The Politics of Parametricism

Digital Technologies in Architecture

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self-referentially enclosed autopoietic social subsystems.

15. The failure to grasp this instrumentality of the built environment's appearance has for too long hampered architecture's proactive pursuit of formal articulation as a key competency of the discipline. The crucial work on formal/aesthetic problems, which in practice takes up the larger part of the architect's design work, is being denigrated or denied in the discipline's self-descriptions. Architecture is responsible for the built environment's social (rather than technical engineering) functionality. Social functionality of the built environment largely depends upon its communicative capacity, which in turn is a matter of visual communication through the built environment's appearance.

16. One of the most detrimental types of restriction that still hampers urban productivity is arbitrary restriction on the density of land use. Economic vitality and productivity gains concentrate in the major high-productivity communication hubs that are the world's megacities and conurbations of today. In Western Europe and North America, political planning impediments unduly constrain this tendency and thus restrict potential synergies and productivity gains. The major cities and high-productivity conurbations like London, New York, and Silicon Valley would grow much more dense were it not for the political impediments. Massive land and real estate price differentials between the central world cities and other cities and regions reveal both the productivity and desirability differentials, on the one hand, and the political restrictions of supply in the centers, on the other hand. Internal price differentials between land-use categories within cities—like the gaping price difference between residential and office properties in London—reveal how what is left of municipal planning is at odds with real requirements as expressed in market demands.

17. The example of London's great estates offers an encouraging historical precedent here, a precedent of private, market-based, long-term urban asset management and private planning establishing an urban order inclusive of a visual architectural order.

Chapter 3

On numbers, more or less

Reinhold Martin

If we take "architecture," as we normally do, to mean the profession and the academic discipline that was codified in the European nineteenth century, it is difficult not to conclude that there would be no architecture without a specific set of techniques for measuring, enumerating, and calculating the dimensions of things in space. Among the characteristics that differentiate those techniques from older ones, such as the geometrical systems of the early modern period (i.e., from the Renaissance to the early Enlightenment), is the widespread use of technical drawings as coordinating instruments. Whether it meant calculating the complex ratios of the Beaux Arts or the intricate patterns of the Gothic Revival, by the end of the nineteenth century, to produce architecture was, by and large, to compile detailed sets of scale drawings that were correlated mathematically with one another and with the eventual building, such that an entire edifice could be inferred from combinations of measured lines, and numbers.

Much historical work remains to be done on the subject, but it is fair to say that what we call modern architecture is, to a certain extent, an outcome of such practices. Beyond visual allusions to machinery, or the use of mass-produced materials, or even the distillation of "abstract" geometries, architectural design was bound to the multiform processes of industrialization by new ways of drawing, measuring, tabulating, and annotating that belonged to the bureaucratization of intellectual labor, on the one hand, and to new regimes for establishing objectivity, on the other. As Hyungmin Pai has shown, by the first decades of the twentieth century, European and American architectural discourse had exchanged, as its discursive base, the epic lines and washes of the large-scale portfolio for the succinct, diagrammatic calculations of the technical drawing.[1] To the extent that today we may be in the midst of a similar modulation, in which digital computation slowly and unevenly gives new meaning to what the German sociologist Georg Simmel called, in 1900, the "calculating character of modern times," this earlier transition is its point of departure.[2]

It is not as simple as saying that to draw differently is to design differently or to build differently. But neither is that suggestion, which remains tacit in today's diatribes regarding the impact of computerization on architectural design, so far off that we should exchange it for the puerile fantasy that the architect independently decides, as a matter of creative will, the architecture. Witness the furious return of the rhetorical watercolor sketch or the shaky, hand-drawn line to the boardrooms of today's architectural discourse, as clients are time and again sold the story that "so-called man"—as the German media philosopher Friedrich Kittler used to say—is the master of (usually) his destiny, the Promethean creator of his world, by virtue of direct contact, through the magic wand of the pencil or the brush, with cosmic poiesis. If nothing else, the premise that different ways of drawing yield different architectural results has thereby been converted, in both the academic design studio and the professional marketplace, from a testable hypothesis to a master narrative with performative qualities all its own.

