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Thinking + Making: Digital Craft as Social Project

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ABSTRACT: "That parametricism "goes social" is not a concession to the prevailing winds of political correctness (that divert and dissolve the innovative thrust of architectural discourse). Rather, it is a sign of parametricism's maturity, confidence and readiness to take on the full societal tasks of architecture, i.e. it implies the inauguration of Parametricism 2.0… After 15 years of muscle flexing it is high time to put these innovations to more serious work." *Patrik Schumaker* (Schumaker, 2015) The 'more serious work' presented here is the presentation of craft, and specifically digital craft, as a historic and theoretic framework that extends the agency of computational thinking and parametric design in the social project of architecture. Ultimately, this paper argues for the development of a more robust theoretical position about the social application of advanced parametric design as a means to expand architectural agency in the discourse surrounding parametric design's relationship to large scale social issues.

1 INTRODUCTION

Architect and theorist Stan Allen notes in his article *Artificial Ecologies* that the practice of architecture has always been in the paradoxical position of being invested in the production of real, concrete matter yet working with tools of abstract representation (drawings, models, computer simulations and so forth). The paradox charges the question: does thinking (and its associated abstractions) or making (and its concrete matter) give architecture its agency? (Allen, 2003)

The capacity to craft, to think through making, instills architecture with an explicit agency to engage outside of the academy and the discipline. The introduction of digital craft into contemporary practice extends, rather than limits, this agency in the social (or political) project of architecture. The process of thinking through making and the accompanying non-linear methods position architects to identify pathways of thought into contemporary issues, and then make visible that which remains unseen to other disciplines. Craft encourages imagination and through imagination the architect enters into the spheres of life, which are not immediate to personal experience: the social (or political) project of architecture. This imagination is a powerful agent as well. The ability to imagine a better world equipped with the capacity to act, is to craft an object with intentionality and purpose.

As the discipline continues to struggle with self-identity and the direction of its fragmented authority, craft remains the most valuable tool at the architect's disposal. This papers aims to define craft as it relates to architecture and the architect, to position craft as an agent of social and political change, and to identify digital craft as an extension of this agency.

2 DEFINING CRAFT

The term craft is derived from the Middle English *craeft*, meaning strength and skill. Craft can also be associated with the professional affiliation of a guild or trade association. Indeed, it first came into widespread use in conjunction with the advent of guilds – self-protective medieval associations or private clubs of artisans with formally cultivated talents rooted in innate and rare abilities. Craft creates intimate relations between problem solving and problem finding, technique and expression, play and work. (Sennett, 2008) It brings to mind material, matter, repetition, talent, time, pride and dedication. Craft comes burdened with accusations of nostalgia, luddite tendencies and perhaps even a regressive attachment to the past and the pre-industrial. In the mid 17th century Denis Diderot spent the better part of twenty years identifying and documenting crafts. The result: *The Encyclopedia, or Dictionary of Arts and Crafts*, exhaustively recorded how practical things are accomplished and proposed ways to improve them. In *The*

Encyclopedia Diderot, places manual pursuits on equal footing with mental labors, asserting that the craftsman's labors were icons of the Enlightenment. He also scorned hereditary members of the elite who did no work and so in Diderot's opinion contributed nothing to society. His definition of craft is as follows:

> *"CRAFT. This name is given to any profession that requires the use of the hands, and is limited to a certain number of mechanical operations to produce the same piece of work, made over and over again. I do not know why people have a low opinion of what this world implies; for we depend on the crafts for all the necessary things of life."*

Denis Diderot, *The Encyclopedia* 1747-1765.

As can be seen in Diderot's explanation, the idea of craft and its embodiment of the thinking maker produced discomfort as it upset a social order where thinking and making were separated and making subordinate to thinking. This separation is not new; it extends to the very foundations of philosophy. As Jacques Ranciere demonstrates in his book *The Philosopher and His Poor*: "So there is only one principle of exclusion (from political life). Plato's Republic does not decree that one cannot be a shoemaker and a citizen at the same time. It simply establishes that one cannot be a shoemaker and a weaver at the same time..." (Ranciere, 2004) In doing so Plato sets forth that the shoemaker has only been given enough time to do one thing and therefore cannot encroach on the monopoly of thought and leisure that the philosopher enjoys. The thinking-maker disrupts the neat hierarchical social order which preferences the philosopher, as thinker, over the artisan, as laborer.

