

Architecture and the Image of Fluidity

While under modernism, architecture had developed according to various tropes of progress from the dialectical to that of the machine, the past two decades have seen the rise of architectural generation based less in models of progress than in ones of fluid models of ongoing formation that reject both production as repetition or the drive towards predetermined ends. A paramount model of this is the Rolex Learning Center on the Lausanne campus of the Ecole Polytechnique Fédérale, by the architectural firm of SANAA which upon its opening “The Independent” proclaimed: “In Lausanne yesterday, the feted Japanese architects Kazuo Sejima and Ryue Nishizawa – aka Sanaa – became the profession’s anointed artists of the floating world. Their new SF110m (£65m) building is a fluid exercise in glass and concrete.”¹ With its continuous, undulating floor plane, ever varying oval voids and effortless expanses, there is little doubt as to the writer’s reference, yet amassing under fluid architecture’s smooth surfaces, questions abound.

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Although architecture’s image of fluidity presents itself as fully manifest, its forms and logics seemingly apparent, the question of what fluidity designates remains unprobed. As a material and spatial practice, however, architecture is able to manifest fluidity in ways not readily allotted other fields. What most distinguishes the architectural question of flow, then, is not architecture’s ability to form flows, but its capacity to question its own spatial image of fluidity. One might ask, then, What is it that flows? Is it architecture’s material manifestation or its stream of inhabitants, information or building systems? Is it to be found in the structuring of space or in the space itself, or the inhabitant’s experience of the space? Underlying these questions is an implied split over whether architecture’s materiality forms flows, or forms channels in which something else flows.² Fluidity, however, elicits a set of complex relations in and through architecture that rejects any such divisive split; asking of architecture, not what flows or how to form flows, but “How does fluidity form relations between spatial, social, material and experiential forms?” This reformation moves beyond explaining how architecture forms flows to offer clues to why fluidity appears as a defining image at the onset of the twenty first century.

The construct of fluidity conveys properties associated with fluids. Traditionally, fluids such as liquids or gases have been defined as amorphous substances that yield easily to external pressure to assume the shape of their containers. Recently, distinctions between states of matter have moved away from a basis in the state's observable properties towards being defined by differences in intermolecular relationships. Accordingly, in fluids, intermolecular attractions keep molecules in proximity, rather than fixed relationships to one another. Fluid thus designates a mobile state, its shape determined by its movement relative to its container.³

THE BOSON THEORY OF FLOW

In July 2012, amidst worldwide acclaim, the European Organization for Nuclear Research, CERN, located a mere 65 kilometers from the Rolex Learning Center, announced they had (with near certainty) detected the long sought after elementary sub-atomic particle, the Higgs Boson. At ± 125 ev, the mass of the Higgs Boson is notably large for a subatomic particle. The particle's fame, though, stems not from its own mass, but from its critical role in the formation of matter. Divided into two classifications, all subatomic particles are either fermions or bosons. Fermions are matter particles that include electrons, neutrinos and quarks.⁴ As matter carriers, these particles have the important quality that two of them cannot occupy the same space at the same time. Bosons, however, are not carriers of matter. Instead, bosons are force-carrying particles⁵ that have the capacity for more than one to occupy the same space at the same time. What makes the Higgs Boson of particular importance is its eponymous subatomic quantum field believed to permeate the universe and create a drag on particles⁶ that bestows mass on them. Every particle - bosons and fermions - feels the field but is affected by it to different degrees. Particles greatly slowed develop a large mass, ones less slowed develop a small mass. So the question of why do particles have different masses becomes the operative question of why do particles feel the Higgs field differently.

FLUIDITY

Following this model, the construct of fluidity might be understood to operate not as matter, but as formative of matter. Fluidity is a boson, not a fermion. As a boson, fluidity is neither about a fluid material, nor about containing fluids. Comparable to the manner in which force carrying bosons mediate interactions between other particles within particular (quantum) fields, fluidity orchestrates how materials, spaces, functions and behaviors, conjoin smoothly in relation to a set of forces: social, physical, spatial or temporal. That orchestration produces the visible and palpable smoothing notable in - and seemingly definitive of - fluid architectures. This smoothing process all but conceals its underlying formative forces to produce something that seems effortless, even inevitable. The result is a seamless aligning of container with contained, the behavior of inhabitants with one another and programs with spaces, leaving manifestations of fluidity to appear unforced even when determined by competing and interacting forces. Through its introduction of inhabitants with agency, architectural manifestations of fluidity entail forms of agreement that introduce social forces in relation to spatial ones.

