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ARCHITECTURE AND THE ONTOLOGY OF INFERENCE

ABSTRACT: In this essay we develop *inferentialism* as a methodological orientation for architectural practice by staging a philosophical confrontation with the discipline's inherited models of form-making. Beginning with Kempelen's chess-playing Turk as an early diagram of distributed cognition, the argument moves through Simondon's critique of hylo-morphism, the imposition of form upon passive matter, to demonstrate why conventional design methods, including *parametricism*, fail to account for the epistemic conditions introduced by artificial intelligence. Simondon's concept of ontogenesis provides the theoretical scaffold: form crystallizes from within, the way a crystal precipitates in a saturated solution, structure and content emerging simultaneously from the primordial soup of data, energy, and potential. This framework dismantles the assumptions embedded in deterministic design paradigms and exposes how schemas imposed onto material suppress its own tendencies, its own metastability, and its own capacity for individuation. The residual hylo-morphisms of contemporary computational design, including top-down constraint hierarchies and convergence toward predetermined formal objectives, reveal an inherited Rationalist commitment to optimization that inference renders obsolete. The argument culminates in the articulation of inferentialism: a mode of practice where form, agency, and knowledge emerge through probabilistic transductive processes distributed across human cognition, computational models, and material environments.

KEYWORDS: inferentialism, individuation, transduction, latent space, hylomorphism, distributed agency, ontogenesis

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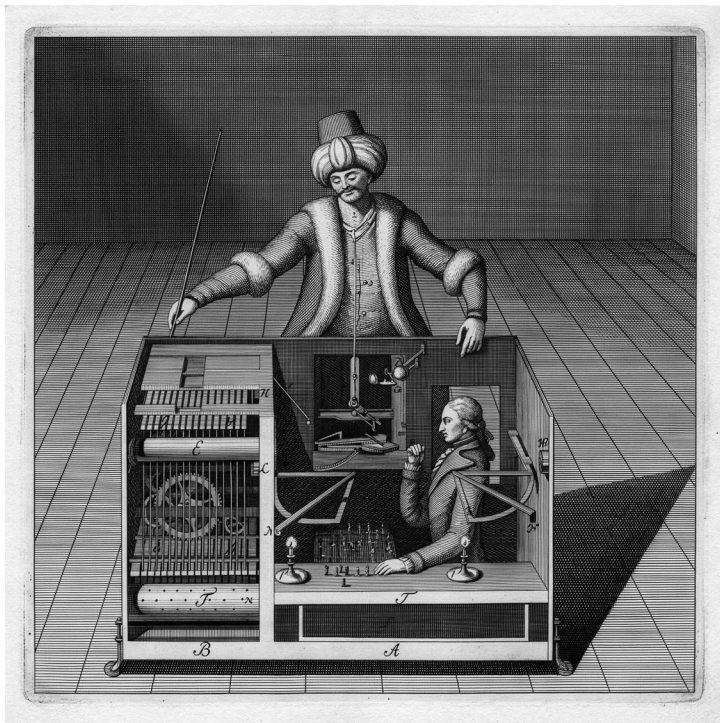


Figure 1. Joseph Racknitz, *Cross-section of Wolfgang von Kempelen's chess-playing automaton, The Turk*, 1789. Published in *Über den Schachspieler des Herrn von Kempelen*, Leipzig and Dresden, 1789. The apparatus serves as a foundational example of a technical ensemble, where the "hidden operator" within the cabinet facilitates a transductive operation across a structured field of play.

MOVEMENT I: THE MECHANICAL INTERVAL

Recently, I toured the Schönbrunn Palace in Vienna. Architecture friends on the visit asked me to show them around. While strolling through these wonderful Rococo spaces, we stumbled upon an important room. It was reserved for the entertainment of the royal family, and this is the room where a child Wunderkind named Wolfgang Amadeus Mozart played blindfolded to the astonishment of Empress Maria Theresa and her entire family. Legend has it that after the concert, the little lad fell into the arms of Marie Antoinette (the one of French Revolution fame) and asked her to marry him. However, for this essay far more important was another event in the same room a couple of years later. In 1770 Wolfgang von Kempelen presented a chess-playing automaton in this very room, before the assembled court of Maria Theresa.¹ The apparatus consisted of a seated figure of a pipe smoking Ottoman, placed behind a wooden cabinet topped by a chessboard. The life-sized mannequin was carved out of maple wood and robed in a lavish Turkish costume, including a large turban crowning the head (Figure 1). He was able to move his pipe to the mouth with his left arm (whilst pondering a move) and had an astounding dexterity in the right arm and hand to pick up and move the chess pieces around.

The doors could be opened to reveal a complex assembly of gears, levers, and rotating components. The audience was invited to examine the complex mechanism up close. The strange machinery appeared to account for all its operations. When the doors closed, the figure started playing. It responded to moves, adjusted pieces, and concluded games. On its tour through the courts of Europe the automaton encountered luminaries such as Benjamin Franklin and Napoleon Bonaparte, who tried to cheat, but the Turk was not having it, and wiped all the figures from the board annihilating the game. The performance suggested an interior governed by mechanical necessity. In the aftermath of the Turk's circulation, the machine inspired serious interrogation of automation, from a wide array of figures such as Edgar Allan Poe,² Henri-Louis Jaquet-Droz,³

¹ T. Standage, *The Turk: The Life and Times of the Famous Eighteenth-Century Chess-Playing Machine*, Berkley Books, New York, 2003.

² E. A. Poe, "Maelzel's chess-player," *Southern Literary Messenger*, 2, 5, 1836, pp. 318–326.

³ The strongest evidence that Wolfgang von Kempelen and Henri-Louis Jaquet-Droz were aware of one another occurs in London. In 1783, Kempelen brought The Turk to London, exhibiting it at Savile Row. At that same time, Henri-Louis Jaquet-Droz was also in

Charles Babbage,⁴ and Ada Lovelace,⁵ who is considered the very first programmer.⁵ A later revelation of a concealed human operator, crouching inside the wooden box (probably in the most uncomfortable way imaginable!), transforms the interest in the device. It morphs the question. The chess-playing figure occupies an ambiguous technical position. The fascination emerges from its dualist pose: mechanism cosplaying as intellect, intellect routed through a mechanical device. The operations of this machine depend on a composite arrangement: mechanical interface, human cognition, spatial concealment and staged visibility. Each of these elements participates in the performance, but none accounts for it alone. The machine produces an effect of autonomy through the orchestration of distributed processes whose boundaries do not coincide with the visible form of the object. What we are seeing in the example of the Turk, is a form of unified agent: an ensemble sustaining the operations, a cabinet suggesting containment, boundary, or frame. Resulting in a performance depending on circulation across components whose relations remained partially obscured. The Turk, this curious machine, allowed agency to circulate across the system, thus making the specific event—the preconceived motions of the chess pieces, the awe of the audience, the disbelief of the losing party—possible in the first place. In doing so, the device displaced the source of action within a structured interval between mechanism, operator, and spectatorship.