3 HIERARCHY AND CRAFT: ANIMAL LABORANS AND HOMO FABER

Richard Sennet opens *The Craftsman* with a distinction between making and thinking. Much of Sennet's argument is an extension of Hannah Arendt's *The Human Condition* that "any maker of material things, is not master of his own house; politics, standing above the physical labor has to provide the guidance." To paraphrase Arendt's distinction between *Animal laborans* and *Homo faber*: *Animal laborans* is a "beast of burden" and *Homo faber* "man as maker." Therefore, *Homo faber* is the judge of material labor and practice, not *Animal laborans'* colleague but his superior. (Arendt, 1958) (Sennett, 2008) Sennett argues that Arendt's separation can be repaired through the act of craft:

> "Thinking and feeling are contained within the process of making (craft). What if *Animal laborans* might serve as *Homo faber's* guide?... His-

tory has drawn fault lines dividing theory and practice, technique and expression, craftsman and artist, maker and user; modern society suffers from this historical inheritance... "

Arendt's argument has a greater subtlety to it than Sennet allows. She casts labor as necessity and in these terms to labor means to be enslaved by necessity. It is this enslavement, which breeds the contempt of *Homo faber* who has been freed from these necessities by *Animal laborans* labor. Simultaneously *Homo faber is* aware that he has won his freedom by excluding *Animal laborans* from full participation in the political process by granting him only enough time to labor.

But what then of the artisan? What of Ranciere's cobbler who discomforts the philosopher? The dichotomy of productive (cobbling) and unproductive labor (philosophizing) has been a topic of interest for a range of scholars from Adam Smith to Karl Marx, who elevated labor above contemplation, reversing the traditional hierarchy. Arendt as well doesn't let *Homo faber* escape freely with his vision of separateness from the labor of *Animal labors*. She holds *Homo faber* in contempt, not innocent of but complicate in the acts of his counterpart, since he (*Homo faber*) invented the artifice, which initially spawned the labor. (Arendt, 1958) Kenneth Frampton picks up Arendt's argument in his essay "Intention, Crafty and Rationality" from *Building (in) the Future: Recasting Labor in Architecture*. He further elaborates upon Arendt's distinction by quoting again from *The Human Condition*:

> "If the *Animal laborans* needs the help of *Homo faber* to ease his labor and remove his pain, and if mortals need his help to erect a home on earth, acting and speaking men need the help of *Homo faber* in his highest capacity, that is, the help of the artist, of poets and historiographers, of monument-builders or writers, because without them the only product of their activity, the story they enact and tell would not survive at all. In order to be what the world is always meant to be, a home for men during their life on earth, the human artifice must be a place fit for action and speech, *for activities not entirely useful for the necessities of life but of an entirely different nature from the manifold activities of fabrication by which the world itself and all things in it are produced.*" (Frampton, 2010)

Frampton continues his essay by questioning the architectural profession's ability to confront this issue of separation: "the unreal split between the media cult of the individual star and the anonymity of divided labor that realizes the work." For Frampton this challenges the concept of singular authorship and also fails to address "the presence of a totally new breed of young architects-academics capable of

working at both an intellectual and a manual-cum-technical level." (Frampton, 2010) Which is the architect: *Homo faber* or *Animal laborans*? And does craft allow an architect to dwell simultaneously in both roles?

4 DEFINING THE CRAFTSMAN

Who then is the craftsman? And how is the craftsman different than the artist? Sennet maintains that an artist claims originality and that originality is the trait of single, lone individuals (Frampton's "media cult of the individual star"). Conversely, craft names a more anonymous, collective and continued practice of authorship. In this case, originality becomes a marker of time and denotes the sudden appearance of something where before there was nothing. (Sennett, 2008) On the other hand, the quality and value of craft is considered to be a shared experiment of collective trial and error. In this sense, good craftsmanship implies socialism. Craft is carried out collectively, at least in spirit, in a workshop or studio, a productive space in which people deal face-to-face with issues of authority and a gradient of skills. Skills become a source of legitimacy to command or to dignify obedience.