SPATIAL IMAGERY

Along with spatial formations, fluid architectures are producers of spatial imagery that differ from their modern predecessors. Over the past decade, as the world has increasingly become digitized, architecture's spatial imagery has



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Figure 1: Google Earth view of the Rolex Learning Center on the Lausanne campus of the Ecole Polytechnique Federale, SANAA.



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Figure 2: Aerial view of the Rolex Learning Center, SANAA.

Figure 3: View of the Rolex Learning Center.

increasingly aspired to a state of pure (analog) fluidity, acting as if in an opportunist fashion to take over a world of thought vacated. The first decades of the twentieth century saw the increasing theorization of the masses in terms of their spatial, aesthetic, and socio-political implications. In 1919, Supreme Court Justice Oliver Wendell Holmes codified the tensions in this emerging socio-spatial order when he issued a ruling that defined the point at which the free speech accorded an individual meets its liminal condition in the action of the masses. Holmes's ruling famously proclaimed: "the most stringent protection of free speech would not protect a man falsely shouting fire in a theatre and causing panic." The ruling, which remains the test case by which to determine the limits of free speech does more than separate protected speech from unprotected action. Premised upon an unseen set of forces, it ties together the limits of free speech to spatial ordering and human behavior.

Flow enters here, as underlying Holmes's thinking is the image of an ordered mass audience who upon hearing the call "fire" do not necessarily flow smoothly out of the rows of seating. Instead, they potentially erupt in all directions. One of the hallmarks of free speech decisions is the distinction drawn between speech and action. Into this the decision, Holmes tacitly, but fundamentally, added space, transforming the speech-action dichotomy into a speech-action-space trichotomy.

Within a few years of the Holmes ruling, socio-spatial images appear explicitly in the critical theory discourse of the period, including Sigfried Kracauer's coining of the term "the mass ornament" in his same titled essay of 1927. In "The Mass Ornament,"⁷ Kracauer designates the proto-Rockette synchronized dance troupe, "The Tiller Girls," to be emblematic of modernism's definitive spatial formation of mass ornament. While the term emanates from the group's synchronized movements, indicative of the mass ornament is its erasure of individual subjectivity. As Kracauer writes, "These products of American 'distraction factories' are no longer individual girls, but indissoluble female units whose movements are mathematical demonstrations."⁸ Critically, Kracauer does not limit his observations to the "Tiller Girls" but extends his diagnosis of mass ornament beyond the performers to the assembled masses, stating: "The regularity of their patterns is acclaimed by the masses who themselves are arranged row upon ordered row."⁹ Crucial to the efficacy of Kracauer's analysis, thus, is the mirroring of the dance troupe in the audience's organization into "row upon ordered row" that readily emerges as the unseen - but not un-theorized - image behind the Holmes's decision.

Mass ornament is not, however, the first spatial image of capitalism, but has a metonymic predecessor in Adam Smith's abiding image of the "invisible hand." Written in the same year as the "Declaration of Independence", Smith's Wealth of Nations puts forth the now-common image of capitalism's free market optimization:

[The individual] generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.¹⁰

Although Smith describes the workings of capitalism as the product of individual self-organization, this assumption comes into question as the hand

simultaneously produces and usurps agency. Differentiating Smith's image from that of mass ornament is that its underlying social subject is not that of the masses, but that of the people. In their 2004 book, *Multitude: War and Democracy in the Age of Empire*,¹¹ socio-political philosophers Michael Hardt and Antoni Negri contrast the long standing notions of social subjects of the people and the masses to that of the emerging one of multitude. Hardt and Negri put forth multitude as an emerging form of collectivity in which groups and individuals are not in fixed relations, but can continually recombine to produce "fluid matrices of resistance that defy the silence of the masses."¹²

