

APPERCEPTIVE PATTERNING: ARTEFACTION, EXTENSIONAL BELIEFS AND COGNITIVE SCAFFOLDING

Ekin Erkan

ABSTRACT: In “Psychopower and Ordinary Madness” my ambition, as it relates to Bernard Stiegler’s recent literature, was twofold: 1) critiquing Stiegler’s work on exosomatization and artefactual posthumanism—or, more specifically, nonhumanism—to problematize approaches to media archaeology that rely upon technical exteriorization; 2) challenging how Stiegler engages with Giuseppe Longo and Francis Bailly’s conception of negative entropy. These efforts were directed by a prevalent techno-cultural qualifier: the rise of Synthetic Intelligence (including neural nets, deep learning, predictive processing and Bayesian models of cognition). This paper continues this project but first directs a critical analytic lens at the Derridean practice of the ontologization of grammatization from which Stiegler emerges while also distinguishing how metalanguages operate in relation to object-oriented environmental interaction by way of inferentialism. Stalking continental (Kapp, Simondon, Leroi-Gourhan, etc.) and analytic traditions (e.g., Carnap, Chalmers, Clark, Sutton, Novaes, etc.), we move from artefacts to AI and Predictive Processing so as to link theories related to technicity with philosophy of mind. Simultaneously drawing forth Robert Brandom’s conceptualization of the roles that commitments play in retrospectively reconstructing the social experiences that lead to our endorsement(s) of norms, we compliment this account with Reza Negarestani’s deprivatized account of intelligence while analyzing the equipollent role between language and media (both digital and analog).

KEYWORDS: Rudolf Carnap; Predictive Processing; Hegel; Robert Brandom; Reza Negarestani; Gilbert Simondon; External Mind

§ I
TELEGRAPHY, TELESCOPES & LANGUAGE: AN INTRODUCTION TO
COGNITIVE COMMITMENTS

In the early 19th century, persistent operative hermeneutic analogies between the enteric nervous system and electric telegraphy were manifold, as the scientific study of organic and technological communications systems inspired one another. For instance, in the first decade of the nineteenth century, scientist M. VorseImann de Heer's account of an "electro-physiological telegraph" was founded upon the employment of shocks, where the passage of an electric current brought about a signal response in the fingers of an observer.¹ In 1849, German physiologist Emil DuBois-Reymond based his description of excitation in nerves and muscles on Michael Faraday's experimentation on induction in electric circuits, drawing a parallel between the operations of the nervous system and the electrical telegraph.² During the mid-1860s, mathematical engineer and physicist William Thomson mapped telegraph wires to his own tongue so as to "taste" the differences between signals.³ Emphasizing the physiological facet of these artificial communication systems allotted for the subject to serve as a kind of "receiving device," whereby cognition served as a patterning program. As Friedrich Kittler's remarks in *Discourse Networks* make clear, nineteenth-century media for writing and communication (e.g., the telegraph, typewriter, phonograph and telephone) were considered to not only be directly imbued with modes of inscription and reception but also to affect how we conceive of cognition—the body's sensory organs were regarded as signal-processing systems, themselves.⁴

In the foreword of *Discourse Networks*, David E. Wellbery makes a rather telling and somewhat disturbing remark, albeit one in line with the Derridean treatment of language. Wellbery notes that, according to Kittler's account:

“[o]ne way of formulating the discursive effect of psychophysics and the typewriter is to say that only with them does language become perceptible as a medium. But

¹ George Prescott, *History, Theory and Practice of the Electric Telegraph*, Boston, Ticknor and Fields, 1866, p. 56.

² Emil Du Bois-Reymond, *On Animal Electricity*, London, Forgotten Books, 2018.

³ Hermann von Helmholtz, *Science and Culture: Popular and Philosophical Essays*, ed. David Cahan, Chicago, University of Chicago Press, 1995, p. 150.

⁴ Friedrich A. Kittler, *Discourse Networks 1800/1900*, trans. Michael Metteer, Stanford, Stanford University Press, 1990, p. 187.

it is not the medial technology of the typewriter alone that makes this perception possible. The development of this technology around 1900 is co-emergent with other medial technologies, in particular the gramophone and film."⁵

Wellbery goes on to underscore that each one of these aforementioned media comport to one of Lacan's registers: writing conveys differences pertaining to the symbolic order; cinema, due to its Peircean indexicality of environmental simulation, transmits imaginary contents through visual presence; and the phonograph allows for the technical recording of the real.⁶ Nonetheless, there is also another less markedly pronounced understanding of language entangled in this remark. That, for Kittler, the materiality of language is foundational for its comprehension—or, at the very least, that language's materiality brings about a more recognizable register of semantic engagement—and that language, much like media artefacts, is an evolutive scaffolding for self-reflective complexity that finds its ultimate original point of reference in itself. That is, semantics does not emerge out of the interaction of minimal syntactic rules or confrontation with basic axiomatic acts but, instead, from techniques of inscription. Before these inscriptions, language is but unrecognizably formulated and language, in and of itself, is not formalizable in the same way that these machines are.

Kittler's fleeting treatment of language is almost identical to Derrida's,⁷ for whom "writing machines" like the stylus and typewriter reveal an inner kinetic condition with distinct ontological implications. Both machines direct language's oriented structure towards not only the machine's ability to materially inscribe time but also to extend intention. For Derrida, language and intentionality necessarily emerged in unison, with language materializing from what he calls "nonlanguage,"⁸ by which it would appear he means a language without

⁵ David E. Wellbery, "Foreword" in *Discourse Networks*, p. 31.

⁶ *Ibid.*

⁷ This is despite Kittler's general genealogical engagement with media qua contingency is thoroughly Foucauldian.

⁸ "Why is it a nonlanguage, therefore? It is a nonlanguage because it evokes the future without predicting it. In other words it remembers the unknown without knowing it; or it recollects the unforeseeable without foreseeing it; that is why it is a remembrance which is not, a foreseeing which is not, a language with is not [...] it recalls what never happened, it evokes the inexperienced of experience [...] It is a language without 'tenses' and 'cases', without predicates and without subject." Branka Arsić, "Active Habits and Passive

constatives and operatives—the first utterance that has no previous history and, thus, is the initial hermeneutic provocation, i.e., the first media.⁹

Contra Kittler and Derrida, this paper will claim that, despite us language-bearers do not have direct access to reality, the conceptual realism required for knowledge to be intelligible is instituted by our attitudes and practices that inferentially reference a pragmatism about semantics which is inherently bound by our determinate status as belief-committed and conscious social organisms. This is not to dismiss media artefacts' engagement with normative content and semantics but to preface media artefacts' ontic status with a more formative understanding of "representation," wherein "representation" designates a modern concept introduced to reconceive of the relation between reality and appearance. "Representation" here presents an alternative model to the "resemblance model" that characterized pre-modern philosophy's designation of correspondence between how things *really are* and how they *appear* in terms of the phenomenal properties or qualities that the two share in a suitable manner. For example, in the "resemblance model" a picture of a tree is assumed to constitute a "veridical" appearance of trees in general iff they both share the same colors, relative proportions, shapes and so on. With Descartes' conception of a *mathesis universalis*, however we see the resemblance model undone¹⁰—this *mathesis universalis* is not only a metaphysical model for understanding nature but an epistemological model for articulating mental states and the world.¹¹

With this new model, we could approach the relation between *appearance* and *reality* though the distinction between *mental representings* and *physical representeds* (as indexed by algebra and geometry, respectively). *Representings* function to mentally

Events or Bartleby" in *Between Deleuze and Derrida*, eds. P. Patton and J. Portevia, London, A&C Black, 2003, p. 155.

⁹ Derrida therefore identifies the Egyptian trickster character, Theuth, with the mythopoetic emergence of writing and, thus, as the progenitor of history. Jacques Derrida, "Plato's pharmacy" in *Dissemination*, trans. B. Johnson, London, Athlone Press, 1981, pp. 61-117.

¹⁰ Descartes' model of "representation" was directly inspired by Galileo's insight that the physical world could be mathematically conceived, mapping temporal duration to the length of lines and the acceleration of bodies to the area of triangles.

¹¹ Daniel Sacilotto, "Realism and Representation on the Ontological Turn" in *Speculations IV: A Journal of Speculative Realism*, eds. M. Austin, P. J. Ennis, F. Gironi, T. Gokey, R. Jackson, Santa Barbara, punctum books, 2013, pp. 55-56.

“represent” the structural features of spatial figures, even if no resemblance obtains between the algebraic formulae and geometric properties of *extended* physical figures. In turn, it is not media’s extension or physical properties that matter for the relation between *representing expressions* and *represented entities* in space and time; this relationship is directed according to a *structural isomorphy* that algebraic symbols share holistically with spatial figures and their transformations. As Robert Brandom notes, “the context of such an isomorphism, the particular material properties of what now become intelligible as *representings* and *represented*s become irrelevant to the semantic relation between them,”¹² for all that is significant is the correlation between the rules that govern the manipulation of *representings* and the real-world possibilities that characterize *represented*s.

§ II

SEMANTIC STRUCTURE & COMMITMENTS

Clearly inspired by Brandom’s inferentialism, this paper stakes the claim that the intelligibility of “what we know” is predicated upon the conceptual form objects have for thought, which represents the way they are “in-themselves.” This is not a direct claim about being in and of itself but, instead, navigates media objects and cognition, as well as their coupled status, in order to progress a transcendental and, indeed, semantic claim about what it means to “know” or be conscious of, something. Furthermore, we will also try to illuminate the Hegelian plexus through which action-enjoining contexts implicitly determine the conceptual content that enjoins media-as-*representings* to laws of nature and formalized computable semantics.¹³

¹² Robert Brandom, *A Spirit of Trust*, Cambridge, MA, Harvard University Press, 2019, pp. 39-40.

¹³ “In response to the skeptical conclusions of rationalist and empiricist epistemologies, Hegel’s attack against the so-called ‘instrument-or-medium conception of reason’ disputes the claim that mind-independent reality is known only as mediated through our representings, and in doing rejected not only Humean skepticism concerning knowledge of what exceeds the sphere of sensory presentation, but also the Kantian difference between knowable phenomena and unknowable noumena, which introduced a gulf of intelligibility between appearances and reality. In short, Hegel does not take issue with the representationalist idea that mathematical formulae may stand in isomorphic relations to spatio-temporal phenomena, but disagrees with the skepticism that makes the possibility of knowledge of things as they are ‘in themselves’ unintelligible.” Robert Brandom, *Spirit of Trust*, p. 191.

Brandom replaces Wilfrid Sellars' primal semantic concerns regarding the theory of meaning (i.e., what it means to understand a proposition) with pragmatic questions. Thus, Brandom redirects our concern to what an interpreter *does* when engaging with speech statements "p" that are embedded with truth-value (and, in turn, belief). That is, the interpreter ascribes a kind of commitment to the speaker to justify their statement "p" where the interpreter takes a position regarding this truth claim, as they ascribe or deny the speaker an entitlement to assert this "p." In turn, Brandom engages with the supposition of rationality underlying such discursive activity.

