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STEVEN HOLL

PARALLAX

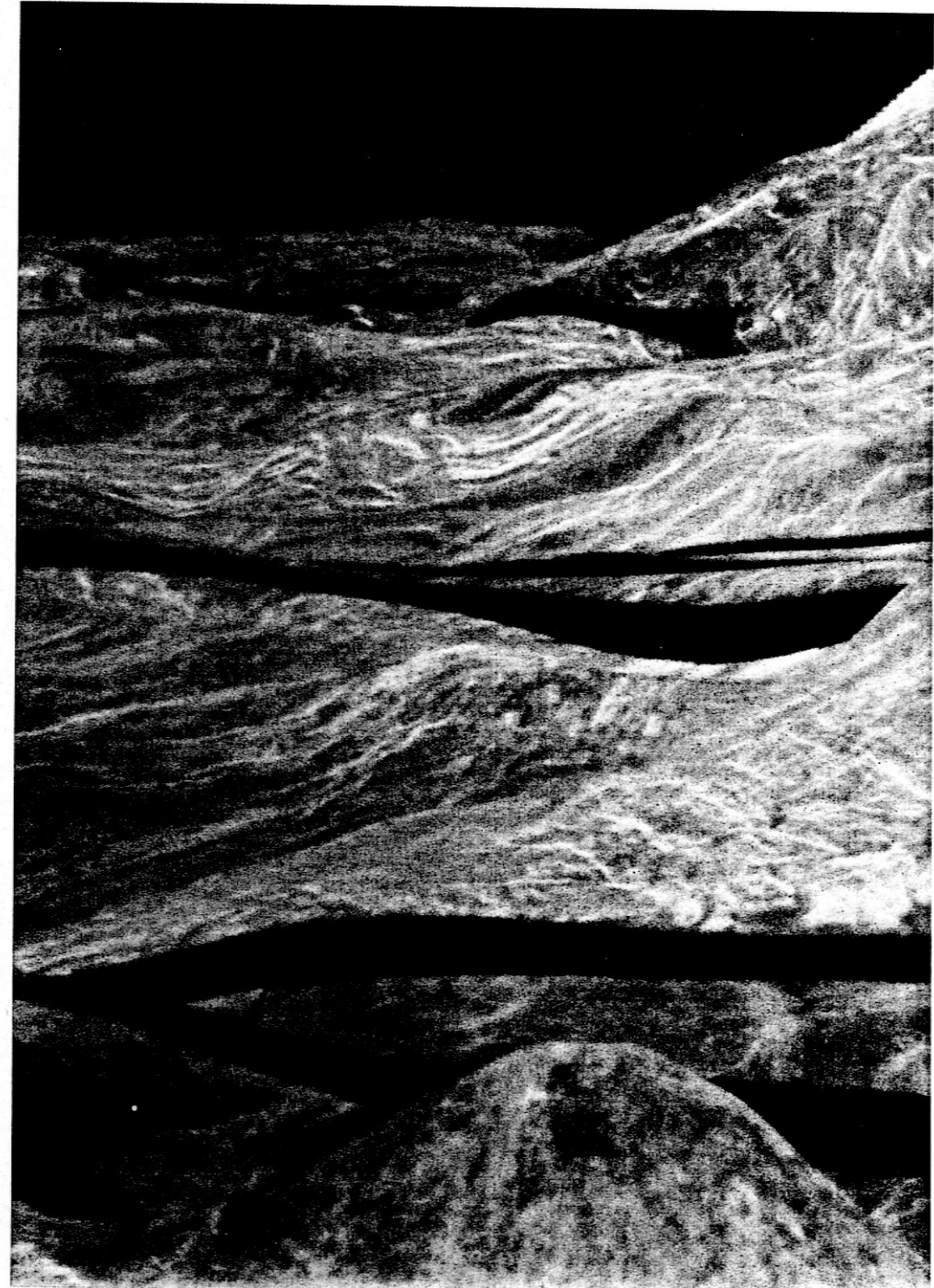
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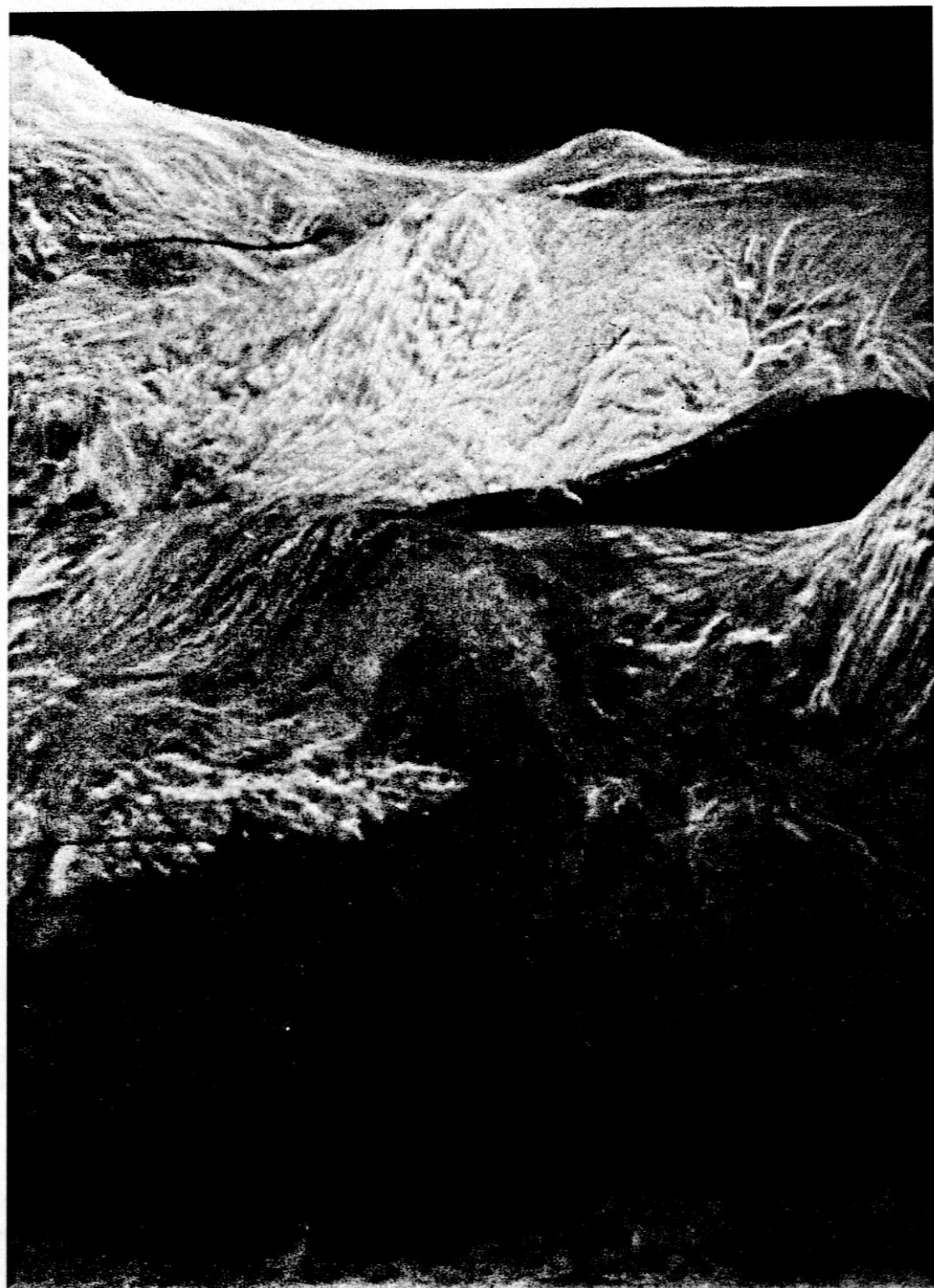
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ELASTIC HORIZONS

