Perforated, Bent and Folded: Pedestrian Geometries

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Abstract

As cities moved toward the new world order of the automobile, the urban terrain of the 20th century shifted paradigmatically. The traditional measure of place, once understood in terms of centers, now gave way to an auto-specific linear construct. Simply getting from one place to another, in terms of distance and time, became the order of the day. The outward thrust of the industrial city, coupled with modernist tenets and the proliferation of the automobile, smoothed out the geometries of traditional urban fabric. The perforated, bent, and folded terrain of traditional cities — i.e. the colonnades, covered walks, raised pedestrian crossings, street markets, and tree-lined boulevards — all but disappeared. "Smooth cities", unable or unwilling to define place and motion in terms of human scale, have become less and less pedestrian and less and less alive. We link human interaction with place through the effects of spatial geometries on human engagement with their surroundings. Our observations suggest that smooth geometries fail to provide the temporal properties necessary for humans to feel at ease within such spaces, whereas perforated, bent, and folded geometries connect humans in a rich and nourishing manner.

Arriving at an Unknown Destination.

In 1925 there were an estimated 20 thousand miles of paved roads and hundreds of thousands yet to be paved. By 1927, the Ford Motor Company alone had built more than 15 million cars. Desperate to resolve the conflict between pedestrians and automobiles, designers have looked for solutions in terms of alternative urban forms. "*In 1923, Harvey Wiley Corbett proposed a scheme that would create a secondary pedestrian plane elevated on walkways in the sky*" — he clearly understood that the urban surface was being overrun by inhuman machines. (1)

For various reasons Corbett's scheme, and others like it, were never realized, leaving pedestrians to fend for themselves. Given no choice, perhaps people felt they would be safer if they had their own car. As the desire for mobility spread, more and more American cities surrendered to the automobile. The public realm, once the rich urban space of the pre-industrial world, simply gave way. In what was now little more than a car-filled landscape, one vast parking lot, the public space of the city began to fall apart, "*and the call to community, formed by an intimacy with one's surroundings and neighbors dwindled and so did our civic values*." (2) For what importance is a city to a "*viewer who moves at machine velocity and watches through a machine construction of space and time?*" (3) Baudelaire, in a critique of the condition of hyper-mobility, sighted that "*instead of a socially-cohesive and physically integrated community, as it*

had once been, the city had now become nothing more than a series of views and viewpoint, objects and events all held together by the fleeting sensations of each individual spectator." (4)

Order of the day: form, perception, and health.

Since the time of Daedalos' privileged view from above, architects have sought to give order to the world below. The construct of visual order emerged against the chaos that was now the American city, and the need for such order beckoned the bureaucratic mind. But, just as the Greek idea of an imagined cosmos of Gods failed to render a true understanding of the night sky, so too, visual order would fail to address the complexity that is the living city.

Instituting simplistic visual order as a means to unravel 19th century cities, 20th century planners sought to create a plan with a high degree of geometrical regularity. "*Concentrating on visual simplicity they began to smooth out the geometries of the traditional urban fabric*", affording greater access and mobility for the machine. Such efforts however, while accommodating the free flow and linear predisposition of the automobile, did not always allow the "*urban functions on the ground to generate their own coherent and connected form*." Whereas "*architectural elements can connect to each other visually through symmetries, similarity, and intermediate forms, there is a basic difference between architectural and human connections*." (5)

"*Functional connections between human activities are not amenable to a treatment in formal terms, i.e. self-similar, symmetry, axiality, because their patterns are more highly complex.*" (6) For this reason, cities that are formed in visual terms often fail to provide sufficient connectivity to engender a healthy urban environment. "*Urban environments that are strongly connected usually look irregular from the air*." (7) "*The simple alignment of buildings that do not interact in any way effectively decomposes a complex system reducing it to a simplistic aggregate*." Thus, despite their orderly and coherent appearance, "*most modern cities are simply a collection of disconnected parts*." (8)

"*The straight lines of a Cartesian Grid provide the fewest connections possible, in effect, limiting human engagement and interaction*." Mathematically we know that, "*two points can be connected by a straight line in only one way, but they can be connected by curved lines in an infinite number of ways.*" (9) The "*roadway defined as a straight line between two points, negates the human dimension.*" (10) "*Straightness is known to have only one scale, which suppresses urban cohesion, a complex relaxed curve, having an infinite number of subscales*" — i.e. points of inflection — fosters greater connectivity and engagement. (11)