There is a presupposition here about our expressive rationality—that we are essentially normative beings due to our capacity to commit and concern ourselves with cognitive commitments or practical commitments regarding how things “shall be” in the conditional future. As discursive beings, our normativity is inferentially articulated, as we are either implicitly or explicitly asking and giving reasons for our commitments. The normative dimension and rational dimension are what, in turn, set us humans apart from other language-bearers, with logic and philosophy making that which is implicit in these practices explicit.¹⁴

What does inferentialism, as such, have to do with mediation and with media objects? Answering the first part of this question is much more straightforward. Brandom's approach to evaluating a being's sapience through the Game Of Giving and Asking For Reasons (GOGAR) illuminates an engagement with the prototypical representation of social practice. Thus, inferentialism makes it possible to evaluate a being's sapience simply by their nature of participation within that game qua reinforcement. In fact, this paradigm can be likened to a Strong AI semblance configured by Markov Decision-Processes, with state transition probabilities and reward values designating reinforcement-style behavior. Decisions, for Brandom, involve the ability to draw inferences and, in consequence, involve a contact with logic (a kind of practical mediation that involves a relation with a noumenal Outside, which in this case involves norms).¹⁵

¹⁴ Robert Brandom, *Making It Explicit*, Cambridge, MA, Harvard University Press, 1994.

¹⁵ Mediation in this sense involves the deployment of inferences, as in scenarios of commitment to something that is inferred but not immediately available as a perceptible. “For example, if someone is presented with an offer of employment, they have the option of signing it and taking the job. To take this all important

Normative vocabulary accordingly is not drawn upon in articulating the scientific image of things as they "really are." Normative vocabulary belongs exclusively to the manifest image. However, the questions addressed by the language of the ordinary lifeworld (i.e., the language of the manifest image) that is deployed in discursive practice also administers vocabulary that describes and explains the world, appealing to the realm of science (*scientia mensura*). This concerns the relations between descriptions and explanations "whose home is in the manifest image and those whose home is in the scientific image."¹⁶ So what Sellars designates as "methodological" and Brandom as "observational" is, seemingly, open to epistemic mediation, which is opposed to its static ontological status. There are different concerns in regards to *how* we know something rather than the kind of thing that we know about. Purely theoretical objects, for instance, are epistemically accessible to us only by means of inference while observable objects are also epistemically accessible via non-inferential reports. We can mediate the status of a methodological object:

"[w]hen Pluto was first postulated, it was as a theoretical entity which we could know only by making inferences from perturbations in the orbit of Neptune. With improvements in telescoping, looking at the calculated position of the hypothetical planetoid yielded the first observations of Pluto. It became, for the first time, observable. But *it* did not change its ontological status; only its relation to us changed."¹⁷

Media objects as such are subject in accordance to beliefs in the pragmatic mode, where they index a shared point of view in regards to sociality. What we do when we understand *each other* is, in turn, a matter of understanding what we are committed to and entitled to in order to hold these aforementioned

decision, a rational being might consider all the consequences of signing that offer, for example, having to wake up 6 a.m. every weekday, being able to earn money. Thus, this interaction of signing the offer might be imagined to be an input-output relation where the input is the presentation of the offer, and the output is signing it. Although both simple performer and rational beings can take part in this interaction with the help of their abilities, what sets rational beings apart is the ability to draw inferences as a consequence of the output action." Arisha Sarkar, "A Brandom-ian view of Reinforcement Learning towards strong-AI," 2018.

¹⁶ Robert Brandom, *From Empiricism to Expressivism: Brandom Reads Sellars*, Cambridge, MA, Harvard University Press, 2014, p. 8.

¹⁷ Robert Brandom, *From Empiricism to Expressivism*, pp. 59-60.

commitments. When we speak of, debate and exchange our Pluto-beliefs, we are tethered to those media instruments from which we draw our commitments. In order to articulate ourselves in those "I-thou relations" from which we build up a social structure, rather than "I-we relation" terms (i.e., the community and "we" in the community), there is no demand that we agree in *all* of our positions. Instead, the demand is that "you" know what "I" am committed to and *keep track*, or "keep score," of what "I" am committed. Here, "I-thou relations" (or "I-you relations") index the relations between a first-person speaker committed to the truth of a statement and a third person who ascribes a truth claim to the other while reserving their own judgment. We will examine how media artefacts play a position in such "score-keeping," particularly as it relates to belief and desire.

The act of ascription is fundamental to the whole practice of discourse as such, which object-ifies the second person into an observed third person.¹⁸ Indeed, Brandom equates the interpreter with a public that judges utterances of an observed speaker, dissolving the internal relation between objectivity and intersubjectivity to favor the priority of the object-ive. As a consequence, the individual in question (i.e., "I") is able to achieve a kind of epistemic independence from the collective authority of a respective language community, but they are tied back into linguistic communication vis-a-vis their beliefs and practical attitudes, or how they mediate their language with action and revisal.

Media objects have allowed for us to deontically "keep score" throughout history, i.e. to understand one another by entangling social structure. Because the scientific image emerged within the manifest image, media allows for a reappropriative change in observables and the descriptive terms of the scientific image. By virtue of such specialized forms of "deontic scorekeeping," agents mutually assess their beliefs and revise concepts through specific cultural methods and techniques. Following the rudimentary tenet of weak empiricism, we do not know anything about the world around us without sensory experience but the form of the conceptual is an inferential form; to be conceptually contentful is to be inferentially articulated. In the game of giving and asking for reasons, an observer's response is conceptually contentful solely insofar as it occupies a node

¹⁸ Jürgen Habermas, *Between Naturalism and Religion: Philosophical Essays*, Cambridge, UK, Polity Press, 2008.

in a web of inferential relations.¹⁹ The question, in turn, turns to how reliable causal connections come to be inferentially used in the world. As sentient beings, we reliably respond to the world around us and these can be tracked inferentially: so, for instance, if “I” take “you” to be a reliable observer of “red things” it is because “I” am prepared to infer from your *claiming that an object is red* that *it is, indeed, red*. This is a reliability-inference where the causal connection between you and red-things is put into an inferential form whereby what you are saying/undertaking is a commitment that gives *me* reason to undertake a commitment. This gives us a way to inferentially track reliable commitments in the world. Media artefacts of reference can either shortcut or take the place of these verbal commitments by memorializing ordinary language, in a sense; as in the example of the telescope, however, they also affect ontic commitments. For Brandom, norms are transcendental insofar as they occupy a functional role that determines the content of a concept that can be instantiated across indefinitely varied linguistic and cognitive hosts.²⁰

In turn, we will progress to exercise the methodologies of classical genealogy—a rich tradition stoked by Nietzsche and one that continues quite robustly in both the analytic and continental philosophical traditions but is often blindsided when it comes to considerations related to philosophy of mind. Furthermore, certain traditions of media philosophy almost unequivocally accept the aforementioned Derridean-Kittlerian rendering of language as coming to form through media. However, subtracted from representation, these media objects occupy the ontic status of metalanguage, insofar as they make explicit the ontological, descriptive content laden within the manifold of communicability which is absent from these accounts.

In resisting the Derridean-Kittlerian treatment, we by no means contend with passive synthesis—that norms are passively constituted and we do not actively

¹⁹ Robert Brandom, *From Empiricism to Expressivism*, p. 192.

²⁰ “Norms (in the sense of normative statuses) are not objects in the causal order. Natural science, eschewing categories of social practice, will never run across commitments in its cataloguing of the furniture of the world; they are not by themselves causally efficacious—no more than strikes or outs are in baseball. Nonetheless, according to the account presented here, there are norms, and their existence is neither supernatural nor mysterious. Normative statuses are domesticated by being understood in terms of normative attitudes, which are in the causal order.” Robert Brandom, *Making It Explicit*, p. 626.

shape them via jurisprudence, media, politics and so on. On the contrary, and as Heidegger points out, there is a critical problem that disrupts the interface between the transcendental aesthetic and the analytic, as was made evident with Kant's difficulty in coordinating the receptivity of intuition with the conceptualizing activity of the understanding in grounding metaphysics.²¹ “[I]ntuition is not purely passive, but seems already productive, individuating the forms of space and time and ‘guiding us’ before cognition under judgment.”²² Without the subject's active contribution through the endowments of sensibility—that is, mediation proper (as in structuring language)—cognition only would be but a formless inconsistency. Intuition as such isn't just a “sensory manifold” of raw data, but that which grounds our pre-discursive representation of individuals that is represented in our empirical cognitions, formulating the objects of our perceptual judgments.

Drawing from Brandom's historical summary of epistemological grounding and practical commitments, we can take note of how the formative project of semantic analysis attempts to clarify the relation between theory and observation in terms of how certain target vocabularies can be considered to be logical elaborations of some base vocabulary. How, then, can target media objects be considered as the semantic elaborations of some basic logic of syntax?

§ III

TRUTH & BELIEF

In Alfred Tarski's semantic conception of truth, we see the revitalization of a conception of correspondence that is in conformity with the classical Aristotelian understanding of truth, wherein there are enactive underlying pragmata that structure the truth-value of statements.²³ As a consequence, to “say of what is that

²¹ Martin Heidegger, *Kant and the Problem of Metaphysics*, trans. R. Taft, Indiana, Indiana University Press, 1997, p. 161.

²² Daniel Sacilotto, *Saving the Noumenon*, 2020, ed. N. Brown, p. 101. (Manuscript in preparation.)

²³ “To prove that A does not belong to every B, we must suppose that it belongs to every B; for if A belongs to every B, and C to every A, then C belongs to every B; so that if this is impossible, the supposition is false. Similarly if the other proposition assumed concerns B. The same results if CA is negative; for thus also we get a deduction. But if the negative concerns B, nothing is proved. If the supposition is that A belongs not to every but to some B, it is not proved that A belongs not to every B, but that it belongs to no B. For if A belongs to some B, and C to every A, then C will belong to some B. If then this is impossible, it is false that

it is not, or of what is not that it is, is false, while to say of what is that it is, or of what is not that it is not, is true.”²⁴ According to Tarski, both the laws of contradiction and of the excluded middle can be deduced from this formula. In Tarski’s definition of truth of an interpreted sentence, a sentence A is true iff A is satisfied by every infinite sequence of objects; for Tarski, because truth is not relative to circumstances, if A is a variable-free sentence utilized within a kind of formalized interpreted language, either all sequences satisfy A, or no sequence satisfies A. In turn Tarski’s absolute concept of truth determines that every sentence is true or false under all circumstances.²⁵

As a result, for Tarski there is a metalanguage carrying assumptive axioms that is richer than our object language. A truth definition needs to be formally correct in the sense that the metalanguage in which the definition is given is richer than the object language *and* it is also to be “materially adequate.” By “materially adequate,” Tarski means that “its consequences [should] include all those required by this convention.”²⁶ Such a formulation expresses a concept of absolute truth wherein the truth of a sentence is not restricted to a certain domain or circumstances. Accordingly, since truth is not relative to circumstances and in order to bar the emergence of logic of the liar-like paradoxes, Tarski suggests that

A belongs to some B; consequently it is true that A belongs to no B. But if this is proved, the truth is refuted as well; for the original conclusion was that A belongs to some B, and does not belong to some B. Further nothing impossible results from the supposition; for then the supposition would be false, since it is impossible to deduce a false conclusion from true premises; but in fact it is true; for A belongs to some B. Consequently we must not suppose that A belongs to some B, but that it belongs to every B. Similarly if we should be proving that A does not belong to some B; for if not to belong to some and to belong not to every are the same, the demonstration of both will be identical.” Aristotle, *Priori Analytics: Book II in The Complete Works of Aristotle*, ed. J. Barnes, Princeton, Princeton University Press, 1991, p. 72, 61b34-62a10.