In contrast, the architectural discourse has long relied on a stable distinction between *instrument* and *author*.⁶ Thus, tools mediated between conception and execution, and machinic processes extended the reach of intention into domains of calculation, fabrication, and coordination. In doing so, the discourse maintained a narrative where the operative field of a project appeared to precede its technical realization, and procedures translated that field into form. Kempelen's chess-playing figure destabilized the balance of this alignment. It staged a technical object whose

London, displaying his own famous automata—The Writer, The Draughtsman, and The Musician—at King Street, Covent Garden.

⁴ C. Babbage (1864). *The Chess Player: In Passages from the Life of a Philosopher*, Harlow, Longman, Green, Longman, Roberts, & Green, London, 1864, pp. 465–471.

⁵ In her famous “Notes” on the Analytical Engine (1843), Lovelace famously argued that the machine “has no pretensions whatever to originate anything.” This philosophical boundary—the difference between a machine following a program and a machine possessing true “agency”—was exactly the same debate that surrounded The Turk during its exhibition tours.

⁶ M. Carpo, *The Alphabet and the Algorithm*, The MIT Press, Cambridge, Mass., 2011.

operations are divorced from a single locus, thus the autonomy appeared superficial, and participation dispersed across the system that sustained it.

The relevance of this configuration extends beyond the eighteenth-century machine. Today, computational environments operate through distributed datasets, staged training procedures, iterative feedback, and concatenated sequences of calculation. The respective interfaces present surfaces of coherence unfolding across operations within infrastructures that exceed immediate visibility. The outputs of these operations stabilize provisionally as subsequent iterations recalibrate earlier results. *The result is that it becomes increasingly difficult to locate where decisions are made and how form settles into place.* Agency circulates across an ensemble of technical and human operations whose boundaries do not align with the visible frame of interaction. The Turk offers an early diagram of this condition. It marks a moment at which technical systems began to occupy an interval between instrument and participant. Participation thus disperses across models, data, interfaces, and interpretive acts. What persists is the structural ambiguity first staged by the device: a technical object whose operation cannot be reduced to either tool or autonomous subject. The implications for architectural methods follow from this displacement.

MOVEMENT II: INSTRUMENTS, INTERIORS, AND THE STABILITY OF METHOD

Circling back to the Instruments and Author trajectory of this essay, architectural practice has long been organized around a relatively stable relation between intention, instrument, and form.⁷ The tools of architectural trade mediated between conception and realization: drafting instruments such as compass and straightedge translated thought into geometry, while model-scale mock-ups tested spatial relations through material approximation. Along the historical lineage that followed, machines extended the reach of calculation and fabrication, allowing increasingly complex geometries and assemblies to be coordinated across expanding technical infrastructures. Procedures unfolded within recognizable sequences in which a project established its operative field, its historical milieu, techniques resolved consequences, and form stabilized as a visible result emerging from this alignment.

⁷ S. Allen, *Practice: Architecture, Technique and Representation*, 2nd ed., Routledge, London, 2009.

Across technological regimes, this structure maintained continuity:

- The drafting apparatus,
- The perspective device,
- The analog model,
- The parametric script.

These configurations reorganized the procedures through which architecture took shape while preserving a familiar alignment between authorship and execution. The operative field appeared in advance of its technical articulation, and instruments acting within that field generated variation that remained legible through an underlying relational order. Within this disposition technical systems functioned primarily as mediators, translating an established schema into spatial or material form. One might recall the arm of the Mechanical Turk traversing the chessboard, grasping a figure and relocating it within a bounded spatial frame, following rules that appeared internally determined while relying on technological devices assembled from pantographs and magnets. Even when procedures grew highly complex, capable of coordinating intricate geometries or large-scale construction processes, their ontological status retained stability, operating within boundaries defined elsewhere while resolving relations without fundamentally altering the formation of the operative field itself.

The Turk (Figure 2) introduced an early turbulence into this alignment. Its performance depended upon a configuration in which operation exceeded any single locus of control or authorship. Despite the visible mechanism suggesting containment, actual operation unfolded across a distributed arrangement extending beyond the cabinet's surfaces of wood, ivory, brass, and silk. Apparent unity emerged from an ensemble whose internal coordination produced the effect of autonomy. The apparatus reorganized the relation between visible mechanism and distributed action, displacing agency across a configuration whose coherence depended upon circulation among components rather than containment within a single object. A similar disturbance begins to register in contemporary design environments, where technical procedures operate alongside predefined relations while simultaneously participating in the formation of the milieu within which design unfolds. Elements of the design process (prompts, datasets, model chains, feedback mechanisms) gain coherence across iterative interaction. Data acquisition,

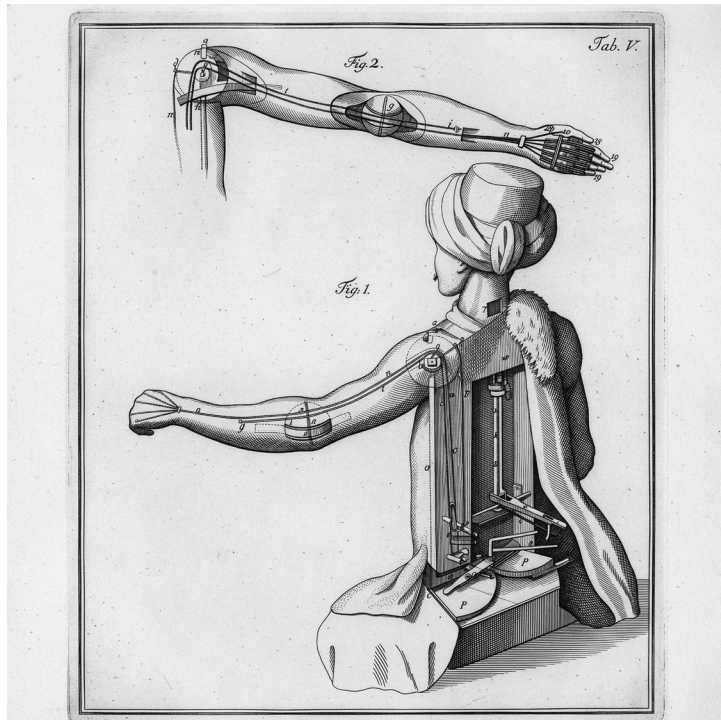


Figure 2. Joseph Racknitz, *Anatomical cross-section of the arm mechanism and upper torso of Wolfgang von Kempelen's chess-playing automaton, The Turk* (Table V, Figs. 1–2), 1789. Published in *Über den Schachspieler des Herrn von Kempelen*, Leipzig and Dresden, 1789. The cutaway reveals the pantograph linkages and internal drive components through which the figure's apparently autonomous gestures were mechanically coordinated—a precursor to contemporary inferential systems, where coherence arises through the progressive alignment of internal elements rather than the execution of a predetermined, hylomorphic form.

probabilistic modeling, staged training, and concatenated computational sequences enter into the formation of architectural proposals in ways that exceed any single originating schema. Consequentially the operative field emerges through successive alignments among heterogeneous components, producing a strange yet persistent stabilization of the design process across distributed systems. However, the conventional instrumental paradigm still operates. Drawings, scripts, and fabrication systems still mediate between conception and form, yet technical operations increasingly participate in shaping the field in which decisions arise. The boundary between instrument and participant acquires a new instability. Methods execute decisions while contributing to the conditions under which those decisions take shape. The Turk offered an early diagram of this condition, and contemporary computational environments extend it across infrastructures composed of datasets, model architectures, and iterative feedback loops. This leads to concerns about the ontological status of method itself: do technical procedures operate within a predefined field or participate in the ongoing formation of that field? A philosophical vocabulary attentive to processes of technical individuation provides a way to describe this shift with greater precision.

