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What Makes a Well Made Harmonic Machine?

1. Inspirations

The sociologist David Sudnow's Ways of the Hand is a detailed, autoethnographic account of his own physical, visual, and cognitive experience learning to play jazz piano. The high fidelity with which he details and reports the mechanics of learning and play in this book provide insights for Heideggarian & Merleau-Pontial phenomenology and semiotics which could not be arrived at without such an experimental ludomusicological study.

Ludomusicology is the study of structures and play in games and music. Sudnow explores Freudian Cathexis and gameplay further in another book, Pilgrim in the Microworld. That lies beyond the scope of this essay, which strives more for what Roger Moseley exemplified in Keys to Play – a confluence of clavier study, comparative literature, ludomusicology, and philosophical critique.

2. Introduction

Through study of poetics and aesthetics in Simondon, Plato, Porter, Empedocles, and Wohl, this paper argues a concept of harmonic machines as generative proxies to then explore questions regarding diatithenai.

The paper proceeds with groundsetting through Simondon's ontogenesis and generation in Plato's Timaeus, as this sets the stage for discussing aesthetics and poetics. From there, the paper argues the concept of a harmonic machine as a generator through Porter's work in classical aesthetics and on Empedoclean cosmogony/zoogony. This allows us to delve into Wohl's "Politics of Form", where the investigative matter of diatithenai may come into the light.

At that juncture, the paper turns towards practice-based research to explore the tension regarding diatithenai and harmonic machines as generative proxies. First, a comparative analysis of the design philosophy and construction of Austin & Aeolian-Skinner Pipe Organs provides phronesis for the topic. This carries into a broader theoretical discussion of the problem of reapportionment in generation, explored through a practice of speculative computing.

3. Purpose

I have two hopes for this paper. First, I'd like to begin truly learning to conduct and write the kind of ersearch I'm most interested in – practice-driven, interdisciplinary critical studies in the realm of poetics at the intersection of classics, legal philosophy, ludomusicology, clavier studies, and speculative computing. Second, I'd like to try establishing a basis (or, at least a foothold) for a more long-term research question I've been engaged with – reapportionment & representation in

political geography and Kant's Transcendental Deduction. This topic asks: by what authority do we differentiate a space, ascribe ownership/belonging, and derive representation? and how do the politics of this matter (which I currently believe to be an issue of transcendental aesthetics) self-modify in language use and the diathesis of phantasia?

4. Methodology

There are two components to the practice-based research supplementing this essay's argument: a comparative case study of two different Pipe Organ makes' design approaches, and a digital humanities practice of speculative computing around reapportionment in clavier design and the space of harmony.

I rely on existing scholarship on autoethnography to guide my reflection & presentation of the former. In "Creative Practice as Research: Discourse on Methodology" R. Lyle Skains provides the following guidance for practice-based researchers: "A) Approach the creative activity from a clearly defined research question; B) observe his/her activities *in situ*, but interpret these observation records (creative notes, drafts, research logs) after a time period that allows for a distanced perspective; and C) supplement these observations of process with media-specific analysis of the creative artefacts themselves (as discussed in a later section)" (Skains, n.d., p. 88). For A, the research question is: what design considerations make a harmonic machine well constructed? For B, I have solid recollection of the dozens of hours I spend inside of the organs I'm analyzing, and for C) I have video documentation from inside Aeolian-Skinner organs which I referenced and reflected on in contrast with photographic documentation of one of the Austin pipe organs' interiors which I used to maintain – thus making the comparative case study's *in situ* reference not just based in recall but verifyable.

Still, I fear autoethnography is not rigorous enough; for my next draft I'll dig through archives for a more robust comparative analysis. In the writing of this draft, I mostly focused on articulating the theoretical question and approach of this study; for the next draft, I'll condense the argumentative section further and expand on the case studies.

The methodology for constructing and articulating the second experiment mostly relies on Drucker & Nowviskie's "Speculative Computing: Aesthetic Provocations in Humanities Computing" and Pacheco's revision of Unsworth's scholarly primitives for the Digital Humanities. Unsworth's primitives are: Discoveing, Annotating, Comparing, Referring, Sampling, Illustrating, and Representing (Pacheco, n.d.). This process begins with a search – a sentiment echoed in Drucker & Nowviskie's criticism: "Prevailing approaches to humanities computing tend to lock

users into procedural structures" (Drucker & Nowviskie, n.d., p. 433). However, they propose a revision to these structures through applying software development *as* research: "Creating digital environments that engage human capacities for subjective interpretation, interpellating the subjective into computational activity…" (Drucker & Nowviskie, n.d., pp. 432-433). To interpellate the subjective into computational activity is to situate a researcher or reader's cognitions into a programmatically demonstrable process. This doesn't pickle or preserve cognitions, but it does exteriorize them into an artefact, and that artefact itself can be like a generator for the field of study itself in addition to being generative for prospective audience engagements.