It is here, that the separation of head and hand are realized, not just as intellectual divides, but by social and economic markers. The architect, the master carpenter and the framer all function as craftsmen. However, the architect sets himself atop the hierarchy of makers imposed within the guild, closer to thinker than to maker. Despite the hint of elitism, the architect must also continue the process of making, grappling with Allen's paradox of abstraction and matter. (Allen, 2003) Additionally, the architect may feel contempt for his reliance upon others to enact his designs as it implies a relinquishment of control. Or as Renzo Piano states (italics are author's for emphasis):

"An architect must be a craftsman. Of course any tools will do. These days the tools might include a computer, an experimental model in mathematics. *However, it is still craftsmanship – the work of someone who does not separate the work of the mind from the work of the hand.* It involves a circular process that draws you from an idea to a drawing, from a drawing to an experiment and from a construction back to an idea again. For me this cycle is fundamental to creative work. Unfortunately, many have come to accept each of these steps as independent. Teamwork is essential if create projects are to come about." (Piano, 1992)

Today's architect-craftsman has adopted technology as a way of bypassing the need for teamwork or reliance upon others to build. Instead of navigating Allen's paradox, this new breed of architect regains control of his craft through the use of the computer and tools of fabrication. However, the act of bypassing the collective and continuous aspect of craft creates a false sense of individuality and originality. As Scott Marble argues in his essay "Imagining Risk":

"If craft is defined as a skill developed over time and in direct relationship to making and to working with materials, architects have long been disconnected from this skill, relying instead on builders and fabricators to actually carry out their designs. Architects work with abstract processes of representation that lead to abstract processes of making. This is a challenging context within which to position craft, if any conventional definition of the term. For craft to function as a useful concept today, it might best be rethought as a process of mediating not only between tools and the objects that are produced but also between design as a process of imagination and production as a process of technique. In fact, craft has always been mediated through a relationship between humans and technology." (Marble, 2010)

This mediation between ideas and objects is the indispensable aspect of craft, which makes the architect the craftsman of the building process. However, does the contemporary architect-craftsman maintain an element of agency?

5 CRAFT AND AGENCY IMPERILED

The American Institute of Architects provides template contracts to its members. One of the primary objectives of the contracts is to protect the architect from liability by distancing the architect from the making of a building:

"The Architect shall not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences, or procedures…"

3.6.1.2 AIA Contract Document B101 Standard Form or Agreement Between Owner and Architect (AIA, 2015)

The advances and proposals made by Marble and others or the arguments set forth in Kieran and Timberlake's seminal *Refabricating Architecture* are undone by the very documents which define the profession as a profession (in the United States) separating *Homo faber* from those who build, *Animal laborans.*

Sennet says of *The Craftsman* "I am writing in a long-standing tradition of American Pragmatism, joining philosophy with concrete practices in the arts and sciences, to political economy, and to religion,

to find philosophic issues embedded in everyday life.") (Sennett, 2008) In this sense craft reflects the objects of everyday life. Well-crafted objects inherit the pragmatism of their philosophical foundations and shed the necessity of the omniscient designer. Additionally, craft implies action and its associated physical products, falling in line with the history of American Pragmatism and the country's foundations built upon the Protestant work ethic. Craft usually hints at the concept of expertise, carefully guarded by professionalism, guilds, trades or unions. What happens though when an outsider takes up a craft, someone not ordained by the keepers of the craft?

Architecture Without Architects an exhibit curated by Bernard Rudofsky at the Museum of Modern Art in New York City in 1964 was a study of non-formal, non-classified architecture – architecture without architects. Rudofsky says of the show "for want of a generic label, we shall call it vernacular, anonymous, spontaneous, indigenous, rural…" Rudofsky continues by saying that "vernacular architecture does not go through fashion cycles. It is nearly immutable, indeed unimprovable, since it serves its purpose to perfection." And that "part of our troubles results from the tendency to ascribe to architects – or for that matter, to all specialists – exceptional insight into problems of living when, in truth, most of them are concerned with problems of business and prestige." (Rudofsky, 1964) It is here that Rudofsky's argument ceases to resonate – he assumes that architecture, vernacular or otherwise, is only tasked with solving problems, not with finding and defining problems.

The focus on non-classified architecture leads into a discussion of the architecture of groups under-served by the traditional profession: the other – be that the impoverished (or any otherness).