²⁴ Aristotle, *Metaphysics*, trans. W. D. Ross, Sioux Falls, NuVision Publications, 2009, §1011b25.

²⁵ Maria van der Schaar, "Truth and Time. Twardowski's Impact on his Students" in *Kazimierz Twardowski: A Grammar for Philosophy*, Leiden, Brill, 2015, p. 129.

²⁶ Alfred Tarski, “The Concept of Truth in Formalized Languages” in *Logic, Semantics, Metamathematics*, trans. J.H. Woodger, Oxford, Clarendon Press, 1956, pp. 152-278. The Tarskian model-theoretic semantic frame can be generalized as and used “without distortion and as a fundamental concept in all of the disciplines from which the above quotations are drawn. In this sense I would assert that the meaning of the concept of model is the same in mathematics and the empirical sciences. The difference to be found in these disciplines is to be found in their use of the concept.” In drawing this comparison between constancy of meaning and difference of use, a semantical question arises in how to explain the meaning of a concept without referring to its technical context. Patrick Suppes, *Studies in the Methodology and Foundations of Science*, New York, Springer, 2012, pp. 165-166.

a given theory should not contain its *own* truth-predicate. Accordingly, “the truth-predicate of a language L_1 would only be expressible in a language L_2 , whose own truth-predicate would be expressible in a higher-order language L_3 , and so forth. Thus, with Tarski, the object-level v. meta-level distinction itself became formalized.”²⁷ For Tarski, the domain of intended application according to which any theory’s “core” becomes coordinated is in regards to tracking a specific sector of the (possible) world that relies on already-available concepts and vocabularies. These given concepts and vocabularies describe the relevant ontological categorial status assigned to the data-basis of a theory.²⁸

According to this position, a Tarskian theory of truth, we have a firm referential grip of truth-conditions and how they structurally relate to the inferential policies we apply to propositions. Therefore, “logical relations are subject to uniform treatment: they are invariant with subject matter” and “they help define the concept of ‘subject matter.’”²⁹ That is, logical relations define subject matter, such that those very same rules of inference both *can* be and *are* accounted for by the same theory which provides us with our ordinary account of inference.

Following Tarski’s doctrine, our physical claims experience no difficulties in aligning themselves with exterior truth-values despite mathematics cannot tie its own references to causal bonds. Physical vocabulary gleans inferential and referential credence in a direct manner, utilizing an appeal to truth-conditionings that is entirely based on component-decompositional policies of reference-linkage. Given Tarski’s conception of language, there is something of an inferential extension at play. This stripe of Tarski-style soundness proofs of the external world support a simple predicate-to-extension picture.³⁰ Indeed, Tarski’s inferential warrants are always provisional, hostage to the consideration that they may rest upon a faulty picture of how physical information is actually encoded

²⁷ Catarina Dutilh Novaes, *Formal Languages in Logic: A Philosophical and Cognitive Analysis*, Cambridge, UK, Cambridge University Press, 2012, p. 87.

²⁸ Thus, “an element x of I is also a subclass of M_{pp} insofar as the latter provides the informational basis for a structural theory.” Daniel Sacilotto, *Saving the Nounenon*, p. 98.

²⁹ Alfred Tarski, “Mathematical Truth” in *Philosophy of Mathematics*, eds. P. Benacerraf and H. Putnam, Cambridge, UK, Cambridge University Press, 1984, p. 411.

³⁰ For a robust counterexample, see: Mark Wilson, *Physics Avoidance*, Oxford, Oxford University Press, 2018.

within a descriptive language.³¹

In Tarski's infrastructure, the theoretical suppositions of logic are referentially equipollent to how language is *formalized*. What does it mean to formalize language and how does a formalized language present itself to us? One answer recalls Carnap's description of how the process of abstraction and the resulting purely formal system that is obtained can be qualified as "formal" or attributed with "formalization":

"[a] theory, a rule, a definition, or the like is to be called formal when no reference is made in it either to the meaning of the symbols (for example, the words) or to the sense of the expressions (e.g., the sentences), but simply and solely to the kinds and order of the symbols from which the expressions are constructed."³²

Recalling our previous discussion of normativity, Carnap's claim can be extended such that the irreducible normative dimension associated with sapient cognition is liable to mathematical distillation, in an information-theoretic and computationalist register. Carnap's thesis is that science deals solely with the description of the structural properties of objects. Consequently, this thesis hinges on the practicability of demonstrating the possibility of a formal constructional system that contains all objects within one single principle. Carnap's reduction can be extended, in turn, to reducing the entirety of phenomenal reality to perceptual experience along the lines of a deductive model of reduction.³³ However, the purpose of these Carnapian reductions are "not ontological in the sense of showing that the physical facts or facts about perception are exhaustive of all the facts."³⁴ Instead, Carnap's reducibility is a kind of transformative reduction, an interdefinability. Nowhere is this clearer than with Carnap's work on fractions and natural numbers. For Carnap, those statements that deal with fractions can be readily transformed into statements concerning natural numbers without losing content. Carnap's account of reductions as transformations or logical constructions is clearly stated in his intent to create a universal system of relations, wherein:

³¹ Ibid., p. 419.

³² Rudolph Carnap, *The Logical Syntax of Language*, London, Open Court, 1934, p. 1.

³³ This is why Carnap's Universal Learning Machine is sometimes termed a Universal Optical Machine

³⁴ John Symons, "Ontology and Methodology in Analytic Philosophy" in *Theory and Applications of Ontology*, New York, Springer, 2010, p. 366.

“[t]o reduce *a* to *b*, *c* or to *construct a* out of *b*, *c* means to produce a general rule that indicates for each individual case how a statement about *a* must be transformed in order to yield a statement about *b*, *c*. This rule of translation we call a construction rule or constructional definition.”³⁵

Hilary Putnam explicitly assumed the view that “the task of inductive logic is the construction of a ‘universal learning machine’” and committed to demonstrating the impossibility of this notion with his diagonal proof of the incompatibility for confirmation functions.³⁶ For Putnam:

“[c]ertainly it appears implausible to say that there is a rule whereby one can go from the observational facts [...] to the observational prediction without any ‘detour’ into the realm of theory [...] this is a consequence of the supposition that degree of confirmation can be ‘adequately defined’; i.e. defined in such a way as to agree with the actual inductive judgements of good and careful scientists. We get the further consequence that it is possible in principle to build an electronic computer such that, if it could somehow be given all the observational facts, it would always make the best prediction—i.e. the prediction that would be made by the best possible scientist if he had the best possible theories. [According to Carnap’s program] *Science could in principle be done by a moron* (or an electronic computer).”³⁷

What Putnam sought to show via his diagonalization argument is that there cannot be a learning machine which is also universal—that is, there can be no universal inductive method that is effectively computable which is also able to eventually detect any pattern that is effectively computable.³⁸

Independently from Putnam, Ray Solomonoff, a student of Carnap’s, presented a formal solution to derivability in the language of Carnap by

³⁵ Rudolf Carnap, *The Logical Structure of the World*, Chicago, Open Court Publishing, 2003, p. 6.

³⁶ Hilary Putnam, “Probability and confirmation” in *The voice of America forum lectures*, U.S. Information Agency, Washington, D.C., 1975, pp. 293-304.

³⁷ Hilary Putnam, *Mathematics, Matter and Method: Volume 1*, Cambridge, UK, Cambridge University Press Archive, 1975, p. 290.

³⁸ According to Putnam, “we may think of a system of inductive logic as a design for a ‘learning machine’: that is to say, a design for a computing machine that can extrapolate certain kinds of empirical regularities from the data with which it is supplied” and “if there is such a thing as a correct ‘degree of confirmation’ which can be fixed once and for all, then a machine which predicted in accordance with the degree of confirmation would be an *optimal*, that is to say, a cleverest possible learning machine.” Putnam asserts that his diagonal proof would show that there can be no such thing: it is “an argument against the existence—that is, against the possible existence—of a ‘cleverest possible’ learning machine.” Hilary Putnam, “Probability and confirmation,” p. 299.

rendering problems of inductive inference whether they involve discrete or continuous data (or both) as being able to be expressed in the form of the extrapolation of a long sequence of symbols. This formalized solution designates a mathematical equation that expresses the probability of a hypothesis' being degree-confirming as a function of the sequences involved. In particular, the solutions that Solomonoff proposed involve Baye's Theorem, insofar as:

"[a] priori probabilities are assigned to strings of symbols by examining the manner in which these strings might be produced by a universal Turing machine. Strings with short and/or numerous 'descriptions' (a 'description' of a string being an input to the machine that yields that string as output) are assigned high a priori probabilities. Strings with long, and/or few descriptions are assigned small a priori probabilities."³⁹

In the *Logical Foundations of Probability*, Carnap subverts the probabilistic paradigms of Humean induction garrisoned by observational data, whereby every form of induction is based on an observable pattern, the very paradigm for deep neural networks. In Carnap's inductive pattern-matching unification, we are introduced to a unique conception of reflective analyticity that is entirely distinct from Kant's. Carnap's insistence on a logical index substantiates that logical atomism is primary and observation secondary—at a fundamental level, probability or statistics cannot bear an ontological *terra firma* until they are couched in terms of logical relationships.⁴⁰

As an inversion of Huffman coding, Solomonoff's strategy first obtains the minimal code for a string and, from this code, obtains the probability of that string in question. Solomonoff's setting is, thus, entirely within the scope of Putnam's diagonalization argument. The crux of Solomonoff's strategy is that we translate a symbol sequence of length t into the observation of the first t individuals. The notion of effective computability, a function of homogenized

³⁹ Ray Solomonoff, "A Formal Theory of Inductive Inference, Pt. I" *Information and Control*, vol. 7, 1964, p. 3.

⁴⁰ Despite Carnap's antipathy for Hegel, his insistence on logical isomorphism corresponds directly to the premise of Hegel's historical program. Hegel's history is that of sequencing forms and division (whether it be subjective spirit's relationship to psychology, objective spirit's relationship to institutions of the state, or absolute spirit's relationship to art/theology/philosophy), such that each sequence set realizes a higher level of development and then decays as their internal contradictions became apparent and their unique potentials have been exhausted.

formalization, is what set Solomonoff's program apart from Carnap's.

