ARCHITECTURAL DESIGN
HYPERSURFACE ARCHITECTURE II

BRIAN MASSUMI

STRANGE HORIZON

Buildings, Biograms and The Body Topologic

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 exceptions 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 widely held opinion that the abstractness of digital space of topology contradicts the spatial reality of bodies and buildings. 'Since we do not live in non-Euclidean space', the objection goes, 'why are you foisting mutant geometries on us that fail to 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, but 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 of your buildings – why should we care?'

But what if *the space of the body is really abstract?* What if the body is inseparable from dimensions of lived abstractness that cannot be conceptualised in terms other than the topological? The objections that topological architecture is too abstract and does not 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 partisan 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 yet abstract enough* 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 of the window. I was looking east onto rue St-Marc, when in fact I was looking north onto rue Baille. I am sad to report that there is no resemblance between the two scenes. Something seriously disorienting was happening in the time it took me to get from the side entry of the building to the door of my office. But that's only the half of it. The seriously disorienting thing 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 from the window of my office. The sudden realisation that my north was everyone else's east was jarring. True, I hadn't paid much attention to the scene. But it wasn't only this. 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's only one thing you can call it: a hallucination. It was a worry.

Thinking about it, I realised that I could make my way to and from my office to the exit without error, but if I'd 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 specialised 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 for 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've ever ridden a subway, it's likely that you've had a similarly jarring experience when surfacing at street level.[1]

That must be it. The paucity of visual cues in tunnel-like places such as 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'd got 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.

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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'll 'intuitively' find your way to the food with relatively little difficulty. Especially if you're hungry. If you think about it, we all go about most of our everyday lives on habitual auto-pilot, driven by half-conscious tendencies that gently gnaw at us 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 they're advertised to be. As a general explanation of orientation, they're 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 emptier the space, the better the brain's ability to orient. The conclusion was that humans orient more by the 'shape of the space' than by the visual characteristics of what's in it.[2] 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.[3] It is known to be the basis of many animals' ability to orient. It is a key element, for example, in the well-known feats of navigation achieved by homing pigeons. Its role in human orientation has significant implications for our understanding of space because it inverts the relationship 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 realise 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're what you habitually head towards or away from. They trigger headings. Vectors. Landmarks are like magnetic poles that vectorise the space of orientation. A landmark is a minimal visual cue functioning to polarise movement's relation to itself in a way that allows us habitually to flow with preferential heading. The vectorial structuring effected by landmarks gives 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, preprogrammed in inches and feet. Isn't it more plausible 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 true 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 acccurate 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 areas filled with sea-monsters on medieval maps). No matter how expert or encompassing our cognitive mapping becomes, the monstrous sea of proprioceptive dead reckoning is more encompassing still. We are ever awash in it.

The very notion of cognitive overcoding implies that we orient with two systems of reference used together. The contradiction between them is 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 realise they're 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 that visual awareness interrupts proprioception. The alarmingly physical sense we feel when we realise we're 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 co-operation between two sense systems. A synaesthetic system of cross-referencing supplements a systemic duality, exo-referential and self-referential, positional and moving, Euclidean and self-varyingly monadic. Synaesthetic co-operation 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.

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Where we go to find ourselves when we're 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 synaesthetic interference and accord, was there really a difference in nature between the sight I positively saw that wasn't there out of my window, and the one with which I laboriously replaced it? Weren't they just two sides of the same coin: the interference side and the accord side? If every effectively placed experience is a synaesthetic 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 narrow our understanding of space down 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 visualisable. 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. Anexact 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 a lot like a topological figure in the flesh? Doesn't the way it all shapes up sound very 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 programme stops running, leaving a Euclidean form as a static witness to its arrested dynamism?[4] 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 programme run, aren't we doing it again, slumped before the screen? Are we not, though immobile, 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 spatialisation, is operatively encompassed by topological movement – from which it derives in the first nonplace.

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

Note on Terminology

'Topology' and 'non-Euclidean' are not synonyms. Although most topologies are non-Euclidean, there are Euclidean topologies.[5] 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 co-ordinate 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.[6] 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 shorthand 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 co-ordinate-box containing things. In this view, widely thought to correspond with 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

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Relational Architecture, *which most of the following images belong to, refers to large-scale interactive installations that create opportunities for buildings to decline their established roles in their particular social performance. The interventions are not 'site-specific' but rather 'relationship-specific', as the public is an actor of the ephemeral transformation. Based on dissimulation and insinuation, relational architecture pieces dematerialise the environment and amplify participants to an urban scale. Contact:* rafael@csi.com

LEFT: Positioning Fear, Relational Architecture 3 - Transformed the Landeszeughaus arsenal in Graz, Austria. *A teleabsence interface projected shadows of passers-by onto the building. Using tracking systems, the shadows were automatically focused and generated sounds. A real-time IRC discussion about fear, involving 30 artists and theorists from 17 countries, was projected inside the shadows. Project web site:* http://xarch.tu-graz.ac.at/home/rafael/fear
Credits: Rafael Lozano-Hemmer (concept, visuals), Will Bauer (audio, programming), Robert Rotman and Conroy Badger (programming), Nell Tenhaaf (IRC moderator).