6 CRAFT'S AGENCY: IMAGINATION AND OBJECTS

Adam Smith argues, in the *Theory of Moral Sentiments*: "As we can have no immediate experience of what other men feel, we can form no idea of the manner is which they are affected by conceiving what we ourselves should feel in a like situation." Therefore, entering into others' lives requires a profound act of imagination. (Smith, 2009)

Impoverishment of any form – physical, emotional, or intellectual – can be interpreted as pain. In *The Body in Pain: The Making and Unmaking of the World* Elaine Scarry remarks on the de-objectifying effect of pain and its consequent destruction of language. On this lack of referential content Scarry says, "…it is not surprising that the language for pain should sometimes be brought into being by those who are not themselves in pain but who speak on behalf of those who are…" However, how do those who speak gain their voice and their agency? For Scarry this happens through the act of imagining. Through imagination, the speaker can enter into the unsharable space between the certainty of pain and the doubt of its objectlessness. (Scarry, 1985)

"…Imagining may entail a revolution of the entire order of things, the eclipse of the given by a total reinvention of the world, an artifact (a relocated piece of coal, a sentence, a cup, a piece of lace) is a fragment of world alteration. Imagining a city, the human being "makes" a house; imagining a political utopia, he or she instead helps to build a country; imagining the elimination of suffering from the world, the person instead nurses a friend back to health." (Scarry, 1985)

Despite Scarry's conviction that imagination alone produces agency, she does allow that the objects resulting from imagination have their own agency: *"…through tools and acts of making, human beings become implicated in each other's sentience."* (Scarry, 1985) Or as John Ruskin, declared in *The Crown of Wild Olive*: "what we think, or what we know, or what we believe is, in the end, of little consequence. The only consequence is what we do." (Ruskin, 1866) It can therefore be reasoned that a consciousness of things cannot be independent of the things themselves. Through an engaged material consciousness, we become particularly interested in the things we can change.

The craftsman then can be considered a social philosopher at the intersection of practice and talent and this poses a general question about agency: we are minded to believe that engagement is better than passivity. Therefore, if craft gains its agency through action, and architecture its agency through craft, then how can craft beget the engagement of architecture with a larger social project?

Architects as producers of space, can also be producers of ideologies and of capabilities. Imagining a route out of poverty, requires architects to think and to act, to imagine and then to produce objects. These objects hold new ideologies and offer spaces to improve capabilities. This means architecture must offer not just shelter, but systems to operate within, schools to educate, infrastructure to travel, hospitals to heal, stages to perform, studios to paint. We cannot build what we have not first imagined, and architecture is uniquely positioned to do just that.

7 DEFINING DIGITAL CRAFT

"Virtual craft still seems like an oxymoron; any fool can tell you that a craftsperson needs to touch

his or her work." Malcolm, McCullough, Abstracting Craft *(McCullough, x)*

What happens then if architecture cedes craft to the digital realm? Or rather, gives up the very thing, which gave it agency in the first place? Is the digital realm an extension of the imaginary space or a replacement for physical space? And does this cyberspace extend architectural agency or limit it? Digital walls do not keep out physical rain or as McCullough states there is "the seeming paradox of intangible craft." Indeed, we may now be entering an age of the master-builder-craftsman or architect-craftsman that John Ruskin sought to revive, but getting there in a way Ruskin could not have anticipated. Issues of dimension, heft, tactility, and materiality remain essential to architecture as built environment, no matter how tantalizing the pixilated world may be. Digital fabrication and its associated tools provide a tactile counterpoint to the image-based environment otherwise prevalent in digital work.

> *"The best way to appreciate the merits and consequences of being digital is to reflect on the differences between bits and atoms."*
>
> Nicholas Negroponte, Being Digital (Negroponte, 1995)

For the purpose of this paper, the digital turn in architecture occurred in the early 1990s and is defined as the computerization of design, construction, and fabrication processes. This is marked by a transition from designs based upon a Cartesian grid to those constructed from a digital field condition abstracted within computational space. Specifically, the introduction of continuous computational splines that are variable within defined limits and can be notated as parametric functions or mathematical relationship between parts. (Carpo, 9)

Digital craft emerges from computational thinking, digital fabrication and robotic construction; processes that allow the full participation of architects in the production of buildings and thereby extend architecture's agency to engage in a larger social and political project. A close reading of the *Human Condition* demonstrates that the spheres presented by Arendt: labor, work, and action are interconnected and in the present day are merged through architectural technology to extend the participation of architects in the construction process beyond the cultural and physical confines of bodily practice.