For over thirty years, emerging discoveries in science have stretched earth-bound horizons. Since Neil Armstrong's 1969 walk on the moon, we have viewed the Earth from a curved, dusty horizon. A more expansive knowledge of horizons beyond the Earth should not lead to a more diminished expectation for the Earth's tangible experiences. The inexpressible harmony of this world comes with a new organic understanding of dynamic systems. Microbiological discoveries and methods correlate with the cosmological. Evolution brings fractal, contingent, interactive, and combinative forms and methods. As a new template to understand space, our recharged perception offers new ideas to the spatial imagination.

Elasticity can be defined as a new malleable inner horizon in fragmented boundaries of tension, condensation, and expansion that challenge thought. In the twenty-first century, the horizons of our fundamental experiences have expanded and continue to expand. We experience and think differently, therefore we feel differently. How elastic are our minds? How far can we stretch them?





Perception is altered by science's spatial discoveries. New views of intergalactic space stretch psychological space. Experience is understood not only via objects or things, yet space is only perceived when a subject describes it. As that subject occupies a particular time, space is thus linked to a perceived duration. The virtual body, as a system of nerves and senses, is "oriented" in space. It is either upside down or right side up. The body is at the very essence of our being and our spatial perception. As we move through spaces, the body moves in a constant state of essential incompleteness. A determinate point of view necessarily gives way to an indeterminate flow of perspectives. The spectacle of spatial flow is continuously alive in the metropolis, as well as throughout the world. It creates an exhilaration, which nourishes the emergence of tentative meanings from the inside. Perception and cognition balance the volumetrics of architectural spaces with the understanding of time itself. An ecstatic architecture of the immeasurable emerges. It is precisely at the level of spatial perception that the most powerful architectural meanings come to the fore.

Surface of Venus seen from the cloud-piercing radar of *Magellan*

Light has a new prolific dimension today as a means of measurement and communication. Compared to the speed of light, all the tangible motions involved in our day-to-day experiences on Earth are tremendously slow. Sound travels at a relatively slow speed of 700 miles per hour compared to light, which travels 186,000 miles per second—the difference is so great that it is almost incomparable. The two fundamental theories of modern physics, general relativity (for the large scale) and quantum mechanics (for the smallest scales), are not yet reconcilable. Science remains essentially mysterious, yet our daily scientific and phenomenal experiences shape our lives; experience sets a new frame from which we interpret what we perceive.

