The Digital Pharmakon: The Poisonous/ Potential of Partial Determinism

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Our tools have always been, necessarily, both powerful and poisionous, in part, becasue tool ontology is an ontology of partial determinism. That is, the strength of the tool is such that it focuses a particular interaction with the world, which unlocks otherwise unavailable potentials; it does this by way of exclusion, and thus partly determines its own ends. This power/poison lies at the heart of the digital pharmakon.

INTRODUCTION

> Any technics or technique – is a pharmakon.[1]
>
> —Bernard Stiegler, *States of Shock*

> The pharmakon is the movement, the locus, and the play: (the production of) difference. It is the difference of difference.[2]
>
> —Jacques Derrida, *Dissemination*

Jacques Derrida described the *pharmakon* as an ambivalent "medicine" or "philter," "which acts as both remedy and poison."[3] This concept comes from Plato who compares Phaedrus' texts to a drug in order to point to the "both/ and" quality of the technology of writing (e.g. writing is both good and bad for memory, good and bad at standing-in for an absent speaker). Derrida appropriates the *pharmakon* as a means of indicating the necessarily mixed character of the technological supplement more generally, saying: "This charm, this spellbinding virtue, this power of fascination, can be - alternately or simultaneously - beneficent or maleficent."[4] Derrida's thinking on this matter leads Bernard Stiegler to argue: 1.) there is *never* a point in history that humans are *not* supplemented, and 2.) the reason that being-supplemented is simultaneously powerful and fraught, is because of the supplement's *partial determinism*.

Awareness of this *partial determinism* it essential to critical relations with any technology but becomes even more elemental when humans cease being the "engines" (i.e. tools become mechanized); here, tools gain a degree of autonomy (unlike, say, a hammer or pencil) and this autonomy heightens the probability of a tool-involvement dictated *by the affordances of the technology*. Which is to say, the energy required to make a non-machinic tool work provides regular openings for feedback—there is a natural rhythm of absorption and reflection when one is swinging a hammer—whereas, machines-in-action, offer little in the way of natural points of feedback. Such autonomy is not *necessarily* negative, but is, as Derrida says, a *heightening* of the danger; the danger being that the supplement will lead one to, "stray from one's general, natural, habitual paths and laws."

The computer has become the design machine *par excellence*. As such, it is important to understand how its powers and poisons affect the "general, natural, habitual paths and laws" of architecture. One notable tendency is particularly important: the capacities of the computer have historically been more receptive to, and motivated by, a *mathematical* syntax of thinking (data processing) than a *poetic* syntax of thinking (*poeisis:* making).[6] As computing power has increased, so have the effects of this bias.

Phil Bernstein offers one possible response to this bias in advocating for a closer coupling of between the tools of building information, parametrics, and simulation in service of design. In this new world of practice, fees would be based on predictions and performance, with architects being paid, in part, based on how well their buildings deliver certain predicted outcomes.[7]

Regardless of approach, we have reached an especially opportune point for becoming more clear about what causes the digital supplement to become poisonous and with this understanding become more prepared to transform the ingredients of the poisons into beneficent capacities; capacities that more powerfully couple architect and architecture.

BIM: BÊTISE IN MAKING

> Stupidity is the law of the pharmakon.[8]
>
> —Bernard Stiegler, *Relational Ecology and the Digital Pharmakon*

> We doubt whether, when mathematicians engage in polemic, they criticize one another for being mistaken in the result of their calculation. Rather, they criticize one another for having produced an insignificant theorem or a problem devoid of sense.[9]
>
> —Gilles Deleuze, *Difference and Repetition*

Bêtise is a term Deleuze employs to indicate, "nonsensical sentences, remarks without interest or importance, banalities mistaken for profundities, ordinary 'points' confused with singular points, badly posed or distorted problems."[10] *Bêtise* occurs when "people mistake a photograph for a work of art, a plagiarism for an audacity, a parody for a laugh, or worse yet, a miserable stroke of inspiration for a creation."[11]

When thinking gets conflated with the administration of information there arises, "imbecile thoughts, imbecile discourses, that are made up entirely of truths; but these truths are base, they are those of a base, heavy and leaden soul."[12] This is the problem, for example, with functionalism: every move can be explained in terms of a simple causal bond; however, such step-wise causality rarely provides insight into such phenomena as compound motivations, synthetic ensembles, or non-linear systems.

A particular empowerment to thinking made synonomous with information collection and data-processing is found Building Information Modeling (BIM) software. Reinforcing a general misconception of design development, BIM frames design as a roughly linear movement from nothing to construction, with the added promise of a design process of limited iterations, because design development is focused on the building up of data. Such a promise has led many a designer to do *everything* in BIM (as the software suggests one should).