MOVEMENT III: MILIEU AND INDIVIDUATION

At this point the introduction of Gilbert Simondon becomes necessary, since the conceptual terrain outlined in the preceding pages already resonates with a vocabulary he developed in the middle of the twentieth century while reflecting on machines, technical objects, and the environments in which they take shape. Ontology, as the term is used in this essay, names neither a taxonomy of beings nor a search for ultimate substances, it refers to the question of emergence: the manner in which entities, relations, and operative fields come into existence, acquire consistency, then shift again under changing conditions. In the previous section, this problem in miniature was presented through *The Mechanical Turk*: presenting an object that appeared as an autonomous agent while its operation depended on a distributed arrangement of mechanisms, concealment, spectatorship, and human cognition. It is an arrangement whose coherence emerged in performance rather than residing fully in any single component. Starting off as an anecdote about a mannequin, a cabinet and a chessboard, the story turns into a more general question about architectural methods currently impacting with unusual intensity:

when technical systems participate in the formation of the field in which design takes place, what exactly comes into being, where does it stabilize, and through which processes does that stabilization hold?

To be clear, it is necessary to distinguish between two computational regimes often conflated in architectural discourse. The first consists of constituted modeling environments grounded in explicit hylomorphic control, such as *Parametricism*; the second comprises contemporary inferential systems where structure emerges through statistical alignment across data.

Returning to Simondon's philosophical project, that precisely gravitates around this question of emergence, developing a vocabulary through which technical and material formations can be understood as processes rather than finished entities. Central to this vocabulary stands the concept of individuation, a term he uses to describe the manner in which a technical object, a biological organism, or a social configuration comes into being through the progressive alignment of heterogeneous elements; for Simondon, "individuation is the operation of a system that is in a state of disparity and that, to resolve this disparity, finds a new structure."⁸ This happens within what he calls an associated milieu, an environment composed of energies, materials, interfaces, and operational conditions that participate directly in the formation of the object itself; or as Simondon put it, "the process of concretization is precisely this invention of an associated milieu, which is at once the condition of the technical object's functioning and the milieu of its relationship with the external world."⁹ Within such a milieu, coherence arises through phases of metastability, temporary equilibria sustained by ongoing exchanges among components whose relations remain open to further transformation, allowing the system to maintain performance while retaining potentials for change. Transduction¹⁰ names the process through which this alignment propagates across the system, a chain of operations through which a structural transformation in one domain induces adjustments in another, producing a continuity of becoming across the ensemble. Against the classical hylomorphic model in which form is imposed upon passive matter, Simondon proposes an account

⁸ G. Simondon, *L'individuation à la lumière des notions de forme et d'information*, Jérôme Millon, Paris, 2005, p. 5.

⁹ G. Simondon, *On the Mode of Existence of Technical Objects*, Minneapolis, Univocal, 2017, p. 60.

¹⁰ G. Simondon, *Sur la technique*, Presses Universitaires de France, Paris, 2014.

of technical becoming grounded in reciprocal adjustment between material conditions and operational procedures, an account in which form emerges through modulation within a field of relations that remains active throughout the process of formation. This reorientation allows technical objects to be understood as configurations whose identity takes shape through the processes that bring them into operation, rather than as instruments positioned for deployment within a predefined field, a perspective that bears directly on the contemporary condition in which computational systems participate in the formation of the very milieu through which architectural design emerges.

Within architectural discourse, this line of thought entered gradually, circulating through multiple theoretical and design trajectories that absorbed aspects of this vocabulary while translating them into distinct disciplinary concerns. Bernard Cache's work on objectile geometry¹¹ drew upon the notion of modulation (borrowed unapologetically from Deleuze) to frame form as continuous variation within a field, allowing geometry to unfold through transformation rather than through the application of fixed templates. Greg Lynn's early explorations of animate form and calculus-based modeling¹² resonated with the idea of metastable variation, treating geometry as a field of continuous adjustment, and subsequent work by figures such as Philip Morel,¹³ Achim Menges,¹⁴ and others¹⁵ operating at the intersection of computation and material processes continued to explore design as an evolving alignment among material behavior, fabrication logics, and computational procedures. Parallel developments associated with the work of Zaha Hadid and Patrik Schumacher articulated these tendencies at an urban and disciplinary

¹¹ B. Cache, *Earth Moves: The Furnishing of Territories*, The MIT Press, Cambridge, Mass., 1995.

¹² G. Lynn, *Animate Form*, Princeton Architectural Press, Princeton, 1999.

¹³ P. Morel, *Empiricism & Objectivity: Architectural Investigations with Mathematics*, Editions HX, Orléans, 2004.

¹⁴ A. Menges, *Material Synthesis: Fusing the Physical and the Computational*, Wiley, Hoboken, 2015.

¹⁵ For others, see also the list of participants in the exhibition *Architectures non-standard*, curated by Frédéric Migayrou and Zeynep Mennan at the Centre Pompidou (Musée National d'Art Moderne), Paris, from December 10, 2003, to March 1, 2004. Participating offices included: Asymptote (Hani Rashid & Lise Anne Couture), dECOi (Mark Goulthorpe), DR_D (Dagmar Richter), Greg Lynn FORM, Jakob + MacFarlane, Kolatan/Mac Donald Studio, Kovac Architecture (Tom Kovac), Lewis.Tsurumaki.Lewis, Objectile (Patrick Beaucé & Bernard Cache), NOX (Lars Spuybroek), ONL (Kas Oosterhuis & Ilona Lénárd), and R&Sie(n) (François Roche & Stéphanie Lavaux).

scale through the doctrine of *Parametricism*,¹⁶ framing architecture as modulation across interdependent parameters within a legible and internally coherent model space. These trajectories collectively displaced the understanding of architectural form as the execution of a prefigured schema, shifting attention toward processes through which coherence arises within a field of interacting elements while leaving unresolved the question of how technical systems themselves participate in the formation of the operative field within which architectural thinking unfolds, a question that acquires renewed urgency in the context of contemporary machine learning environments whose operations extend across distributed datasets, model architectures, and iterative feedback structures. Despite their emphasis on emergence, these approaches operate within fields whose relational structure precedes computation itself.