ARCHITECTURE MODELS

Against modernity's advancement of the spatial image of production as repetition, is the increasingly common appearance of fluid formations in the work of numerous architecture practices. At some 215,000 square feet, the Learning Center appears from above as a large rectangle punctuated by variously sized non-geometrically perfect oval voids situated in an urban campus within site of the Alps. The fourteen voids, which act as entry points, provide light, and create a set of outdoor spaces, serve most critically to define the center's spatial organization. The building's very substance forms around them as one continuous, undulating, extrusion. Modulating between two levels, the wavelike motion places the building in a continuous state of formation, held in check by its maintaining a consistent eleven foot floor to ceiling datum.¹³

Although from above, the center's rectangular exterior clearly delineates it from the campus's urban fabric, inhabitation diffuses this contrast as its perimeter is not breached on entry. Instead, users slide under raised sections of the building's perimeter to enter the realm below the undulating, concrete floor slab and into the amorphous interconnected succession of spaces formed by the melding of the voids. There, entry into the building's interior occurs where the larger openings meet the ground. As the building's ground plane rises and lowers intermittently, users necessarily navigate a realm that is neither fully horizontal nor vertical.¹⁴ Owing to this, movement through the center is always doubly prescribed, the product of two sets of forces; the undulating ground plane that redefines vertical movement and the formation of the oval-like voids that direct that movement in sinuous paths circumnavigating the building. Together these forces fashion spatial zones without use of physical barriers.¹⁵

While the Learning Center's fluidity initiates from the continuous rise and fall of its internal landscape coupled with the circuitous movement around its ovoidal openings, the center's fundamental defining aspect is its combined programmatic and spatial openness. Programmatically, the Center houses a library, student workspaces, offices, a restaurant, a café,¹⁶ but owes its definitive character to the extensive areas of unprogrammed space.¹⁷ Developed by the University and the architects as an experimental place of learning, the center's use is less predetermined than it is enacted. This yields a jointly modulated specification of fluidity between users and building, and users and each other; supporting an agency to develop at a line between the center's rules and ours, elicited but not defined. Within the rigidly defined rows and aisles of Holmes's theater, space had readily met its limits in disruptive speech. By contrast, the unprogrammed nature of the learning center interjects free speech in the form of the occupation of the space – an occupation that aligns with the space of containment in its openness, rather than its containment. The center's amalgamation of programmed and



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Figure 4: Interior view of the Rolex Learning Center, SANAA.

Figure 5: Aerial view of MAXXI, Rome, Zaha Hadid.

Figure 6: Lobby view of MAXXI, Rome, Zaha Hadid.

Figure 7: Docks de Paris, Paris, Jakob + MacFarlane.

unprogrammed space allows for the joining of free speech and action instead of the dividing of the two. From that intersection, the protean flesh described by Merleau-Ponté and seized upon by Hardt and Negri to characterize the multitude, emerges, formed and forming.

With the Learning Center, elements that might elsewhere take a dichotomous stance, instead speak to the exhaustion of such thinking. This occurs, for example, as the building's simultaneously formative/punctuating voids continually reverse any hierarchy of spatial or programmatic order. Similarly, the floor, in its modulations, extinguishes the existence of discrete levels. In both instances there is no structure of opposites instantiated in order to be subverted. Instead, the Learning Center divests itself of the dialectic's formulation in terms of opposites to allow the spatial image of a smooth fluidity to emerge in full.

All architectural manifestations of fluidity, however, are not the same but develop disparate transformative capacities. One of the main distinguishing factors lies in relations each produces to dialectical thought and formative or generative processes. These distinctions yield divergent models of history and subjectivity in how the building situates its inhabitants. Although dialectical progressions enlist dichotomies as a way of moving forward, as a progression, in instances where those opposing forces are merely repeated time and again in the same terms and forms – as they frequently are in architecture's entrenched dichotomies – that model ceases to produce progress. Against this, the Learning Center's model of fluidity distinguishes itself from a world whose logic of progression had too frequently become mired in repetition and teleological thought, thwarting its efficacy.

