

STRANGE HORIZON  
Buildings, Biograms, and the Body Topologic

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Computer-assisted topological design technique in architecture is no longer a novelty. With the required software and hardware becoming more accessible, paperless studios and offices are less the exception they once were. With growing familiarity have come inklings of discontent. There is a common drift to many of the reactions voiced at lectures, conferences, and in the classroom. It seems to be a widely held opinion that the abstractness of the digital space of topology contradicts the spatial reality of bodies and buildings. We do not live in non-Euclidean space, the objection goes. Why then are you foisting mutant geometries on us that don't correspond to anything real? Topological architecture is just too abstract. It can't connect to the body as we experience it. Besides, you can animate architectural design practice as much as you like. You still end up with a building that isn't going anywhere. It's all a sham. Design techniques based on continuity and movement rather than static form betray themselves in the fixity of their final product. If you're so stuck on continuity, where's the continuity between your process and its product? It's all very pretty, but why should we, your public – livers-in and passers-by buildings – why should we care?

What if ... *the space of the body is really abstract*? What if the body is inseparable from dimensions of *lived abstractness* that cannot be conceptualized in other than topological terms? The objections that topological architecture is too abstract and doesn't connect at all with the body would dissipate. Conversely, the question of how precisely the process continues in the product would become all the more pressing. Topological architecture would need to do more than it has up to now to develop a response. After all, its very effectiveness as a design method is in the balance. The answer may well disappoint partisans of concreteness incarnate. It may turn out that computer-assisted topological design technique has inadequately addressed the question

of its end-effectiveness because *it is not abstract enough* yet to be a fitting match for the abstract resources of “concrete” experience.

## THE ARGUMENT FROM ORIENTATION

It is with some chagrin that I confess to having sat contentedly in my temporary office at the Canadian Centre for Architecture for no less than two months looking at the wrong street out the window. I was looking east onto rue St-Marc. But I was seeing north onto rue Bailie. I am sad to report that there is no resemblance between the two scenes. Something was happening in the time it took me to get from the side entry of the building to the door of my office that was seriously disorienting me. But that’s just the half of it. The something seriously disorienting that was happening as I snaked my way through the corridors overpowered the evidence of my eyes. It was completely overriding the clear-as-day visual cues available to me out the window of my office. The sudden realization that my north was everyone else’s east was jarring. True, I hadn’t paid much attention to the scene. But I wasn’t just not paying attention. When it hit me, I had the strangest sensation of my misplaced image of the buildings morphing, not entirely smoothly, into the corrected scene. My disorientation wasn’t a simple lack of attention. I had been positively (if a bit vaguely and absent-mindedly) seeing a scene that wasn’t there. It took a moment’s effort to replace what positively hadn’t been there with what plainly was. When you actively see something that isn’t there, there is only one thing you can call it: a hallucination. It was a worry.

Thinking about it, I realized that I could make my way to and from my office to the exit without error, but if I had been asked to sketch scenes from the corridors or to map the route I couldn’t have done it with any accuracy. I had precious little memory of the way – yet I navigated it flawlessly. Correction: I had precious little *visual* memory of the way. I must have been navigating on autopilot using some form of basically nonvisual memory. If I put myself mentally through the paces of exiting, instead of seeing passing scenes I felt twists and turns coming one after the other with variable speed. I was going on a bodily memory of my

movements, one of contorsion and rhythm rather than visible form. There is in fact a sixth sense directly attuned to the movement of the body: proprioception. It involves specialized sensors in the muscles and joints. Proprioception is a self-referential sense, in that what it most directly registers are displacements of the parts of the body relative to each other. Vision is an exo-referential sense, registering distances from the eye.

It appears I had been operating on two separate systems of reference: a predominantly proprioceptive system of self-reference operating in the tunnel-like bowels of the building, and a predominantly visual system of reference for the vistas outside. The two systems were not calibrated to each other. Or they hadn't been, until my moment of hallucinatory truth before the window. Their respective spaces of orientation had been noncommunicating, like qualitatively different monads of experience. The idea that this is not as unusual a situation as my initial concern had suggested came to me in the subway on the way home. If you have ever ridden a subway, it is likely that you have had a similarly jarring experience when surfacing to street level.<sup>i</sup>

That must be it. The paucity of visual cues in tunnel-like places like corridors and subways requires a back-up system to take over from the usual way of orienting: using visible forms grouped into fixed configurations to make what psychologists call cognitive maps. I had a happy ride. Until I thought about how I had just gotten where I was. My memory of getting from the exit of the building to the subway stop just moments before was virtually blank. Not quite (not again!): twists and turns in rhythm. Yes, again, I had been on autopilot. I had gotten to the train by habit, and it was evidently my proprioceptive system of reference that seemed to be the habitual one, window or tunnel, vista or no vista. Clear visual images of forms in mapped configurations now seemed the exception. Landmarks I remembered. Sporadically. Rising into the light from rhythms of movement, as from an unseen ground of orientation, in flux.

Close your eyes and try to make your way to the fridge. Your visual memory of the rooms and the configurations of the furniture will start to fade within seconds. But chances are you will “intuitively” find your way to the food with relatively little difficulty. Especially if

you're beginning to get hungry. If you think about it, we all go about most of our everyday lives on habitual auto-pilot, driven by half-conscious tendencies gnawing at us gently like mild urban hungers. Orienting is more like intuitively homing in on the food with your eyes closed than it is like reading a map. Something is rotten on the shelf of spatial-experience theory. Cognitive maps, built on the visual basis of generic three-dimensional forms in Euclidean geometric configurations, aren't all that they are advertised to be. As a general explanation of orientation, they are past their use-by date. The way we orient is more like a tropism (tendency plus habit) than a cognition (visual form plus configuration).

Research in spatial orientation has been stumbling in the same direction. Recent studies assumed the traditional cognitive model, based on "reading" visual cues embedded in the forms and configurations of objects. It was found, however, that the brain's ability to orient increased the *emptier* the space. The conclusion was that humans orient more by the "shape of the space" than the visual characteristics of what's in it.<sup>ii</sup> But what is the shape of empty space?

Indeterminate – except for the rhythm of movement through it, in its twistings and turnings. The studies were suggesting that the proprioceptive self-referential system – the *referencing of movement to its own variations* – was more dependable, more fundamental to our spatial experience, than the exo-referential visual-cue system. Self-referential orientation is called "dead-reckoning," after the nautical term.<sup>iii</sup> It is known to be the basis of many animals' ability to orient. It is a key element, for example, in homing pigeons' well-known feats of navigation. Its role in human orientation has significant implications for our understanding of space because it *inverts the relation of position to movement*. Movement is no longer indexed to position. Rather, position emerges from movement, from a relation of movement to itself. Philosophically, this is no small shift.

It takes little reflection to realize that visual landmarks play a major role in our ability to orient. Landmarks stand out, singularly. Most of us would be capable of pasting them together into a visual map. But to do that, you have to *stop* and think about it. It takes effort – an effort

that interferes with the actual movement of orientation. *Cognitive mapping takes over where orientation stops.*

The way landmarks function in the actual course of orientation is very different from reading a map. They are what you habitually head for or away from. They trigger *headings*. Vectors. Landmarks are like magnetic poles that vectorize the space of orientation. A landmark is a minimal visual cue functioning to polarize movement's relation to itself in a way that allows us habitually to flow with preferential heading. The vectorial structuring effected by landmarks give the space of orientation a *qualitative* dimension, expressed in tropistic preference. The cognitive model assumes that visual cues are somehow used to calculate distances, as if our brains were computers pre-programmed in inches and feet. Isn't it more plausible instead that our bodies are habituated in steps? And that steps relate more directly to other steps than they do to conventional feet? The computational fiction is a natural outgrowth of the assumption that we effectively move through and live in a static, metric or quantitative, Euclidean space. I for one don't count my way around town. A qualitative space of moving, step-by-step self-reference accords better with my navigationally competent (if at times cognitively challenged) sense of where I am.

Landmarks rise up visibly from a nonvisual sea of self-related movement. They refer more directly to the self-referencing of the movements surrounding them than to each other. Fundamentally, each landmark stands alone with its associated coursings. What they mark most directly is a *monad* of relation, a patch of motion referencing its own self-variations (the multiple headings it carries). Landmarks and their associated patches of qualitative relation can be pasted together to form a map – but only with an additional effort that must first interrupt the actual course of orientation. It is in a second moment, in an added operation, that the quantifiable cognitive product is fed back into the space of movement. This can indeed increase the flexibility and precision of a body's orienting. But it remains that cognitive mapping is secondarily applied to the experience of space, or the space of experience. This makes it an *overcoding* – a certain way in which experience *folds back on itself*. It is very uncommon, a limit-case rarely attained,

that we carry within our heads a full and accurate map of our environment. We wouldn't have to carry maps on paper if we had them in our brains. No matter how consciously overcoding we like to be, our mappings are riddled with proprioceptive holes threatening at any moment to capsize the cognitive model (like the empty quarters filled with sea-monsters on medieval maps). No matter how expert or encompassing our cognitive mapping gets, the monstrous sea of proprioceptive dead reckoning is more encompassing still. We are ever aswim in it.