The position developed in these pages emerges from a slightly different orientation. It shifts focus from the technical object toward the chain of operations through which objects, images, models, and environments gain temporary coherence across distributed systems. In earlier computational design systems, computation modulated relations already defined; in contemporary machine learning systems, computation infers relations that did not previously exist as formal entities. Thus, contemporary machine learning environments introduce a further displacement in which the operative field of design takes shape through recursive alignment across data, models, infrastructures, and interpretive practices rather than appearing in advance as a predefined domain within which variation unfolds. Previous regimes of computational design methods operated within constituted parametric environments whose internal relations structured the horizon of possible transformations, enabling geometry to evolve through modulation across explicit dependencies among variables while preserving a legible field whose organization preceded the operations performed within it. Contemporary inferential systems unfold within a different ontological configuration in which the field itself arises through iterative exposure, recalibration, and evaluation across distributed technical ensembles, allowing patterns to register gradually across datasets and model architectures whose interactions generate phases of temporary coherence. A dataset gathers

¹⁶ P. Schumacher, "Parametricism as a style—Parametricist manifesto," presented at the 11th Architecture Biennale, Venice, 2008.

heterogeneous instances into a structured collection through which recurrent relations become perceptible to a computational system, while a model refers to a trainable architecture capable of registering such relations through adjustment of internal parameters across repeated exposure, allowing tendencies to stabilize provisionally across successive epochs and broader training cycles that structure the temporal dimension of learning within contemporary computational environments. Inference occupies a central role within this landscape as the mechanism through which outputs arise through statistical estimation grounded in prior exposure, producing architectural proposals whose coherence emerges through recursive alignment across data, models, simulations, and guided by human interpretive acts that steer trajectories and select among provisional outcomes.

Form and field take shape together through processes of *individuation* unfolding across distributed technical systems, producing an ontological condition in which stabilization registers as a phase within an evolving milieu whose coherence arises through alignment across heterogeneous operations rather than through the execution of a prefigured schema. Architectural practice operates inside this evolving configuration as a participant in processes of calibration, selection, and interpretation through which the operative field acquires consistency across concatenated procedures that sustain its formation across time.

MOVEMENT IV: FROM MORPHOGENESIS TO INFERENCE

Simondon's concept of *ontogenesis*¹⁷ sharpens the argument at this juncture, particularly when placed in relation to the architectural discourse on *morphogenesis*¹⁸ that shaped digital design thinking across the final decade of the twentieth century and the early years of the twenty-first. Morphogenetic approaches, developed through Greg Lynn's *Animate Form*, through the research culture surrounding the Architectural Association in London in the work of Michael Hensel, Achim Menges, Michael Weinstock, and George Jeronimidis,¹⁹ and through parallel

¹⁷ G. Simondon, "The position of the problem of ontogenesis," *Parrhesia*, 7, 2009, pp. 4–16.

¹⁸ A. Menges, "Computational Morphogenesis: Integral Form Generation," in A. Okeil, A. Al-Attili, Z. Mallasi (eds.), *Em'body'ing Virtual Architecture, Proceedings of the 3rd International ASCAAD Conference*, pp. 725–744.

¹⁹ M. Hensel, A. Menges, M. Weinstock, *Emergent Technologies and Design: Towards a Biological Paradigm for Architecture*, Routledge, London, 2010.

explorations by figures including Neri Oxman,²⁰ Kas Oosterhuis,²¹ and Alberto Estevez,²² described architectural form as the outcome of dynamic processes unfolding within generative environments structured by parametric relations, material behaviors, or biological analogies whose internal logic remained available to inspection through parameters, rules, and constraints. Geometry evolved through continuous modulation across relational fields whose organization structured the horizon of possible variation, allowing form to register as differential transformation operating inside constituted systems whose internal coherence preceded the transformations occurring within them. Morphogenesis provided architecture with a language for emergence, variation, and dynamic formation, while retaining an ontological assumption according to which the field of generation functioned as the ground within which variation unfolded, stabilizing the horizon of possible outcomes even as specific configurations continued to transform across successive iterations.

Simondon's description of crystal growth offers a lucid demonstration of ontogenesis as a process through which form and field emerge together through progressive alignment across a medium initially undifferentiated yet charged with potential for structural resolution. In a supersaturated solution, a seed crystal initiates propagation through which molecular relations extend across the surrounding medium, generating a structured lattice whose coherence registers gradually through successive phases of alignment rather than through the execution of a predetermined form imposed upon inert matter (Figure 3).

Growth unfolds through local interactions that establish conditions for further alignment, allowing structure to emerge through reciprocal engagement between seed and milieu as the surrounding environment acquires organization through the very process of crystallization. Instead of occupying a pre-existing field, the crystal structures the medium through the transductive propagation of internal relations, or, as Simondon observes, "each already constituted molecular layer serves as the base for the next layer being formed, and the result is an amplifying structure."²³

²⁰ N. Oxman, "Structuring materiality: Design Fabrication of Heterogeneous Materials," *Architectural Design*, 80, 4, 2010, pp. 78–85.

²¹ K. Oosterhuis, *Hyperbodies: Towards an E-motive Architecture*, Birkhäuser, Basel, 2003.

²² A. T. Estévez, "Genetic Architectures: New Bio-digital Techniques," *Architectural Design*, 81, 6, 2011, pp. 54–61.

²³ G. Simondon, *Individuation in Light of Notions of Form and Information*, University of Minnesota Press, Minnesota, 2020.

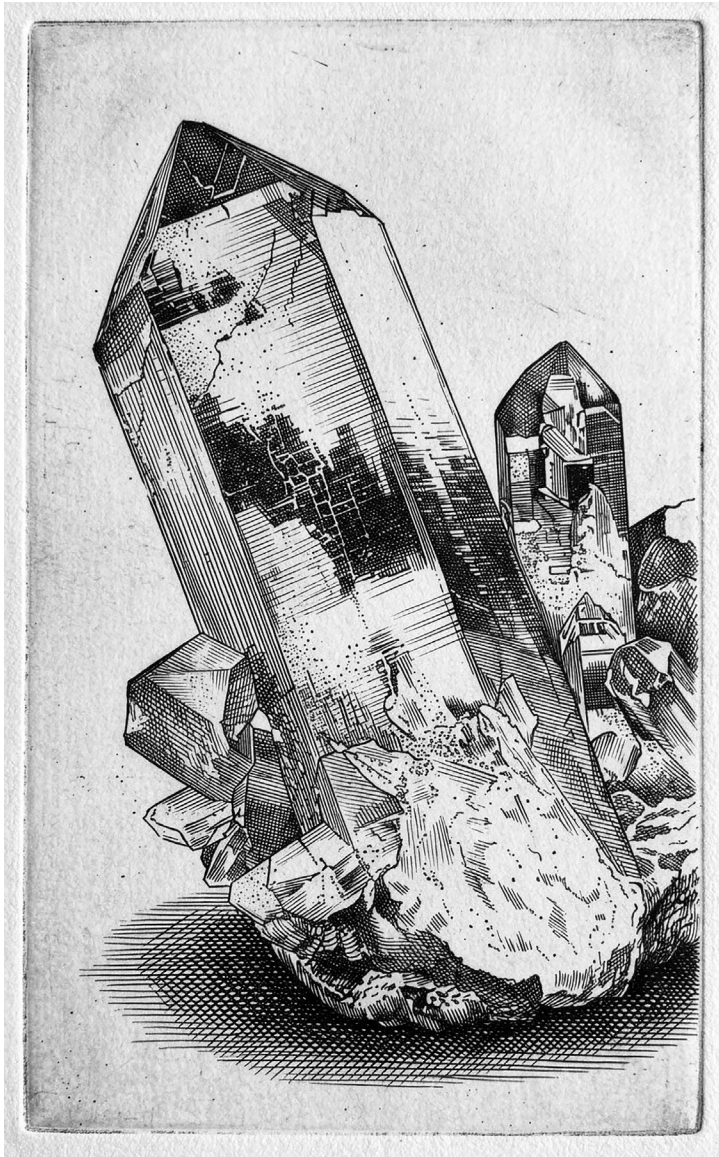


Figure 3. Matias del Campo, *Crystallization as Transductive Individuation*, 2018. Courtesy of the author. A diagram of ontogenesis where structure emerges through transductive propagation across a metastable medium: form as provisional settlement arising through reciprocal engagement between seed and milieu rather than external imposition.