BIM's power—the ability to manage and process large amounts of building data—is also its poison. This poison sickens creative and critical thinking, becasue the totalizing environment that structures the software circumscribes a particular method for architectural inquiry—building information—and directs attention always to the whole building, often leading to a "touch everything, design nothing" result. For those learning architectural design, BIM is especially limiting and destructive. Here, it becomes an engine for generating architectural *Bêtise*.

The difference between BIM and other softwares that provide the semblance of a building is that in BIM the "building design" gains instantaneous legitimacy, because any initial move leads immediately to calls for more building information. BIM is self-confirming in this way, telling the designer at every step of the engagement, "Yes, you are making a building. Keep going." Here, the computer edges towards full-autonomy (parametric modeling software has this tendency as well), with "designs" being generated simply by attending to the endless menus of questions pertaining to the details of construction. Here, the designer is transformed into a machine-operator; the onslaught of information allows little impetus for reflection upon priorities, ideas, or relationships—reflections that are almost unaviodable when faced with *choosing* a particular elevation to draw, *deciding* on a specific section cut, *determining* a certain perspective view or detail to be paradigmatic for the design.

The irony of BIM is that its totalizing environment encourages atomistic thinking: picking out components, attending to minutia, essentially spending time cataloguing the way a building will be built prior to determining whether one is working on something worth building in the first place.

Extending this irony: even though the workings of BIM encourage a focus on minutia, BIM simultaneously discourages *designing* these minutia; instead, it encourages the notion that "specifying" *is designing*. For example, it used to be that when a student did not have time to design, say, a railing or stair, that these particular details would either be very sketchy or simply not exist. However, a few years ago, students started presenting work that showed apparently detailed buildings, replete with stairs, railings, furniture, etc.; yet, upon inspection, it was clear that these projects were glaringly deficient in their design development. It turns out that these deficiencies were largely the result of students working in Revit and substituting the selecting of pre-determined BIM components for design; the availability of predefined BIM elements was leading to designs that appeared complete, but lacked a coherent or compelling architectural language. Further, the issue was not just that students were selecting these assemblies as time saving devices, when questioned many of these students admitted that it never even occurred to them that they might design a stair, a railing, a desk, etc. In this way, BIM tells one both *what* and *what not* to think about, as well as *how* to think about it.

Perhaps most importantly BIM software inhibits diagrammatic thinking; and thus, suggests not only is there "no need" to think *parti,* the material language of assemblage, or conceptual goals. Anthony Vidler describes this inhibition as a result of an undermining of the generative engine of the diagram—the abstract machine. He states: "the question raised by the new digital diagrams is whether they are in fact abstract at all."[13] The loss of abstraction fosters a general forgetfulness (or unawareness) amongst students about the use, value, and modalities of the diagram itself (including sketching). For example, in a third-year studio final review I was discussing with a group of students the need to iterate through a number of formal-spatial arrangements in order to arrive at plan coherence via *parti* resolution. One of the students made a comment that crystalized what the word "iterate," meant to him: *make multiple BIM models*. He then explained that because of time limitations such iterations would be impossible. In this case, it seemed that no design tools or methods other than BIM had any real impact on this student's design process.

BIM, over and over, presents the appearance of design and the illusion of professionalism, via the architectural simulacra it produces. Edward Tufte has discussed a similar phenomenon in his commentaries on PowerPoint's "auto-content," where just enough "finish" is communicated to legitimate ideas of marginal worth, or sometimes, undermine ideas of immense value.[14]

DIGITAL LOGICS: BEYOND AUTOMATION

Chris Luebkeman has offered provocative counsel in how to capitalize on the ever-increasing computing power available to architects, suggesting that many of the tasks of architecture could be, and should be, automated, believing that selective automation would allow architectural focus to return architecture.[15]

Mentioning automation tends to strike fear in the heart of those affected, particularly around the concern of job-loss. However, a 2016 article in The Atlantic entitled, "The Automation Paradox" discussed how the history of automation, going back to the industrial revolution has not been one of job elimination; but rather, job redefinition.[16] This is due, in part, to the effects of automation, which "reduces the cost of a product or service, and lower prices tend to attract more customers."[17] The author uses the profession of law as an example of how this growth occurs, describing how, "automation software made it cheaper and faster to trawl through legal documents, so law firms searched *more* documents and judges allowed more, and more-expansive, discovery requests.[18]

Architecture has experienced some small positive influences of automation. For example, Gregg Lynn expressed his appreciation for the emergence of the modeling software FormZ while he was working for Peter Eisenman, because it automated the tremendous amounts of work (what would have been drafting) that was required in the making of Eisenman's "iterative topological transformations of volumes."[19] However, more important than boosting efficiency and fostering new office modalities, is Luebkeman's observation about its potential to sharpen disciplinary focus.