The very notion of cognitive overcoding implies that we orient with two systems of reference used *together*. The contradiction between them is only apparent. Pragmatically, they co-function. Visual cues and cognitive mappings function as storage devices allowing us more ready reaccess to less habituated proprioceptive patches. They also serve as useful correctives, when we find ourselves hallucinating buildings that positively aren't there. The reverse is also true: proprioceptive orienting can act as a corrective to visual awareness. When we are momentarily lost, the buildings in front of us are in plain view. They may be strangely familiar, but we still can't place ourselves. Oddly, the first thing people typically do when they realize they are lost and start trying to reorient is to look away from the scene in front of them, even rolling their eyes skyward. We figure out where we are by putting the plain-as-day visual image back in the proper proprioceptive sea-patch. To do that, we have to interrupt vision, in the same way visual awareness interrupts proprioception. The alarmingly physical sense we feel when we realize we are lost is a bodily registering of the disjunction between the visual and the proprioceptive. Place arises from a dynamic of interference and accord between sense-dimensions.

Our orienting abilities, then, combine the resources of two different dimensions of experience. The places we plainly see as we go about our daily lives are products of a cooperation between two sense systems. A *synesthetic* system of cross-referencing supplements a systemic duality, exo-referential and self-referential, positional and moving, Euclidean and self-varyingly monadic. Synesthetic cooperation links these dimensions to each other, always locally – specifically, where we are lost. Cross-sense referencing forms a third hinge-dimension of

experience. This “lost” dimension of experience is where vision’s conscious forms-in-configuration feed back into the vectorial tendency-plus-habit of proprioception, and where proprioception feeds forward into vision. Where we go to find ourselves when we are lost is where the senses fold into and out of each. *We always find ourselves in this fold in experience.*

An aside: If the positioned sights we plainly see always result from synesthetic interference and accord, was there really a difference in nature between the sight I positively saw that wasn’t there out my window, and the one I laboriously replaced it with? Weren’t they just two sides of the same coin: the interference side and the accord side? If every effectively placed experience is a synesthetic production, it becomes difficult to maintain that there is a difference in nature between hallucination and perception. Isn’t it just a pragmatic difference, simply between cross-referenced and not cross-referenced? It would stand to reason that there would be a kind of continental drift naturally affecting proprioceptive experience patches due to their self-referential, monadic operation. Their mode of *reality* demands it. Isn’t getting lost, even seeing things that aren’t there, just a momentary grounding in an impractical dimension of reality? It is the encompassing reality of what we really experience in a spatial way that gets lost if we try to limit our understanding of space too narrowly to vision in its exo-referential single-sense functioning and the associated Euclidean geometry of form-in-configuration. In Euclidean vision, where we always find ourselves is what gets lost.

Look at things from the proprioceptive side. Its elements are twists and turns, each of which is already defined relationally, or differentially (by the joint nature of the proprioceptors), before entering into relation with each other. That makes the relation entered into among elements a double differentiation. The elements fuse into a rhythm. The multiplicity of constituents fuses into a unity of movement. The resulting patch is a self-varying monad of motion: a dynamic form figuring only vectors. Although effective, the dynamic form is neither accurate nor fully visualizable. It is operatively vague, a vector space not containable in metric space. It is a qualitative space of variation referenced only to its own movement, running on autopilot. It is not a space of measure. To get a static, measurable, accurately positioned, visual

form, you have to stop the movement. This capsizes the relation between movement and position. Now position arises out of movement. Static form is extracted from dynamic space, as a quantitative limitation of it. An exact vector space feeds its self-variational results into the limitative conditions of quantitative, Euclidean space, populated placidly by traditional geometric forms plottable into configurations.

Doesn't this sound familiar? Doesn't the proprioceptive experience-patch sound an awful lot like a topological figure in the flesh? Doesn't the way it all shapes up sound a lot like the way Greg Lynn describes computer-assisted design – starting with differential parameters that automatically combine to govern unities/continuities of self-varying movement, ending only when the program stops running, leaving a Euclidean form as a static witness to its arrested dynamism?<sup>iv</sup> Doesn't topological design method digitally repeat what our bodies do noncomputationally as we make our way to and from our work stations? Then when we watch the program run, aren't we doing it again, slumped before the screen? Are we not immobily repeating our body's ability to extract form from movement? When we stare, barely seeing, into the screen haven't we entered a "lost" body-dimension of abstract orientation not so terribly different from the one we go to when we roll up our eyes and find ourselves in the fold?

The proprioceptive dimension of experience was described as one of two experiential dimensions. But the two were also described as folding into each other. That folding of the Euclidean and non-Euclidean into and out of each other is itself understandable only in topological terms. This hinge-dimension between quantitative and qualitative space is itself a topological figure – to the second degree, since topology already figures in it. It is a topological hyperfigure. The non-Euclidean, qualitative, and dynamic is more encompassing than the Euclidean, quantitative and static, by virtue of this double featuring. Simply, to put the two together you have to make a move between them. You have to fold experience back on itself. You have to twist one of its dimensions into the other and cross-reference them both to that operation. This means that all orientation, all spatialization, is operatively encompassed by topological movement – from which it derives in the first non-place.

The space of experience is really, literally, physically a topological hyperspace of transformation.

#### A NOTE ON TERMINOLOGY

“Topology” and “non-Euclidean” are not synonyms. Although most topologies are non-Euclidean, there are Euclidean topologies.<sup>v</sup> A Möbius strip or a Klein bottle are Euclidean figures, of one and two dimensions respectively. The distinction that is most relevant here is between topological transformation and static geometric figure: between the process of arriving at a form through continuous deformation, and the determinate form arrived at when the process stops. An infinite number of static figures may be extracted from a single topological transformation. The transformation is a kind of superfigure that is defined not by invariant formal properties, but by continuity of transformation. For example, a torus and a coffee-cup belong to the same topological figure because one can be deformed into the other without cutting. Anything left standing when the deformation is stopped at any moment, in its passage through any point in-between, also belongs to their shared figure. The overall topological figure is continuous and multiple. As a transformation, it is defined by vectors rather than coordinate points. A vector is *transpositional*: a moving-through points. Because of its vectorial nature, the geometry of the topological superfigure cannot be separated from its duration. The figure is what runs-through an infinity of static figures. It is not itself determinate, but *determinable*. Each static figure stands for its determination, but does not exhaust it. The overall figure exceeds any of its discrete stations, and even all of them taken together as an infinite set. This is because between any two points in Euclidean space, no matter how close, lies another definable point. The transformation joining the points in the same superfigure always falls *between* Euclidean points. It recedes, continuously, into the between.<sup>vi</sup> The topological superfigure in itself is the surplus passing-through between Euclidean spatial coordinates. Logically, it is not sequential, even though it is oriented (vectorial). It is recessively *transitional*. In this essay, the word “non-

Euclidean” is used as a convenient short-hand for a space of this kind: one that cannot be separated from its duration due to a transitional excess of movement. “Non-Euclidean” is a good-enough nontechnical term for dynamic or durational “spaces” that do not fit into the classical Euclidean (actually Cartesian) intuition of space as a triple-axis coordinate-box containing things. In this view, widely thought to correspond to our everyday experience, time is an independent variable adding a fourth, formally distinct, dimension to the traditional three of space. Topologically speaking, space and time are dependent variables. They are not formally distinguishable. They cannot be separated from each other without stopping the process and changing its nature (Euclideanizing it). The relation of the dimensions of space to that of time is one of mutual inclusion. This mutual inclusion, and the strange logical and especially experiential effects associated with it, is what is termed a “hyperfigure” or “hyperspace” for the purposes of this essay. It may be noted in passing that even a Euclidean topological figure may generate a surplus-effect, although in a more static vein. A Möbius strip is a one-dimensional figure whose twisting creates a 2-D effect. A Klein bottle is a two dimensional figure whose folding in on itself creates a 3-D effect. The “effects” are real, but not part of the formal definition of the figure. They are in the figure as it is really experienced, adding another *quality* to it, precisely in the way it stands out from its formal limits. They are extra-formal stand-out or pop-out effects. The word “hyperspace” may also be applied to experiential surplus-dimension effects of this kind, whatever the geometry. Experience itself may be defined as a hyperdimensional reality: as the “being” of the excess of effect over any determinate spatial configuration. As the following argument from synesthesia asserts, the “shape” of experience can be considered to be a one-sided topological figure: an abstract (recessive/pop-out) “surface” for the reception, storage, and reaccess of qualitative hyper-effectivity that can only be approached head-on.

## THE ARGUMENT FROM SYNESTHESIA

The hinging of the proprioceptive on the visual in the movement of orientation is a synesthetic interfusion. It is not the only one. Each side, for example, enters into its own synesthetic fusion with the tactile: a determinate, positioned sight is a potential touch; the tropism of proprioceptive twisting-and-turning is assisted by past and potential bumps and the tactile feedback from the soles of our feet. There are many other synesthetic conjunctions, involving all the senses in various combinations, including smell and hearing. Clinical synesthesia is when a hinge-dimension of experience, usually lost to active awareness in the sea-change to adulthood, retains the ability to manifest itself perceptually. In synesthesia, other-sense dimensions become visible, as when sounds are seen as colors. This is not vision as it is thought of cognitively. It is more like other-sense operations at the hinge with vision, registered from its point of view. Synesthetic forms are dynamic. They are not mirrored in thought; they are literal perceptions. They are not reflected upon; they are experienced as events. Synesthetes who gain a measure of willful control over them still perceive them as occurrences in the world, not contents of their heads. They describe summoning them into perception, then moving toward or around them. Synesthetic forms are used by being summoned into present perception then recombined with an experience of movement. And they are useful. They serve as memory aids and orientation devices. Since they work by calling forth a real movement-experience, they retain a privileged connection to proprioception. This is not cue-based form-and-configuration vision. Although synesthetic forms are often called “maps,” they are less cartographic in the traditional sense than “diagrammatic” in the sense now entering architectural discourse.<sup>vii</sup> They are lived diagrams based on already lived experience, revived to orient further experience. Lived and relived: *biograms* might be a better word for them than “diagrams.”