This account provides a useful lens through which contemporary computational environments in architecture may be understood. A large image corpus assembled for training a generative model gathers heterogeneous visual instances into a field of potential relations whose consistencies register gradually through repeated exposure across model architectures capable of amplifying latent correspondences. In contemporary diffusion-based image models, visual data undergoes a transformation in which images are decomposed into numerical matrices composed of pixel intensities and color values, then subjected to iterative processes that introduce progressive noise until recognizable structure dissolves into a stochastic field of values whose distribution retains traces of prior relations without preserving explicit form. This noisy field functions as a saturated informational medium within which latent correspondences persist in distributed form. Generation unfolds through a reverse process of iterative denoising in which local correlations propagate across the field under the influence of conditioning inputs that guide alignment without prescribing final structure, allowing recognizable configurations to emerge gradually as relations stabilize provisionally across successive passes through the model (Figure 4). The resulting image appears as a temporary settlement within a field whose structure develops through recursive alignment across noise, data, and guided interpretation, recalling the propagation of crystalline structure across a saturated solution in which local ordering establishes conditions for further alignment across the surrounding medium.

At this juncture it becomes necessary to acknowledge that contemporary image models operate within regimes structured not only by statistical relations among pixels or spatial configurations, but also by semantic associations introduced through captioning, tagging, and other forms of linguistic alignment that bind visual data to descriptive vocabularies. Such processes shape the formation of relations within the dataset and influence the trajectories through which inference unfolds, introducing layers of meaning that interact with formal tendencies across the training corpus. The present argument maintains its focus on the ontological question of how form and field emerge through recursive alignment across distributed systems, leaving a sustained examination of semantic labeling, linguistic conditioning, and the politics of dataset construction to a separate inquiry whose scope extends beyond the present investigation, even as its relevance to the broader ecology of contemporary computational design remains evident.

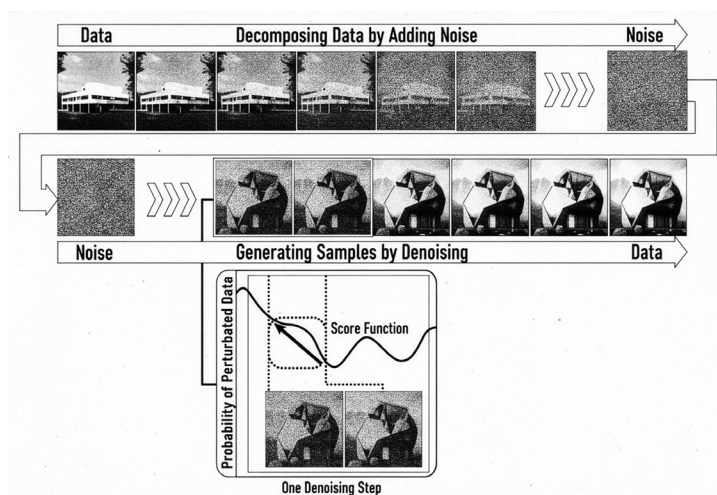


Figure 4. Matias del Campo, *The Transductive Cycle of Diffusion*, 2023. Courtesy of the author. A schematic representation of the iterative movement between structured data and stochastic noise. The sequence illustrates the forward process of decomposing data by adding noise and the generative reverse process of generating samples by denoising along a Markov chain. In the context of the ontology of inference, this cycle serves as a diagram for ontogenesis: form is not a static imposition upon matter, but a provisional stabilization—an individuation—emerging from the recursive alignment of noise, latent correspondences, and conditioning inputs.

Outputs emerging from such environments register as provisional stabilizations within a field whose organization develops through recursive alignment across data, model behavior, simulation, and guided interpretation, allowing architectural proposals to appear as temporary settlements within a milieu that continues to evolve through ongoing interaction. One might consider the series of latent-space explorations conducted through generative adversarial models trained on *Piranesi's Carceri* engravings (PiranesiGAN, Figure 5), where spatial configurations arise through iterative navigation across a probabilistic field whose internal relations register gradually through repeated probing, selection, and recalibration. Individual images acquire temporary coherence as architectural propositions, then reenter the evolving field as further iterations redirect the trajectory of exploration, allowing form to register as a provisional settlement within a continuously transforming informational landscape. Stabilization appears as a phase within an ongoing process, since the conditions that produced coherence remain active and capable of further transformation, situating architectural practice within a milieu whose structure develops through the operations that sustain it. Design activity unfolds through calibration, selection, and interpretation across distributed technical systems whose interactions generate phases of coherence that orient subsequent decisions. Datasets, model architectures, simulation environments, and interpretive judgments enter into dynamic alignment, allowing proposals to register through recursive propagation of relations across concatenated processes that gradually acquire recognizable consistency. Form settles provisionally as alignments accumulate across operations guided by human interpretation, registering as a temporary crystallization within an environment whose internal structure continues to evolve through sustained interaction rather than through the execution of a predetermined schema.

A useful way to render this trajectory more tangible appears in the formation of river deltas (Figure 6), where sediments travel within a fluid medium shaped by currents whose direction and intensity shift over time, depositing material in zones where alignment among forces allows particles to settle into temporary formations whose contours register the history of their emergence. Channels branch, merge, redirect; layers accumulate unevenly; emergent landforms acquire provisional stability while remaining open to further reconfiguration under changing conditions. The resulting landscape appears structured and legible, yet its coherence arises from distributed flows interacting across time rather



Figure 5. Matias del Campo and Sandra Manninger (SPAN), *PiranesiGAN: Spatial Individuation*, 2020. Courtesy of the artists. Generative adversarial network output trained on Giovanni Battista Piranesi's *Carceri d'invenzione* engravings. Architectural configurations emerging from a latent space trained on the *Carceri* series: each image acts as a provisional settlement—a momentary stabilization of form within a probabilistic milieu that continues to evolve through recursive navigation and data alignment.