Recently, Tom F. Sterkenburg has revived the prospects of Solomonoff–Levin's mathematical proposal regarding Carnap's optimum universal inductive machine. Sterkenburg has stressed that the Solomonoff–Levin measure manages to successfully unite versions of Putnam's two adequacy conditions—1) M converges on any true computable hypothesis; 2) M is computable—by involving a weakened notion of effective computability. However, in investigating the possibility of a perfectly general and purely mechanical rule for extrapolating data, Sterkenburg's position clashes with Putnam's philosophical supposition that, in fact, “there is no universal algorithm” for inductive purposes by effectively obtaining universalizable events.⁴¹

Using transformations by functions that are effectively computable allows Sterkenburg to modify functions to transform along finite sequences and therefore impose the property of computability. Sterkenburg attempts to construct a monotone machine, drawing from Carnap's program by resurrecting the notion of a universal mechanical rule for induction that can be visualized as operating on a steady stream of input symbols, producing an (in)finite output sequence in the process. Sterkenburg's attempts to identify a natural class of effective elements that are immune to diagonalization but, ultimately, is unable to locate a natural class of effective functions that cannot be diagonalized, i.e., that contains universal elements.

Unlike Kripke's distinction between analyticity and metaphysical necessity, Carnap's conception of modal logic and intentional semantics collapses intentional content in its treatment of quantifiers as ranging over objects. Despite Sterkenburg's commendable analysis, his program is unable to universalize universal elements into optimal inductive rules. Just as Carnap takes L -truth to be a semantic concept that explicates the informal convention of designating a sentence logically true iff the sentence is true in virtue of semantic rules without reference, it would similarly appear that the entire conceptual prospect of first-order modal predicate semantics (i.e., modal functional logic) is not axiomatizable into a functional calculus of substitution.

⁴¹ Tom F. Sterkenburg, "Putnam's Diagonal Argument and the Impossibility of a Universal Learning Machine," *Erkenntnis*, vol. 84, no. 3, 2019, pp. 633-656.

According to Sellars, Carnap's definitional construction of transformation rules elides normative terms and their force, such that this definitional schema for transformation can not capture the normative content of rules implied by terms such as "ought" or "ought not"—rather, Carnap's program accounts solely for relational terms instead of properly construed definitions. More specifically, the first prong of Sellars' twofold critique of Carnap deals with normativity. Sellars's second, and closely related critique, takes Carnap to task for the absence of reference to actions in his rule schema. Sellars makes the assertion that:

"a rule is always a rule for *doing* something [...] any sentence which is to be the formulation of a rule must mention a doing or action. It is the performance of this action (in specified circumstances) which is enjoined by the rule, and which carries the flavour of ought."⁴²

That is, for a rule to function as a rule, proper, instead of a mere generalization, it must be internal to an action, such that the rule-regulated behavior in question occurs due to the rule and not simply in conformity with it. For instance, take Carnap's notion of "arrestable." Even if Carnap's schemata are able to capture the action-based quality of rules in definiendum, they can still fail to capture a general rule—"arrestable" as such fails to be transferred over to definiens from definiendum such that it may specify the circumstance in which a person *is* "arrestable" but does not capture the general rule for "arresting" someone. Accordingly, Carnap's definitional schema does not give any accurate definition for what counts as a linguistic rule.⁴³

Thus, for Sellars:

"[a] rule is always a rule for doing something in some circumstance.
And a rule is the sort of thing that one follows. But following a rule entails recognizing that a circumstance is one to which the rule

⁴² Wilfrid Sellars, "Language and Meaning" in *In the Space of Reasons: Selected Essays of Wilfrid Sellars*, Cambridge, MA, Harvard University Press, 2007, p. 18.

⁴³ "Carnap's claim that he is giving a definition of "directly derivable in S" is a snare and a delusion. It is as though one offered the following "definition" as a formulation of a basic rule governing the activities of policemen: "X is arrestable =_{DF} X has broken a law". It is obvious that such a definition would be a mistake not only because the definiendum "arrestable" has, as we saw, a normative force not shared by the definiens, but also, because it designates an act, the act of arresting, which is not designated by the definiens." Wilfrid Sellars, "Inference and Meaning" in *In the Space of Reasons*, eds. K Scharp and R. Brandom, Cambridge, MA, Harvard University Press, 2007, p. 19.

applies. If there *were* such a thing as a semantical rule by the adoption of which a descriptive term acquires meaning, it would presumably be of the form “Red objects are to be designated by the word 'red.' ” But to recognize the circumstances in which this rule has application, one must already have the concept of red! Those who speak in this sense of semantical rules, therefore, are committed to the view that an awareness of abstract entities is a precondition of learning the intelligent use of symbols.”⁴⁴

Specifically, what Sellars is concerned with is the performance of an action which ties it to the rule and extends it into intention. Turning away from the logic of substitution, then—and, in turn, settling with the impossibility of a Carnapian program that effectively collapses language and computation—let us turn to material engagement. Having reviewed some of Carnap’s shortcomings, let us also retain a healthy bit of skepticism regarding theories of extended mind and embodied cognition that exact a reductive transformation which renders the perceptible function of memory as the representation of language without accounting for a normative theory of belief-formation. We will further detail this with David Chalmers and Andy Clark’s work on extended cognition.

§ IV

MATERIAL ENGAGEMENT & EXTENSION

According to Lambros Malafouris's Material Engagement Theory (MET), actions, objects and signs are, ontologically speaking, inseparable and our "mindscape" is constituted by bodily practices and via artefacts.⁴⁵ Malafouris' interest is not in, say, simply the lines we draw on paper, for instance, but also those "imaginary lines" that "connect our past with our present and possible future and allow us to become the self-conscious beings we are, [which] exist in the middle space where brain, body and culture conflate.”⁴⁶ Never entirely mental, in the “internal” sense, and never just material, in the “external” sense—

⁴⁴ Wilfrid Sellars, “Is There a Synthetic A Priori?,” *Philosophy of Science*, vol. 20, no. 2, 1953, p. 133.

⁴⁵ Lambros Malafouris, “Mind and Material Engagement,” *Phenomenology and the Cognitive Sciences*, vol. 18, 2019, pp. 1-17.

⁴⁶ *Ibid.*, p. 4.

neither mind, in the cognitivist sense, nor matter in the materialist sense—MET suggests that the “enacted inside” of the world is based on cognitive commitments of material engagement qua epistemic constraints, wherein the materiality of mind is differentially extended. MET proposes that we can only extend human beings and what it is to be human by understanding modes of human cognitive “becoming” or how human minds “become” at personal, peripersonal and extrapersonal temporal-spatial scales of engagement. Accordingly, what we call mind is a *process* constituted by the continuous recycling and re-organization of cognitive-artefactual thinking, which exists in a state of perpetual movement (i.e., “[m]inds never stop minding” and “[m]inds always become”).⁴⁷ While this seemingly applies to every sentient organism, it is especially true in the case of humans given their profound plasticity and the diverse artefactual engagements of the material forms that we make.

As an anthropologically-minded researcher of archeological development, Malafouris underscores the evolutionary progression relevant to the human ability to participate in collaborative activities with shared intentions. In particular, Malafouris draws attention to the linguistic facet of object-oriented processes of material engagement, illuminating relationships between technological change in the Early Stone Age (ESA) and underscoring evolving hominin brain size, functional lateralization and language capacities so as to support the argument that human brains and technology have been co-evolving for at least two million years. In particular, new imaging data shows that the neural circuits supporting stone toolmaking partially overlap with language circuits, which suggests that these behaviors share a primordial foundation in how goal-directed actions have evolved in a mutually reinforcing way.⁴⁸

Of course, MET is not the first theory of artefactual engagement and has historically developed from a lineage of theorists, anthropologists and philosophers concerned with behavioral automatization outpouching mental activity vis-à-vis habit. The most cited and perhaps most celebrated version of this is found in David Chalmers and Andy Clark’s Extended Mind (EM)

⁴⁷ Ibid., p. 5.

⁴⁸ Dietrich Stout and Thierry Chaminade, “The evolutionary neuroscience of tool making,” *Neuropsychologia*, vol. 45, 2007, pp. 1091-1100.

argument. Chalmers and Clark reference the ascriptions of extended beliefs vis-à-vis media mnemonics that are automatically consulted by way of a case study: a man named Otto. Otto suffers from Alzheimer's disease and, like many Alzheimer's patients, he relies on information environmentally embedded in order to structure his life. One of the critical examples that Chalmers and Clark recall is Otto's notebook:

“Otto carries a notebook around with him everywhere he goes. When he learns new information, he writes it down. When he needs some old information, he looks it up. For Otto, his notebook plays the role usually played by a biological memory.”⁴⁹

Compared to Inga, who has a perfectly functioning memory, Otto's notebook plays a role functionally akin to memory because the notebook is part of Otto's cognitive process. Inga is attending the same exhibition opening as Otto at the Museum of Modern Art (MoMA) on 53rd st., between 5th and 6th ave., in Manhattan and walks to the museum using solely her memory. Otto travels to the opening by consulting the directions that he has jotted into his notebook. Nonetheless, it follows that both Inga and Otto both are operating according to belief. Respectively, Inga's memory and Otto's notebook combine desire (to go to the museum) with memory in order to produce action.

According to Chalmers and Clark, Otto's notebook demonstrates a socially embodied relationship of reference, taking on the kind of ontic commitment-based role elsewhere accounted for by social relationships. What, then, is to be said of the realization of belief(s)? Consider, for instance, the example that Clark and Chalmers give of the waiter at a regular patron's favorite restaurant. The waiter who serves a patron the meal that they regularly request can act as a repository for the patron's beliefs about their favorite meals and we can even account for this as a case of extended desire. The waiter is a cognitive collaborator with whom the patron is entangled in automatic endorsement; yet the information in question (directions, meal orders) has, at some previous point, been *consciously* endorsed, which is tacitly referenced in constructing implicit belief. Of course, such common kinds of collaborative belief-relationships often

⁴⁹ Andy Clark and David Chalmers, "The extended mind," *Analysis*, vol. 58, no.1, p.12.

transpire between lovers, bosses and secretaries, co-workers and so on.⁵⁰

The important point is that a kind of meta-syntactical performance, i.e., a language, is being exchanged here. How do Clark and Chalmers designate that which is language? It is equipollent to extended articulation, such that media are syntactical elements because they allow for the coupling of various cognitive references. Without such a language, we become akin to those stripped Cartesian inner minds where higher-level cognition can solely rely on internal resources—for instance, beliefs predicated upon mathematical inferences. According to Descartes' mathematical opportunism, nature offers us restricted occasions wherein we can follow developing processes with reasoning tools, internally mentally mapping the possibility of an enlarged landscape through those reasoning procedures that occupy a computational stripe.⁵¹ However, language allows for this burden to be spread into the world of objects—language is no mirror of the inner Cartesian states of belief but allots for an ontic compliment. Language thus serves "as a tool whose role is to extend cognition in ways that on-board devices cannot."⁵²

In a foreword to Andy Clark's *Supersizing the Mind*, Chalmers recollects the mind's offloading by recounting a recent purchase:

"[a] month ago, I bought an iPhone. The iPhone has already taken over some of the central functions of my brain. It has replaced part of my memory, storing phone numbers and addresses that I once would have taxed my brain with. It harbors my desires: I call up a memo with the names of my favorite dishes when I need to order at a local restaurant. I use it to calculate, when I need to figure out bills and tips . . . Friends joke that I should get the iPhone implanted into my brain. But if Andy Clark is right, all this would do is speed up the processing and free up my hands. The iPhone is part of my mind already."⁵³

While Otto's notebook, Chalmers' iPhone and Inga's memorization apparently do not differ in terms of their participation in cognitive processes, there *is* a distinction linked to *when* and *how* offloaded memory is consulted. This distinction relies upon the facilitation of cognitive processes that would otherwise

⁵⁰ Ibid., p. 17.