Seen in this light, design with computers is not so very different from design with charcoal, in that attaching message to medium presumes in both cases that architectural content is a linear function of its means of conveyance. Or, to put it differently, it may seem that drawing materials carry an ideological burden similar to building materials, wherein, say, charcoal is to brick what Autocad is to drywall. There is some logical consistency to this, but less in terms of semantics than in terms of pragmatics, if by pragmatics we understand more than simply use, or, in today's idiom, performance. To begin with, we must allow pragmatics or performativity to encompass the realm of nonlinear causality that constitutes the uncertain ground of constructionist models of knowledge. Constructionism can itself mean many things; here, let it simply mean the proposition that knowledge and cultural production, including technological production, are historically contingent. What any given discourse maintains as truth is not simply the opposite of untruth, but the outcome of a potentially (and numerically) infinite set of interacting historical factors—economic, technological, social, aesthetic—some of which, like modes of architectural visualization, can be isolated and studied in their variants, in order to determine the rules or principles that govern their interaction with other factors.

In focusing on techniques or material processes, such a view inherently favors the ontic over the ontological, or the realm of historically contingent facts over that of metaphysical absolutes.[3] In which light most dogma regarding the constitutive role of visual or technical media in architectural design and production rapidly discloses its metaphysical ambitions. That is, rather than contemplate the historical consequences of this or that technique, architects concerned with such matters tend to imply that this or that technique gives greater or lesser access to timeless truths. If what is on the table in our case is the technique or set of techniques that have been named "parametricism,"[4] my first concern is to evaluate its historicity before considering its claims to metaphysical authority.

But neither is constructionism, as I have described it, immune to the accusation that it substitutes a metaphysics of contingency for a metaphysics of the absolute. By regarding visualization and production techniques as subject to the vicissitudes of history, context, or culture rather than as pathways to universal value, some might say that we risk a relativism that, in the final analysis, remains unable to establish the priority of this or that set of techniques since all techniques are historically constructed and hence, derive from competing priorities that are, in theory, equally valid. As a result, we could be further accused of assigning to History, contingency's master, the status of indisputable sovereign. The first part of this critique is tangentially applicable to the claim made by postmodernists regarding the universal aspirations of Modernism, which many of its apologists saw as historically inevitable: that deference to local context, style, or tradition was ethically preferable to the imperious rule of number, standardization, and abstraction with which Modernism was associated.

The retort has often been that architectural pluralism or relativism imposes a tyranny of its own, willingly submitting to the consumerist spectacle by offering up architectural styles like so many commodities on supermarket shelves. In its broadest, most inclusive forms, so-called parametric architecture has sought to resolve the apparent antinomy that pits postmodernist variability against modernist calculability simply by subsuming one within the other. Its most recognizably (i.e., stylistically) postmodern instances are to be found in the design practices of commercial builders who use digital modeling and fabrication techniques to produce variations on traditional stair rails, banisters, and other components for suburban houses in place of the "abstract" geometrical patterns that are favored by their vanguardist colleagues.[5] But the underlying philosophical and political questions are the same. To address these questions, we must establish the basics of an intellectual history in which they become intelligible.

First of all, what is a parameter? Nearly every field uses the term: physics, economics, statistics, music, linguistics, medicine, psychology, genetics, computer science, philosophy, geology, climate science, literature, and, of course, architecture. This does not make parameter a universal concept; on the contrary, it relativizes it since many of these fields use the term in a specialized way. In general, we can divide the usage of "parameter" across fields into two classes: quantitative and qualitative. A parameter controlling or guiding

a particular outcome could be numerical, as, say, in the pair of equations, $x = a \cos \theta$ and $y = b \sin \theta$, where θ runs between 0 and 2Π, which constitute the mathematical description of all points x, y lying on an ellipse, where the angle θ is the parameter.[6] All such parameters are quantitative by nature. But a parameter can also correspond to a certain quality such as, say, "redness," whether or not that quality is strictly measurable. In which case, the more "red" someone is, the more closely she may be thought to adhere to a particular political ideology, which in turn may affect her social standing, and so on.

But even here, my qualitative example (degrees of "redness") implies a certain quantitative aspect, which is expressible in terms like "more" or "less." This is because we cannot avoid mathematics, even in our ordinary or "natural" language. Lying within that language are numbers, or at least, numerical concepts. So even in its qualitative form, a parameter is a number, more or less.