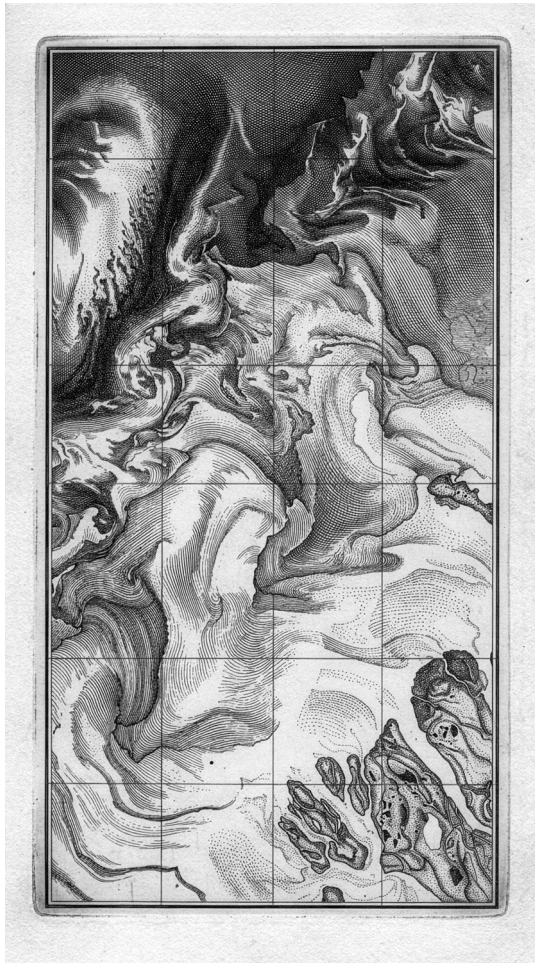


Figure 6. Matias del Campo, *The Delta as Inferential Landscape*, 2026. Courtesy of the author. An aerial cartographic rendering of a river delta illustrating structure emerging from distributed flow rather than external imposition. The delta functions as a diagram for the inferential milieu, where form acts as a temporary settlement stabilized through the recursive alignment of internal tendencies.

than from the execution of a singular geometry imposed from outside the system. Contemporary computational design environments unfold through comparable dynamics in which data circulates, models register tendencies, simulations redirect trajectories, and interpretive decisions modulate the flow, producing architectural configurations that settle provisionally within a milieu whose structure develops through the very operations that sustain it.

Elsewhere I have described engagement with generative systems as navigation across latent space, a terrain composed of statistical relations whose internal structure becomes perceptible gradually through iterative probing, selection, and recalibration, allowing certain regions of the space to condense into recognizable proposals while others dissolve back into the surrounding field of potential. Stabilization registers as alignments accumulate across successive operations, producing configurations that acquire temporary consistency without exhausting the potentials embedded in the environment that sustains them. What emerges resembles a landscape shaped by repeated flows of adjustment and interpretation, registering the traces of interaction that produced it while remaining open to further transformation across subsequent cycles of engagement.

Here, agency distributes across the ensemble rather than concentrating at a single locus. Computational processes register tendencies across data and simulations extend those tendencies into provisional spatial organizations. Evaluative acts redirect trajectories; and the architect operates within this evolving configuration as a mediator of alignments, introducing new material, filtering outputs, and steering the propagation of relations through which form and field acquire temporary coherence. Architectural proposals register as settlements within a moving landscape, stabilized through recursive interaction among heterogeneous components whose relations remain active, allowing the operative field to take shape through concatenated processes that continue to evolve as new alignments form. Seen from within this evolving configuration, the mechanism through which such alignments register becomes legible.

MOVEMENT V: INFERENCEALISM

Within contemporary computational environments associated with machine learning and generative modeling, inference functions as the operation through which patterns detected across prior exposure become actionable within present interaction, allowing outputs to emerge through

probabilistic evaluation grounded in accumulated relations (Figure 7) rather than through the execution of predefined geometric dependencies characteristic of earlier parametric systems. Inference registers tendencies across datasets, propagates correlations through model architectures, and presents configurations whose coherence reflects the alignment of distributed operations unfolding across time. Architectural proposals emerging from such environments may therefore be understood as the result of inferential processes through which relations stabilize provisionally within an evolving field, allowing design activity to unfold through orientation within a probabilistic milieu whose structure takes shape through the very operations that sustain its formation.

Decision-making within such a milieu assumes the character of orientation rather than prescription. The designer engages a field of tendencies whose responses register through gradients, clusters, and zones of stabilization that guide subsequent action, producing a mode of practice in which navigation across probabilistic terrain replaces traversal across a fixed geometric domain associated with earlier digital modeling paradigms (Figure 8). Method acquires the character of a technical ensemble composed of interacting procedures whose alignments generate phases of temporary coherence that sustain performance while retaining potentials for transformation. Architectural form appears as a momentary settlement within a landscape structured by inference, concatenation, and iterative stabilization.

A methodological orientation becomes legible through the operations described in the preceding sections, giving conceptual clarity to procedures already active within contemporary architectural work. What has been described across these pages can be gathered under the term *inferentialism*. The term designates a mode of architectural activity in which form emerges through probabilistic evaluation across concatenated technical systems whose interactions participate directly in the formation of the operative field. The field within which design unfolds takes shape through recursive alignment among datasets, model architectures, simulations, interfaces, and interpretive acts that guide trajectories across successive iterations. Stabilization registers as a phase within an ongoing process of individuation sustained by these interactions, allowing architectural form to appear as a provisional calcification within an evolving ensemble whose internal relations continue to shift across time.

In this sense the term consolidates the trajectory extending from the mechanical interval staged by Kempelen's Turk through Simondon's

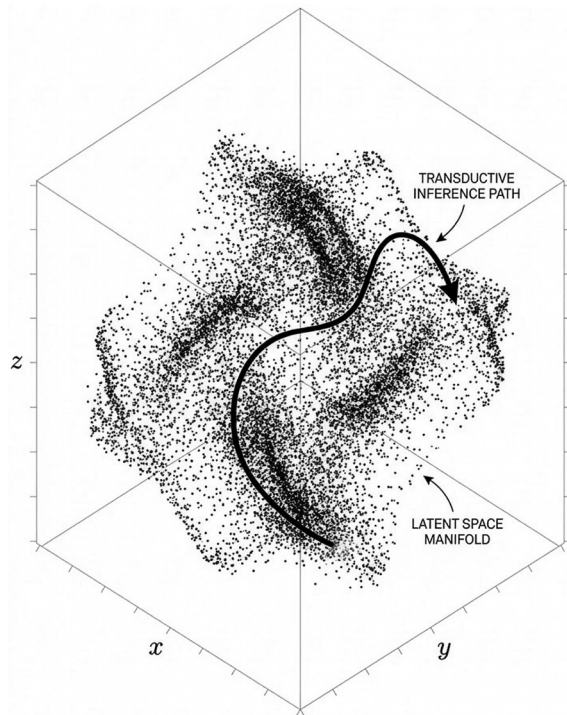


Figure 7. Matias del Campo, *The Topology of Inference*, 2026. Courtesy of the author. Diagram of a three-dimensional latent space manifold with a transductive inference path. The data density constitutes a pre-individual milieu where inference stabilizes provisional form. Coherence remains contingent on model weights: a robust path achieves transductive resolution, whereas underfitting lacks structural definition and overfitting is trapped by localized noise, failing to navigate generative potentials.