Curtains of light: electrons from the solar wind rain down along the Earth's magnetic field lines. Color depends on the type of atom or molecule struck by the charged particles. The northern lights or aurora borealis are historically poetic and mythical—today full of new feelings.





In the mist of the metropolis at night, space dissolves before our eyes, only to take shape again within seconds. The spatial depth of the urban field cannot be objectified precisely. In its pulse the polarized position of our body and its perceptions are upset. If we explore spatial depth, then we can consider how objects appear correct or inverted. During our thought-experiments regarding space—especially space beyond the earthbound—we accept new spatial levels and, by the force of our imaginations, alter the known spatial levels of previous human existence.

Consider recent discussions of the behavior of a black hole in a galaxy 100 million light years away. Scientists estimate the capability of a black hole to pull matter in at a speed of six million miles per hour. The outer limit of a black hole, the realm of no escape for matter and light, is called the "event horizon." For example, the event horizon of a black hole 800 times the mass of the sun is roughly 3000 miles in diameter (the distance from New York to Los Angeles). The term "horizon" is open to new limits and new meanings with unforeseen discoveries.

Event horizon, black hole

A horizon is not only an optical condition but also a spinning moment in space-time. In this sense, the earth is not the ground. As things continue to float, they spin and accelerate. Centrifugal forces—like electronic loops with steel sword blades—propel centripetal grounds. The mechanical gives way to diverse, digitally dynamic systems. Still, we are organic beings. All of our objective relations begin from the inside out. We must form an extended comprehension of space and time at the scale of astronomical events while not losing the perspective of the microscopic.

Horizon with aurora borealis



Horizons of thought—ever larger, more expanded, incorporating rotations and energies—seek to reconcile the microscopic and the ecological dimensions contracting an earth-bound crisis. As the horizon of our globe contracts, the horizon of our thought expands. In the face of immeasurable transformations in thought, our values at every scale stand to be redefined.

A radarsat satellite allows us to see the Earth in a new way. A view of Antarctica's Lake Vostok; 140 miles by 30 miles wide with liquid sealed from view for over a million years.



WORKING WITH DOUBT

"Convictions are more dangerous enemies of truth than lies." —Nietzsche

Absolute zero temperature, the hypothetical point at which a substance would have no molecular motion, is -459.72 degrees Fahrenheit. The "absolute zero" temperature in physics can be said to correspond to absolute music—music that has no program and does not try to tell a story or describe a scene. We have reached a marvelous moment in architecture in which determinant developments can occur from any discipline. Architecture, no longer limited to beginning in architecture, can be inspired by music, poetry, sculpture, or scientific phenomena—hundreds, thousands of beginnings. If an idea is realized, related to a specific site and circumstance, its differential combinations should connect to the organic nonlinear and the infinite.

An absolute exists in the specific. Site, geometry, program, circumstance, and materials are for into spaces by an idea. A unique site and circumstance requires a specific idea, a "limited concept." More than just a verbally expressed idea, a limited concept sets a manifold relation. It refers to a nonhegemonic, local stability. It is semihierarchical. A limited concept states an ideal. An ideal aspiration in architecture is not eclectic. In the mind, an ideal is seen; it is a kind of perfection. It is closer to "classical" art than eclecticism. However, a limited concept thrives on going forward into the unknown, embracing doubt.

A concept can be in some cases mathematically precise. Mathematicians follow four laws in approaching a problem. They express it verbally, numerically, algebraically, and visually. Likewise architecture has a verbal concept, numeric size and proportion, algebraic integration of structure and material dynamics (and heat and cooling dynamics), and form. These four aspects forge an integrated connection for each site and program.

Mathematical codes dominate an absolute aim in today's Human Genome Project. They dominate the description of the double helix of DNA and yet James Watson and Francis Crick admit that a dream—the ultimate in subjectivity—was central to the discovery of DNA's structure. The subjective-objective transformations in the actions of life are not predetermined in genetic given; we move, adopt, and live in new ways. In order to live and act we make errors, corrections, and correlations in an active advance; that is, we work with doubt.

The power of working with doubt or suspending disbelief is fundamental for creative thought in science and in architecture. Today the absolute is displaced by the relative and by the interactive. Instead of stable systems, we work with dynamic systems. Instead of simple and clear programs, we engage diverse and contingent programs. We work with, instead of precision and exactness, intermittent crossbred methods and combinative systems. The dynamic and interactive are qualities of contemporary architecture that set it apart from the clarity of the classic and the functional purity of the modern. Today we long for an absolute architecture after decades of ameliorating historicism. We desire an architecture that is integral rather than empirical, that has depth rather than breadth; we desire an architecture that will inspire the soul.

Working with doubt can yield an intrinsic affirmation of human choice that gives presence to an idea. Without intrinsicness, there is no architecture. (Building construction continues regardless of the lack of architecture.) Architecture is for the bold in spirit; it rises to a pledge of inspired space out of a crowd of shrugging shoulders. A fusion of changing functions finds its flow within the open volume of an emphatic testimony, so that architecture today can in and of itself shape and inspire new feelings.