Craft has long been seen as the antithesis of the evils of modernity and industrialization. Against the rigorous perfection of the machine, the craftsmen became an emblem of human individuality, symbolized by the positive value placed on variations, flaws and irregularities in handiwork. However, does craft, like all traditional knowledge, inherit and pass on

prejudice? As members of the University of Virginia School of Architecture Faculty wrote in an open letter to the board of visitors, the university administration, and the university community entitled *"What are the Jeffersonian Architectural Ideals?"*

> "Is there a problem in choosing an architecture to stand for the values of a university at the beginning of the twenty-first century when that architecture was inaugurated at an historical moment when racial, gender, social, and economic diversity were less welcome?" (UVA, 2006)

Does craft gain or cede authority by tethering itself to the continuity of human thought and event? Contemporary craft loses it agency when it becomes associated with the Luddite, romantic, or historic. In fairness, craft does not need to be mistreated by these associations. The combination of technology with craft, termed digital craft, prevents craft from this characterization.

David Pye defines craft in *The Nature and Art of Craftsmanship:* "Craftsmanship…means simply workmanship using any kind of technique or apparatus, in which the quality of the result is not predetermined but depends on the judgment, dexterity and care which the maker exercises as he works. The essential idea is that the quality of the result is continually to risk during the process of making…." (Pye, 1968)

If fabrication and digital craft is seen as the completion of an idea that is then constructed by the machine, then indeed the most valuable aspect of craft is lost to over-determination. Simulation can sidestep this over-determination but it is a poor substitute for tactile experience. If the digital is used to eliminate the feedback loop of question finding through question answering, then craft itself is at risk. Machines break down when they lose control; whereas people make discoveries, stumble upon happy accidents. There is a nostalgia for a lost space of freedom – free space in which people can experiment, a supportive space in which they could at least temporarily lose control. A radical emancipatory challenge provokes:

> "Power in action requires some largeness and imaginativeness of vision. Men must at least have enough interest in thinking for the sake of thinking to escape the limits of routine and custom. Interest in knowledge for the sake of knowledge, in thinking for the sake of the free play of thoughts is necessary then to the emancipation of practical life – to make it rich and progressive…."
>
> John Dewey *"Concrete and Abstract Thinking" How We Think* (Dewey, 1910)

Therefore, how might digital craft re-engage the best aspects of craft, thinking through making, and the power of the digital realm? First, digital craft

must embrace the spatial conditions of the computer environment. The term cyberspace first appeared in William Gibson's 1982 story *Burning Chrome* and was subsequently popularized by his 1984 novel *Neuromancer*. (Gibson, 1984) The concept of other or virtual space is woven throughout history, appearing in literature and cultural commentary from Plato's *Allegory of the Cave* to Descartes' *Evil Demon*. However, the concept of cyberspace is unique in that it offers not just a space of representation and communication but also provides a social setting within which these activities can exist. The resulting social relationships are what give cyberspace its physical presence and thereby architectural ramifications. In architecture, this conceptual space is often considered to be the space of the screen or monitor and therefore simultaneously the space within the computer and the internalized space of perception.

Is it possible, that the future of architecture lies in our ability to make the parametric sensate or to actualize the abstraction of cyberspace into meaningful physical objects? In digital culture, there is a new continuity between subject and the architectural object, with no void between them. As if the distance of vision was abolished by tactility. Craft and its inherent materiality will prevent architecture from falling prey to the complete cognitive internalization of the screen, it will halt the progression toward ocular space primacy, and it will create the interactive corollaries between cyber and physical spaces.

For digital craft to promote the agency of thinking through making, architecture must embrace the aspects of feedback mechanistic processes offer, by expanding the field of information to the tools used in the discipline.

8 CONCLUSION

Digital worlds should not be seen as alternatives or substitutes for the built world, but rather as an additional dimension which allows architects a new freedom of movement in the physical world. In other words, the transcendence of physicality in the digital world allows architects to extend their agency in the physical world. (Carpo, 10)

Digital craft brings together the physical and digital worlds. The historic and theoretic framework presented here aims to move forward the agency of computational thinking and parametric design in the social project of architecture. The development of a more robust theoretical position about the social application of advanced parametric design will expand architectural agency in the discourse surrounding parametric design's relationship to large scale social issues: Schumaker's 'more serious work'.

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