It is worth paying close attention to how synesthetes describe their “maps.” The biograms are usually perceived as occupying the otherwise empty and dimensionless plane between the eyes and objects in the world. This liminal non-place has been characterized as “peri-personal.” It lies at the border of what we think of as internal, personal space and external, public space. The appearance of the biogram is borderline in time as well. It is accompanied by a feeling of

“portentous” *déjà vu*: an already-past pregnant with futurity, in present perception.<sup>viii</sup> This makes experiencing the biograms, in the words of one synesthete, dubbed MP in the literature, like “seeing time in space” – a good way of describing an event. They have a feeling of thickness or depth to them, like a “flexible moving 3 dimension.” But the depthlikeness is vague enough that they can still be likened to diaphanous “slides” projected on an invisible screen. They retain a *surface* character. The “maps” MP draws at the researcher’s request do not satisfy her. Her biograms are not plainly visible forms. They are more-than visual. They are event-perceptions combining senses, tenses, and dimensions on a single surface. Since they are not themselves visual representations, they cannot be accurately represented in mono-sense visual form. Oddly, although they appear in front and in the midst of things, the biograms are “larger than my visual range, like looking at the horizon.” They are geometrically strange: a foreground-surround, like a trick center twisting into an all-encompassing periphery. They are uncontainable either in the present moment or in Euclidean space, which they instead encompass: strange horizon.

Since they are determinately positioned neither in time nor space, their presence can only be considered a mode of abstraction. They are real – really perceived and mnemonically useful – abstract surfaces of perception. Since they continue indefinitely, in order to bring up certain regions the synesthete has to move around, into, or away from them. She doesn’t *actually* walk, of course. The movement, though really perceived and mnemonically useful, does not measurably take place in Euclidean space. It is an *intensive* movement, occurring in place (as at a work-station, or with rolled-up eyes) – or more accurately out-placed, in the event. This is an *abstract movement on an abstract surface*.

The synesthete uses her biograms, for example, to keep track of birthdays. On the birthday biogram, each region stores a conjunction between a date, a name, and a color. When she has to recall a birthday, she will use the color as a landmark, and when she approaches the right colored region, the name and date will appear. The shape and sound of the letters and numbers are stored in the colors, diaphanously merged into them as in a dissolve, or like strands

“woven together” in a patch of fabric. They are accessed by a reverse dissolve that is like “pulling out threads.” Shape, sound, and language: of a fabric with color.

MP has a unique biogram for everything she needs to remember. The biograms are “not connected in any way.” They are like separate monads of abstract lived experience. Except that in their strange twisting between foreground and horizon each loops back at a certain point into darkness. Each biogram arcs in multicolored mnemonic glory from a sea of shadow. What lies in the darkness at the end of the rainbows? The answer comes without the slightest hesitation: *other people’s minds*.<sup>ix</sup>

Biograms cannot be described without resorting to topology: centers folding into peripheries and out again, arcs, weaves, knots, and unthreadings. Face it. That is to say, you are always facing it. Wherever you are, whoever you are, whatever day or year it is, the biogram is *in front* of you. The synesthetic form of experience is *faced*, in something like the sense in which writing is handed.<sup>x</sup> Except that a left has a right, and this front doesn’t have a back (yet it still has shadow?). This means a biogram is a *one-sided topological surface* – really, strangely, usefully.<sup>xi</sup> This is not a metaphor. If there is a metaphor in play, isn’t it rather the mathematical representation that is the metaphor for the biogram? The biogram is a literal, graphically diaphanous event-perception. It is what is portended when you remember seeing time in space.

Synesthesia is considered the norm for infantile perception. The theory is that it becomes so habitual as to fall out of perception in the “normal” course of growing up. It is thought to persist as a nonconscious underpinning of all subsequent perception, as if the objects and scenes we see are all “threads” pulled by habit from a biogrammatic fabric of existence.<sup>xii</sup> Synesthetes are “normal” people who are abnormally aware of their habits of perception. “Normality” is when the biogram recedes to the background of vision. Biograms are always in operation. It is just a question of whether or not their operations are remarked.

For all perceivers, the biogram is the mode of being of the intersensory hinge-dimension. Its strange one-sided topology is the general plane of cross-reference not only for sights, sounds, touches, tastes, smells, proprioceptions, but also for numbers, letters, words, even units of

grammar. On that plane, the learned forms that are usually thought of as restricted to a “higher” cultural plane re-become perceptions. *Practice becomes perception*. The cognitive model has it that “higher” forms are associative compounds built up from smaller sights and sounds as from elementary building blocks. But the workings of synesthetic biograms shows that the higher forms feed back to the “lower” perceptual level. They enter the general dissolve, on a level with the elementary, fused into the surface, interwoven components of the fabric of life. This makes it impossible to apply to “raw” experience distinctions such as “higher” and “lower,” “perceptual” and “cognitive,” or even “natural” and “cultural.” There is no “raw” experience. Every experience takes place in the already-taken place of higher and lower, where they join for the future. Every experience is a portentous *déjà vu* at a hinge.

The relevant distinction is between involuntary and elicited. Or rather: this is the relevant connection. Biograms are described as having an odd status: they are “involuntary *and* elicited.”<sup>xiii</sup> They retain the surprise of the *déjà vu* even for clinical synesthetes who can summon them forth and consciously navigate them for future heading. Eliciting with future heading is not the same as willing. Biograms remain their own creatures even for proficient synesthetes. They maintain a peri-personal autonomy from psychological or cognitive containment. They cannot be entirely owned personally, since they emerge from and return to a collective darkness. But they can be tamed, induced to appear and perform feats of memory. They are less like a static image on a slide screen than a live circus act, performed in a ring that lies stage-center and encircles the tent.

Clinical synesthetes have trained synesthesia to perform on signal. They have perfected the trick of consciously eliciting involuntary intersense-connection as a way of invoking memory. Vision is typically used as a plane of general cross-reference. It is on the abstract surface of color that everything fuses, in way allowing a single thread to be pulled back out as needed, before returning to the fold. All the other senses, and any and every “higher” form, are gathered into color, together with the three dimensions of space and time. It is as if all the dimensions of experience were compressed into vision. This is why the topology of the biogram

is so strangely twisted. It is not due to any lack, say of cognitive organization or of Euclidean accuracy. There are simply too many dimensions of reality compressed into vision. It can't hold them all in discrete, determinate, harmonious form and configuration. It buckles under the existential pressure.

The biogram is not lacking in order. It is over-organized, loaded with an excess of reality. It is deformed by experiential overfill. It is a *hypersurface*. Its hyperreality explains why it is so stubbornly abstract. Since it cannot concretely hold everything it carries, it stores the excess fused in abstraction, ready for useful reaccess. In other words, the hypersurface of synesthetic experience is "real and abstract" in precisely the way Deleuze describes the *virtual*: as an intense, torsional coalescence of potential individuations. "Pulling out a thread," or decompressing a differential strand of the fusional weave of experience, involves actualizing a virtuality. That is why the synesthetic perception is always an event or performance pulling determinate form and function out of a larger vagueness, like a rabbit from a one-sided hat.

It was argued earlier that there was no essential difference between perception and hallucination, both being synesthetic creations. The feedback of "higher" forms and their associated functions onto the biogrammatic hypersurface expands the list. There is no fundamental difference between perception, hallucination, and cognition. It was also argued that the separation between the natural and the cultural was not experientially sustainable. In view of this, is it so far-fetched to call the unseen out of which biograms are "other people's minds"? Not particular other people's minds, of course. The other of them all: an other of particular mindedness from which everyone's individuated perceptions, memories, and cognitions emerge and to which they return, in a twisting rhythm of appearance and dissolve: a shared incipency that is also a destiny. What is the other of mindedness? From what does all individual awareness arise and return? Simply: matter. Brain-and-body matter: rumbling sea for the rainbow of experience. The synesthetic hypersurface refracts the activity of matter through many-dimensioned splendor into color. It is the hinge-plane not only between senses, tenses, and

dimensions of space and time, but between matter and mindedness: the involuntary and the elicited.

Reaccessing the biogram and pulling a determinate strand of organized experience from it is to reapproach the point where the materiality of the body minds itself. It is to catch the becoming-minded of the movements of matter in the act. It is to re-perform the memorial trick of experience pulling itself rabbit-like out of the black hat of matter. This is quite an ontogenetic contorsion. It involves a hyperreal looping between the impersonal and the “peripersonal.” Any personal strand is pulled out of that non- to near-personal loop, as the grande finale. After which there is nothing to do but introduce the next abstract act.