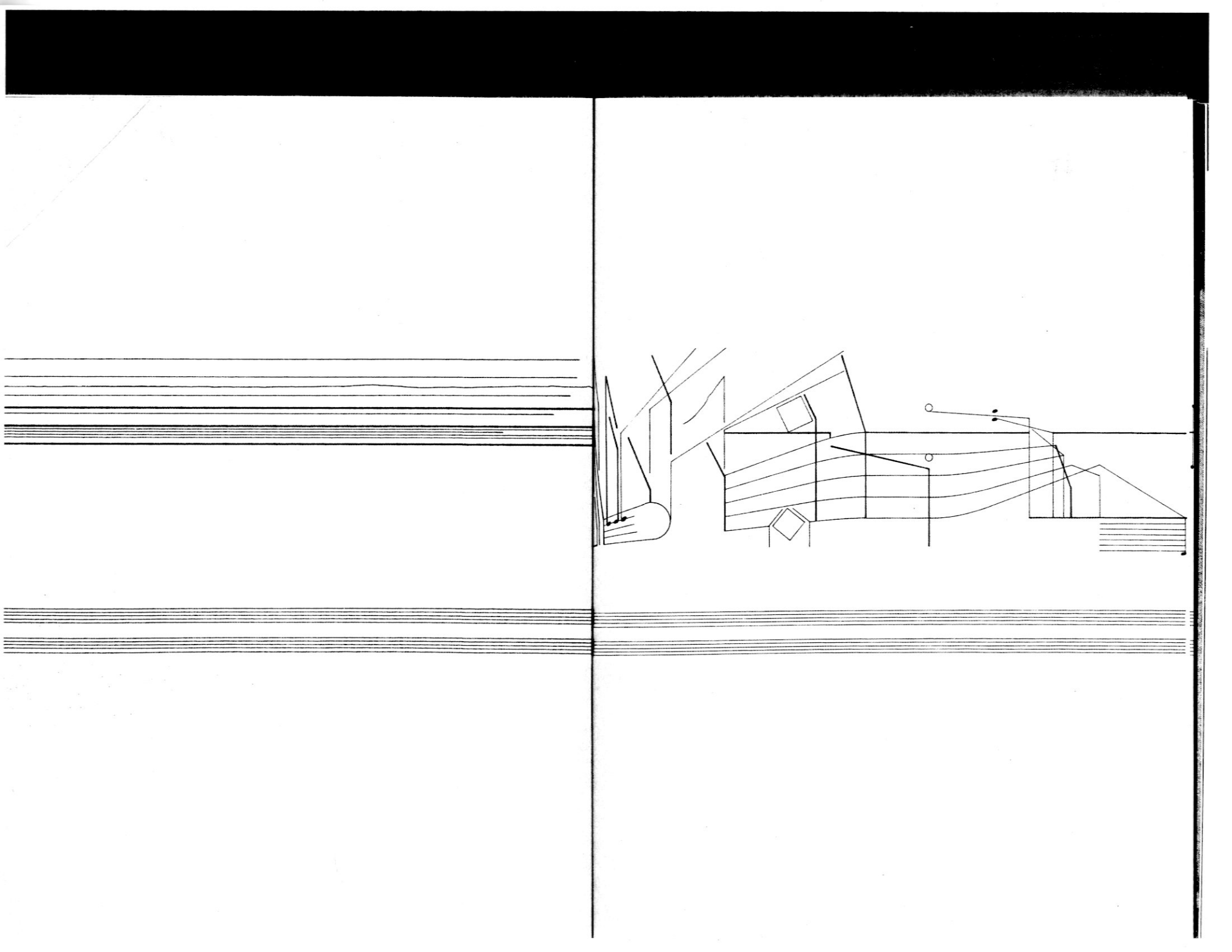
Yesterday's efforts to develop a technology for our needs have given way to an avalanche of new technologies and the challenge of incorporating them. Technology-guided function slips easily into technocratic architecture. Discoveries in science require a new relation to architecture, not a renewal of monastic rationality or deterministic thinking. A nonconformist openness explores new potentials while embracing archaic wisdom. Incongruous methods conduct explorations that are critical of science and yet that utilize ultramodern techniques, creating supercharged doubt.

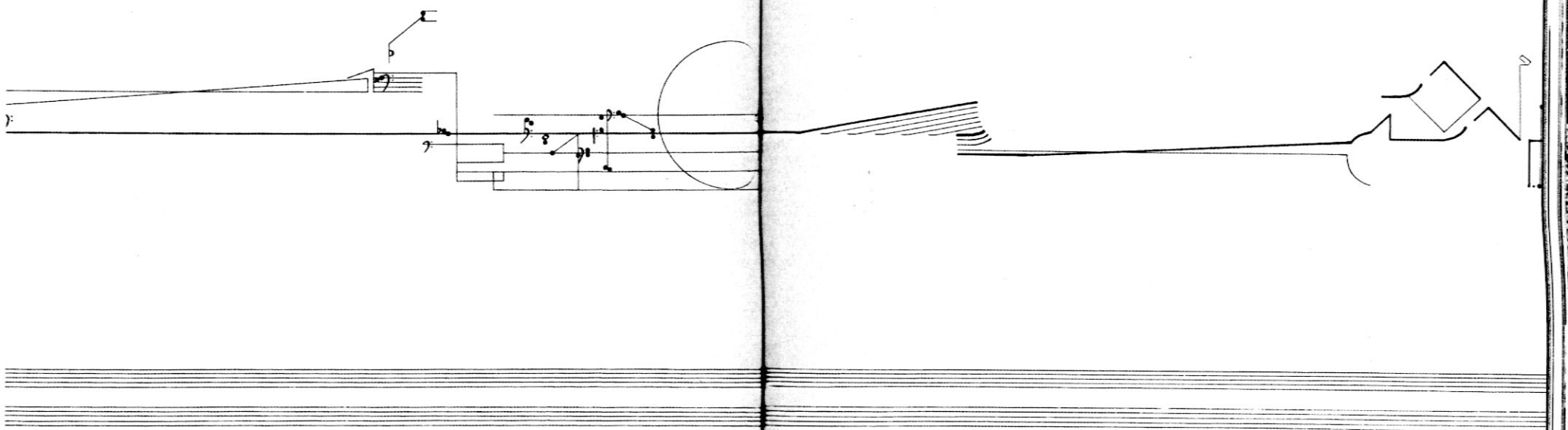
We should aspire to build an architecture free of taking one thing for another. Rising like blood to a slapped face, architecture is not generic; its passion is set ricocheting through the generic, causing a positive chain reaction of embracing feeling. Architecture challenges the generic and, in an intense realization, forms become specific.