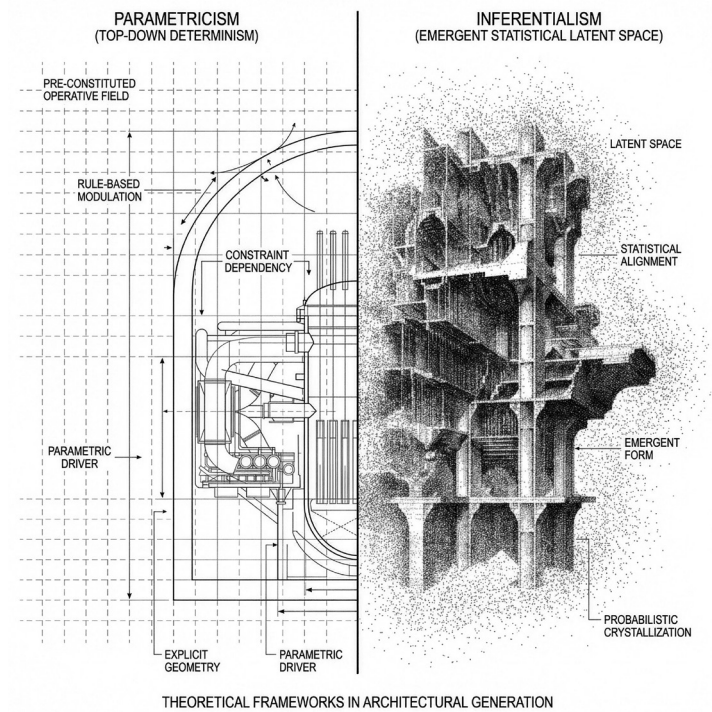


Figure 8. Matias del Campo, Theoretical Frameworks in Architectural Generation: Parametricism and Inferentialism, 2025. Courtesy of the author. Diagram. Left panel: Parametricism as top-down determinism—a pre-constituted operative field governed by rule-based modulation, constraint dependency, and explicit geometry driven by parametric inputs. Right panel: Inferentialism as emergent statistical latent space—probabilistic crystallization producing emergent form through statistical alignment within a distributed latent field. The diagram maps the epistemic difference between traversal across a fixed geometric domain and navigation across probabilistic terrain as the operative condition of contemporary AI-assisted architectural practice.

account of technical individuation to the contemporary situation in which inference functions as a generative mechanism within architectural practice. *Inferentialism* is a concept in which an architectural method unfolds through distributed processes whose coherence arises through recursive interaction across concatenated systems. Inference and concatenation mark the specific contribution presented here, situating architectural work within a landscape where agency circulates across data, models, simulations, and interpretive acts whose alignments generate phases of stabilization within an evolving field.

MOVEMENT VI: THE MIRROR ROOM

Picture yourself back in 1770, in that lustrous Mirror Room of Schönbrunn Palace (Figure 9). Dozens of candles reflected across the large mirror panels cladding the elaborate white-and-gold Rococo interior. Kempelen's concoction, the Turk, positioned at the center of the hall, its surfaces still carrying the scent of fresh paint while presenting the same assurance of containment: carved panels, hinged doors, a chessboard resting above a massive plinth that appears to hold the entirety of the operation within its wooden enclosure. The figure of a Turk wearing an oversized turban gazing toward the opponent across the board. Opening the box reveals an arrangement of gears, cams, springs, and sliding components whose visible complexity suggests mechanical sufficiency. When closed, the Ottoman mannequin resumes the game, scanning the board with his mechanical arm. Motion after motion of the chess pieces proceeds with measured delay, responses registering across the board as if calculation occurs inside the cabinet itself.

Despite these seemingly computational procedures, the performance never resided fully within the visible mechanism. Operation extended across a milieu that included the concealed human operator, the mechanical linkage, the spatial staging of the room, and the attention of those gathered around the board. Coherence emerged through coordination across this arrangement, and the figure presented at the center of the hall offered a surface of unity while sustaining relations that exceeded the frame appearing to contain them. What took place in the Mirror Room can therefore be read as an early diagram of distributed computation, one in which apparent autonomy stabilized through alignment across heterogeneous components rather than through containment within a single device.



Figure 9. Spiegelsaal (Mirror Room), Schönbrunn Palace, 2026. Interior designed by Nicolaus von Pacassi, 1743. Photograph by Matias del Campo. The room in which Wolfgang von Kempelen first demonstrated the chess-playing automaton before the court of Maria Theresia, here read as an early spatial diagram of distributed computation: apparent autonomy stabilized through alignment across heterogeneous components rather than containment within a single device.

Contemporary design environments shaped by artificial intelligence experience a comparable structural condition. Assembling datasets, training models, evaluating outputs, extending simulations, adjusting parameters, and reintroducing iterations compose concatenated chains of operation through which architectural proposals acquire temporary coherence across distributed systems. What appears at the interface as a resolved form registers as the outcome of inferential alignment across these chains, allowing the operative field of design to take shape alongside the processes acting within it, rather than preceding them as a predefined domain. Simondon's account of individuation provides the vocabulary necessary to describe this configuration with precision, situating technical formations within associated milieus whose relations remain active throughout phases of stabilization that sustain their operation. Within such conditions, inference registers tendencies across data, propagates relations through models, and guides provisional stabilization across iterative cycles of calibration in which human interpretation participates as one element among many.

These particular coordinates mark the intersection of the trajectories presented in this essay. The eighteenth-century automaton staged intelligence as a performance sustained by distributed coordination, while contemporary computational environments embed inference within the processes through which architectural relations align and stabilize across time (Figure 10). The fake Automaton once presented before the Viennese court now reads as a diagram through which the ontology of inference becomes legible: a condition in which form and field take shape together through concatenated operations whose coherence registers provisionally within an evolving milieu. Architectural practice unfolds within this interval, engaging technical systems that participate directly in the formation of the field in which design decisions acquire consistency. What emerges under the name *Inferentialism* concerns this orientation. Architectural program and form appear as a temporary stabilization within a field structured by inferential alignment, and the ontology at stake concerns the conditions through which relations emerge, propagate, and hold long enough to be called a project.

