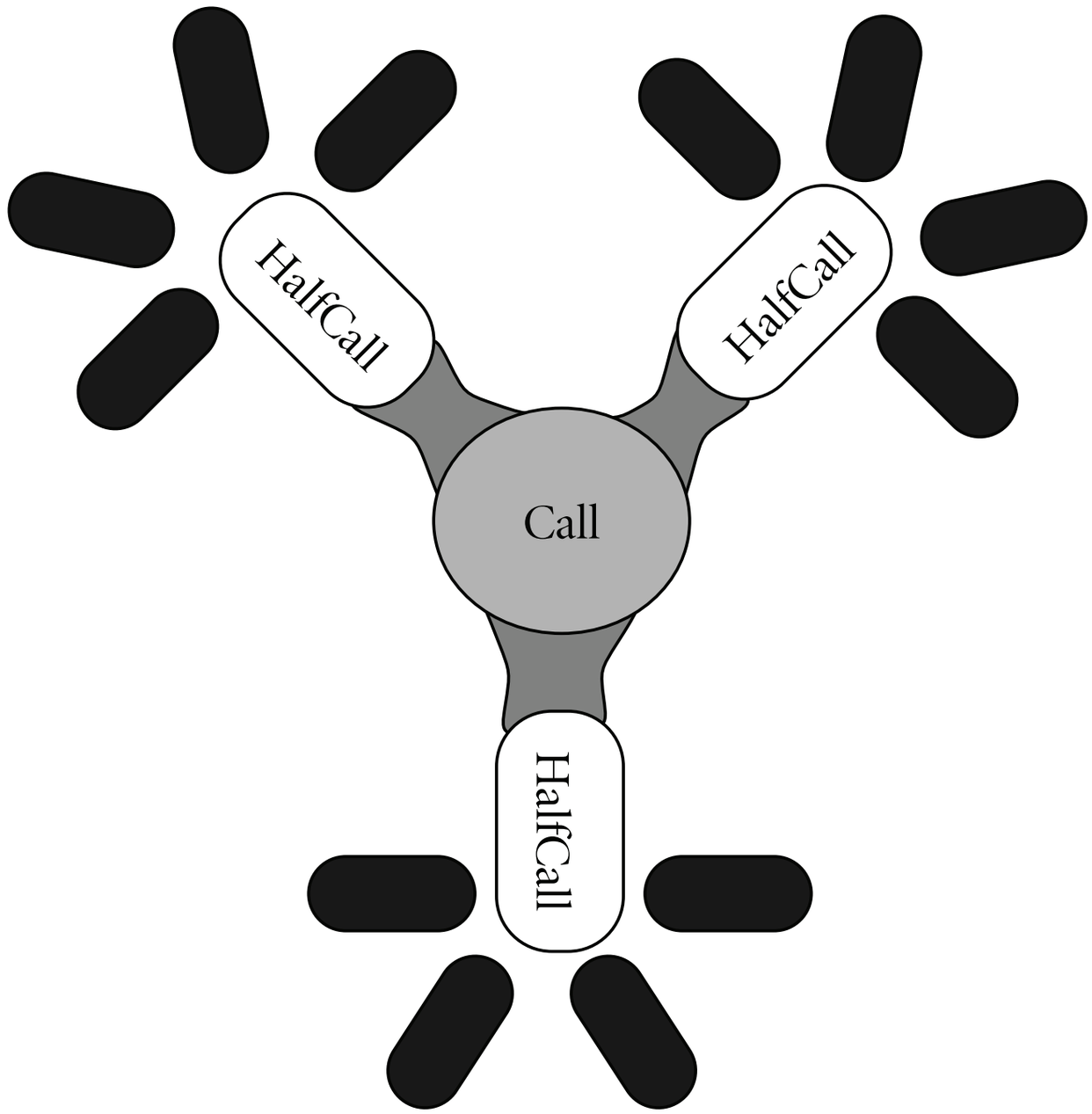
Centers: Diagrams



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

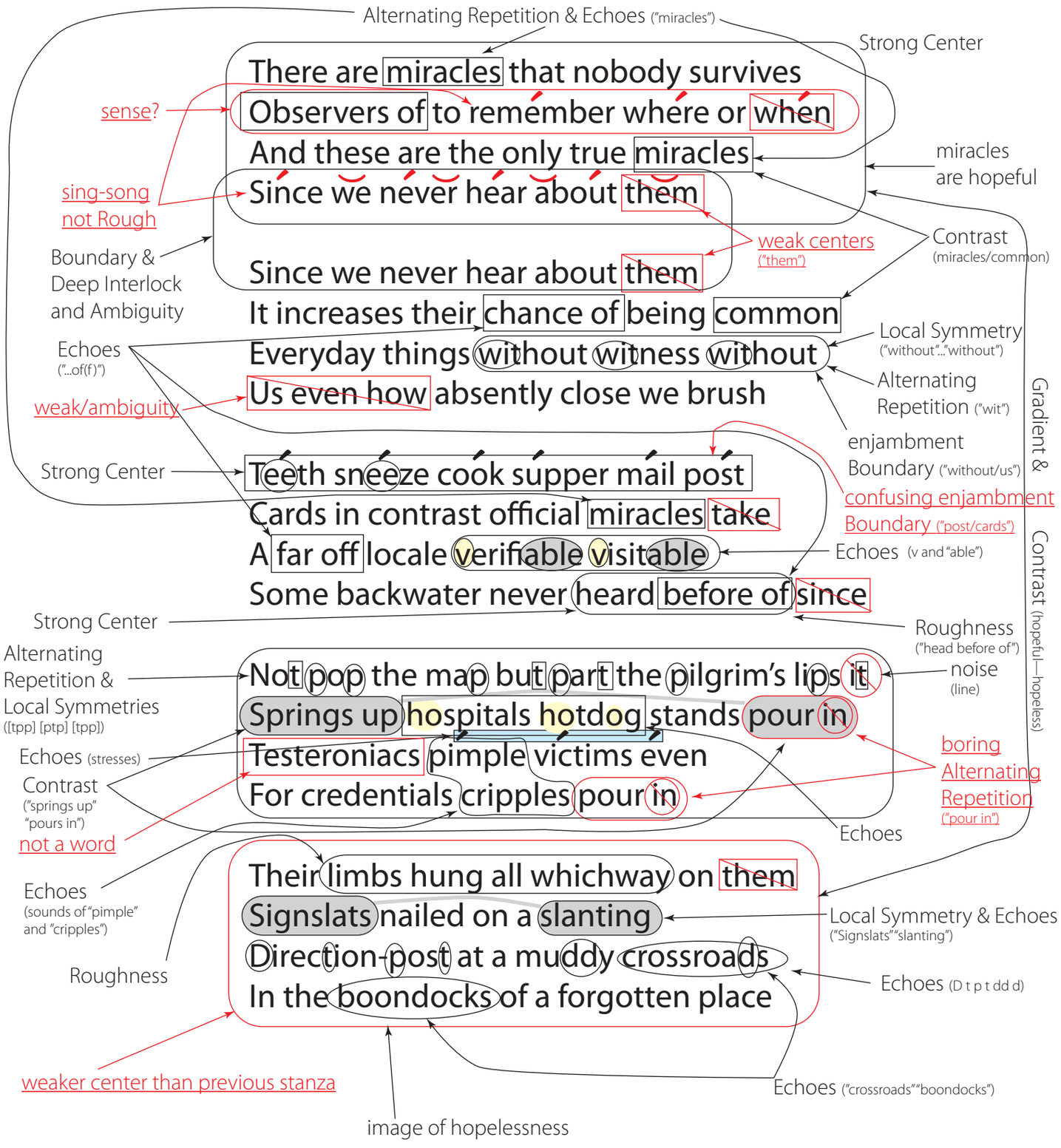
These can be multiple local people on the call or other devices

Centers: Diagrams



- Conference calls, multi-way calls

Lourdes


Alternating Repetition & Echoes ("miracles")
Strong Center
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 part the pilgrim's lips it
Springs up hospitals hotdog stands pour in
Testeroniacs pimple victims even
For credentials cripples pour in
Their limbs hung all whichway on them
Signslats nailed on a slanting
Direction-post at a muddy crossroads
In the boondocks of a forgotten place
sense?
sing-song not Rough
Boundary & Deep Interlock and Ambiguity
weak centers ("them")
miracles are hopeful
Contrast (miracles/common)
Local Symmetry ("without"..."without")
Alternating Repetition ("wit")
enjambment Boundary ("without/us")
Echoes ("...of(f)")
weak/ambiguity
Strong Center
confusing enjambment Boundary ("post/cards")
Echoes (v and "able")
Roughness ("head before of")
Gradient & Contrast (hopeful—hopeless)
Strong Center
Alternating Repetition & Local Symmetries ([tpp] [ptp] [tpp])
noise (line)
Echoes (stresses)
Contrast ("springs up" "pours in")
boring Alternating Repetition ("pour in")
not a word
Echoes
Echoes (sounds of "pimple" and "cripples")
Local Symmetry & Echoes ("Signslats""slanting")
Roughness
Echoes (D t p t dd d)
weaker center than previous stanza
Echoes ("crossroads""boondocks")
image of hopelessness

Lourdes

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 part the pilgrim's lips it
Springs up hospitals hotdog stands pour in
Testeroniacs pimple victims even
For credentials cripples pour in

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

sense?