Generalized, repeated, speculative constructions of rent-collecting maximization spring up continuously across the continent. Indifference to quality of life is the norm. Banality in excess yields a negativity, which has become apocalyptic in today's society. Faultless eyes watch social terrorism in the brittle world of suburban high schools. A fashionable (cynical) acceptance of commercial forces is opportunistic and unconvincing. Negative capability is the capacity to take in all that is problematic, and in the face of uncertainties, create. We need sincere architects with negative capability and the imagination to forge a catalyst for change.

Rather than a fixed and systematic background, a dynamic and relative world of change forces displacements. The hoped-for stable and unified theory in physics has given way to theories based on constantly changing parameters. Physicists speak of the universe as having a number of different possible phases comparable to different phases of matter. Allowing different possibilities in architecture requires opening up thought, comparable to new science—working with doubt. To doubt the validity of our ingrained opinions, ideals and views that we so hotly defend takes courage and endurance. What is our central paradox? A joy in doubt in the deepest sense of being.

Following: Absolute notation/indeterminate notation, first by John Cage, then by Cornelius Cardew, whose unfettered approach embraced the radical openness of indeterminacy.





THE STONE AND THE FEATHER

(LANDSCAPE INTO ARCHITECTURE)

"Whole thing works on gravity. Heavy falls and the light floats away."

—Wheat rancher explaining how a threshing machine operates

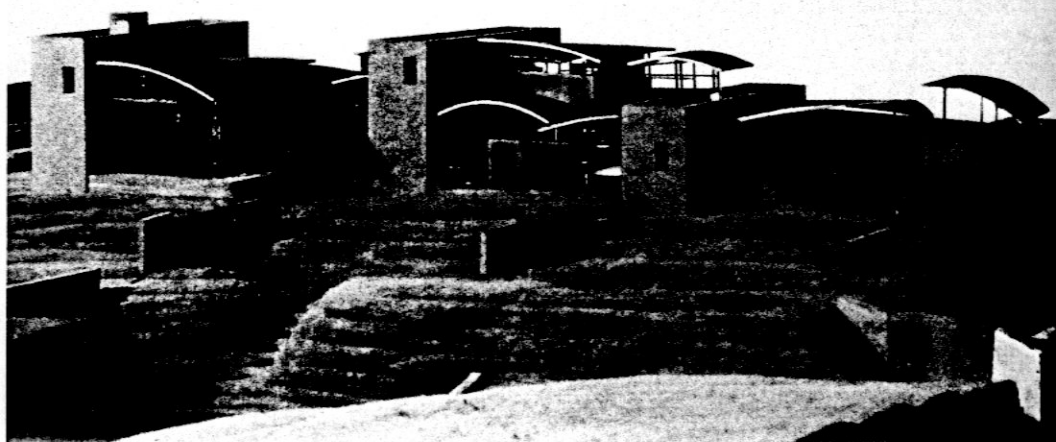
Buckminster Fuller was a pioneer of the lightweight, of liberating the building from gravity. He invented a conscious lightness. "How much does your building weigh?" was his question. He counterpoised heavy stone, brick, and timber with the birdlike frame and the featherweight tensile skin. His systems of spider-web tensile domes and frames rejected the heavy for the light, linking weight and efficiency to politics and power.

In contrast to Fuller's singular, monistic philosophy, Italo Calvino's musings in one of his last texts, *Six Memos for the Next Millennium*, stated that "two opposite tendencies have competed in literature: one tries to make language into a weightless element that hovers above things like a cloud, or perhaps the finest dust, or better still a field of magnetic impulses. The other tries to give language the weight, density, and concreteness of things, bodies, and sensations." (Cambridge, MA: Harvard University Press, 1988, p.15) Calvino circumscribes weight and weightlessness as two separate conditions.

A phenomenal architecture calls for both the stone and the feather. Sensed mass and perceived gravity directly affect our perceptions of architecture. The weight of the low, thick, brick arches in Sigurd Lewerentz's Church at Klippan outside of Stockholm conveys the power of gravity and mass. Dim light gains its power from both the heaviness of the brick masses overhead and its effect on the inner spaces. A duality exists in the bricks' weight pressing in on the dim light.