Unlike dialectical models, fluidity is defined not by opposites, but by degrees and continuums. While dialectics advance through the progression of opposites, fluidity is about the conjoining of forces in the continual realignment of what is contained and what is container, what is propelled and what propels. While the dialectic is about the particular, fluidity strives to produce the analog. In rethinking how boundaries are formed, navigated, and function, architectural models of flow challenge the formation of dichotomies by moving seamlessly between what had been previously conceived as dichotomous positions, as between container and contained, or between being director of space and operations, and being directed and operated. How fluidity is understood enters into this process. If a fluid is defined as taking the shape of its container, as in its traditional definition, its enactment more readily accepts of dichotomies, container/contained. But if based in an understanding of fluidity as determined by movement and intermolecular proximity, other possibilities develop. Rather than the dialectical progression of history, fluidity presents a new image of both the present and of progress, one not based in a succession of opposites but in a continual state of formation, producing as much an image of progress as it is one of the present.

Architectural fluidity is a socio-spatial manifestation that entails the conjoining of forces, social, material, operational. As with the definition of states of matter based on intermolecular relations, fluidity's various components are kept in a proximity to one another rather than in a fixed relation. How these various forces are related in their architectural manifestations determines the character or type of fluidity produced. So while all manifestations of fluidity in architecture share some type of smoothing, blurring of spatial or programmatic boundaries, they do not all emphasize the same aspects or relations between aspects. While the Rolex Center

develops one manifestation of fluidity, types of architectural fluidity vary in the degree of stress they place on the component forces that produce their conditions of fluidity, thereby making certain aspects more or less evident. The various relations between the stresses of the constitutive components of fluidity are indicative of their models of history, progress, materiality and subjectivity.

Opened in the same year as the Rolex Center, Zaha Hadid's MAXXI National Museum of 21st Century Arts in Rome presents a very different image of fluidity, one defined by a characteristic spatial structure that organizes the museum. The architects describe this structure in distinctly fluid terms, stating: "The walls of the MAXXI create major and minor streams. The major streams are the galleries, and the minor streams are the connections and the bridges."¹⁸ Readily visible from above the museum, the major streams constitute a series of broad, sinuous bands of space running the length of the building. Peering up from within the museum's entry area, the minor streams, composed of connecting bridges and vertical circulation, unfold at various angles across the large, high, open entry area. Along these bands of space the museum's main functions lead seamlessly one to the next, entry to circulation to gallery to circulation.

With this structure, the MAXXI museum intertwines two predominant architectural formations of fluidity, joining the association of fluidity with circulation on the one hand to a particular form of circulation as channeling on the other. How circulation is conceived and manifested in a building is critical as the constructs of progression and history frequently appear within architecture as circulation or procession. In the MAXXI, circulation is at moments distinct and at other ones merges fluidly with gallery spaces. While its slippages between functions is suggestive of freedom, movement along the museum's streams is in many ways prescribed or channeled, raising questions as to the limits of the visitor's agency within the space. Streams – as channels - lead someplace. The MAXXI's endpoint of its series of streams occurs at the museum's uppermost level, where the channel of space abruptly ends, severed by a plane of glass, which transforms it from a means of circulation into a frame for viewing the city.

Channeling, as one of the most central tropes of architectural fluidity, defines a particular relation between that which flows and that which contains and directs flows. This suggests that the architecture forms the channel for the flows – people, exhibitions – or even more explicitly in some projects, water, air, or other building systems. Where it merges with the architectural idea of circulation, channeling readily takes on the measure and narrative of progress as with UN Studio's Mercedes Benz Museum (2006). Beginning at the museum's uppermost level, visitors navigate the building by spiraling downward along a ramp that intertwines circulation and narrative with history. The procession commences at the top of the spiral with the joint birth of the automobile and the corporation and continues downward with its exhibitions paralleling successive automotive advances with world historical developments. This formation renders circulation and fluidity inextricable from both progress and history.