Drucker & Nowviskie's own computational project is called "Temporal Modeling," and in contrast to the act of research starting from without the essential question – like an archaeologist hunting for a dig site – they interpellate the researcher and the work as the call itself. They write: "Interpretation of subjective activity can be formalized *concurrent with* its production – at least, that is the design principle we have used as the basis of *Temporal Modeling*" (Drucker & Nowviskie, n.d., p. 433). In other words, a practicioner-researcher may develop their interpretation of a text or problem in the Arts & Humanities simultaneously *through and as* a computational implementation. I've extensively engaged in this practice for years – for example, trying to implement Kant's Critique of Pure Reason in object-oriented and functional programming schemas, or exploring Glissant's arguments on history, relation, opacity, and errantry (in intersection with Blanchot's Silence & Literature, and Mallarme's Mastery) through designing a reapportioning algorithm for a harmonic machine. That last project is the one brought in view at the end of this paper; but how does this speculative computing approach modify traditional Humanities work? and how should I articulate this endeavor of digital humanities well?

Pacheco presents revised scholarly primitives for interdisciplinary work: chaining, accessing, assessing, disseminating, networking, probing, translating. This schema is highly collaborative, proceeding by synthesis with analysis, prioritizing revision, feedback, and co-authorship, and putting demonstration first. In my own approach with this essay, I chain theoretical considerations throughout the field of classical aesthetics to play with access and analysis, for the matter of diatithenai is largely opaque; I view the several people I'll ask for feedback from on this paper as part of the collaboration.

However, I mildly disagree with Drucker & Nowviskie's argument about the difference brought by Speculative Computing's application in aesthetics.Where they write: "Generative aesthetics has a different meaning than that of traditional aesthetics… the keyword vocabulary in this approach would not consist of *beauty, truth, mimesis, taste*, and *form* – but of *emergent,*

autopoietic, generative, iterative, algorithmic, speculative, and so on." My contention is precisely in my interest in the interplay between the language and scholarship of traditional aesthetics and this modern counter-tradition; I see them in apposition, rather than stark exclusion. Hence, the heavy focus on both generative and traditional aesthetics in the discussion of work that follows.

5. Argument

The main inquiry of this paper is: what makes a harmonic machine well made? What I mean by "harmonic machine" is peculiar and will be contrived through the argument that follows. The discussion centers on form, matter/content, and the mechanical and political acts of generation.

5.1 Inciting Problematic: Hylomorphism

Introducing Gilbert Simondon's problematic in Individuation in Light of Notions of Form and Information, Jacques Garelli describes an inciting premise: "on the methodological plane there is an attitude shared by Merleau- Pontian phenomenology and the epistemology of microphysics, such as it is stated in Niels Bohr and Werner Heisenberg, according to which we cannot radically separate the scientific "object" discovered at the end of research from the path of the thought and the operative processes that have led to revealing and constructing it" (Simondon, 1964, pp. xv-xvi). In other words, the object of our inquiry will take a form dictated by the modality of our approach.

If our inquiry seeks to draw ou some essential matter, then the matter's essence will withdraw from the grasping of our research, and instead some suitable form will rise to the surface. How should we proceed, given this mechanic of withdrawal?

In his eponymous Platonic dialogue, Timaeus said: "What is that which is Existent always and has no Becoming? And what is that which is Becoming always and never is Existent? Now the one of these is apprehensible by thought with the aid of reasoning, since it is ever uniformly existent; whereas the other is an object of opinion (doxa) with the aid of unreasoning sensation, since it becomes and parishes and is never really Existent… when the artificer of any object, in forming its shape and quality, keeps his gaze fixed on that which is uniform… that object… must of necessity be beautiful; but whenever he gazes at that which has come into existence and uses a created model, that object thus executed is not beautiful" (Plato, 1929, pp. 49-51). Timaeus contrasts the eternal & true agains the doxographic & the represented, arguing what is modeled after ideal matter will be beautiful, and what is modeled after a manifested form will only be a cheap copy. So, returning to Simondon's premise – where matter eludes our inquiry and a limited

form rises to meet our investigation in the place of the truth, both in physics and in phenomenology –, we must resolve the aesthetic question of hylomorphism – matter becoming form.

Addressing hylomorphism gives rise to schools of argument called "formalism" and "materialism" . Porter gives a thorough survey of the forms of formalism – ranging from form arising in experience and dismissing matter altogether, to schemas of form generating matter by relation and opacity (Porter, 2010, p. 72), or by Hegelian phenomenology (Porter, 2010, p. 73). He also gives a strong case for materialism (Porter, 2010, pp. 8-10). However, there's a particular aspect of Simondon's response to the matter of becoming I'm interested in: the proxy.