That the personal is the finale distinguishes this synesthetic ontogenesis of experience from phenomenological approaches. For phenomenology, the personal is prefigured or “pre-reflected” in the world, in a closed loop of “intentionality.” The act of perception or cognition is a reflection of what is already “pre-” embedded in the world. It repeats the same structures, expressing where you already were. Every phenomenological event is like returning home.<sup>xiv</sup> This is like the *déjà vu* without the portent of the new. In the circus of synesthesia, you never really know what act will follow. The rabbit might turn into a dove and fly away. Experience, normal or clinical, is never fully intentional. No matter how practiced the act, the result remains at least as involuntary as it is elicited. Under the biogrammatic heading, the personal is not intentionally prefigured. It is rhythmically re-fused, in a way that always brings something new and unexpected into the loop. The loop is always strangely open (with just one-side, how could it ever reflect itself?).

What if topological architecture could find ways of extending the “diagrams” it designs into “biograms” inhabiting the finished product? What if it could find ways of embedding in the materiality of buildings open invitations for portentous events of individuating *déjà vu*? Might this be a way of continuing its topological process in its product?

To do this would require somehow integrating logics of perception and experience into the modeling. Processes like habit and memory would have to be taken into account. As would

the reality of intensive movement. Ways would have to be experimented with of architecturally soliciting an ongoing eliciting of emergent forms-functions at the collective hinge of perception, hallucination, and cognition. Techniques would have to be found of overfilling experience. The methods would have to operate in a rigorously anexact way, respecting the positivity of the virtual's vagueness and the openness of its individual endings. Never prefiguring.

In a way, architecture could even surpass synesthetes like MP by finding ways of building-in nonvisual hypersurfaces. There is nothing wrong with color, light and darkness. Rainbows of experience are good. But imagine the startling effects that might be achieved by using proprioception as the general plane of cross-referencing. Imagine how positively, qualitatively moving that would be. Practices of architecture allied with experimental art, like the "reversible destiny" architecture of Arakawa and Gins or the "relational" architecture of Rafael Lozano-Hemmer, might have much to contribute. Technologies could be favored that can be twisted away from addressing preexisting forms and functions toward operating directly as *technologies of emergent experience*. Imagine if these were to become infrastructural to architectural engineering. What better place to start than with the much-touted "new media," approached not only as design tools but as architectural elements as basic as walls and windows? Could architecture build on the ability of digital technologies to connect and interfuse different spheres of activity on the same operational plane, to new effect? This is a direction in which the work of Lars Spuybroek, among others, is moving.<sup>xv</sup>

## THE ARGUMENT FROM THE FACEDNESS OF EXPERIENCE

Whether you are clinically synesthetic or not, wherever you are, you are ever facing the continuation of your experience. You are always heading onward. It is relatively easy to say where any given form or configuration that comes into focus along the way is located. But where is the heading itself? That is the same as asking where is the ongoing of experience? It is not in any recognized thing or place. It is in them all, but in each under a different heading. Experience,

as it happens, is in difference-of-heading before it goes in any determinate direction. The space of continuing experience is a pure or absolute space of differential heading: an indeterminate vector space infusing each step taken in Euclidean space with a potential for having been otherwise directed. The whole of vector space is compressed, in potential, into every step. Taking into consideration the feedback of higher forms discussed above, our concept of this intensive vector space of experience must be broad enough to encompass headings toward qualitatively different planes (habit, memory; vision, proprioception; color, language).

## THE ARGUMENT FROM DOUBLING

In synesthesia, remembering is a perceptual event. It is a reactivation of a biogram for purposes of reaccess. If an event-perception is faced, then when a biogram is reaccessed isn't the synesthete facing a previous facing? Hasn't experience doubled back on itself like a Möbius strip? The exemplary experience of the most renowned synesthete in the literature, A.R. Luria's patient S., supports this (exemplary, because S.'s synesthesia was so intense that he enjoyed total recall).<sup>xvi</sup>

S.'s biograms were very different from MP's. No two synesthetes generate the same dynamic forms. S.'s were built explicitly on a shifting proprioceptive ground. They came in "walks." He would store biograms as "objects" deposited at a particular turn along a meandering walk. There they would remain as mnemonic landmarks that would come into sight when approached. When an object became visible, the component sense-threads could be pulled apart to yield an astounding range of determinate word and number memories that had been woven into them. The walks themselves were biograms, of a configurational kind. They were composed of a number of synesthetic objects stored in vicinity to one another. They had to be reaccessed in order, following the proprioceptive twists and turns of the walk. Each object-form had a background, for example a wall or corner or other feature. These figure-ground landmarks combined into whole itinerant geographies. To find a memory, S. would have to enter the right

geography and then move ahead proprioceptively, cross-checking against his mnemonic progress against visual landmarks until he reached the one he needed to unthread. The eventfulness of the biograms is illustrated by the fact that he could make mistakes. Significantly, the mistakes were not cognitive errors. They were tricks of perception. For example, he might accidentally store a bright biogrammatic object against a white wall, and when he passed that way again he might overlook the memory because it blended in.<sup>xvii</sup> The involuntary had failed to be elicited.

To simplify matters, he would sometimes use a familiar scene as a template for a new biogrammatic geography. For example, he might take his bedroom and store synesthetic objects under the bed, and in the closet and in all the drawers and corners. Whether based on a found geography like his bedroom or entirely constructed, a biogram is a previously experienced vector- space. When S. faced one of his biograms, he was facing his own previous presence. This facing was usually implicit, or virtual. When he recalled a biogram, he didn't usually see himself facing it the last time. Otherwise he would be facing a potentially infinite regress of himself as he repeatedly reaccessed. There were, however, times when he did encounter his former facing in the biogram.<sup>xviii</sup> The folding back of the facedness of experience on itself is a virtual biogrammatic operation which, like the biograms themselves, can actualize in conscious visual form. Perhaps schizophrenia involves a continual, involuntary awareness of the double-facedness-to-infinity endemic to experience?<sup>xix</sup> At the other extreme, "normal" perception would be habitual unawareness of it. Isn't what we call "cognition" a deceitful simplification of the virtual regress of reaccess into a plainly available present "reflection"?

The biogram is a perceptual reliving: a folding back of experience on itself. ("He revived the situation in which something had registered in his memory.")<sup>xx</sup> Each biogram, then, is a virtual topological superposition of a potentially infinite series of self-repetitions. A biogram doubles back on itself in such a way as to hold all of its potential variations on itself in itself: in its own cumulatively open, self-referential event. Synesthetic experience becomes monadic in the vicinity of a biogram. Facing a biogram, we are *looking forward to our own past* and *looking past into the future*, in a seeing so intense it falls out of sight. ("He would close his eyes or stare

into space.”)<sup>xxi</sup> Experiential vector-space time-loops. Each new present, each event-perception, is a differential repetition of that spatiotemporal loop-the-loop: different if only by virtue of being an “again,” darkly.

It is often argued that architecture should allude to history. How pale that clear-eyed ambition seems faced with the twisted intensity of the biogram. If architecture were to make its mission to build in biogrammatic triggers or elicitation devices rather than contenting itself with all-too-cognitive “citations” it will have outgrown its moniker as a “spatial art.” It would have become not just metaphorically historical, but a literal technology of time. It would be as directly an art of time as of space, concerned with eliciting their continuous looping into and out of each other, in mutual reaccess and renewal.

#### THE ARGUMENT FROM RECURSION

The time-loop of experience has been experimentally verified, to the continuing chagrin of cognitive theory. In famous studies in the 1970s, Benjamin Libet demonstrated that there is a half-second delay between the onset of brain activity and conscious awareness of the event.<sup>xxii</sup> Cognitive scientists and theorists of consciousness have worried over this because in brain terms, a half-second is a very long time. This is a long incipency of mindedness in brain matter. All kinds of things might be going on in autopilot as perception and reflection are taking off from chemical and electrical movements of matter. Thought lags behind itself. It can never catch up with its own beginnings. The half-second of thought-forming is forever lost in darkness. All awareness emerges from a nonconscious thought-o-genic lapse indistinguishable from movements of matter.

One of the things that happens in the lapsing is a fiction. Libet determined that thought covers up its lag: the awareness is “back-dated” so that each thought experiences itself to have been at the precise time the stimulus was applied. Thought hallucinates that it coincides with itself. The simplest perception of the simplest stimulus is already a fairly elaborate hoax, from

the point of view of a theory of cognitive authenticity that sees truth in plain and present reflection. To accept the implications of the Libet-lag, cognitive theory would have to accept that its own model is an even more elaborate hoax: a sophisticated version of thought's self-coinciding, matter aside. The cognitive model would have to recognize that it too has been a matterful hallucination, on the half-second installment plan.

The conclusion has to be that the elementary unit of thought is already a complex *duration* before it is a discrete perception or cognition. Further, it is a duration whose end loops back to its beginning. It is a *recursive* duration.