Adaptive architecture has finally been recognized as an extension of the human mind to the built environment. "*We build structures so that we may connect to them; this extends our consciousness to our immediate surroundings. If we cannot connect to surrounding surfaces then we find ourselves in what feels like an alien environment and our most basic instincts drive us to leave it*." Urban health and our sense of wellbeing are disturbed when "*the anxiety that comes from an ambiguity of bonding surfaces and the threat of cars invalidates any information which the region might offer*." "*Under stress from our environment, our baser instinct narrows our perceptual field*" and decreases our degree of engagement with our surroundings. (12)

If one is cut off from the lived experience of everyday space, whether by narrowed or flattened perception, the ambiguity of place, or the brute force of the machine, our phenomenological understanding of the world becomes ungrounded. If we can no longer operate as "*body or flesh moving within the figure/ground, horizon/center relations that structure our bodily spatialization of the world*" then we become further disconnected or displaced. (13) Still, we continue to allow the machine, and its need for speed, to make inroads into the urban fabric, gaining such a degree of access to the city and our lives that it has begun to fundamentally reshape our perception of the built environment.

"*At a pace of 30mph buildings begin to blur, becoming featureless boxes or surfaces*."(14) "*Seen in succession, images superimpose upon one another such that, buildings are evaluated less by their weight and presence than by their fluctuating outlines*." (15) Transforming the traditional phenomenological model and thereby altering the lived experience, hyper-mobility inaptly renders the urban fabric as an expression of speed, wherein:

Speed extends sight beyond the capacities of the human body, creating images beyond the holding capacity of consciousness

Speed reveals buildings as planar and linear so that they are no longer understood as three-dimensional forms or felt as palpable textures

Speed negates architecture as the direct spatial extension of corporeal sensations

Speed transforms architecture from site to flow, from object to event

Speed turns cities into silhouettes, as the intricacies of detail and context give way to the uncertainties of outline and scale

Speed renders the city as a sequence of disembodied and abstracted forms

Speed induces unaesthetic vision, sight becomes absent-minded, and building differentiation turns into streaming images whose substance has nothing to do with the customary meanings of these architectural elements

Speed reduces cities to single-surfaced images of built forms, distinct from the multi-angled view of the city once possible through exploration on foot

Speed sponsors spatial disconnection

Speed transforms architecture into surface extracted from place

Speed destroys the density of experience

Speed isolates us from our surroundings

Speed shifts from the tactile sense to the optical sense, where visual stimulation becomes proportionally more important than bodily stimulation

Speed replaces civility

Speed separates viewer from the space of the object, and modern spectators become disconnected (16)

Application of the Perforated Bent & Folded methodology.

If we extend the logic of these three operations — i.e. perforation, bend, and fold — into actual urban entities, we begin to understand how certain cities seem to work on a human scale better than others. In his book "Earth Moves" Bernard Cache, working through a Deleuzean model of "The Fold", describes the Swiss city of Lausanne in terms of its terrain. Geographically postured between the Swiss Plateau and a valley lake below, the complexity of the site sponsors an urban fabric of perforations, bends, and folds. As it does, it creates a more complex and cohesive urban form. In order to navigate the urban surface you must move across bridges and through tunnels while traversing the upper plane, the mid-plane, and the lower plane. These operations bring urban mobility into scale, with the pedestrian body fostering a healthier environment through the density and decelerated scale of the experience.

Using this analysis, it is easy to make similar observations about the authors' place of residence, San Antonio, Texas. Known for its famous River Walk, you need only experience the urban terrain from within the topography of the river to see the benefits it affords its human occupants. Laid out beneath the city, the river bends and turns as it weaves its way through the urban fabric. The river's elevation is approximately 16-20 feet, about one story, below the city streets, making it easy to access. At every bridge there is a set of stairs that lead down to the River Walk. From there you can wind your way through the city without fear of losing a limb to an oncoming and often aggressive automobile. While the subterranean aspects of the space work well to create a hospitable environment for visitors who are unfamiliar with the surfaces streets and are typically distracted, they also serve the local residents.