Fuller tensile experiment from the book *Inventions*





material x sound
time

=

material x light
space

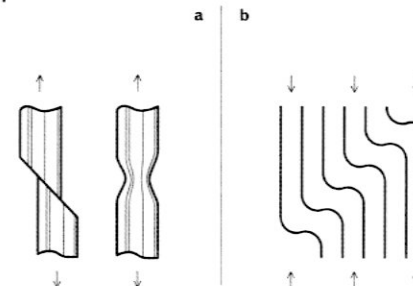
Architecture's expression of mass and materials according to gravity, weight, bearing, tension, and torsion reveal themselves like the orchestration of musical instruments. Material is made more dynamic through the contrast of heavy (bass, drums, tuba) and light (flute, violin, clarinet). The contrast in mass of the bass instruments in Béla Bartók's "Music for Strings, Percussion, and Celeste" is emphasized by the physical separation of the light and heavy instruments on stage during the performance of the piece. The materiality of music is resonantly conveyed via the instruments to aural temporal experience. A heavy and light materiality is likewise conveyed via the structure, material, and spatial experience of architecture.

The Stretto House we built in Dallas, Texas, in 1991 was an experiment in parallel to the Bartók composition. The composition in four movements alternates from the heavy "spatial dams" of concrete block to the billowing, tube-framed, lightweight roof structures. The house flows like the adjacent stream as it merges with the landscape laterally. The center of the composition is a "flooded room" where the waterscape fuses with the building. The heavy and light tectonic concept aims toward a new field of landscape merging with architecture.

Below a: Failure of steel in tension, by shearing at 45 degrees and by necking

Below b: Compression failure in wood

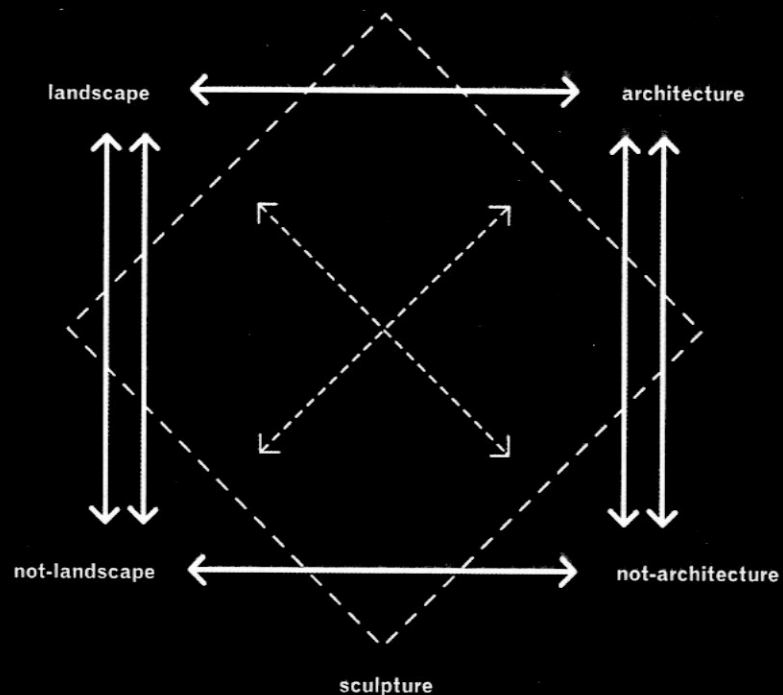
Left: Stretto House, Dallas, Texas, 1991



The force of gravity as a function of mass and distance can be expressed by $F=GmM/r^2$. On the moon with less gravity, objects have less weight. Gravity draws a stone quickly to the ground, while a feather zigzags slowly through the air, lifted by the opposing forces of friction and buoyancy.

The ideal of complementary contrast drove our design for an addition to the 1933 Nelson-Atkins Museum in Kansas City, Missouri, a model of classical stone temple and surrounding landscape. We envision a new paradigm fusing landscape and architecture in the new portion of the museum. In contrast the new lightweight architecture of glass lenses is scattered about the landscape, engaging the great sculpture garden. The visitor's experience will be newly charged with an experience of views and partial views of landscape; sequences of shifting perspectives charge spaces where landscape merges with architecture.

Right: Diagram from Rosalind Krauss's argument "Sculpture in the Expanded Field"