RIGHT: Piel Capaz, a technological coffin for vampire buildings. *A virtual reality installation that visualises resting sites for emblematic buildings that are not allowed to have a natural death. The participant's motion controls the point of view in the projected environments on the wall and on the floor.*
Credits: Emilio Lopez-Galiacho (concept, visuals), Rafael Lozano-Hemmer and Will Bauer (interaction).

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the process and changing its nature (Euclideanising 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 text. 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 two-dimensional effect. A Klein bottle is a two-dimensional figure whose folding in on itself creates a three-dimensional 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 hyper-dimensional reality: as the 'being' of the excess of effect over any determinate spatial configuration. As the following argument from synaesthesia 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 Synaesthesia

The hinging of the proprioceptive to the visual in the movement of orientation is a synaesthetic interfusion. It is not the only one. Each side, for example, enters into its own synaesthetic 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 synaesthetic conjunctions, involving all the senses in various combinations, including smell and hearing. Clinical synaesthesia 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 synaesthesia, other-sense dimensions become visible, as when sounds are seen as colours. 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. Synaesthetic forms are dynamic. They are not mirrored in thought; they are literal perceptions. They are not reflected upon; they are experienced as events. Synaesthetes 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. Synaesthetic forms can be usefully recombined with an experience of movement. 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 synaesthetic forms are often called 'maps', they are less cartographic in the traditional sense than 'diagrammatic' in the sense now entering architectural discourse.[7] 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 synaesthetes 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 nonplace has been characterised 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.[8] This makes experiencing the biograms, in the words of one synaesthete 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, like a 'flexible moving third dimension'. But the depthlikeness is vague enough that they can still be compared 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 to MP, 'larger than my visual range, like looking at the horizon'. They are geometrically strange: a foreground-surround, like a trick centre 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 synaesthete 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, occuring in place (as at a workstation, 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 colour. When she has to recall a birthday, she will use the colour as a landmark, and when she approaches the right coloured region, the name and date will appear. The shape and sound of the letters and numbers are stored in the colours, 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 colour.

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 multicoloured 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'.[9]

Biograms cannot be described without resorting to topology: centres folding into peripheries and out again, arcs, weaves, knots and unthreadings. Face it. 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 synaesthetic form of experience is faced, in something like the sense in which writing is handed.[10] 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.[11] This is not a metaphor. If there is a metaphor in play, isn't it rather the

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mathematical representation that is the metaphor for the biogram? The biogram is a literal, graphically diaphanous event-perception. It is what is portented 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.[12] 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; it is also the general plane of cross-reference 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 synaesthetic 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'.[13] They retain the surprise of the *déjà vu* even for clinical synaesthetes 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 synaesthetes. 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 centre stage and encircles the tent.

Clinical synaesthetes have trained synaesthesia 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 colour that everything fuses, in a 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 colour, 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 organisation 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-organised, 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 synaesthetic experience is 'real and abstract' in precisely the way Gilles 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 actualising a virtuality. That is why the synaesthetic 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 synaesthetic 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 arc '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 incipiency 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 synaesthetic hypersurface refracts the activity of matter through many-dimensioned splendour into colour. 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 organised 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 a somewhat ontogenetic contorsion. It involves a hyperreal looping between the impersonal and the 'peri-personal'. 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 synaesthetic 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.[14] This is like the *déjà vu* without the portent of the new. In the circus of synaesthesia, 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 practised 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?).

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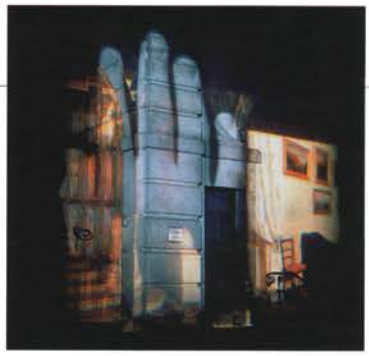

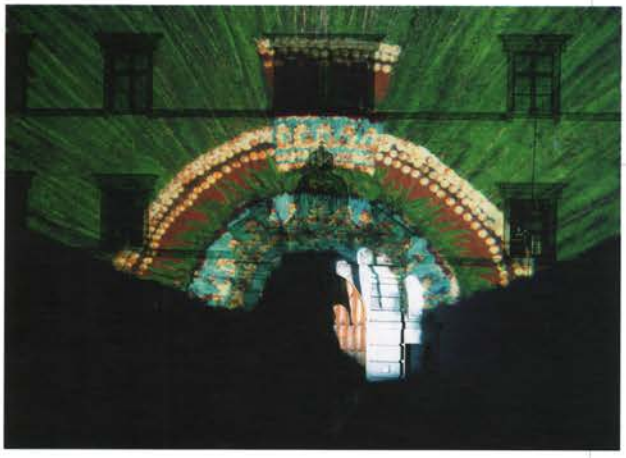

What if topological architecture could find ways of extending the 'diagrams' it designs into 'biograms' inhabiting the finished product? What if it could find ways of embedding in the materiality of buildings open invitations for portentous events of individuating *déjà vu*? Might this be a way of continuing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