This is not to say that all language is ultimately a branch of mathematics; it is simply to set aside any absolute distinction between quantitative and qualitative statements. But what, after all, is a number? This is an age-old philosophical question with quite a controversial history, of which it is worth reviewing a few excerpts. Typically, architects, like architectural theorists and historians (myself included), are not mathematicians. Still, they regularly make use of mathematical concepts that participate in the everydayness of number, a characteristic that is expressed, for example, in the fondness of mathematicians and logicians for illustrating complex ideas with examples drawn from everyday experiences. I will therefore reverse that habit and use everyday examples related to architecture to suggest ways in which associated concepts, like objecthood and color, give access to rudimentary problems in the philosophy of number that may help illuminate the more obscure corners of parametric thought.

In 1919, for example, Bertrand Russell, the British logician who helped to popularize the set theory developed by the German mathematician Georg Cantor, gave what remains a classic definition of number. In its simplest form, Russell defined number as "anything which is the number of some class," in which "the number of a class is all those things that are similar to it."[7] This means that the number two will be defined as the class of all sets containing two elements, or the class that contains every instance of pairing or coupling, whether these are pairs of houses or pairs of persons. In contrast to this set-theoretical definition, where number is ontology, or logical essence, Russell's student, Ludwig Wittgenstein, in his "late" period of the 1930s and early 1940s, redefined number as an element in a language game. By this he meant that there is no number "two" prior to its enunciation in language, as "two." More specifically, a number belongs to what Wittgenstein called the language game

of "inventing a name for something," or the game of "ostensive definition." In such games, which obey strict rules, there is nevertheless always room for confusion. If I point to two houses and say "this is called two," you cannot be sure whether I am referring to all pairs in general or this particular pair of particular things in a particular place. To clarify, I might say, in the manner of set theory: "This number is called two," thereby fixing the term "number" grammatically as a denotative. Once fixed grammatically, however, the word "number" still requires other words to define it, which in turn require other words to define them, and so on.[8]

This does not mean that the meaning of "number" is utterly dependent on the self-referential abyss of language and is therefore undecidable; it only means that the meaning of "number" is context dependent; in other words, what we mean by "number" is an extra-mathematical function of its usage in a complex, socially enframed language game. On this view, there are no purely mathematical numbers, or no numbers outside language and the social relations it entails. Wittgenstein's redefinition therefore takes number out of the rarified, Platonic sphere of mathematical logic and puts it back in the world.

All of which becomes more immediately relevant to us when we recall that Wittgenstein's concept of language games was taken up in 1979 by the French philosopher Jean-François Lyotard in his influential "report on knowledge" titled The Postmodern Condition. Although it is mostly remembered for announcing the disappearance of the "grand narratives" that shaped the modern period, such as the narrative of progress or the narrative of emancipation, the main concern of Lyotard's little book was a shift in regimes of legitimation, or the determination of truth. This shift, Lyotard claimed, was proper to what he called a "computerized society," where, as knowledge ceased to be an end in itself and became commodified as a unit of networked exchange, assisted by massive governmental and corporate investment, the determination of truth, including scientific truth, increasingly became a matter of the political and economic power to decide what is true and what is not.[9]

Although many have interpreted this argument as hopelessly relativistic, it is not; it is, as Lyotard says, pragmatic (we could even say pragmatist) in the philosophical sense. That is, language games help to explain how different forms of truth-making work at a practical level. For this Lyotard draws on a series of sources in addition to Wittgenstein. These include the pragmatist semiotics initiated by the nineteenth-century American philosopher Charles Sanders Peirce and the speech act theory of the mid-century British philosopher J.L. Austin. Essentially, Lyotard argues that the truth-value of different types of statements depends on the social contract among speakers that defines the rules of the

game they are playing. Examples include descriptive utterances ("this is true" because you and I agree that it is true, as when I say "this is an interesting lecture") and performative utterances ("this is true" because I am in a position to make it true, as when I say "this lecture is over"). According to Lyotard, such rules apply to scientific truth claims just as they do to everyday speech. And so, if we accept Wittgenstein's "turn" to language as an alternative to the ontologies of logical positivism, even the definition and usage of number is not determined by an absolute, timeless truth, as philosophers like Russell believed; rather, it is the consequence of socially constructed rules defining the language game of mathematics as these contribute to a general "agonistics of language" in which, as Lyotard says, "to speak is to fight."[10]