POROSITY

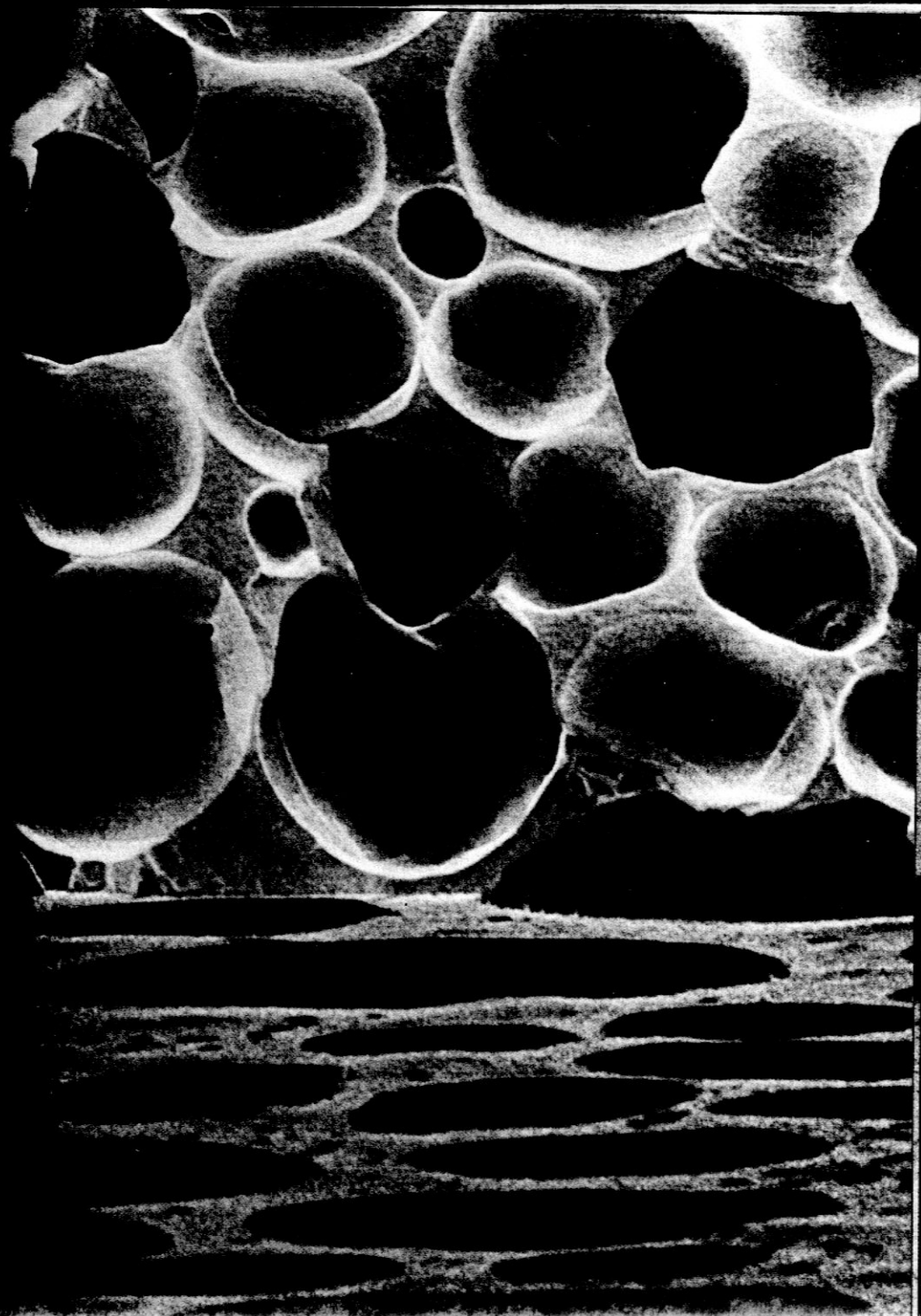
(FROM THE TYPOLOGICAL TO THE TOPOLOGICAL)

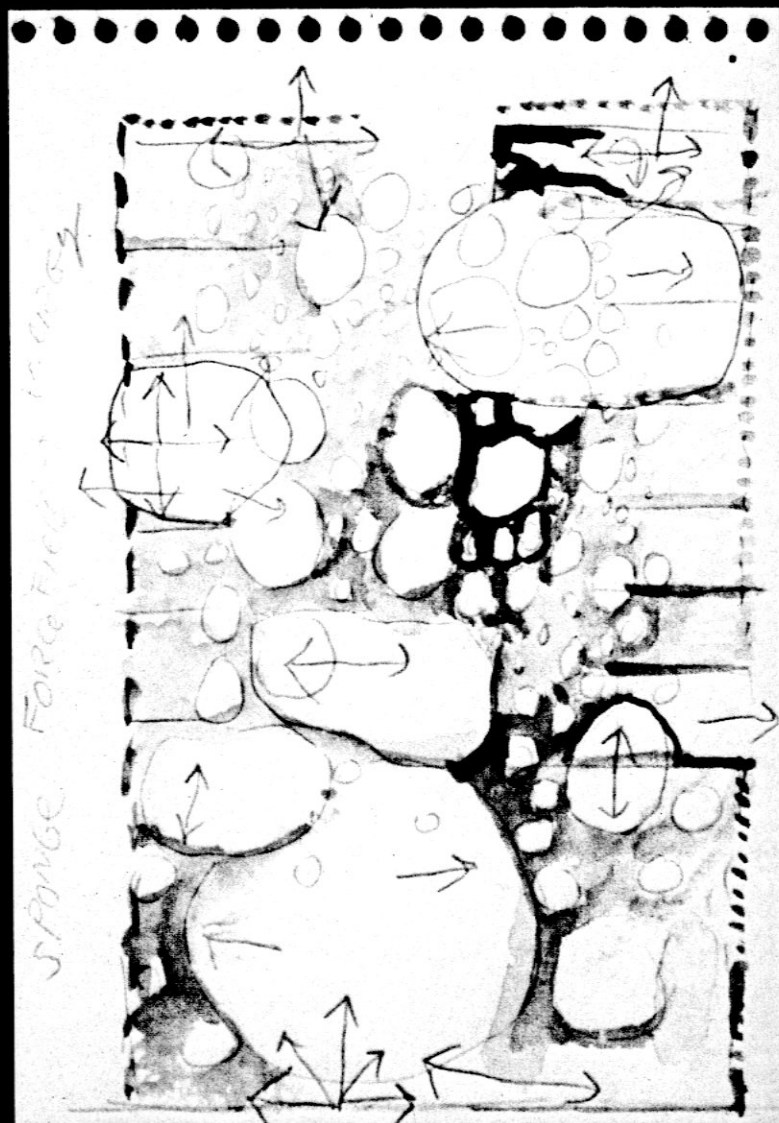
In the 1980s, I published little manifestoes in the *Pamphlet Architecture* series. In two issues, *The Alphabetical City* and *Urban and Rural House Types*, I argued for reconstructing the city by stark interpretations of type, a zero ground of architecture.