⁵¹ Mark Wilson, *Physics Avoidance*, Oxford, Oxford University Press, 2018, p. 375.

⁵² Andy Clark et al., "The extended mind," p. 18.

⁵³ Andy Clark, *Supersizing the Mind*, Oxford, Oxford University Press, 2008, p. ix.

have been autonomous. That is, in order for the extended cognition argument to verify that formal languages transform cognitive processes in non-trivial ways, there “must be more than incidental facilitation of cognitive processes which are otherwise essentially autonomous.”⁵⁴

Accordingly, Chalmers and Clark’s Parity Principle states that external devices do not merely facilitate cognitive tasks but are in fact *constitutive* of those cognitive operations in question; cognitive states and processes extend beyond the brain and into the external world when those relevant parts of the world function in the same way as do unquestionably cognitive processes in the mind. However, how are certain media objects differentiated? The notion of extended cognition is, by itself, arguably far too liberal, for it would account for all nonbiological artefacts that are utilized in any kind of momentary or occasional information-processing cognitive process, making the concept of “mind,” proper, elusive. Jeroen de Ridder accounts for a putative set of restrictions via the Modified Parity Principle.⁵⁵ This further articulates a distinction derived from Chalmers and Clark’s criteria that an artefact must satisfy in order to qualify as part of a subject’s cognitive process:

- 1) the resource must be reliably available to the subject and typically invoked in the relevant circumstances; it is a constant in the subject’s life;
- 2) easy access: information in the resource should be accessible as and when needed, without difficulty;
- 3) automatic endorsement: information retrieved from the resource must be automatically endorsed, deemed about as trustworthy as information retrieved from internal biological sources, and not usually be subject to critical scrutiny;
- 4) past endorsement: the information in the resource has been consciously endorsed in the past and is there because of this endorsement.⁵⁶

⁵⁴ Catarina Dutilh Novaes, *Formal Languages in Logic*, 2012, p. 182.

⁵⁵ According to the *Modified Parity Principle*, “if, as a group confronts some task, a part of the group’s life functions as a state which, were a state in the head of an individual to function similarly to it, we would have no hesitation in recognizing as a mental representation, then that part of the group’s life is a collective representation.” Jeroen de Ridder, “Representations and Robustly Collective Attitudes” in *Socially Extended Epistemology*, eds. A. Clark et al., Oxford, Oxford University Press, 2018, p. 49.

⁵⁶ Ibid. Andy Clark et al., “The extended mind,” p. 17.

For Chalmers, in particular, information is conscious if it is reportable and that which is reportable directs how such information is occasioned for function.⁵⁷ In turn, it is critical that the correct kinds of internal representations meet the representations that qualify a necessary condition for having a belief (or some other representational attitude). The collective mental attitudes stipulated upon involve representations that can be further stratified between mental imagery and linguistic or conceptual structure. This is *why* and *how* aspects of our environment actively instantiate parts of our cognitive processes, rather than all elements of our environment being actively entangled. Specifically, Chalmers' two-dimensionalist theory of reference between primary intension (of sense) and a secondary intension (of referential assignment) is highly related to Carnap's logical empiricism, where existential questions (of desire and/or belief) are relative to the linguistic framework (embedded in the artefacts of the EM), or the set of rules governing the relevant terminology in which they are posed.

If we wish to search for any operational syntactical metalanguage to take account of how our pragmatic questions are determined, our concern about *how* our choice of linguistic frameworks are retrofitted vis-à-vis confirmation will, as with Carnap, be neglected once again. Notably, Chalmers' *does not* involve deferential concepts that are in part about rule-obeying behavior nor does Chalmers' account require deferential thoughts that involve the concepts of "meaning"⁵⁸ or "reference."⁵⁹ Rather it is a language of reference only insofar as

⁵⁷ David Chalmers, *The Conscious Mind*, Oxford, Oxford University Press, 1996, p. 237.

⁵⁸ According to the instantiation of a metalanguage of meaning, one "must be thinking about the word 'narcolepsy', when he is [falsely] entertaining the thought 'narcolepsy is a disease of the nose', if the term 'narcolepsy' in that thought is equivalent to a metalinguistic description. This is doubtful for several reasons, including that the subject did not fix upon the words/labels themselves. When we entertain thoughts involving concepts whose reference we might consult an expert to decide, such as QUARK or NARCOLEPSY, it does not seem as though these thoughts are particularly different from thoughts that involve concepts that we fully grasp ourselves, such as HAND or UP. Thoughts involving deferential concepts don't seem to stand out to us as being somehow thoughts about language." Cathal O'Madagain, "Outsourcing Concepts: Social Externalism, the Extended Mind, and the Expansion of our Epistemic Capacity," *Socially Extended Epistemology*, p. 24.

⁵⁹ "Young children, for example, might use many concepts deferentially—coming to believe that electricity is dangerous, or that the stove runs on gas, without having the ability to uniquely identify either electricity or gas. It seems highly doubtful that they should grasp the concepts MEANING or REFERENCE for this to take place, and yet on the metalinguistic account, such concepts must be playing a role in their deferential thoughts." *Ibid*, p. 27.

it allows for semantic deference, or for entangled language to be adaptively pointed to certain artefacts/media objects as a functional articulation of their use-value, such that Otto's notebook helps him consolidate the reference-words in his notebook—"Museum of Modern Art," "6th ave.," "53rd Street," and so on—in a step-oriented manner (i.e., directive planning). The paradigm of EM reasoning is beneficial in identifying cases of *functional parity* between cognitive states and object-oriented activities where no reflections on language are necessary at any stage in the employment of deferential concepts or rules. Therefore, co-opting the EM framework, deferential and non-deferential concepts differ solely at the level of the retrieval mechanism in play with underlying semantic knowledge: "for non-deferential concepts, that mechanism operates locally, while for deferential concepts that mechanism depends on information stored in other people's minds."⁶⁰

Without relying on the Parity Principle, philosophers who endorse the second wave of the EM theory such as Richard Menary consider extension in terms of *integration*. Despite abandoning the Parity Principle, second wave EM thinkers co-opt the "complementarity principle," which rejects the notion that external factors must be functionally similar to conventional mental states and processes in order to qualify as "cognitive." Rather, what is emphasized here is integration with biological systems and the "coordination" of a biological system to be hybridized (or "hominized"). So, to recall Chalmers and Clark's MoMA example, Otto's notebook is not a "part" of Otto's mind because it functions exactly like Otto's memory used to. Instead, the notebook is coordinated and integrated with Otto's mind because it engages in feedback loops with the biological brain during various episodes of cognition. For Menary and other such second wave proponents of EM, external elements are not mere "tools" for they can be reciprocally integrated with those minds that act upon them and are acted upon. Accordingly:

"[o]ne way to understand integration is as follows: cognition is the coordination of bodily processes of the organism with salient features of the environment, often created or maintained by the organism. A coordinated process allows the organism to perform cognitive tasks that it otherwise would be unable to; or allows it to

⁶⁰ Ibid., p. 31.

perform tasks in a way that is distinctively different and is an improvement upon the way that the organism performs those tasks via neural processes alone.”⁶¹

The true advantage of this Complementarity Principle in comparison to the Parity Principle is that it allows its proponents to avoid the claim of extra-cranial and intra-cranial functional equivalency. Instead, the focus is on the increase in “computational power” offered by the involvement of “exograms” rather than on how they might truly modify and transform cognitive processes. In particular, it is John Sutton, a second wave EM advocate highly influenced by Merlin Donald, who underscores a distinction between “exograms,” or external symbols, and “engrams,” or the brain’s “memory traces.” For Sutton, the aforementioned integrated coordination is between the biological brain and “exograms,” which occupies a wider category. Sutton’s preoccupation is in carving functional distinctions between those processes that involve “exograms” and those which do not, regardless of whether or not the functional outcome is the same. Some unique properties of “engrams” include: internal memory record; fixed physical media; constrained format; impermanence; large but limited capacity; limited size of single entries; not being easily refined; retrieval paths that are constrained; limited perceptual access in audition, with virtually none in vision. On the other hand, some properties of “exograms” include: external memory record; virtually unlimited media; unconstrained and reformattable; the possibility of permanence; virtually unlimited; unlimited iterative refinement; retrieval paths that are unconstrained; unlimited perceptual access, particularly with in vision, with spatial structure serving as useful.⁶²

⁶¹ Menary goes on to distinguish four different kinds of classes of bodily manipulation of the environment that “mediate” it. 1) Biological coupling: organism-environment relations. 2) Epistemic actions: directly manipulating the environment to make the completion of a cognitive task simpler. These epistemic actions manipulate an environment in order to reposition its informational state and result in a better state for problem solving or task planning. 3) Self-correcting actions: the use of language and syntactical props (gestures and other information-bearing elements) to direct and structure practical actions in completing tasks. Unlike epistemic actions, for Menary self-correcting actions do not involve a direct physical manipulation of the environment (this is a rather crude understanding of environment, however). 4. Cognitive practices: manipulations of external representational and notational systems regulated by cognitive norms. Richard Menary, “Dimensions of Mind,” *Phenomenology and the Cognitive Sciences*, vol. 9, is. 4, p. 563.

⁶² “Exograms, however, are inherently very different from engrams. Whereas engrams are built-in devices, genetically limited to the format and capacity of the human central nervous system, exograms are virtually

Nonetheless, Sutton's emphasis on "exograms," with their unique retrieval features in comparison to episodic and procedural skills, offers little more than underscoring computational power, "rather than [focusing] on how they might truly modify and transform cognitive processes (not just 'more', but something really different)."⁶³ This is another way to articulate what Catarina Novaes terms the "old idea" of first-wave EM—i.e., that the central cognitive impact of writing concerns an increase in working memory. Both Sutton and Clark's interest in external representational systems are as they figure into serving as devices for the storage of information, or working as an external drive to consult and coordinate with.

Joscha Bach presents a related model of mentality that incorporates and projects *simulation* in his Conductor Theory of Consciousness (CCT), which sees the logic of the Modified Parity Principle replicated into all representationally-bound cognitive operations. Bach's description delineates how a computational model can account for the phenomenology and functionality of consciousness.⁶⁴ Bach's position is predicated upon how our nervous systems possess a multitude of feedback loops that respond to environmental data, such as the mechanisms of the brain stem regulating heart rate and breathing patterns. The human neocortex is described as a regulatory system that deals with needs and the encoding of sensory patterns into a hierarchical model of the environment, which also includes the inner environment.