Lyotard's assessment of postmodernity further accepts the German social systems theorist Niklas Luhmann's proposition that, as Lyotard puts it, "in postindustrial [or computerized] societies the normativity of laws is replaced by the performativity of procedures."[11] As it happens, we have a local instance of this in architecture, where we can observe everywhere the normative "laws" of Euclidean geometry, construed by European humanists as absolute and God-given and taken up by their modernist successors as a sort of secular divine, being dismantled and replaced by computerized, rule-based procedures, such as the "design methods" devised by the 1960s Cambridge group or their rediscovery by today's parametricisms. In such games, which could, strictly speaking, be described as language games (think for example of the language of command in computer code), legitimacy is defined as obedience to quasi-bureaucratic, rule-based procedure, yielding statements of the type: "My design is beautiful not because it obeys the laws of absolute proportion, but because it was generated in such-and-such a manner, according to such-and-such set of rules."

Lyotard calls this "legitimation by power" since the legitimacy of the rules or procedures themselves is determined by the performativity criterion, not necessarily in the sense of optimizing some function, but in the sense of the performative utterance.[12] Such an utterance is self-legitimating: this particular set of procedures is optimal because I am, or the system of which I am a function, in a position to determine it to be so. Therefore I, or the system of which I am a function, allocate further research funds to this set of procedures on the basis of this determination and cancel the funding allocated to other utterances that fail to meet the self-legitimating performativity criterion. Such a sequence has nothing to do with either truth-value or use-value in any absolute sense. It has only to do with the capacity to play the game according to the rules that are in place, or to change those rules to favor certain outcomes."

Lyotard's account of the pragmatics of knowledge within postmodern language games learned much from Luhmann's adaptation of the mid-century American sociologist Talcott Parsons's functionalist model of society as a system of systems. But Lyotard argues that Luhmann's notion of the self-referential, self-organizing social system builds into itself the administration of consensus, which is related to the fetishization of procedure as the sole legitimation game in postindustrial societies. In Lyotard's view, the system or language game of science, for example, is programmed to reject (or to defund) those results that constitute genuinely new moves or that require a change in the game's basic rules. Translated to social relations, this suggests conformity (something like Thomas Kuhn's "normal science") akin to the totally administered lifeworld feared by critics of corporate life. It also bears comparison to the Frankfurt School philosophers Theodor Adorno and Max Horkheimer's merciless critique of Hollywood's "culture industry," which they describe as a dream factory relentlessly producing identification with the system and a desire for what that system desires, in a perfectly coherent instance of autopoietic self-organization and self-regulation.

Lyotard calls this administrative violence "terror," or, in his words, "the efficiency gained by eliminating, or threatening to eliminate, a player from the language game one shares with him."[13] Hence, the politics of knowledge becomes, fundamentally, a question of language. Although Lyotard himself cautioned against architects "getting rid of the Bauhaus project" by "throwing out the baby of experimentation with the bathwater of functionalism,"[14] those very architects, whether we call them postmodernists or not, are the inheritors of modernity's "linguistic turn," which runs from Wittgenstein to Lyotard and well beyond. But language is not the only domain in which the singular authority of number has met its own contingency, or variability.

Lyotard's former colleague at the journal Socialisme ou Barbarie (Socialism or Barbarism), the Greek-French philosopher Cornelius Castoriadis, for instance, was a reader and friend of the Chilean theoretical biologist Francisco Varela, from whose work on the self-generation of biological systems he drew strong analogies with his own political philosophy of radical democratic or "autonomous" self-government. Like Luhmann, Castoriadis borrowed the term "autopoiesis," or self-creation, from Varela. But Castoriadis used the term somewhat differently, to designate the fundamental creativity he ascribed to social beings, or more specifically, to what he called the "social imaginary." For Castoriadis, the "imaginary" was not a Lacanian speculum, or a deformed looking-glass image of an unrepresentable reality, nor was it simply a linguistic construct; it was both the product and the producer of lived realities, including what he called the "imaginary institution of society" itself.