How complex a recursive duration it is only started to emerge later. Libet found that stimuli applied during the thought-o-genic lapse could affect the outcome. You'd think that a stimulus applied at the quarter-second would have to wait till three-quarters of second were up to make its mark. It would come in orderly succession after the half-second awareness emerging from the first stimulus. That way you'd get a reasonable succession of discrete perceptions or cognitions, even though each would still be a bit of a cheat by virtue of having backdated itself. The backdating would just be a quantitative peccadilo, a simple, measurable lag we might find it in our cognitive selves to forgive our brains for. But if the intervening stimulus affects the outcome of the first, then things get much less reasonable. If a later stimulus can modulate an earlier one before it becomes what it will have been, the recursive durations start to meld together. Experience smudges. You get a *thirdness*: a supplemental effect not reducible to the two stimuli's respective durations considered separately. You get a supernumerary difference, a qualitative difference arising from the interrelation of recursive durations. To put it bluntly, you get a relational time-smudge. A kind of hypertime. Think about it. Since any lapse of time is infinitely divisible, and at every instant there must be some kind of stimulus arriving through one sense channel or another, if you try to fill in what happens in the half-second lapses of awareness, things get downright hallucinogenic. Say at .01 seconds a second loop begins; at .02 seconds another begins ... but at .015 seconds there will have been an intervening beginning, and also at .0125. You're left with an infinite multiplication of recursively durational emergent

awarenesses, madly smudging each other. You get an exponentially self-complicating relational mess.

The only way to sort it out is to posit a double system of reference, with each doublet effectively enveloping an experiential infinity. Each recursive duration must be posited as leading to a discrete awareness. Except that only a very few of the teeming swarm actually make it to awareness. The others subsist nonconsciously. These are Leibniz's infinitesimally "small perceptions," each a monad unto itself.<sup>xxiii</sup> In other words, the bulk of discrete perceptions and cognitions remain virtual. Our lived experience swims in an infinite cloud of infinitesimal monadic awarenesses: micro-awarenesses without the actual awareness; gnats of potential experience.<sup>xxiv</sup>

Every awareness that achieves actual expression will have been in some way modulated by the swarm from which it emerged. But the modulatory effect is in principle separable from what the result would have been, had the recursively durational monad not smudged. This "would have been" discrete of actual awareness can potentially be accessed, if experience folds back on itself, cross-references, and pulls on the right strand to extract an associated form from the fusional smudge. The effective discreteness of an awareness is an active creation of experience doubling back (on its already recursive duration) and extractively self-referencing. Every first-time perception of form is already, virtually, a memory. Perception is an intensive movement back into and out of an abstract "space" of experiential previousness.

The supplemental fusion-effect that can be cross-referenced-out for present purposes belongs to a second experiential infinity. Every virtual gnat of awareness will have potentially modulated every other, if ever so slightly, actually or not. Thus there co-subsists with the swarm of potential forms/configurations an infinity of qualitative relational differences. This second virtual infinity is infinitely larger than the first, since each member of the cloud of discreteness potentially has an infinity of microperceptions to smudge with, and each smudge can smudge again, indefinitely. The relational infinity is not only larger than the first, discrete infinity, but also differs in nature. It is composed of productive interferences, or in-between effects (affects).

Accordingly, it comprises a continuity of transitions rather than a collection of discrete elements. It is differentiated as a continuous variation.

We have seen this double system of reference before. The discrete perceptions/cognitions that are actually extracted provide the elementary building blocks for compound forms and configurations. They feed into metric, Euclidean space and the present of linear time associated with it. The relational, variational continuum pertains to a qualitative space that can only be described topologically. Its recursivity cannot be ignored, so it is as immediately a nonlinear temporality as it is a non-Euclidean space.<sup>xxv</sup>

The two systems virtually co-subsist and actually co-function. Normally, the relational continuum actually appears only in its modulatory effects. It is backgrounded or peripheralized by forms and configurations taking center stage, cross-referenced-out by their attention-grabbing extraction. But it is insistent. It always finds a way to re-enter the scene. It appears, for example, in the settled cloud of sawdust covering the floor of the circus ring, swarming but ignored beneath the stand-out movements of the featured performers. And in “peripheral vision,” the kinesthetic-proprioceptive commotion ringing every determined act of viewing with a barely-noticed synesthetic color-and-light show. Or as a white wall that a synesthetic object accidentally blends back into.<sup>xxvi</sup>

Architects do not have to choose between the two systems of reference, as if one is more real than the other. The challenge is to design for both simultaneously: to build discrete forms in functional configurations, but in ways that newly reaccess the infinities of experiential potential, discrete and continuous, from which they were extracted. Building for the historically positioned here-and-now is to be satisfied with too little: a gnat of design. The challenge is to build *also* for the recursive duration. To see discretely in present time and determinate space--but also to “see time in space,” necessarily more vaguely (and creatively), in direct future-past relation: in continuing modulation. Don’t mediate. Modulate.

THE ARGUMENT FROM THE FEEDBACK OF HIGHER FORMS

It was asserted earlier that practice becomes perception. In other words, compound forms of result feed back to the thought-o-genic level, where they fuse with more “elementary” or gnat-like components of experience, toward a new emergence. Words, numbers, and grammars recursively-durationaly smudge as messily as anything. They reenter the relational continuum. This means that no matter how conventional or even stereotyped they may be, they never really go stale. They are odd fruit of experience that go “raw.”

Corroboration for this has been found in studies of “blind-sight.” Blind-sight is nonconscious visual perception usually due to brain injury. A person with blind-sight may consider themselves totally blind. Put an object in front of them, and they will insist that they see nothing. But if you ask them to reach out for the object, their hands go straight toward it and their fingers open exactly the right amount to grasp it. They do see, but nonconsciously. Their visual awareness remains virtual. (The success of their grasping stands as a testament to the effective reality of the virtual.)

The traditional explanation of this phenomenon has been that “higher” cortical functions were damaged, but that “lower” functions embedded deeper in the “reptilian” brain were still intact. This convenient interpretation was shattered by the discovery that people with blind-sight can also *virtually read*. This was demonstrated in patients who were partially blindsighted but retained a reduced field of normal vision. The experimenter would flash a word with more than one meaning in the sighted field. Then a word associated with one of its meanings would be presented in the blind field. For example, “bank” would be flash into sight, followed by a flash of either “money” or “river” in blindsight. It was found that the word presented to the patients’ blindness would color their interpretation of the word they could see.<sup>xxvii</sup> An unconscious perception involving highly developed cognitive skills was *modulating* conscious awareness. A practiced meaning had become a nonconscious perception capable of positively coloring the conscious production of more meaning (interpretation). This loop between “primitive”

perception and “higher” cognition has been observed in undamaged brain function. One of the most startling findings has been that a single neuron is capable of recognizing a face.<sup>xxviii</sup>

The feedback of “higher” functions undermines the deconstructionist mistrust of “naïve” or “natural” perception. In deconstructivist architectural theory, this mistrust has often translated into an aversion to any talk of direct perception, shunned in favor of mediated readings. But if social operations like recognizing a face or cultural operations of literate interpretation can dissolve back into direct perceptions, there is nothing to worry about. If there is never any possibility of “raw” experience to begin with, there is nothing to bracket or deconstruct. The most material of experience, the firing of a single neuron, is “always already” positively socio-cultural. Conversely, and perhaps more provocatively, *reading ceases to be a practice of mediation*. We are capable of operating socially and culturally directly on a level with matter.

It all becomes a question of modulation. This is a pragmatic rather than critical issue: how, concretely, can the virtual feedback of higher functions be used to re-modulate experience? How can unmediated inflections of sociality and literate interpretation be embedded in the direct experience of the built environment? How can cultural signs be encouraged to rematerialize, to feed back into a “smallness” of perception on a level with the movements of matter? How can the literate become literal and the literal literate, in two-way, creative interference? Most of all, how can this “involuntary but elicited” looping be accomplished *openly* and without moralizing--without the arrogance of deceit, the preciousness of conceit, or the imposition of an authorial “voice” or “vision” aimed at grounding a sea-tossed world?<sup>xxix</sup>

## THE ARGUMENT FROM CHANGE

We tend to think of our bodies as being contained in a three-dimensional space as in some kind of box. Things are in the boxed present, which skips along from moment to moment, as from one point on a line to the next. The past is simply a point somewhere behind on the line,

and the future is just a point ahead. Past and future are nothing more than presents in succession. Nothing exists outside of the march of the boxed-in present.

The problem is that if the body were in all and only in the present, it would be all and only what it is. Nothing is all and only what it is. A body present is in a dissolve: out of what it is just ceasing to be, into what it will already have become by the time it registers that something has happened. The present smudges the past and the future. It is more like a doppler effect than a point: a movement that registers its arrival as an echo of its having just past. The past and future resonate *in* the present. Together: as a dopplered will-have-been registering in the instant as a unity of movement. The past and future are in continuity with each other, in a moving-through-the-present: in transition.

It is not the present that moves from the past to the future. It is the future-past that continually moves through the present. How could it be otherwise? If the body were all and only in the here-and-now, unlooped by dopplerings, it would be cut off from its “was”s, not to mention its “would have been”s and “may yet be”s. How could a body develop habits and skills? Are these not pastnesses primed in the present for the future? How could a body remember? To remember something we have forgotten, must we not somehow return to the pastness in which it lies dormant, in order to pull out its thread of presence again? Most all all, how could a body change? Where would it find change, if it did not have the resources for it already within itself?

A body does not coincide with its present. It coincides with its *potential*. The potential is the future-past contemporary with every body’s change.