One could say that this projection of inner environment into outer environment is a dynamic model not just of mapping from past observation to future observations but also one that progressively updates, much like Solomonoff's use of predicative Bayes. This progressively updated stateful function, as an iterative program that generates a simulation of the environment,

unlimited in both format and capacity. Engrams are impermanent, at best lasting only as long as the life of a single individual; exograms can be made permanent, outlasting individuals and, at times, entire civilizations. Unlike engrams, systems of exogram storage are infinitely expandable, lending themselves to virtually any system of access, cross-indexing, cataloging, and organization [...] Thus, a cognitive system containing exograms will have very different memory properties from a purely biological system." Merlin Donald, *Origins of the Modern Mind*, Cambridge, MA, Harvard University Press, 1991, p. 315.

⁶³ Catarina Dutilh Novaes, *Formal Languages in Logic*, p. 182.

⁶⁴ Joscha Bach, "The Cortical Conductor Theory: Towards Addressing Consciousness in AI Models" in *Biologically Inspired Cognitive Architectures*, ed. A.V. Samsonovich, BICA Society Annual Meeting, 2018.

finds the formalization of (biological) *needs* rather than *desires*. Through data compression—optimizing data structure that allows for the most accurate prediction of future observations based on past observations—Bach replicates Solomonoff's inductive modeling for a computational agent that can give their environment form by capturing apparent invariances of the world into what appears as a static model, bringing variances into elliptical stable state(s). This, in turn, affects decision by way of probabilistic projection, where cognitive prepatterned modules are externalized into conceptual evolutionary manifolds:

“[b]y varying the state, such a model cannot only capture the current state of the world, but be used to anticipate and explore possible worlds, to imagine, create and remember.”⁶⁵

According to CTC, our conceptual manifold is organized and manipulated using a grammatical language, which allows for the synchronization of concepts between speakers even when there is no shared corresponding sensory-motor script. Thus, the “shape” of the conceptual manifold is inductively processed in an act of machine translation where there is a lack of corresponding mental simulations. According to Bach's CTC program, coordinated perceptual differentiation can be supplemented with coherence and reflection such that AGI-consciousness could be potentially formulated via sensory motor scripts predicated on approximation.

With the exception of Bach, the previous elaborations and permutations of the Extended Mind thesis do not find themselves replicated qua desire vis-à-vis any AGI. That is, rather than offshore that program into a novel feedback circuit, a preprogrammed AGI will come to a halt if it is not able to execute a “desire-command.” Bach underscores how in the human brain the functionality of the cortical conductor is linked to a protocol of what is attended to, thus forging a series of links to experiences generated by other cortical instruments. In creating a scaffold of reference, this protocol partially recreates past states through mental simulations that reactively correspond the configuration of active regions with parameters from stored links. Thus, consciousness is a reactivation of past states of mental simulation that generate a re-enactment of a previous world state, i.e.,

⁶⁵ Ibid., p. 18.

a memory. The external object-environment comports directly with memory here, bypassing desire and erecting something like a simulated environ that is recollected through physiological feedback storage.

If phenomenal consciousness—by which Bach means epiphonema, the qualia of “what it is like”—can simply be understood as the most recent memory of what our prefrontal cortex attended to, then memory is a prosthesis of reference. According to CTC, these prostheses are stacked, as “attentional protocol can provide for binding of other cortical functionality into a single structure for the purpose of self-regulation,”⁶⁶ such that, through protocol-references, we can enumerate some of the functionality that corresponds to a given conscious state. Thus, for CTC, conscious experience is not an experience of being in the world, or in an inner space, but a memory—“[i]t is the reconstruction of a dream generated [in] more than fifty brain areas, reflected in the protocol of a single region,” which stores and then recreates the experiential memory of being conscious.⁶⁷

§ V

CONTINENTAL PHILOSOPHIES OF MEDIA

So far, our schematic genealogy of language and information-processing systems anticipates a formalized evolutionary theory in which the emergence of mind from nature—but also AGI’s distinctiveness—can be explained by way of inference. We will return to such questions but let us also engage with a review of the continental tradition of media-as-extension, so as to uncover its complicities. The nature of many of our questions have been directed towards inference and induction and these interests more or less escape the entirety of continental philosophy of media. Yet there may be good reason to historically review how media and cognition are consolidated in the lineage of philosophers of “technics” with particular interest in how something homologous to “meta-language,” or even a noumenal border-concept such as Hegel’s spirit—wherein difference is grounded in essence and within a genus that divides itself under essential

⁶⁶ Ibid., p. 23.

⁶⁷ Ibid., p. 22.

determinations—blossoms from Ernst Kapp through to André Leroi-Gourhan. Admittedly, some of the thinkers of continental comport have a rather crude and reductive treatment of semantics, where language in the philosophy of technics designates *how* we talk about media and their extended cognitive relationships but is not treated as a condition *for* media's have such extended cognitive relationships.

One dominant theory of technology begins with Ernst Kapp, who coined the phrase “philosophy of technology” in 1877. Kapp was a Hegelian philosopher whose work seeks to demonstrate technics as the synthesized projection of organs. In *Philosophy of Nature*, Hegel constructs concepts that define the mechanical, the chemical and the organic, demonstrating that these are instantiated in our experience of the world.⁶⁸ The acting self and absolute spirit come into synthesis for Hegel in human expressions such as but not limited to art, religion and philosophy. Via absolute spirit, the eternal idea in and of itself keeps itself concentrated and reproduced, continually regenerating itself and enjoying its eternal status. By demonstrating an inner affinity between the constructed tool and the human organ, Kapp's notion of *organprojektion* (“organ projection”) facilitates a constructive affinity that is drive-based, as artefactual technesis results in the human being's made partial, or dividuated, such that the artefact serves as a means of reproduction. Here, however, it is not language that is reproduced, but something primordial and biological—for Kapp, this is the well of cognitive activity from which language is drawn and it is made reproducible via tool-construction. With the organ now partially separable from the entirety of Being, its practicability is defined and derived through usage and growing complexity. As Jeffrey West Kirkwood and Leif Weatherby remark:

“[t]he telegraph articulates a point that the ax could not have alone: objective spirit borders on absolute spirit in the expression of the unity of idea and material, here modeled on the brain. This moment is crucial in Kapp's exposition and imparts a Hegelian core to his form of posthumanism. He [Kapp] asks rhetorically: ‘We have seen the unconscious take part in the emergence of the tool's basic forms and in their nearest modifications. Is it supposed to cease participating when we realize [*vergegenwärtigen*] that even the highest achievements [*Leistungen*] of conscious artefaction [*Artefaktion*] ultimately, in their turn, unconsciously serve the progressive

⁶⁸ G.H.W. Hegel, *Hegel's Philosophy of Nature*, trans. M.J. Petry. London, Allen & Unwin, 1970.

revelation [*Offenbarung*] of the entire human being as thought-entity [*Gedankenwesen*].”⁶⁹

For Kirkwood and Weatherby, Kapp’s “organ projection” is cognitively substantiated by the growth of networks of communication, which not only imitate the directional movements of the central nervous system but, more importantly, the function of material transmission vis-à-vis absolute spirit. Thus transpires the ontological paradox of dialectical historicity as premised on an open Whole that is irremediably ruptured by its own absolute negativity. Following Hegelian synthesis, the supposed transcendental subject is solely an autonomous agent insofar as they are suspended in the self-organizing process of *Geistig*, whereby *Dasein*, or presence, is encapsulated in the generative combinatorial processes afforded by discretized iteration and recursive activity. With Kapp’s description of artefactual processes (chiefly tool-making), recursion is a scaffolding—a memory-driven and generative cognitive process where the performance of each action is built upon the history of previous actions.⁷⁰ In turn, according to theories of artefactual extension which build upon the Idealist tradition, anatomico-endogenous processes proffer adaptively and according to a kind of transcendent causality, or in accordance to a kind of “essential will”:

“[t]he crooked finger becomes a hook, the hollow palm a bowl. In the sword, spear, oar, shovel, rake, plow, pitchfork, one can easily trace the dynamic tendencies of the arm, the hand, and the fingers and their adaptation to activities such as hunting, fishing, planting, and harvesting. As the stylus elongates the finger, so the lance elongates the arm, augmenting its action of force while at the same time, by decreasing the distance to the goal, also increasing the odds of reaching it—an advantage further compounded by the momentum of the lance in flight.”⁷¹

The concrete universal in the Kantian synthetic a priori dictates continuation and completion, as in the example of a triangle where, given two sides and an angle, one can find the third side and remaining two angles. The basis of the mediate judgment of inference is characterized in the identity pervading a manifold of differences that is instrumentalized as a scaffolding for further

⁶⁹ Ernst Kapp, *Elements of a Philosophy of Technology*, trans. L.W. Wolfe, eds., J.W. Kirkwood and L. Weatherby, Minneapolis, University of Minnesota Press, 2018, p. xxviii.

⁷⁰ Reza Negarestani, *Intelligence and Spirit*, Falmouth, Urbanomic, 2019, pp. 321-322.

⁷¹ Ernst Kapp, *Elements of a Philosophy of Technology*, p. 38.

inference. This is exactly what is repeated with the construction of instruments for Kapp, where mediate judgments express a dimension along which universals exert authority over those particulars upon which they are applied. The specific tool-concept characterizes and negotiates authority over the crooked finger, style, lance and so on.

In Eduard von Hartmann's *The Philosophy of the Unconscious* (1869), the unconscious is identified as the ideational driver for the artificial construction of a world external to the human psyche. Contra Kant's immanent import of causality, for von Hartmann sense-impressions are prefigured by some "Non-Ego independent of the Ego."⁷² Von Hartmann adopts the independence of physiological volition from Berkeley and Fichte,⁷³ and this conception of discretization figures prominently into Kapp's organic conception of technē.

Kapp's project of incipient organ-practicability and demonstrative prosthetic designation as a requisite dialectical process is continued with Arnold Gehlen. Gehlen's work on technologies and institutions as "ersatz organz" is predicated on conceptual deficiency (*Mangel*), whereby conscious artefaction compensates that which is "unfinished" or inherently "lacking" in the human, thereby allotting a predatory form of survival.⁷⁴ Here we see von Hartmann's unconscious reappear as instinct. Gehlen's description of artefaction reifies Hegelian "infinite" as abstracted representation. As a psychological phenomenon, Gehlen's artefaction consists of "handling things, *immediately* in our consciousness, and even in our outwardly directed activity and in the limbs of our body."⁷⁵ Following the Hegelian thread of the essential self-positing unity of immediacy and mediation,

⁷² Eduard von Hartmann, *The Philosophy of the Unconscious*, Abdington, Routledge, 2019, p. 290.