5.2 Proxies

A proxy is a third party agent given authority to conduct action in a case. Simondon treats the matter of becoming as a thermodynamic process occuring over time, with a prior metastable system of organized elements which under go a technical process to form into some posterior state. He illustrates this with the baking of a clay brick – the metastable state is the colloidal form of the clay's molecules' arrangement in a slurry; this metastable system undergoes a thermodynamic process to *take shape*. "The clay yields a brick because this defomration operates on masses whose molecules are already arranged relative to one another […] The mold limits and stabilizes rather than imposing a form: […] it *modulates* the ensemble of the already formed sections: the action of the worker who fills the mold and packs the clay continues the prior action of the kneading, stretching, and shaping…" (Simondon, 1964, pp. 24-25). The operative process enacts the becoming, while the mold is already in place so that the matter can take shape; the technical operation is the handiwork of whoever arranges the system, kneads the clay, applies the heat. This artificer is invisible within the machine of becoming.

Baked into Simondon's response is the answer to our inquiry, but we've yet to understand the question itself, and as such the insightful dimension remains occluded. Simondon and Timaeus both present the mechanics of "making" and "making well", but their revelations hinge upon an agent – an artificer, a creator. What if the proxy for the operative process was not agential, but machinic?

5.3 Generators

"Makhana" (μαχανά) – which gives us the word "machine" – was used to say "to contrive" or "construct" (Liddell et al., n.d., p. 1131). While agents are living, machines are contrived. How might a dormant construct create?

In Group theory, a generator is a formulation which could be said to model, instantiate, generate, or represent all the elements a group comprises of. For example, an expression that generates the group of all the even numbers could be written as $E = \{2n : n \in \mathbb{N}\}$ ("E is the set of all numbers in the set of Natural Numbers multiplied by two; this is equivalent to the set of all even numbers"). A generator is some formulation which begets all possible matter of a specific order – it is autopoietic, "self-making".

Now we are close to understanding this essay's question. A machine acting as a generative proxy is some non-agential metastable state which not only holds the possibility of creation, but autonomously actualizes it. How might we make one well? and what differentiates generative proxy machines?

5.4 Cosmogony, Zoogony, Harmonia

I'm well past the time of submission for the first draft, so I'm submitting it as incomplete from here. The parts I'm still writing proceed as such:

1. 1-2 paragraphs: Introduction of Empedocles's cosmogony and zoogony as media for understanding material construction and political contrivance from a generated state; the first will be explored through physically constructed machines, while the second will be explored through a more opaque speculative computation machine.
2. 1 paragraph: Introduction of Porter's work on Greek terms from Timaeus, Phaedo… "harmonia (fittingness)… diathesis (arrangement)… charis (charm)… skleros (hard, rough)" as ways of aesthetically analyzing material.
3. 1-2 paragraphs: Return to Timaeus and introduction of Victoria Wohl's arguments "Aesthetic form and political meaning are not mutually exclusive… they are indivisible: one cannot strip away the aesthetic form to get to a kernel of political content because the aesthetic form *is* the political content" and matters of "psychagogia or 'leading of the psukhe' (soul, mind, psyche)." Engagement with the politics of form within the frame of diatithenai (arranging matter) emerges here as the crux of the essay's inquiry, which is then explored through the comparative case study and the speculative computing section.
4. Comparative Case Study – 3 sections
    1. Austin's design philosophy for pipe organs, with Timaeus and skleros in mind
    2. Aeolian-Skinner's mechanical design approach and harmonia
    3. Discussion of Grace Cathedral's Aeolian-Skinner's arrhythmia shifts the comparison from a binary opposition towards a more nuanced, temporal and political consideration

5. Speculative Computing case study
    1. Engaging with opacity in Glissant and Porter
    2. Design approach for a harmonic machine – reapportioning the space of harmony algorithmically, and the importance of user interface design (connecting back to the mechanical construction of pipe organs)
    3. Return to the literal harmonic machine (clavier) as a generative site after practical and theoretical discussion of implementations of "harmonic machines as generative proxies" for playful experience, seen through the work of Wohl and Simondon discussed earlier

I'm guessing I'll have to cut the theoretical argumentation to at least 1/3 of the size it's currently at, and spend more time within the experiments, in order to remain within the spirit of the assignment. In this draft, I prioritized arguing methodology and articulating the opaque thesis; for the final draft, I'll prioritize the completing assignment's parameters. For myself, playing with dense theoretical writing explored through rigorous clavier study and speculative computing mattered most; a lot of this essay comes from conversations with professors in other departments, who I'll prepare a better theoretical draft for to garner their feedback, though I'm very interested in further exploring dense classics and critical theory through the interdisciplinary methods of ITP.

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