The basic insight of Bergson’s philosophy, taken up by William James and later Gilles Deleuze, is that past and future are not just strung-out punctual presents. They are continuous dimensions contemporaneous to every present--which is by nature a smudged becoming, not a point-state. As Deleuze repeatedly notes, the present would never “pass” if it didn’t have a dimension of “passness” or pastness to fold aspects of itself into as it folds out others into what will have presently been its futurity. Past and future are in direct, topological proximity with each other, operatively joined in a continuity of mutual folding. The present is the crease. The

moments of time are dimensions of each other's unity of movement into and out of each other. They are co-operating dimensions of transition. A body does not coincide with the discretely cognizable point of its here-and-now (remember the Libet-lag). It coincides with the twisted continuity of its variations, registered in an endless doppler loop.

The point is that *the idea that we live in Euclidean space and in linear time excludes the reality of change*. The things with which mindful bodies interact, involuntarily and otherwise, also change. As do the buildings they live in or with. Things too coincide with their potential. Anything that endures, varies. Anything that varies in some way carries the continuities of its variations. The difference between minds, bodies, and objects are perhaps not as essential as philosophies stuck on the subjective-objective divide make them out to be. Perhaps it is not the presence or absence of any supposedly essential properties, for example consciousness or life, that distinguishes a mind from a body from an object. Perhaps they are distinguished modally, by their ways of carrying variation: by their different dopplerings of potential (different "speeds").

A thing cannot be understood without reference to the non-present dimensions it compresses and varyingly expresses in continuity. The formula is by now familiar: these dimensions are abstract yet real. They are virtual. Logics of presence or position that box things in three-dimensional space strung out along a time line just don't doppler. Logics of transition are needed: qualitative topologies.

## THE ARGUMENT FROM OUTER SPACE

"Diverse astronomical observations agree that the density of matter in the cosmos is only a third of that needed for space to be Euclidean."<sup>xxx</sup> Attempts to study the size and shape of the universe have largely given up on Euclidean geometry, in favor of non-Euclidean hyperbolic topologies.<sup>xxxi</sup> Some strange twistings are required to account for the "lost" matter, the "dark" matter that stubbornly fails to show (insistence of the void). Strange void-related twistings also show up in the vicinity of a black hole, where events of cosmic scale funnel directly back into

the quantum soup, in contravention of Euclidean gradations of scale. Understanding black holes and dark matter will have to wait for a “theory of everything”: a model connecting relativity (itself based on Riemannian geometry) to quantum mechanics. The most promising candidates are topological “superstring” theories, in which the world is described as a spaghetti of many-dimensional, continuous strands in unimaginable contortions.

Two of the greatest mysteries of cosmology are questions every child asks: if everything is in the universe, then what is the universe in? And, where was the world before the big bang, and how long was it there? The first question is a logical consequence of the assumption that space is Euclidean, like a box-frame containing things. The second is an equally logical consequence of the assumption that time is a line with a beginning and end, running through or alongside space. It is clear that no glimmer of a solution is possible working with these assumptions. Some recent scientific efforts to solve these cosmically childlike questions have gone so far as to suggest topological models where space loops so twistedly that it ends up back in time. For example, the outer edge of the universe might not be an edge at all, but a recursion where the limits of space loop back to the irruption of time, from which space unfolded in the first place. Certain modelings of what occurs inside a black hole also feature a space-time fold. It has been hypothesized that matter funneling into a black hole is converted into a soup of virtual particles, called tachyons, moving backwards in time.

Whatever the final answers – if they are ever arrived at – odds are that the descriptions of upper and lower limits of material existence, and the weird sink-holes bunching its fabric, won't be based on a Euclidean geometry or linear notion of time. The universe is not just a bigger box. It could well be a giant version of a Leibnizian monad: not the box to end all boxes, but the monad to outloop all monads. (Is our every Leibnizian awareness then a modest echo of a cosmic dynamism?)

THE ARGUMENT FROM INNER SPACE

The body is composed of a branching network, decreasing in size right down to the level of molecular tubes at the mitochondrial scale. Geometrically, a body is a “space-filling fractal” of a “fourth” dimensionality, between a two-dimensional plane and a three-dimensional volume.<sup>xxxii</sup> “Our skin obeys the laws of three dimensions ... but our internal anatomy and physiology is living in a four-dimensional spatial world” (the three of enveloping Euclidean space plus the “fourth” fractal dimension of internal branching).<sup>xxxiii</sup> A body lives in three dimensions only at the envelope of the skin. The “Euclidean” space of the body is a *membrane*.

The membrane isn't closed. It folds in at the mouth, ears, nostrils, eyes, anus, urethra, vagina, and pores. The mouth connects through the stomach and intestines to fold back out the anus. This is one leaky “box.” It's closer to a Klein bottle: a two-dimensional topological figure. Even the skin isn't really three-dimensional. It just acts as if it were. It creates a 3-D closure effect by regulating movements into and out of the space-filling fractal it twistedly envelops. Biologically, it's all an act, a complex nutritive, excretive act: circus of the body. We do not live in Euclidean space. We live *between* dimensions.

Might it still be argued that even if we do not live in Euclidean space, we certainly build in it? Fair enough: we build in Euclidean space in the same sense that we eat in it. To build is to produce a closure-effect by regulating movements in and out (and fractally all around). A building is a membrane.

Regulating movements is a question of scale and speed. An architect or engineer is not concerned with the swarming micro-movements of matter occurring in insane velocity at the molecular level of the materials used in construction. All that concerns her is that at a certain level those unpredictable movements settle into a dependable patterning. It is the undependable movements' *aggregation* that can be depended upon: their manner of massing. The solidity of a brick is a mass mannerism, a crowd phenomenon: a *molar* relational effect.

When you place a brick against a brick, you are not rubbing hard matter up against hard matter. The electrons and nuclear particles making up the molecular aggregates are separated by voids many orders of magnitudes larger than they are. A brick is as sparse as a little universe.

Nothing actually touches. The brick's "surface" is pitted by emptiness. Nor is there anything solid within each atom. Subatomic innards are a quantum soup of intense, virtual events, some occurring faster than the speed of light (quantum tunneling), some enjoying experimentally verified recursive causality (complementarity). The effective stability of the brick emerges from the interrelation of those intensive, incorporeal movements. The quality of hardness is a surface-effect defined by what the holding-together of the brick's fused elementary constituents lets pass, captures, or blocks. It is a regulated regime of movement. The "surface" itself is nothing other than this relational effect of hardness, or regime of passage. The effect is relative to the nature of the movement that comes to pass, its scale, and speed (a gamma ray would neither find it hard nor treat it as a surface to bounce off).

When you place a brick next to another brick you are not placing matter against matter. You are placing effect against effect, *relation against relation*. You are building a conglomerate economy of movement. You are hinging molar stabilities to build larger molar stability. What we think of as Euclidean space is a mutual holding in relational stability of incorporeal event-spaces, relative to kind of movement, scale, and speed. Incorporeal: abstract. Euclidean space is the *relative concreteness of the abstract*. It is a certain kind of abstract-surface hinge-effect.

When you place bricks together to build four walls and then put a body inside, something similar is happening. The memories, habits, and tropisms the body carries with it, in the associated, intensive event-space of incorporeal or abstract movement evoked repeatedly in this essay, constitute an aggregate of relation. All the goings-on and passings-by around the building constitute another aggregate of relation: a sea of movements, each of which has a potential effect on the body, capable of modulating which determinate threads are pulled from the relational continuum it carries. Which threads the body re-expresses is regulated by the modulatory sense-interferences that the walls, doors, windows – not to mention screens and speakers – let pass. Certain tendential headings, perceptions, and cognitions are backgrounded, peripheralized, or

blended out by the synesthetic economy of movement-across regulated by the architectural regime.

A building is a technology of movement – a technology of *transposition* – in direct membranic connection with virtual event-spaces. It functions topologically, folding relational continua into and out of each other to selective, productive effect. It functions abstract-concretely to inflect determinations of potential experience. A building is an experiential supermodulator device: a modulator of modulations. It is a way of placing relation against relation, toward inflected variation. Its 3-D closure effect is a regulated coupling between virtual seas of relation, swarming and smudgeable. We build in Euclidean space when we design the kind of aggregate hinge-effects between swarmings and smudgings of experience that shake out in favor of maximum stability of cognitive result (“there’s nothing like home”: *recognition*). To build in Euclidean space is to build in predictability.

Is it possible, in addition, to build for newness, for the emergence of unforeseen experiential form and configuration, inflected by chance? We know that it is possible to design topologically. This essay has argued that we live topologically. But can we also build topologically?

To build topologically would be to accept that the body’s ultimate innards are as effectively incorporeal, as really abstract, as the atom’s. The body’s innards are not just the stomach and intestines. As vitally as food, a life feeds on habits, memories, and tropisms. The living body’s “ultimate” innards are the proprioceptive habits on a level with muscle fiber. They are the micro-social skills on a level with a single visual neuron. They are enculturated memories lying at the cross-roads of sense channels coursing through the flesh. They are the pattern of preferential headings hinging on all of the above, which we somewhat grandly call our “personality.” The body *is* these virtual innards’ holding-together, as they fold out, recursive-durationally, in the loopy present, in determinate form and configuration, always provisional because always in becoming.

The arguments presented in this essay all make the same point: that the life of the body, its lived experience, cannot be understood without reference to abstract-real processual dimensions. These cannot be contained in Euclidean space and linear time. They must be topologically described, using an array of concepts specially honed for the task: continuous variation, intensive movement, transpositionality, event, durational space, recursive-duration, modulation, qualitative effect, biogram, feedback of higher functions, to name just a few.