⁷³ "Fichte, again, after all his unsuccessful attempts to weave the Non-Ego entirely from the Ego, cannot do without an external impulse for this activity of the Ego, and this impulse stands with Fichte for the true Non-Ego. Berkeley, too, suggests a transcendent cause for every perception, referring everything, however (overleaping the world of things in themselves), without distinction, directly to the Absolute, i.e., foregoes the attempt to explain our perceptions, and every attempt to penetrate the mystery of the real connections of their special originating causes." Eduard von Hartmann, *The Philosophy of the Unconscious*, pp. 290-291.

⁷⁴ Arnold Gehlen, *Die Seele im technischen Zeitalter*, Munich, GRIN Verlag, 2007. Reza Negarestani also offers a similar description of the suspension of the ego via artefaction; in an act of dynamic translation, "the predator makes the prey a prosthesis of itself." "Unidentified Gliding Object: The Day the Earth Was Unmoored," *SUM*, vol. 11, 2019, p. 1632.

⁷⁵ G. W. F. Hegel, *The Hegel Reader*, ed. Stephen Houlgate, §65- §66, 1998, p. 166.

the immediacy of artefacts and their use-value indicates the interplay of cognitive activity embedded in them. Gehlen's artefaction involves the object-ification of "knowing," which "*inwardises, recollects* itself out of immediate being" and, "through this mediation find essence," fulfilling the Hegelian terms of "mediated knowing."⁷⁶

In opposition to Socrates, the Cynics and the Stoic philosophers, the denial of philosophy as lived biography is central to Hegel's confluence with Aristotle's conception of philosophy as λόγος (logos), or giving a rational account for the world.⁷⁷ This rejection of the immediate in favor of the mediate is also in agreement with Hegel's idea of conquering nature by way of its annihilation, yielding its transformation into the Idea in and for itself, or into the self-realization of the Absolute. Nonetheless, Hegel's rejection of immediacy does not mean that he rejects infinite—quite the opposite, as Hegel's philosophy is one of rendering infinitude mediate. Recalling his work on aesthetics and mediation, in "Philosophy of the Absolute Spirit" Hegel remarks:

"[no]w as the pulsating heart shows itself all over the surface of the human, in contrast to the animal, body, so in the same sense it is to be asserted of art that it has to convert every shape in all points of its visible surface into an eye, which is the seat of the soul and brings the spirit into appearance. — Or, as Plato cries out to the star in his familiar distich: 'When thou lookest on the stars, my star, oh! would I were the heavens and could see thee with a thousand eyes', so, conversely, art makes every one of its productions into a thousand-eyed Argus, whereby the inner soul and spirit is seen at every point. And it is not only the bodily form, the look of the eyes, the countenance and posture, but also actions and events, speech and tones of voice, and the series of their course through all conditions of appearance that art has everywhere to make into an eye, in which the free soul is revealed in its inner infinity."⁷⁸

Recall Hegel's oft-quoted apothegm, "*der Geist ist ein Knochen*," frequently translated as "*the spirit is the bone*." The bone-as-artefact demonstrates that in both his work on the Absolute Spirit and material speculative iteration, Hegel's subject

⁷⁶ G. W. F. Hegel, *Science of Logic*, trans. J.N. Findlay, Abdington, Routledge, 2015, p. 389.

⁷⁷ Whereas, for Socrates, the Stoics, Nietzsche and Foucault, philosophy is primarily concerned with the technē (τέχνη) of transforming one's bios (βίος). See: John Sellars, *The Art of Living: The Stoics on the Nature and Function of Philosophy*, Bristol, Bristol Press, 2009, pp. 2-11.

⁷⁸ G.W.F. Hegel, *The Hegel Reader*, p. 429.

is incorporated in its negativity⁷⁹—it is through the bone-as-artefact that the remainder of spirit as absolute becomes manifest.

In his work on "Animal Societies" ("Des sociétés animales"), Alfred Espinas, a positivist-turned-realist, further builds upon Kapp's underdeveloped (or "lacking") Promethean man, identifying prosthetic tool-making with restorative completion. In particular, Espinas theorizes that artefaction is related to pre-societal relationships associated with parasitism, commensalism and mutualism.⁸⁰ Espinas' conception of mutualist prosthesis is further complicated by Leroi-Gourhan, from whom Stiegler's contemporaneous use of "exosomatization" is derived. Leroi-Gourhan theorizes that, in addition to the liberation of organs, artefactual objects are the exteriorization of memory.⁸¹ The conversion of ontology through artefact is thus predicated on the conversion of the non-Ego to habit by making memory material. Consequently, a Hegelian synthesis of the mechanism of self-feeling occurs at the same time that memory becomes the mechanism of intelligence. By making memory material, Leroi-Gourhan's artefaction imputes Hegelian recollective performance—recollecting self-realization via mediated infinitude—and rationally reconstructs an implicit history of beliefs and normative attitudes.

Yuk Hui's project traces how "technology is complicit with an episteme that is fundamentally cosmological and irreducible to universal values."⁸² For Hui, originary technicity is relative to the continuity of the irreducible. In every one of these philosophers' literature on artefacts and technical instruments, we can discern the irreducible from Kant's ahistorical pure intuition of human reason (the functor of the Transcendental Decision) or the nonhistorical natural determination of being from Hegel's eternal world spirit (*Weltgeist*).⁸³

⁷⁹ Johan Vandycke, "The Spirit (Of Our Time) Is and Is Not a Bone," *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 3, nos. 2-3, 2007.

⁸⁰ Emmanuel d'Hombres, "Un organisme est une société, et réciproquement?," *Revue d'histoire des sciences*, vol. 62, no. 2, 2009, pp. 395-422 (original translation).

⁸¹ André Leroi-Gourhan, *Gesture and Speech*, trans. A.B. Berger, Cambridge, MA, MIT Press, 1993.

⁸² Yuk Hui, *Recursivity and Contingency*, New York, Rowman & Littlefield, 2019, p. 266

⁸³ "The Idea, Spirit, transcends time because it is itself the Notion of time; it is eternal, in and for itself, and it is not dragged into the time- process because it does not lose itself in one side of the process." G.W.F. Hegel, *Hegel's Philosophy of Nature: Encyclopedia of the Philosophical Sciences (1830), Part II*, ed. A.V. Miller, Oxford, Oxford University Press, 2004, § 258, p. 36. Even prior to German Idealism and subsequent Idealist

§ VI

SIMONDON & THE PREDICTIVE MIND

Gilbert Simondon remains a singular and unrelicated thinker in the continental tradition of philosophy of technology.⁸⁴ For Simondon, any media paradigm depends on the aperture of informational transmission and Simondon's interest in the egalitarian relationship between technics and man is bifurcated into a status of "majority status" and "minority status" of technical objects. The "minority status" of a technical object is first and foremost attributable to an object that carries implicit use-value and habitus, with this essentially having developed during childhood. "Minority" technical knowledge is implicit, nonreflective and habitual. Conversely, what Simondon describes as the "majority status" corresponds to an operation of reflection and self-awareness, as "the means of rational knowledge, elaborated through the sciences."⁸⁵ The question of implicit and explicit, the dialectical relation of exterior artefacts and the interior cultivated knowledge of utilizing them, is central to Simondon. Furthermore, Simondon notes that:

"[t]he representation of the craftsman is drowned in concreteness, engaged in material manipulation and sensible existence; it is dominated by its object; the representation of the engineer is one of domination; it turns the object into a bundle

philosophy, the irreducible has, historically, been a philosophical arche-artefact of deductive cognition. Recall that, in the *Meno*, Socrates insists that one can know nothing of virtue intrinsically and that, rather, it is through dialogue and interrogation, or sociability and deduction, that the nature of virtue can reveal itself. Consequently, Socrates calls upon an uneducated slave from Meno's retinue, querying whether this boy knows how to calculate the double of the area of a square. As he draws a square in the sand, followed by diagonal lines, Socrates claims that the slave boy "spontaneously" recovers the solution to this problem. Exteriorizing the calculation, technesis involves the synthesis of the hypomnesic inscription within the inorganic domain (the sand).

⁸⁴ Although Simondon engages with vitalism to some extent, recalling Bergson when he speaks of "potential energy" and "actual energy" (for instance, in his detailed study of transducers), this strategic implementation is more so in order to describe how there is homeostatic modulation in energy transference with such machines (e.g., Ashby's homeostat). There is no reason we can not do away with Bergson's vitalism and codify coherent work in order to retain Simondon's description of thermodynamic or homeostatic machines' moving from one state of constrained equilibrium to another via external manipulations. Although he does not rely upon it, Simondon does repeat Kapp's gesture when he states that "for the tool is an extension of the organ, and it is carried by gesture." Gilbert Simondon, *On The Mode of Existence of Technical Objects*, Minneapolis, University of Minnesota Press, 2017, p. 130.

⁸⁵ *Ibid.*, p. 104.

of measured relations, a product, a set of characteristics.”⁸⁶

Recall how, for Descartes, physical *representeds* were only known as mediated by our mental *representings* of them; as a consequence, *representings* were presented immediately to consciousness, yielding a kind of direct, incorrigible knowledge by acquaintance about one’s mental states. For Simondon, there is something akin to a technical subconsciousness that cannot be verbalized in clear terms via reflective activity but is intuited; this does not, however, amount to language’s being secondary to this reflective activity or as being constituted by it.⁸⁷

Refocusing upon the providence of intention thus redirects considerations regarding media to the mind and the constitutive rapport of participation, i.e., a transmission of information. As Simondon notes, by considering any media element as a directive of participatory reference—from ideal numbers to thermodynamic machines—fundamental structures can define being independently of any “sensible given.”⁸⁸ Correlatively, as with Plato’s teachings on the ideal numbers in mathematics or, much later, with conditional necessitarianism bolstering the ideal fixture of scientific rationality, the “human individual seeks to be immortalized in the sensible, i.e. in becoming.”⁸⁹ The continental tradition in general reiterates that technical objects not only instantiate a static history but a “becoming.”

Distinguishing a theory of machines that are not based on positive or negative feedback vis-à-vis registration, as with first order cybernetics, Simondon (often writing in response to an implicitly present Norbert Wiener) is explicitly concerned with demarcating a different category of machines—in particular, a machine that can exist without contributing a relation between the chain of

⁸⁶ Ibid., p.105.

⁸⁷ Accordingly, this technical subconsciousness “cannot be verbalized in clear terms by reflective activity, in farmers or shepherds, capable of directly grasping the value of seeds, the exposure of a plot, the best place to plant a tree or to set up a pasture so that it is sheltered and well positioned. These men are experts in the etymological sense of the term: they take part in the living nature of the thing they know, and their knowing is a one of profound, direct participation that necessitates an original symbiosis, including a kind of fraternity with a valued and qualified aspect of the world. Man here behaves like an animal who smells water or salt from a distance, who immediately knows where to choose the place for a nest without prior reasoning.” Gilbert Simondon, *On The Mode of Existence of Technical Objects*, p. 107.

⁸⁸ Gilbert Simondon, “History of the Notion of the Individual” in *Individuation: Volume II*, p. 487.