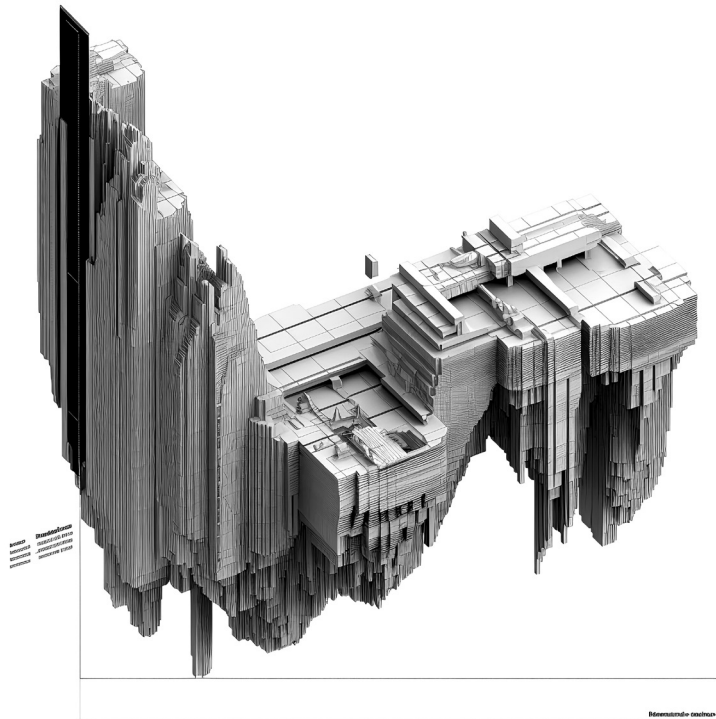


Figure 10. Matias del Campo, *Blocks_Boulder*, 2024. Courtesy of the author. The image registers what hylomorphic logic cannot account for: tectonic character that emerges from within probabilistic processes rather than descending from a form imposed upon passive matter. Mass, striation, overhang, and habitable ledge crystallize through iterative statistical alignment—a Simondonian individuation in which the milieu participates in producing the individual rather than receiving it. The project does not execute a prior intention but stabilizes, provisionally, within an inferential field. What appears as architecture is the momentary calcification of a process still in motion. This is the paradigm shift the essay proposes: not parametric determination operating top-down across a pre-constituted geometric domain, but *Inferentialism*: form as a phase condition emergent from probabilistic terrain.

GLOSSARY

Associated Milieu

A term developed by Gilbert Simondon to describe the environment that co-constitutes a technical object. A machine does not operate in isolation; it comes into being through alignment with materials, energies, interfaces, and users. In contemporary computational design, datasets, models, interfaces, and human interpretation form such a milieu. Architectural form emerges through interaction with this evolving field rather than within a predefined container.

Concatenation

A chaining of operations in which outputs from one procedure become inputs for another. In inferential design environments, prompts, datasets, model runs, simulations, and evaluations form concatenated sequences whose cumulative alignment generates provisional coherence. Architectural work unfolds through such chains rather than through a single linear act of design.

Dataset

A structured collection of examples used to train a machine-learning system. For architectural purposes, a dataset is not merely a storage of images or models but a field in which relations become statistically perceptible. It provides the informational medium through which patterns can be inferred and later re-activated in design processes.

Diffusion Model

A class of generative machine-learning systems that produce images or forms through iterative transformation between noise and structure. Starting from a field of randomness, the model gradually stabilizes recognizable configurations by aligning local correlations. For architecture, diffusion models illustrate how form can emerge as a provisional stabilization within a probabilistic field.

Distributed Agency

A condition in which action does not originate from a single author or instrument but circulates across an ensemble of human and technical components. In contemporary computational environments, decisions arise through interactions among datasets, models, interfaces, and designers. Agency appears as a relational effect rather than a singular source.

Field (Operative Field)

The domain within which architectural relations take shape. In earlier computational design, this field often preceded the operations performed within it. In inferential environments, the field itself emerges through iterative alignment across data, models, and interpretation. Form and field therefore take shape together.

Generative Model

A machine-learning system capable of producing new images, forms, or spatial configurations based on patterns learned from prior data. Rather than executing explicit instructions, generative models operate by inferring statistical tendencies and stabilizing them into provisional outputs. They function as engines of variation within probabilistic environments.

Inference

The process through which a trained model produces an output based on patterns learned from prior exposure. Inference does not retrieve stored forms; it estimates relations that are statistically likely given the input. Within the essay, inference names the mechanism through which architectural proposals emerge from probabilistic alignment across datasets, models, and interpretive acts.

Inferentialism

The methodological orientation proposed in the essay. Inferentialism describes an architectural practice in which form emerges through probabilistic evaluation across concatenated technical systems. The operative field of design takes shape alongside these processes rather than preceding them. Architectural work becomes an activity of navigating and stabilizing relations within an evolving inferential milieu.

Individuation

A concept from Simondon describing the process through which entities and relations come into being. Rather than assuming fixed objects or forms, individuation emphasizes emergence through alignment within an associated milieu. Architectural proposals can be understood as phases within such processes, acquiring temporary consistency through iterative stabilization.

Interface

The surface through which humans interact with computational systems. Interfaces present outputs as coherent objects while concealing the distributed processes that produced them. In design environments shaped by artificial intelligence, the interface stabilizes perception while underlying operations remain dispersed across data and models.

Latent Space

A mathematical representation of relations learned by a machine-learning model. Instead of storing images or forms directly, the model organizes patterns within an abstract space of tendencies and correlations. Designers navigating such a space explore regions where recognizable configurations condense from statistical structure.

Machine Learning

A computational approach in which systems learn patterns from data rather than following explicit instructions. In architectural contexts, machine learning allows relations to be inferred across large datasets, producing outputs that reflect statistical tendencies rather than predetermined geometries.

Metastability

A state of provisional equilibrium that holds temporarily while remaining open to transformation. Simondon uses the term to describe systems that sustain coherence through ongoing exchange with their milieu. Architectural proposals emerging from inferential environments may be understood as metastable formations within evolving fields.

Model (AI Model)

A trainable computational architecture capable of registering and reproducing patterns across data. A model does not contain fixed forms; it encodes relations that can be activated through inference. In architectural workflows, models participate in shaping the field within which design decisions take place.

Morphogenesis

A term adopted from biology to describe processes through which form emerges through dynamic interactions within a system. In architectural discourse, morphogenesis often refers to parametric or generative

procedures that produce variation within a defined field. The essay contrasts this with inferential environments in which the field itself emerges through data-driven alignment.

Ontogenesis

Simondon's term for the coming-into-being of form and field together. Ontogenesis emphasizes processes through which structures emerge from interactions within a medium rather than being imposed from outside. Contemporary computational environments can be understood through this lens, as form stabilizes through recursive alignment across data and models.

Parametric Model

A computational design system in which geometry is generated through explicit relationships among defined parameters. Parametric models operate within a preconstituted field whose structure precedes variation. The essay distinguishes this regime from inferential systems, where relations themselves are learned rather than predefined.

Probabilistic Field

An environment structured by statistical tendencies rather than deterministic rules. In machine-learning contexts, outputs emerge through evaluation of likelihoods across learned relations. Architectural work within such fields involves orienting and stabilizing tendencies rather than executing fixed geometries.

Prompt

An input provided to a generative model that guides the direction of inference. Prompts function less as commands than as vectors that orient the model within a probabilistic field. They participate in concatenated sequences of interaction through which outputs gradually stabilize.

Stabilization

The process through which provisional coherence emerges within an evolving system. In inferential environments, stabilization occurs when alignments across data, models, and interpretation temporarily settle into recognizable form. Such stabilizations remain open to further transformation.

Technical Ensemble

A configuration of interacting technical and human components whose coordination produces a coherent effect. Rather than treating tools as isolated instruments, the essay frames architectural practice as engagement with such ensembles. Design unfolds through alignment across these distributed systems.

Transduction

Simondon's term for the propagation of structure across a system through successive transformations. A change in one domain induces adjustments in another, producing continuity of becoming across the ensemble. In computational environments, transduction can be observed in the way outputs feed back into datasets, models, and subsequent iterations.

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