This is not to say that there is one topological figure, or even a specific formal non-Euclidean geometry, that corresponds to the body's space-time of experience or some general "shape" of existence. Topologies, like Euclidean geometry, are modeling tools. Each echos an aspect of the world's dynamism (and share of stability). Each repeats, on screen or in thought, an intensive mode of movement that is really of this world. Each is capable of bringing to formal expression certain dimensions of the infinitely twisted life of the body and the cosmos. No one model can lay claim to a final "reflection" of or "correspondence" to reality. It is simply not about reflection or correspondence. It is about *participation*. Differential participation. In what way does a given geometry's effective resonance with intensive movements in the world allow us to extend them, in our orientations, memories, and brain-lagged awarenesses, toward their (and our) creative variation? How can geometry make a qualitative difference in the world?

Once again, these are pragmatic rather than critical issues. It's a question of appropriate technology. Choosing a geometry to design with is to choose potential modulations not only of the designed form but, through its device, of people's lives. It was not the purpose of this essay to suggest particular design methods, esthetics, or "ideal" end effects. It was only to suggest that new paths might be found by letting go of the sterile opposition between the abstract and the concrete, and its fellow-traveller, the subjective and objective. To do this, it is necessary to take another look at perception and lived experience, and even broach such tired topics as consciousness. The fear that this will inevitably fall into a domesticating, self-satisfied subjectivism-in-spite-of-itself, like that preached by phenomenological architecture, is not justified. All you need to do to avoid that path is, quoting Deleuze and Guattari: *look only at the*

*movements*.<sup>xxxiv</sup> It has been suggested that extending the concept of the diagram into the “biogram” might be a vector worth pursuing. Formal topologies are not enough. The biogram is a *lived* topological event. It is *onto-topological*. It is the event of experience folding back on itself for its own furtherance, its continuing becoming. Onto-topological means *ontogenetic*. The biogram is experience reaccessing its powers of emergence, for more effect. It is the existential equivalent of lifting oneself up by the bootstraps: ontogenetic and *autopoietic*.

Look only at the movements – and they will bring you to matter. The perspective suggested here displays a tropism toward realist materialism (without reflection: especially not “pre-”). At virtually every turn in the discussion, dynamics that seemed “subjective” to the extreme made a literal end-run back to impersonal matter. The end-run of mindedness back to matter always somehow coincided with its emergence from it, the exemplary case being Libet’s feedback loop between the dawning of perceptual awareness and the ever-present previousness of movements of brain matter capable of coloring experience without themselves becoming aware. Accepting this insistence of the material and impersonal (the “involuntary”) *in* bootstrapped personal experience distinguishes the current account most sharply from phenomenological approaches. Its claims both to realism and materialism paradoxically depend on it--paradoxically, because the “backdating” of matter-driven consciousness is also an argument that there is no essential difference between perception, cognition, and hallucination. This is a realist materialism with a paradoxically creative edge, summed up in the mantra: involuntary *and* elicited. The “involuntary and elicited no-difference between perception, cognition, and hallucination” can in turn be summed up in a single word: *imagination*.

This is also where topological architecture is carnally challenged and proves inadequately abstract. It does well with the involuntary, in the form of chance variations programmed into the topological form-generating software. It does much less well with the elicited. Putting the two together is necessary for grasping the minded body’s mode of reality, which can be evoked by any number of necessary oxymorons: modulated self-decision; creative receptivity; induced self-activity; laboriously orienting autopilot; ever-present lapse. Use your imagination: no single

logic, geometric or otherwise, is flexible enough to encompass the concrete-abstractness of experience in all its ins and outs. Just as the body lives between dimensions, designing for it requires operating between logics. To be sufficiently abstract, topological architecture needs to welcome the translogic. A translogic is different from a metalogic. It doesn't stand back and describe the way multiple logics and the operative levels they model hold-together. It *enters* the relations, and tweaks as many as it can to get a sense of what may come. It is pragmatic. It imaginatively enters the fabric of transition, and pulls as many strands as it can to see what emerges. It is effective. Rather than metalogical, it is supermodulatory.

It is not that architecture does not already go about its business like this, in a certain regulatory manner, if not always fully cognizant of the strange horizon of that relational fact, and at times even in outright denial of it (as when it proudly deconstructs positively absent structures; or privileges determinations of history over potential becomings; or cutely cites when it could be effectively tweaking; or boringly domiciles the world in its own supposed pre-reflection). If architecture pursues extending diagrams into biograms it will become more what it has always been: a materialist art of qualitative body modulation; a translogical engineering of matter gone mindful. Its buildings will also be more what they are. More modulatory. More flexibly membranous. More intensely lived, between more relational dimensions brought concretely into abstract-surface proximity. How such an onto-topological architecture will develop, if it does, certainly cannot be pre-reflected. It will unfold experimentally. Or not.

To be determined.

## NOTES TO CHAPTER 8

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<sup>i</sup> Sandra Buckley analyzes the differences, cultural and experiential, between ground-level movement through architectural spaces and underground movement in “Contemporary Myths of the Asian City,” (*In*) *Visible Cities: From the Postmodern Metropolis to the Cities of the Future*, ed. Robert Sargent and Pellegrino D’Acierno (New York: Monticello Press, forthcoming).

<sup>ii</sup> See Russell Epstein and Nancy Kanwisher, “A Cortical Representation of the Local Visual Environment,” *Nature*, vol. 392 (9 April 1998). For a popular press account of Epstein’s and Kanwisher’s work on adult brain functioning during orientation tasks, see “A Positioning Unit of Sorts in the Brain,” *New York Times*, 28 April 1998, p. B13: “The experiments dovetail with work on rats and human infants showing that when they get lost, it is the shape of the space, rather than the objects in it, that are used to get reoriented.”

<sup>iii</sup> For an overview, see Ariane S. Etienne, Joëlle Berlie, Joséphine Georgakopoulos and Roland Maurer, “Role of Dead Reckoning in Navigation,” *Spatial Representation in Animals*, ed. Sue Healy (Oxford: Oxford University Press, 1998), pp. 54-68. Most animals combine landmark recognition with dead reckoning. Studies of ants’ ability to orient have shown that dead reckoning (or “path integration”) predominates in learning phases, and that landmark use takes over for known territory. This accords with the argument developed here for human orientation: that the process of orienting differs in nature from the “mapped” application of its cognitive products, which function as a kind of visual shorthand for the more encompassing sensorimotor process from which they derive. See B. Schatz, S. Chameron, G. Beugnon, and T.S. Collett, “The Use of Path Integration to Guide Route Learning in Ants,” *Nature*, vol. 399 (24 June 1999), pp. 769- 772.

<sup>iv</sup> Greg Lynn, *Animate Form* (New York: Princeton Architectural Press, 1999) and *Folds, Bodies and Blobs. Collected Essays* (Brussels: La Lettre Volée, 1998).

<sup>v</sup> Bernard Cache, in “A Plea for Euclid,” provides an excellent account of the topological resources of Euclidean geometry available for architectural design. *ANY (Architecture New York)*, no. 24 (1999), pp. 54-59. The

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present essay, however, diverges sharply from Cache in its assessment of the importance and usefulness of non-Euclidean conceptions.

<sup>vi</sup> “Movement in itself *continues* to occur elsewhere: if we serialize perception, the movement always takes place above the maximum threshold [in the super-figure’s passing-through] and below the minimum threshold [recessively] in expanding or contracting intervals (microintervals) ... Movement has an essential relation to the imperceptible; it is by nature imperceptible,” Gilles Deleuze and Félix Guattari, *A Thousand Plateaus*, trans. Brian Massumi (Minnesota: University of Minnesota Press, 1987), pp. 280-281. Another word for “imperceptible” is “abstract.”

<sup>vii</sup> *ANY (Architecture New York)*, no. 23 (1998), special “Diagram Work” issue, ed. Ben van Berkel and Caroline Bos.

<sup>viii</sup> On the peri-personal and *déjà vu*, see Richard E. Cytowic, “Synaesthesia: Phenomenology and Neuropsychology,” *Synaesthesia: Classic and Contemporary Readings*, ed. Simon Baron-Cohen and John E. Harrison (Oxford: Blackwell, 1997), pp. 20, 23.

<sup>ix</sup> Richard E. Cytowic, *Synesthesia: A Union of the Senses* (New York: Springer-Verlag, 1989), pp. 217-227.

<sup>x</sup> For diagrammatic renderings of this facedness, see Cytowic, *Synaesthesia: A Union of the Senses*, figures 7.9-7.17, pp. 202-209.

<sup>xi</sup> Raymond Ruyer: Experience is “a surface with just one side ... If the sensible surface could be seen from two sides, it wouldn’t be a sensation, but rather an object. ... it’s an ‘absolute surface’ relative to no point of view outside of itself.” *Néo-finalisme* (Paris: PUF, 1952), pp. 98-99.