To explain, Castoriadis proposed starting with what he called the "banal facts," namely, that

There is no society without arithmetic. There is no society without myth. In today's society, arithmetic is, of course, one of the main myths. There is not and cannot be a "rational" basis for the dominance of quantification in contemporary society. Quantification is merely the expression of one of its dominant imaginary significations: whatever cannot be counted does not exist.[15]

Accordingly, our society's dominant imaginary significations occupy two related dimensions: what Castoriadis called the "ensemblistic-identity" (or "set theoretical, logical," calculating, computational) dimension and the "properly imaginary dimension." Like Wittgenstein, Castoriadis wanted to pry open the ontological closure of set theory, although in this case not with language but with life. In a 1995 exchange with the biologist Varela on French radio, Castoriadis associated the set-theoretical or "identitary" dimension with a computational model of human cognition, to which he opposed the irreducibly "creative" or autopoietic dimension of the "instituting imaginary." By which he meant an imaginary dimension of being that incessantly produces itself and in so doing, produces a world "for-itself." Castoriadis, who was a student of the phenomenologist Maurice Merleau-Ponty (also a source for Varela), frequently returned to the example of color. In his view, color does not exist independently of its instituting imaginaries. Certain living beings perceive color, but, as Castoriadis put it, "the world [or, we could say, the instituting imaginary] of the physicist does not have color, it has wavelengths."[16] So, translated to our context, the parameter of "redness," which we have already recognized as possessing a quantitative and a qualitative dimension, can be described in two ways: first, as a mathematical function that is expressed, say, in a Photoshop slider or color wheel, under which lies a pattern of ones and zeroes; and second, as the effect of an instituting imaginary, or a combination of interacting imaginaries, for which political redness may or may not coincide with the color of a flag, the color of a pixel, or the color of a book.

Red or not, philosophers hardly agree on the political or proto-political characteristics of number. Alain Badiou, for one, has dedicated an entire book—if not an entire philosophy—to reversing Wittgenstein's move from logic to language, not by positing an extra-logical or extra-mathematical order of being (as does Castoriadis) but by returning to mathematics, and in particular, to set theory, in order to locate what he calls "another idea of number" in its irreducible rupture, or "event."[17] Like Castoriadis, Lyotard, and many other philosophers who in different ways stress event-like indeterminacies or multiplicities over closed or internally homogeneous sets, Badiou does so to combat what he calls "number's despotism," which circumscribes our notion of the political by reducing politics (and economics) to instrumental acts of counting.[18] But unlike these others, Badiou asserts number's ontology, over and above its ontics, as the basis for resisting or overcoming such despotism.

Badiou also proposes "mathematics as ontology" over and against the historicism that has been implicit thus far in my emphasis on situational contingency, be it Lyotard's or Wittgenstein's pragmatics of language, or the collective, socially constituted imaginaries of Castoriadis. In this respect and in general, Badiou's philosophy is anticonstructionist, without necessarily falling into the abyss of a mystical (or, as he would put it, religious) essentialism. That is because his ontology of number is not based, as he again might say, in the oneness of the One; it is founded on multiplicities to infinity. These are not limited to simple multiples, or to serially infinite sets of ordinal numbers. Nor are they solely concerned with limit cases, or with the possibility that a seemingly infinite series will double up on itself, and repeat. Badiou's multiplicities, and ultimately, his appeal to the infinite, appear in the gap between numbers, in the simple step from one to two, as an unfathomable but utterly real event.

Badiou derives these arguments from the logic of sets by moving through some of the landmark hypotheses in its modern history and challenging or extending their conclusions. Others, equipped with specialized knowledge, have evaluated his tendency to metaphorize or anthropomorphize set theory's language and hence, distort its translation to human affairs by overstepping set theory's limits.[19] We might temporarily minimize this concern through recourse to one of Badiou's nonmathematical examples: the seriality of modern art. In his lofty meditation on the artistic and political life of the twentieth century (almost exclusively in Europe), titled simply The Century, Badiou provides an example of what he calls, elsewhere, the "grand style" of philosophizing that rejects historicism and epistemological niceties (the "little style") in favor of the "glacial antihumanism" of ontology and truth.[20] Announcing his method, Badiou declares: "For us philosophers, the question is not what took place in the century, but what was thought in it."[21] In response to which we learn that, among other things, the European twentieth century sought to think, repeatedly and in unique ways, the infinite. It did so, among other ways, in the negative, through the serial artwork—as in Duchamp's Readymades (the set of all urinals, etc.)—which makes visible "the power of the finite," as repetition.[22] Extended logically, such repetition tends toward infinity not because its series is endless, but because each repetition is an act, like the artistic construction of "situations" or happenings that followed in the modernist lineage devoted to the subsumption