To do this would require somehow integrating logics of perception and experience into the modelling. 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 for architecturally soliciting an ongoing eliciting of emergent forms/functions at the collective hinge of perception, hallucination and cognition. Techniques would have to be found for 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 synaesthetes like MP by finding ways of building-in nonvisual hypersurfaces. There is nothing wrong with colour, 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 favoured that can be twisted away from addressing pre-existing forms and functions towards 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 already moving.[15]

TO BE CONTINUED . . .[16]

[RLH]

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Displaced Emperors, Relational Architecture 2 - Intervention on the Habsburg Castle in Linz, Austria. *An* architact *interface consisted of wireless 3D trackers that calculated the direction of the participant's arm and a large projection of a human hand appearing wherever he or she was pointing. 'Touch' transformed the castle into Chapultepec Palace, the residence of the Habsburg emperors in Mexico and trigger a temporary post-colonial override consisting of a huge image of the Atzec head-dress kept at the ethnological museum in Vienna. Credits: Rafael Lozano-Hemmer (concept, visuals), Will Bauer (audio,programming), Susie Ramsay (production). Photos by Dietmar Tollerind.*

Notes

I gratefully acknowledge the assistance of the Australian Research Council and the Canadian Centre for Architecture in supporting this research.

1 Sandra Buckley analyses the differences, cultural and experiential, between ground-level movement through architectural spaces and underground movement in 'Contemporary Myths of the Asian City', in Robert Sergent and Pellegrino D'Acierno (eds), *(In)Visible Cities: From the Postmodern Metropolis to the Cities of the Future*, Monticello Press (New York), forthcoming.

2 See Russell Epstein and Nancy Kanwisher, 'A Cortical Representation of the Local Visual Environment', in *Nature*, vol 392, 9 April 1998. For a popular press account of their work on adult brain functioning during orientation tasks, see 'A Positioning Unit of Sorts in the Brain', *New York Times*, 28 April 1998, pB13: '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'.

3 For an overview, see Ariane S Etienne, Joëlle Berlie, Joséphine Georgakopoulos and Roland Maurer, 'Role of Dead Reckoning in Navigation', in Sue Healy (ed), *Spatial Representation in Animals*, Oxford University Press (Oxford), 1998, pp54–68.

4 Greg Lynn, *Animate Form*, Princeton Architectural Press (New York), 1999; and *Folds, Bodies and Blobs: Collected Essays*, La Lettre Volée (Brussels), 1998.

5 Bernard Cache provides an excellent account of the topological resources of Euclidean geometry available for architectural design in 'A Plea for Euclid', *ANY (Architecture New York)*, no 24, 1999, pp54–9. The present essay, however, diverges sharply from Cache in its assessment of the importance and usefulness of non-Euclidean conceptions.

6 'Movement in itself continues to occur elsewhere: if we serialise perception, the movement always takes place above the maximum threshold [in the superfigure'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*, Brian Massumi (trans.), University of Minnesota Press (Minnesota), 1987, pp280–281. Another word for 'imperceptible' is 'abstract'.

7 Ben van Berkel and Caroline Bos (eds), *ANY (Architecture New York)*, no 23, 1998, special 'Diagram Work' issue.

8 On the peri-personal and *déjà vu*, see RE Cytowic, 'Synaesthesia: Phenomenology and Neuropsychology', in Simon Baron-Cohen and John E Harrison (eds), *Synaesthesia: Classic and Contemporary Readings*, Blackwell (Oxford), 1997, pp20, 23.

9 Cytowic, *Synaesthesia: A Union of the Senses*, Springer-Verlag (New York), 1989, pp217–27.

10 For diagrammatic renderings of this, see ibid, figs 7.9–7.17, pp202–9.

11 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*, PUF (Paris), 1952, pp98–9.

12 See Daphne Maurer, 'Neonatal Synaesthesia: Implications for the Processing of Speech and Faces', in Baron-Cohen and Harrison, op cit, pp224–42.

13 Cytowic, 'Synaesthesia: Phenomenology and Neuropsychology', op cit, p23.

14 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 concretise the 'integrity' of being-in-the-world: to 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 concretise and structure man's being in the world. Architecture reflects, materialises and eternalises 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 needed 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 movement, rather than extended movement departing from pre-position). Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, Academy Editions (London), 1996, pp50–1. 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.

15 Arakawa and Madeleine Gins, *Reversible Destiny*, Guggenheim Museum (New York), 1997. Take 'reversible destiny' as 're-incipient life' (experience returning to the point of matter-minded ontogenesis). On 'relational architecture', see Rafael Lozano-Hemmer in this volume and at http://xarch.tu-graz.ac.at/filmarc/fest/fa3/fear. Take 'relational' to mean 'intensively cross-referencing disparate planes of experience'. See also Lars Spuybroek, in this publication. For an overview of his work see Spuybroek, *Deep Surface*, *NOX* (Rotterdam), 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.

16 The full text of this essay is available online at *http://www.hypersurface.net*

[RLH]

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