Often, when trying to get from one side of town to another, local residents prefer to drop down into the space of the River Walk, where they can easily traverse the city, avoiding the city traffic. Once you understand the lay of the land, or landmark buildings, you can quickly manoeuvre throughout the entire urban environment at a pace that is in keeping with the human scale. This allows individuals to engage with the material presence of the space, making the necessary connections to sponsor a coherent and cohesive experience.

In addition to the natural perforations, bends, and folds, the businesses that line the river's edge must reconcile the alignment of the river with the streets above. In many cases this is achieved by a series of more intimate exercises of perforations, bends, and folds. Operating beyond the formal aspects of the facility — and at a slightly different scale — program, function, and form are folded into each other in an effort to optimize the building's engagement with its users. From business offices to restaurants, from hotels to retail sales, multiple combinations of program merge to form a more suitable degree of programmatic density.

Up on the urban asphalt surface the city benefits from a great number of turn-of-the-century structures. Through their form, placement, and detailed facades these buildings greatly extend the information field that humans depend upon to navigate the built environment. Standing at the end of each primary street, these buildings fold the urban space back onto itself, while allowing the street system to gently bend around them. Bent in plan or placement, folded in their details or functions, their weight and physical presence are experienced by pedestrians on both the River Walk and the streets above. In this way the two urban topographies are tightly knitted together to form a more cohesive urban fabric.

A lot can be learned from San Antonio, in terms of its human environment, but equally there are some lessons that its neighboring city, Houston, has to offer. We have passed through Houston on several occasions, the operative words being “passed through”. Even on the surface streets of Houston we have always felt compelled to simply get where we were going. Down amongst the iconic towers of modern hyper-mobility, with their smooth surfaces and slick finishes, the urban scale breaks down. As you race from one city block to another you begin to realize that if you happened to be on foot you would probably be alone and completely at the mercy of the city’s principal inhabitant: the automobile.

We would venture to say that 75 percent of the ground floors of buildings in Houston are occupied solely by the automobile. Like the sentinels of the Forbidden City the large parking garages ward off the unwanted pedestrian. Given the sheer number of parking garages, we guess it would come as no surprise that there are about as many automobile entrances as pedestrian entrances; maybe more. These great big holes cut into the urban fabric would seem to offer an opportunity for a perforated connection, but instead they most often lead to dark and hostile places. As the urban surface continues to spread we turn our attention to the east of town where, separated by a vast paved area, you find both a convention center and a stadium. To maintain their sovereignty they stand isolated and empty, with no sign of activity around them. They keep their distance with military planning. Walking in this area, devoid of humans, makes you wish you were in your car, safe from the city. By design, Houston breaks down the human scale at every corner. The blur of cars going by is reflected in the polished granite monoliths that are its buildings, creating an ambiguity of place that forces you away. So inhospitable are the city’s streets that Houston has developed its own underground series of connecting tubes to allow pedestrians to get from one building to the next without ever having to go outside.

A comparison of just these two cities makes it hard to argue against our proposals. Admittedly, these two towns had very different beginnings and serve a very different purpose, still you only have to step foot in them to understand the value of the perforated, bent, and folded methodology. If we were to proffer a conceptual model of a folded Houston, we would see the urban program collapse into itself as the urban surface is folded over. Imagine if the center was now too dense for cars and the parking structures were limited to the periphery, while still within walking distance. If the convention center and stadium were then made a part of the immediate urban fabric, this type of fold could trigger a need for a greater degree of perforation, realigning the processes of the city such that it was easier to traverse on foot and therefore more healthy and humane.

Conclusion.

The perforated, bent, and folded methodology provides the necessary urban couplings to engender the kind of spaces that are human and alive. It is intended to be applied on multiple levels, from the urban plan to the detail of a building façade. To be effective, it must also maintain the human scale. This paper only addresses some of the larger applications, but if we look closely at those areas of our cities that are healthy, we can begin to see these operations at work. In the day-to-day routine that is urban design and city planning, we sometimes have to limit the complexity of our task to be able to negotiate a solution, but in so doing, we often

nullify that which keeps a city alive: its complexity contained in its perforations, bends, and folds.

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