Understanding what this might mean starts with re-thinking a general misunderstanding that a machine's apogee occurs when humans are no longer needed. Gilbert Simondon put it this way, "idolators of the machine generally assume that the degree of perfection of a machine is directly proportional to the degree of automatism."[20] In an contemporary example of this misconception, Jen Carlile of Google Flux makes this disturbing statement about their new software for the building industry: "if you can connect your structural API [application program interface] to your fabrication machine, you no longer have to have humans involved."[21] Or, Tom Preston-Werner, co-founder of Github, says flatly that there will only be two types of jobs in the future: coding computers, and being told what to do by computers.[22]

In contrast to such idolaters, Simondon believed automatism to be "a fairly low degree of technical perfection."[23] Claiming instead, technical perfection has to do with a machine's "margin of indetermination."[24] That is, a machine's sophistication increases the more they can be affected by other actors within the system—this is where Simondon's notion about the role of human as conductor begins. Simondon's theory raises important questions about what automation with a "margin of indeterminacy," would look like in architecture.

Google X's Genie was the one of the first moves in this direction. And one of the driving forces of this move was financial. The Google X team estimated that Genie could save 30-50% in prevailing construction costs and shorten the time from the start of planning to market by 30-60%. The Genie team estimated that the platform had the potential of generating $120 billion a year for Google, and so Flux was born.[25]

Flux is the second generation of Genie and, despite Carlile's belief in in total automation,[26] is perhaps the next step towards automating a multitude of the automatable tasks associated with building design and planning with a "margin of indeteminacy." Randy Deutsch explains some of its features:

> The software "designs" all of the bathrooms, fire stairs, ducts. Because all of the rules are encoded within the building seed, you can make changes to the building. When you do that, the building regrows.[27]

Another tool Flux built helps with organizing data, making it more actionable and more universally accessible. Think of it as a feasibility study algorithm that, once you identify a site or sites, instantaneously assesses entitlements, massing, building program, building performance, leasable area and overall project budget.[28]

In a presentation about Flux, Carlile highlighted some other examples of tasks that might be automated:

> Here we're looking at the facade system, the building knows it needs external shades on the outside of the building to block the afternoon sun and reduce the internal heat gain… It knows which connections are moment connections, it knows how to design the HVAC. It goes all the way down to the hot and cold-water pipes, the air ducts, elevators and stairs.[29]

Such an evolution of design software could be useful in a number of ways, particularly in basic code compliance and implementation of certain best practices. However, a successful evolution demands hanging on to Simondon's key point: the real value of this software is not found in its full automation, rather it is found in its margins of indeterminacy,

because while the *practice of building* requires the adherence to many rules and facts, the *discipline of architecture* has very little to do with the rules and facts that a software like Flux automates.

Instead, the rules of the discipline must be, as Vittorio Gregotti says, "capable of cultivating and disseminating the profession's traditions, of dealing with the new problems and territories of the project as a discipline, and also of assuming the moral and civic responsibilities implied in the act of building."[30] Thus, the opportunity here is to use automation as a means of focusing architectural design on all the questions that are bound up with critical choice, creativity, and those things specific to the discipline of architecture—those things that exceed the facts of the profession. The potential of this tool employed architecturally is that it could allow architectural ideas, affective material assemblies, human inhabitation, the cultivation of particular places, and so on to become more focal in architectural practice.

Antoine Picone believes achieving something like this requires a reinvention of "the primitive heart of the digital condition."[31] In the context of this discussion I take this to mean, fundamentally re-envisioning and reworking the digital medium (and our relationships to it) so that digital tools increasingly become modeled on the logics of architectural design instead of the paradigms of data processing or the drives of commerce. The automation of certain rules and fact-based tasks to provide focus on issues and opportunities inherent to the discipline of architecture would be a powerful beginning. However, this task requires some consideration of the human/machine relationship, the working processes of the architect, and the possibilities for innovation to further architectural thinking—a process that is not without precedent. Greg Lynn recalls:

> When I think back to the number of times that people from Rhino, Microstation, Autocad came through my office and spent days here, used to consult for us for free on projects, they would look how we were misusing certain tools to get what we wanted, and that is how **we became** Grasshopper and all kind of specific tools in the software that were really designed for a handful of architects that were interested in them. There was a time that we were using tools that were not custom-designed for us, but in the 90s and 00s I would say if there was ever something that we wanted, it was pretty easy to get the software companies to build it for us. They were actually asking us what they could build for us more than we were able to give them ideas of what we wanted. In this sense, it is a two-way process of needs and possibilities. Norman Foster, Lars Spuybroek (*Water Pavilion, Interactive Media Project*), myself, are examples of architects whose projects generated a variety of new digital tools which today are just taken for granted as everyday possibilities.[32]