In 1984, on a long train ride across Canada, a philosophy student introduced me to the work of Maurice Merleau-Ponty. Critical of the Kantian, the Bergsonian, and the Sartrean methods, I immediately connected to architecture in the writings of Merleau-Ponty. I began to read everything that I could find of his work.

The train trip had a turning point—the "spiral tunnel," a famous construction through a large mountain. Its spiral space echoed the change in my thinking from the typological to the topological. The problem with a theory of architecture that begins in type is the impossible gap between analysis and synthesis. With the reflective capacities of phenomenology, an intrinsic understanding of space, and a pure passage from the sign to the signified, it is possible to move from the particular to the universal. The seer and the architectural space were no longer opposites; the horizon includes the seer. A new topological openness in the form of a field that extends to a "horizon-structure" became my theoretical frame (no longer simple morphology-typology).

Our book *Questions of Perception: Phenomenology of Architecture (A+U, 1993)* is divided into eleven "Phenomenal Zones": 1. Enmeshed Experience: The Merging of Object and Field; 2. Perspective Space: Incomplete Perception; 3. Of Color; 4. Of Light and Shadow; 5. Spatiality of Night; 6. Time Duration and Perception; 7. Water: A Phenomenal Lens; 8. Of Sound; 9. Detail: The Haptic Realm; 10. Proportion, Scale, and Perception; 11. Site, Circumstance, and Idea. This book (with contributions by Alberto Perez-Gomez and Juhani Pallasmaa) broke clear of postmodernism's countermovement, deconstruction.

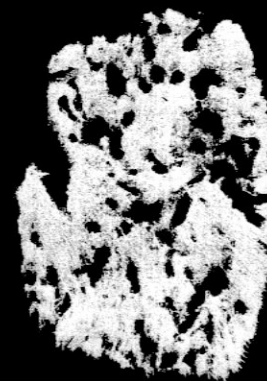




Merleau-Ponty's concepts are pivotal to our architectural methods. As he states, environments include patterns, "lines of force," and—if we can read them—meanings. Focusing on the essential characteristics of a situation and the geometry of a structure creates ways of dealing with problematic elements. For example, what if one aspect of a site—porosity—becomes a concept? Porosity can be a new type of being. Its potentiality of consciousness indicates an opening where the horizon is included within it. We hope to develop the possibility of a collection of things held together in a new way where the "horizon" is open and merges with both exterior and interior.

Left: Study for undergraduate Residence, MIT, Cambridge, Massachusetts, 2001.
Force fields of energy—sponge voids in section.

Below: Natural sponge with grain variations in each face



Our project for an undergraduate residence for 350 students at the Massachusetts Institute of Technology began by rejecting an urban plan that called for a wall of brick buildings of a particular “Boston type.” Instead, we argued for urban porosity. Along the 2100-foot strip of Vassar Street, a series of buildings would each demonstrate porosity in four different ways: horizontal, vertical, diagonal, and overall porosity. We developed horizontal porosity in a “folded street” concept that merged 1:20 sloped sections of lounge-corridors with rooms in suspended trusses. After we completed all schematic drawings, we were told that the planning authorities would not allow a building over 100 feet in height. We immediately shifted to another example in our porous urban strip—the sponge—to create overall urban porosity.

The building mass has five large-scale openings, which due to the PerfCon structure require no beam cantilevers. The next scale of openings—the vertical voids—are geometrically developed from ruled surfaces, which vertically connect “sponge paintings” made on every other floor plate. These voids become activist areas of the house lounges and are filled with light and air. The extra-wide main corridors are broken by these vertical voids, like events along a city street.

The 9'-3" height of the ceilings offers the last luxury—the luxury of space. Students will manipulate, pile up, recreate with, and interact with these open volumes. Due to the 20-inch depth of the window wall, summer sun is blocked from entering directly while winter sun is drawn in. Night light from the "sponge" will be an indeterminate urban event, a dynamically random sparkling orchestrated by the students.

Concept diagrams: Urban porosity; individual building porosity

Following page: Diagram of inner voids: sponge painted plans connected by ruled surfaces through two floors