of art into life. "Ideally," says Badiou, "the twentieth century artwork is nothing other than the visibility of its own act." This visibility, which is finite, overcomes the "romantic pathos" of the artist-seer and of the singular artwork, "because the artwork has nothing infinite to show, save for its own active finitude."[23] All art is therefore in some sense choreography, "an art of formalization [of the set, of the series] rather than of the work." And formalization is "the great unifying power behind all the century's undertakings—from mathematics (formal logics) to politics ... by way of art ...."[24]

Badiou's political philosophy, in which the paradigmatic event is revolution itself, and his philosophical poetics both depend on the transitivity (in the set-theoretical sense) of number from one realm to another, not as sign, but as being. The opposite of this is the case with the ideology—for we cannot rightly call it a thought, or even a theory—that architects call "parametricism." The parametricist premise is simple enough: being is multiple rather than one; reconceived as number, architecture transitively reproduces that multiplicity. But—and here is a crucial difference—not as an act and that, in its repeatability and its ultimate sameness, indirectly reveals the inhuman infinite that lies between its numbered series. Rather, the aestheticized manipulation of parameters aims to domesticate multiplicity by saying, most definitively: Stop! And then: Repeat! Its affect is thus built around the problem of deciding which of the innumerable variables should be preferred. This problem above all others commands our attention as fields of parameters are deployed across the cityscape. We understand well that, in all such cases, the particular version selected (and perhaps built) is not in any real sense optimal; it is not and can never be, even for the most ardent systems modeler, a coordinated balance of variables that "solves" the problem of human habitation and formal expression once and for all. Rather, what matters is that the selected option appears—and, in effect, is made to appear—as simply one variation among many at which the serial process happens to have paused, and therefore, one among many instantiations of the set of equations by which that problem has been posed.

As in finance or cyberwar, the equations, rather than the value of this or that parameter, govern. Our society is saturated with such equations. We are surrounded by sliders, by pseudo-optimized curves, and by mini-max functions writing the code for the new capitalist organicism. It is an organicism rather than a "glacial antihumanism" because it encodes a nightmarishly emergent, autopoietic system that is fiendishly "alive" even as it shouts "Stop! Repeat!" to the calculations (and the calculators, both human and electronic) that underlie it. The artistic formulas of parametricism display these calculations in a finite being, such that the unruliness of number might finally be domesticated, and the

attributes of that being—a building, a city, a chair, a collective—might finally be counted, rather than thought.

This is the dominant imaginary in which we find ourselves today: Badiou's intransigence notwithstanding, it is a self-perpetuating, performative reality, in which life itself is subject to number's "despotism," or the tyranny exerted by numbers when conceived as instruments rather than thoughts. Badiou enunciates the society's categorical imperative: "Count!"[25] To which we might add the question of who and what counts, in both senses. Namely, who is doing the counting and who is counted, in or out. Or, translated to the parametric idiom, what or who counts as a parameter and what or who does not, according to what rule of what numbers game—meaning, what language game—or, if you prefer, what form of life.

But politics is not counting, whether of votes, opinions, or anything else, nor is it the enumeration of statistics or the provision of choices. Nor is counting inherently political, in the strong sense of giving form to the polis. It is, however, an act. Whether it is a repressive act or an emancipatory one depends on how we respond to the disputes that I have outlined. It is not my aim to resolve them here, less still, to reduce their depth to the few generalizations that a sketch of this sort permits. Instead, I hope only to have shown what it would mean even to begin the necessary task of theorizing number in artistic, or architectural, thought.

In his meditations on the twentieth century, Badiou gives us a suggestive, if simplistic, glimpse of the antihumanistic aspirations of number, which he likens to the "Bauhaus in architecture: a building that renders nothing in particular, for it is reduced to a translucent, universally recognizable functionality, the kind of functionality that has forgotten every instance of stylistic particularity."[26] If there is something familiar in this, it is in the sense that still today architects and theorists of architecture resist that antihumanism as they return to a longstanding problem associated with the "Bauhaus in architecture," and with Modernism more generally. Namely, the problem of transforming humanity rather than simply counting its variants, as postmodernists tend to do.