Compared to explicitly channeling models, SANAA's Rolex Center presents a world not determined by narrative. In its place it institutes the model of open-ended scientific research, which by nature cannot be clearly delineated as to pace or direction in advance; a world in contrast to that in which the issues of private versus public or container versus contained still hold dominant sway. The Center uncouples the association of circulation and a predefined progress, whether

ENDNOTES

1. "The Independent," February 18, 2010.
2. For a longer discussion of these questions, see my essay: "Flow's Socio-spatial Formation", in *Thresholds 40*, (Cambridge, MA), April 2012, 39-46.
3. By comparison, in a gas, the molecules have enough kinetic energy so that the effect of intermolecular forces is small. Gas is thus the state in which molecules are comparatively separated and intermolecular attractions have relatively little effect on their respective motions.
4. Quarks are critical components of the larger, protons and neutrons.
5. Forces are that which cause an object to undergo a certain change, either concerning its movement, direction, or geometrical construction. Forces include: the strong force, the weak force, gravitational forces and electromagnetic ones.
6. All fields are mediated by bosons.
7. Sigfried Kraeuer, "The Mass Ornament," *New German Critique* 5, (Spring 1975), p. 67-76. The opening ceremonies of the 2008 Beijing Olympics offer a contemporary example of mass ornament.
8. *Ibid*, p. 67.
9. *Ibid*.
10. Adam Smith, *The Wealth of Nations*, (New York: Bantam Dell, 2003), p. 572
11. Michael Hardt and Antonio Negri, *Multitude: War and Democracy in the Age of Empire*, (New York: The Penguin Press, 2004).
12. Hardt and Negri, *Multitude*.
13. The exception to this is the six hundred seat multipurpose room with its sixteen foot ceiling.
14. The building includes a limited and localized number of stairs or level areas that assist in navigating or inhabiting the building at certain moments.
15. As the architects note, "Clearly, but without dividing walls, one area gives way to another."
16. An unseen basement level contains parking and additional stacks.
17. To support such purposes, SANAA developed with IDEE, bean-bag seats that are scattered around the floor.
18. From the architects: as a: "confluence of lines, where the primary force of the site is the walls that constantly intersect and separate to create both indoor and outdoor spaces."
19. Schumacher has, for example described their process as a "coherent forming of spaces that is based on the computation of forces like we find in natural forms, including erosion forms like caves. . . .We look into many natural systems, topographies and fluid dynamic systems to learn how to create environments that have coherence without monotony. This kind of beauty and nature-like elegance is only possible with these new digital design tools that simulate natural systems."

narrative or historical. In divesting itself of the explicit forms of channeling, it presents a world no longer propelled by dichotomous logics but potentiated in a dynamic system of conjoining and shifting alignments, manifesting perhaps, the first post-Deleuzian world, or in the terms of Hardt and Negri, a sign of the emergence of multitude.

The Learning Center's fluidity presents a logic of progression as (nondichotomous) formation. The boson theory of flow as formative allows its various particles to respond to the field in disparate ways. By producing a model coming into its own, the Learning Center carries the promise of new archetypes of social formations, views of history, and of subjectivity. Its logic of formation does not ask where is history going as in a teleological progression. It presents no moment or specified place of resolution, no narrative, no absolute direction that exists outside of its coming into being through a combined inhabitation and social agency. This complex process – one in search of new modes of progress and formation - begins to account for why many architectural productions of fluidity import models of growth, frequently from the natural sciences to serve as viable substitutes for existing models of dialectical progressions or the image of mass production.¹⁹

Inherent in fluidity's complex functioning is a conjoining and smoothing over process that at times problematically masks its own socio-spatial formations and associated behaviors. This is particularly the case when the model becomes divested of its social functioning. With that in mind, the promise of architectural fluidity lies in a continuum that brings multifarious forces, actors and spaces into an ongoing state of formation, one that replaces entrenched dichotomies, such as idealist-materialist debates with a model of a fluid interchange of multiple acting agents. Fluidity emerges full on at the moment when entrenched forces of development, as dialectical ones have been all but vanquished and the image of the uniform masses dissipated; at the point when the search for a replacement can no longer be viably sought or found in the image of individual subjectivity or indistinguishable repetitive mass movements. The dialectical images of progress that thrived with modernity and re-emerged as a structure of criticism under postmodernism, reach their unimagined end in the image of an elusive and ever changing fluidity.