sing-song
not Rough

weak centers
("them")

weak/ambiguity

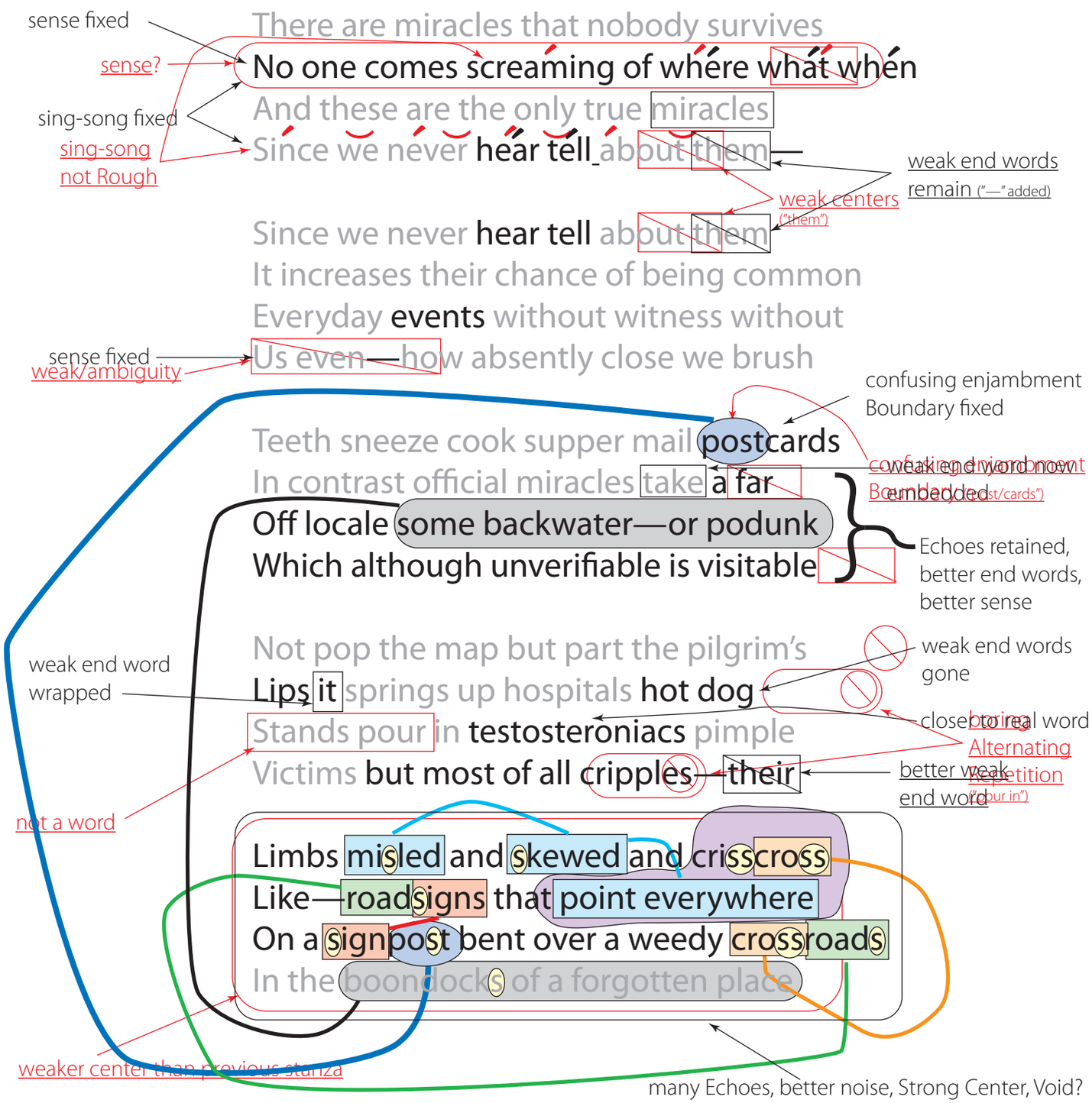
confusing enjambment
Boundary ("post/cards")

boring
Alternating
Repetition
("pour in")

not a word

weaker center than previous stanza

Lourdes


sense fixed
sense?
sing-song fixed
sing-song
not Rough
There are miracles that nobody survives
No one comes screaming of where what when
And these are the only true miracles
Since we never hear tell about them
weak end words
remain ("—" added)
weak centers
("them")
Since we never hear tell about them
It increases their chance of being common
Everyday events without witness without
sense fixed
weak/ambiguity
Us even—how absently close we brush
confusing enjambment
Boundary fixed
Teeth sneeze cook supper mail postcards
In contrast official miracles take a far
weak end word now
embedded
Off locale some backwater—or podunk
Which although unverifiable is visitable
Echoes retained,
better end words,
better sense
Not pop the map but part the pilgrim's
weak end word
wrapped
Lips it springs up hospitals hot dog
weak end words
gone
Stands pour in testosteroniacs pimple
Victims but most of all cripples their
closer to real word
Alternating
Repetition
("pour in")
better weak
end word
not a word
Limbs misled and skewed and crisscross
Like—roadsigns that point everywhere
On a signpost bent over a weedy crossroads
In the boondocks of a forgotten place
weaker center than previous stanza
many Echoes, better noise, Strong Center, Void?

The Nature of Order

Richard P. Gabriel
IBM Research