The style called "parametricism" is only the latest entry in the list of efforts to discredit the project of transforming humanity, in this case by pretending to take up its numerical idiom. Parametric commands—"Stop! Repeat!"—run mathematical functions that replace the repetition of the same with the repetition of difference. But as we have seen, repetition does not necessarily extend the limit to infinity; it simply rehearses the act of counting. Any "ism" that pretends to replace the sameness of that act with its variability dons the sentimental cloak of the human—the one who counts, the calculator, the computer—to protect itself

from the glacial stare of number. This cloak secures for the architect admission into the parametric dreams of capital, which, far from dehumanizing, depend on the warm reassurance that all the world is a bar graph, a fluctuation, a line. That this may in fact be true, though in a manner unthinkable to the managers, the counters, and the calculators, is a possibility we will have to leave for another day.

Notes

1. Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America* (Cambridge, MA: MIT Press, 2002).

2. Georg Simmel, *The Philosophy of Money*, ed. David Frisby, trans. Tom Bottomore and David Frisby, 2nd ed. (London: Routledge, 1990), p. 443.

3. Bernhard Siegert, "Cultural Techniques: Or the End of the Intellectual Postwar Era in German Media Theory," *Theory, Culture & Society* Vol. 30, No. 6 (2013), p. 57.

4. Patrik Schumacher, *The Autopoiesis of Architecture: A New Framework for Architecture,* Vols. 1 and 2 (Chichester: John Wiley & Sons, 2011).

5. The industry-wide application of digital design and fabrication techniques is discussed in Peggy Deamer & Phillip G. Bernstein, eds., *Building (in) the Future: Recasting Labor in Architecture* (New York: Princeton Architectural Press; New Haven: Yale School of Architecture, 2010).

6. This example and others like it are commonly given to define parameterization, as in *The Concise Oxford Dictionary of Mathematics,* 4th ed. (Oxford: Oxford University Press, 2009), online at http://www.oxfordreference.com/view/10.1093/ acref/9780199235940.001.0001/acref-9780199235940-e-2105# [accessed January 2, 2015]. The Wikipedia entry under "parametric equation" gives a similar example, at http://en.wikipedia.org/wiki/Parametric_equation [accessed January 2, 2015].

7. Bertrand Russell, *Introduction to Mathematical Philosophy*, 2nd ed. [1920] (New York: Dover, 1993), pp. 18–19.

8. Ludwig Wittgenstein, *Philosophical Investigations*, trans. G.E.M. Anscombe (Oxford: Basil Blackwell, 1963), pp. 5e–15e.

9. Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge*, trans. Geoffrey Bennington (Minneapolis: University of Minnesota Press, 1984), p. 8.

10. Lyotard, *The Postmodern Condition*, p. 10.

11. Ibid., p. 46.

12. Ibid., p. 47.

13. Ibid., p. 63.

14. Jean-François Lyotard, "Answering the Question: What Is Postmodernism?," trans. Régis Durand, in *The Postmodern Condition*, p. 71.

15. Cornelius Castoriadis, "The Imaginary," in *World in Fragments: Writings on Politics, Society, Psychoanalysis, and the Imagination,* ed. and trans. David Ames Curtis (Stanford: Stanford University Press, 1997), p. 11.

16. "Life and Creation," Cornelius Castoriadis in dialogue with Francisco Varela, trans. John V. Garner, in Castoriadis, *Postscript on Insignificance: Dialogues with Cornelius Castoriadis,* ed. Gabriel Rockhill (New York: Continuum, 2001), p. 60. Interview from radio broadcast France Culture, 1995.

17. Alain Badiou, *Number and Numbers*, trans. Robin Mackay (Malden, MA: Polity Press, 2008), p. 4. On number as event, or "evental trans-being," p. 214.

18. Ibid., pp. 1–2.

19. Ricardo L. Nirenberg & David Nirenberg, "Badiou's Number: A Critique of Mathematics as Ontology," *Critical Inquiry* Vol. 37, No. 4 (Summer 2011), pp. 583–614.

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22. Ibid., p. 158.

23. Ibid., p. 159.

24. Ibid., p. 160.

25. Badiou, *Number and Numbers*, p. 1.

26. Badiou, *The Century*, p. 161.