Such cooperative innovation should be regarded as fundamental to the development of new digital tools. For example, although one of the strengths of a software like Flux is that the way it affects thinking is almost the inverse of BIM thinking—in Flux, the systems populate and adapt to the *design* instead of the reverse—it still has its potential poisons, poisons that might be minimized through the kind of close dialogue Lynn describes between tool designers and building designers—this is how the margins of indeterminacy are implemented. However, making this shift effective depends not only upon implementing margins of indeterminacy, but, Stiegler believes, attending to the following question as well:

> To what degree can and even must these digital relational technologies also give birth to *new attentional forms* that pursue in a different manner the process of psychic and collective individuation underway since the beginning of grammatisation; new forms that make this network society arrive at a new stage in the individuation of this plural unity of the *logos* where the attentional forms we recognise as our culture abound?[33]

In short, one must be ready to both seek and recognize that a sustained vitality of thought requires enmeshment with our tools *and* cultural mores; effectively participating in "network society" and its "digital relational technologies" asks for intellectual agility and a habitual malleability, both of which are given substance through the focused pursuit of precision in thought, effective communication, an ability to be affected by the significance of situations, and an exploratory attitude towards emergent technologies with an eye towards architecture and the practices therein.

PRESSING INTO THE FUTURE

> The most important thing about this technology is its allowing us to lead manufacturing again, and that it is bringing us back to the point of the master builder … we do not have to shop out of a Sweet's Catalogue anymore in order to put a building together.[34]
>
> —Gregg Pasquarelli, *The New Modernists - Folds, Blobs and Boxes*

Work informed by, and pushing, the digital can be seen formally in projects like ALA's Kristansand Concert Hall, Office dA's, Banq, Diller Scofidio Renfro's Broad Museum, and Amanda Levete's MAAT. However, it is when the digital goes beyond pure form to affect practices of architecture that a whole host of unseen potentials and effects are unlocked.

It could be argued that most comprehensive transformation of architectural practice recently is found in the example of SHoP. SHoP is interesting because of the way they paired digital techniques with economic insights to find better ways

to realize architectural ideas. For example, their revelation about the potential for architecture to generate revenue—their 5,000 fee for Dunescape created a million-dollar windfall for PS1—was a seminal idea for the firm, and led to further insights about links to construction, fabrication, development, and architecutral fee structure. Their success opened many questions about normative notions of practice, which has led to further speculation about what might be possible.[35]

Research into new materials and techniques of construction is one on-going speculation. For example Rael San Fratello says of their work, "we have become material scientists, or better, cooks—inventing recipes that would allow us to ask questions about the future of architecture through the lens of 3D printing."[36] Or Theverymany has taken a differnt avenue of experimentaiton,which has led to the creation of, "site-specific structures that unify skin, support, form, and experience into a single system."[37] A project like the Minima|Maxima World Expo Pavilion employs multi-ply constructions, so called "structural stripes" to achieve an innovative ultra-thin (6mm aluminum) skin/structure/envelope.[38] And in another direction then there is the quasi-biological enclosure of Menges Sheffler's Hygroskin – Meteorsensitive Pavilion, where:

> The dimensional instability of wood in relation to moisture content is employed to construct a metereosensitive architectural skin that autonomously opens and closes in response to weather changes but neither requires the supply of operational energy nor any kind of mechanical or electronic control. Here, the material structure itself is the machine.[39]

Another avenue for impact is found in Beijing-based People's Architecture Office who offers a nice example of next generation prefab; particularly interesting is their implementation of urban "plug-in's" used to retrofit existing environments, "suggesting new building technology that considers financial, social, and environmental concerns."[40]

There are also a number of firms that have turned to new digital tools to enhance aspects of traditional practice. For example, SGA is using extensive VR to enhance client understanding of proposed spaces and programmatic options to allow decision to be made "faster in real time."[41] Then there are firms like Woods Bagot, HDR, and NBBJ that have streamlined management operations via digital tools;[42] and Payette, who has been working to integrate new and existing digital tools into a more robust and comprehensive design suite, allowing their work to become both more sensitive and precise.[43]

Whatever forms the progression of the digital takes, vouchsafing the modalities of thought that foster the affective language of architecture is a fundamental challenge of future practice; this task requires creating opportunities that *elevate* architectural thinking *by way of* technical influences. However, elevation is only possible if there are ongoing, open-minded, interrogations of emergent technologies, interrogations that aim to discern the basic affordances and technical logics that underpin the technical apparatus used in the making of architecture to understand their poisonous/potentiality. In this regard, perhaps Rael San Fratello's comment offers the proper spirit with which we must proceed:

> We start galleries in the middle of nowhere. We talk to homeless people. We stack straw bales. We play in the mud. We start corporations. We imagine a better border. We question green. We love fluorescents and brown. We write. We educate. We learn. We often lose, but it doesn't stop us from trying.[44]

ENDNOTES

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