<sup>xii</sup> See Daphne Maurer, “Neonatal Synaesthesia: Implications for the Processing of Speech and Faces,” Baron-Cohen and Harrison, *Synaesthesia: Classic and Contemporary Readings*, pp. 224-242. For a theory of developmental psychology consistent with the view that infant perception is synesthetic and that synesthesia persists unconsciously as a stratum of adult experience, see Daniel Stern, *The Interpersonal World of the Infant: A View from Psychoanalysis and Developmental Psychology*

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(New York: Basic Books, 1985). The theory of the synesthetic basis of infant perception was most influentially advanced by Eleanor J. Gibson, *Principles of Perceptual Learning and Development* (New York: Appleton-Century-Crofts, 1969). For a series of essays on empirical investigations into the functioning of synesthetic (“intermodal”) perception in infants, see David J. Lewkowicz and Robert Lickliter, eds., *The Development of Intersensory Perception: Comparative Perspectives* (Hillsdale, NJ: Lawrence Erlbaum, 1994), pp. 165-370. On the limitations of the concept of “intermodality,” see Chapter 6 below.

xiii Cytowic, “Synaesthesia: Phenomenology and Neuropsychology,” p. 23.

xiv The notion of intentionality is often used as a way of establishing an identity between the structure of the world and the structure of the subject in the world. The insistence on such an identity is a tacit assumption of a divide. An objective-subjective split is backhandedly enshrined in this way of thinking. A mediating instance is then required to bring the two realms back into harmony. The senses are assigned to the job. In architectural phenomenology, a building becomes a “metaphor” “reflecting” for the senses the identity-structure shared by the subject and the world. Architecture is called upon to express, and reinforce in concrete, that ideal fit. Its “mission” is to concretize the “integrity” of being-in-the-world: close the loop. The whole process revolves around identity and an ultimately normative ideal of authenticity. The ideal is suspiciously domestic (Heidegger’s “house of being” is just around the corner). This is how Juhani Pallasmaa puts it: “The timeless task of architecture is to create embodied existential metaphors that concretize and structure man’s being in the world. Architecture reflects, materializes and eternalizes ideas and images of ideal life ... Architecture enables us ... to settle ourselves in the world ... Our domicile becomes integrated with our self-identity ... Architecture is the art of reconciliation between ourselves and the world, and this mediation takes place through the senses.” The “mental task” of architecture, Pallasmaa continues, was best formulated by Frank Lloyd Wright: “What is need most in architecture today is the very thing most needed in life-- Integrity. Just as it is in a human being, so integrity is the deepest quality in a building ... If we succeed, we will have done a great service to our moral nature.” It all adds up to a high-minded moralism. This is sharply at odds with any form of architectural experimentalism, whose rallying cry would not be to close the loop, but to loop-the-loop; not to ground in the “authentic” but to dizzy with potential (remembering that position arises from intensive

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movement, rather than extended movement departing from pre-position). Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (London: Academy Editions, 1996), pp. 50-51. In the perspective of this essay, there is not an identity between the subjective and objective, or between the world and experience: there is a continuity that mutually includes each side of the divide in the same self-differentiating reality.

<sup>xv</sup> Arakawa and Madeleine Gins, *Reversible Destiny* (New York: Guggenheim Museum, 1997). Take “reversible destiny” as “re-incipient life” (experience returning to the point of matter-minded ontogenesis). On “relational architecture,” see Rafael Lozano-Hemmer, *Alzado Vectorial. Arquitectura Relacional No. 4/Vectorial Elevation. Relational Architecture No. 4* (Mexico City: National Council for Culture and the Arts, 2000). Take “relational” to mean “intensively cross-referencing disparate planes of experience.” For an overview of the work of Lars Spuybroek see Spuybroek, *Deep Surface* (Rotterdam: NOX, 1999) (exhibition catalogue, Exhedra Gallery, Hilversum). See especially “Off the Road: 103.8 MHz,” a description of a housing project and noise barrier in Eindhoven. The aim of the project is to create a “zone of transition” (using among other devices a sound processing feedback loop between the houses and the cars passing by on the highway) that sets up a “resonance” between “bits and bricks,” (air) “waves and ground.” This activates the in-between as an operator of relation rather than leaving it a passive boundary. The “zone of transition” is an airborne, abstract holding-together in addition to (rather than in opposition to, or simply breaking down) the concrete holding-apart of discrete, down-to-earth divisions demanded by the need for a highway noise barrier.

<sup>xvi</sup> A. R. Luria, *The Mind of the Mnemonist: A Little Book About a Vast Memory* (Cambridge, Mass.: Harvard UP, 1968).

<sup>xvii</sup> Luria, *The Mind of the Mnemonist*, p. 35.

<sup>xviii</sup> For example, see Luria, *The Mind of the Mnemonist*, p. 108.

<sup>xix</sup> See Luria’s discussions of S.’s “split I,” pp. 149-160.

<sup>xx</sup> Luria, *The Mind of the Mnemonist*, p. 63.

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xxi Luria, *The Mind of the Mnemonist*, p. 10.

xxii 217-240. See in particular Benjamin Libet, "Unconscious Cerebral Initiative and the Role of Conscious Will in Voluntary Action," *Behavioral and Brain Sciences*, no. 8 (1985), pp. 529-566. For a good presentation and summary of the issues raised by Libet's work, see Tor Norretranders, *The User Illusion: Cutting Consciousness Down to Size*, trans. Jonathan Sydenham (New York: Viking, 1998), pp. 213-250. For considerations of the implications of Libet's work for cultural theory, see William Connolly, "Brain Waves, Transcendental Fields, and Techniques of Thought," *Radical Philosophy*, no. 94 (March/April 1999) and Chapter 1 above.

xxiii Gottfried Wilhelm Leibniz, preface to *New Essays in Human Understanding*, in *Philosophical Writings*, ed. G.H.R. Parkinson, trans. Mary Morris and G.H.R. Parkinson (London: Everyman, 1995), pp. 153-158.

xxiv These are related to the normally unperceived "object-likes" and "space-likes" of Chapter 6.

xxv Walter Benjamin's early essays develop a philosophy of experience that dovetails in many ways with the one advanced here. For the early Benjamin, experience is a supplemental abstract-excess (recessive/"pop-out") surface of "legibility" best described in topological terms, as enveloping a double infinity: "A given surface of legibility (or set of conditions for possible experience) is supplemented by the speculative claim that these conditions are themselves but one of an infinite set of possible surfaces or conditions of experience. The speculative configuration is both folded into and exceeds the particular surface of legibility, allowing Benjamin to conceive of a double infinity: the transcendental infinity of possible marks on a given surface (or perceptions within a given framework of possible experience) and the speculative infinity of possible bounded but infinite surfaces or frameworks of experience," Howard Caygill, *Walter Benjamin: The Colour of Experience* (London: Routledge, 1998), p. 4. The "speculative infinity" is what is termed the "virtual" here, in its largest extension. For reasons that cannot be adequately dealt with in the present framework, this "surface" as virtually construed is better understood to be "limited" than "bounded." A limitation is not necessarily the same thing as a boundary. On reading, see the next argument (on the feedback of higher forms).

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xxvi On the white wall of perception, see Deleuze and Guattari's comments on the work of Isakower, Lewin, and Spitz on the relation between vision and proprioception, *A Thousand Plateaus*, pp. 169-170. On the background as a "groundless ground" that rises into vision and in rising, recedes, see Deleuze, *Difference and Repetition*, trans. Paul Patton (New York: Columbia University Press, 1994), 28-29, 151-152, 229-230, 272-275.

xxvii "Out of Sight, Into Mind," *New Scientist* (5 September 1998), p. 41. For the classic account of blindsight, see L. Weiskrantz, *Blindsight: A Case Study and Implications* (Oxford: Oxford UP, 1986).

xxviii Itzhak Fried, Katherine A. MacDonald and Charles L. Wilson, "Single Neuron Activity in Human Hippocampus and Amygdala During Recognition of Faces and Objects," *Neuron* 18 (May 1997): 753-765. "Some neurons maintained a record of previous stimulus response that was more accurate than the person's conscious recollection," 753.

xxix Pallasmaa, among many others, exalts the traditional view of architecture as grounding: "The sense of gravity is the essence of all architectonic structures and great architecture makes us aware of gravity and earth. Architecture strengthens the experience of the vertical dimension of the world," *The Eyes of the Skin*, p. 47. Compare Greg Lynn's arguments for an architecture of "lightness": "When defined by the qualitative relations between particularities of matter rather than by the relation of various masses to a single ground form, a multiplicity of potential architectural gravities emerge," *Folds, Bodies and Blobs*, p. 100. See also John Rajchman, "Lightness," *Constructions* (Cambridge, Mass.: MIT Press, 1998), pp. 37-54.

xxx Jean-Pierre Luminet, Glenn D. Starkman, and Jeffrey R. Weeks, "Is Space Finite?," *Scientific American* (April 1999), p. 94.

xxxi On hyperbolic models of the universe, see Luminet, Starkman and Weeks, *op. cit.*, and Roger Penrose, *The Large, the Small and the Human Mind* (Cambridge: Cambridge University Press, 1997), pp. 21-49.

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xxxii Geoffrey B. West, James H. Brown, and Brian J. Enquist. "A General Model for the Origin of Allometric Scaling Laws in Biology," *Science*, vol. 276 (4 April 1997): 122-126. In all organisms "essential materials are transported through space-filling fractal networks of branching tubes," p. 122.

xxxiii Geoffrey West, quoted in Roger Lewin, "Ruling Passions," *New Scientist*, 3 April 1999, p. 39.

xxxiv Deleuze and Guattari, *A Thousand Plateaus*, p. 281.