⁸⁹ Ibid., p. 460.

causality *conveying the action* and the chain of causality *conveying the information*. For Simondon, “there are machines that are not automatons or that at the very least do not convey automatisms except through secondary or temporary and occasional functions (for example, those that guarantee security, servomechanism, or remote control).”⁹⁰

This question of relational interiority and exteriority is complexified by the distinction between first-order and second-order cybernetics, however. In 1948, Wiener noted that “the social system is an organization like the individual, that it is bound together by a system of communication.”⁹¹ Simondon’s critique is that, in collapsing the social system with the individual, Wiener bolsters an energestic theory of form-taking, which prevents any veritable formulation of prediction. Wiener’s cybernetics, for Simondon, makes it very difficult to introduce probabilistic theories into the social domain, “since the more the samplings are broadened, the more heterogeneous they are.”⁹² Wiener’s non-probabilistic method does not grant any privilege to stable configurations. Unlike Wiener, Simondon’s concern is with how and why groups change in accordance with the conditions of metastability.

However, this same critique could not be effectively levied against second-order cybernetics. Applying W. Ross Ashby and Heinz von Foerster’s cybernetic constructivism to observing systems, “second order cybernetics” prompted a radical turn by introducing the endo-model: every cybernetic system was understood as a cognitive system modelled along adequation and relative to the unstable position of an observer.⁹³ This presciently foretold how predictive processing would eventually frame the architecture of synthetic intelligence as an architecture of motivated cognition as well, with intelligence understood as the homeomorphic tracking of the world vis-à-vis bottom-up probabilistic patterns.

⁹⁰ Gilbert Simondon, “Individuation and Invention” in *Individuation in Light of Notions of Form and Information: Volume II: Supplemental Texts*, trans. T. Adkins, Minneapolis, University of Minnesota Press, 2020, p. 427.

⁹¹ Norbert Wiener, *Cybernetics, or Control and Communication in the Animal and the Machine*, Cambridge, MA, MIT Press, 1961, p. 24.

⁹² Gilbert Simondon, “Form, Information, and Potentials,” in *Individuation: Volume II*, p. 695.

⁹³ First order cybernetics was based on flack and recursion, where second cybernetics emphasized the “recursion of recursion” (or “the observing of observing”). Heinz von Foerster, *Understanding Understanding: Essays on Cybernetics and Cognition*, New York, Springer, 2003.

As second order cybernetics dealt with the “recursion of recursion” and the “observing of observing,” it presaged today’s algorithmic modes of predictive patterning and, more specifically, *predictive coding*, which is “one specific implementation of predictive processing that rests on algorithms developed in the setting for data compression.”⁹⁴ Here, compression is a form of discretization by way of implemented measurement, a byproduct of the cognitive mind’s visuality and apperceptive ordering. Recalling Giuseppe Longo’s position on complexity, we are reminded that, despite the networks of artificial neurons of “the new AI” (e.g., machine learning and neural nets) are based on continuous variations of connectivity, they are conditioned by physical measurement and modeling, “which is always an interval, always approximate.”⁹⁵

Second-order cybernetics’ generative predictive coding model accounts for the interoceptive contribution of the body and environment in ecologically structuring sensorimotor interactions. This program is akin to Simondon’s description of “ground” and “form” as an inventive process, wherein “the relation of the ground and the form is inalienable” and “the perception of the individual totally integrated into the community is to some extent an abstract simulated perception; instead of extracting the object from the world, it [perception] cuts up the world according to categories that correspond to the classifications of the community, and it establishes bonds of affective participation between beings according to these communal categories.”⁹⁶ Second order cybernetics also recalls the Helmholtzian principle of “perception-as-interference.” Hermann von Helmholtz insisted that perception involved a form of unconscious logical inference, preparing the foundations for the mind to be conceived of as information-processing device that is engaged in differentiation.⁹⁷ According to knowledge-based apperception, stimulus (or that which Simondon terms “prior virtualities”) has to be translated into an internal representation (the “information” of the “associated milieu”) and, consequently, this representation

⁹⁴ Anil K. Seth, “The Cybernetic Bayesian Brain: From Interoceptive Inference to Sensorimotor Contingencies” in *Open MIND*, ed. Metzinger, 2015, p. 2.

⁹⁵ Giuseppe Longo, “Letter to Turing,” *Theory, Culture and Society*, vol. 36, no. 6, 2018, p. 80.

⁹⁶ Gilbert Simondon, “Individuation and Invention” in *Individuation: Volume II*, p. 430.

⁹⁷ Peter Norvig and Stuart J. Russell, *Artificial Intelligence*, p. 12.

is manipulated by cognitive processes to derive new internal representations (“determination”).⁹⁸ Thereafter, these internal representations are “retranslated back into action,”⁹⁹ or, in Simondon’s parlance, “the actual.”¹⁰⁰ According to Kenneth Craik, having created a “small-scale model’ of external reality,”¹⁰¹ cognitive organisms proffer the necessary capacity of apperception, utilizing past knowledge and, thereby, process an internal visualization of “relation-structure.” Continuing Craik’s work, experimental psychologist Donald Broadbent modelled apperception as information processing, conceiving of differentiation vis-à-vis the selective attention and filtering of perception.¹⁰²

As Ashby once noted “[t]he whole function of the brain can be summed up in: error correction,”¹⁰³ paving the way for an action-oriented neuroeconomic model of predictive processing (PP).¹⁰⁴ In PP, the passage from sensory percepts to modelling concepts is elaborated in terms of an inverse correlation between model detail and predictive horizons. The transition from variance to invariance is motivated by a probabilistic engine that adjusts at different spatio-temporal scales. In turn, if percepts are distinguished by a short-term horizon of prediction with rich detail, then concepts are characterized by coarse detailed and longer-term prediction horizons. With its revere-engineering picture of mind, PP describes how a cognitive system progressively comes to track objective causal structure. While PP allots that we do not have access to the distal causes of sensory signals, it binds intuitions and concepts through schematic rules and, therein, isolates the most general dynamics which make cognition possible.¹⁰⁵

⁹⁸ Gilbert Simondon, *On The Mode of Existence of Technical Objects*, p. 61.

⁹⁹ Peter Norvig et al., *Artificial Intelligence*, p. 12.

¹⁰⁰ Gilbert Simondon, *On The Mode of Existence of Technical Objects*, p. 61.

¹⁰¹ K.J.W. Craik, *The Nature of Explanation*, Cambridge, UK, Cambridge University Press, 1967, p. 61.

¹⁰² Donald Broadbent, *Perception and communication*, Oxford, Pergamon Press, 1958, p. 31.

¹⁰³ W. Ross Ashby quoted in Andy Clark, “Whatever next? Predictive brains, situated agents, and the future of cognitive science,” *Behavior and Brain Sciences*, vol. 36, no. 3, pp. 181-204.

¹⁰⁴ In order to avoid confusion we have chosen to designate PP for Predictive Processing rather than the Parity Principle.

¹⁰⁵ Kant adopted a top-down analytical approach as his central guiding principle in the transcendental method of argument, which justifies the existence of a concept or claim by demonstrating that it is a necessary condition for the possibility of some other fact of experience. Thus, those such as Link R. Swanson have made a strong case for the relation between PP and Kant. As Kant says in his 1783 *Prolegomena to Any Future Metaphysics*: “[w]e will start from the position that [...] cognition is actual; but we must nonetheless

PP sees the realization of Simondon's dream, where the function of predictions is to extract useable models of regularities for the effective guidance of behaviour. The further up a level is, the more that level deals with modelling long-term regularities or tracking perceptual invariants (e.g., making plans or remembering past sequences of events). Levels at the bottom of the hierarchy are, instead, involved in predicting short-term events or keeping track of a presently occurring process. This, in turn, relates to the distinction of percepts from concepts:

“[i]t seems the difference between percepts and concepts comes out in terms of a gradual movement from variance to invariance, via spatiotemporal scales of causal regularities. There is thus no categorical difference between them: percepts are maintained in detail-rich internal models with a short prediction horizon and concepts in more detail-poor models with longer prediction horizons [...] Percepts are thus basically shorter-term expectations and concepts longer-term expectations”¹⁰⁶

Similarly, Simondon's interest in minimizing free energy in regards to how organisms act to maintain themselves presaged Jakob Hohwy's contemporaneous work on predictive coding and processing, minimized prediction error, the selective sampling of sensory data, expected prediction and minimal complexity in internal models that map on to perception, action, attention and modelling.¹⁰⁷ Building on Predictive Processing, Hohwy's project identifies all organisms as free energy minimizers, which entails that we see them as engaging in Bayesian inference. The implication for perception therefore emerges as a consequence of

next investigate the ground of this possibility, and ask: how this cognition is possible.” Immanuel Kant, *Prolegomena to Any Future Metaphysics: That Will Be Able to Come Forward as Science*. ed Gary Hatfield, Cambridge, Cambridge University Press, 2004. Because of the Kantian application of this “top-down” style of analysis to the study of cognition and perception, Link supports the argument that PP has Kantian roots in Kantian, since some of the strongest advocates of the top-down analytical approach in cognitive science are those working on PP theories. Link R. Swanson, “The Predictive Processing Paradigm Has Roots in Kant,” *Front. Syst. Neurosci*, vol. 10: 79, 2016, pp. 1-13.

¹⁰⁶ Jakob Hohwy, *The Predictive Mind*, New York, Oxford University Press, 2013.

¹⁰⁷ Jakob Hohwy, “The neural organ explains the mind” in *Open Mind*, vol. 19, eds. T. Metzinger and J. Windt, Frankfurt am Main, Germany, 2015.

a more fundamental imperative that is concerned with *organizational homeostasis*, rather than a process of simply engaging in internal world-model construction.¹⁰⁸

In addition to the Kantian-Helmholtzian picture of reverse-engineering, PP accounts for the abilities that condition representation as evolutionary acquired and empirically trained. In turn, PP places an emphasis on empirical Bayes, or learned priors. Is language subsumed within this picture language? Despite it remains tethered to assessments of representational correctness or error, these empirical Bayes *are not* propositional or truth-functional states. Therefore, they do not pertain to the normativity and epistemic statuses instituted socially within a public language of asking and giving reasons.

§ VII

ONTOLOGICAL REDUCTION IN DERRIDA & STIEGLER: A CRITIQUE

For Simondon, signification, or any operative in practice, is *transindividual*, meaning that it holds an antecedent and immanent status across a wide contributory hermeneutic platform of language-users. Accordingly, this is why, for Simondon:

“it is absolutely insufficient to say that language is what allows man to access significations; if there were no significations to sustain language, there would be no language; language is not what creates signification; it is merely what conveys between subjects an information, which, in order to become significative, must encounter this ἄπειρον [*ápeiron*] associated with the definite individuality in the subject; language is the instrument of expression, the conveyance of information, but it does not create significations. Signification is a rapport of beings, not a pure expression; signification is relational, collective, transindividual, and it cannot be provided by the encounter of expression and the subject. We can say what information is based on signification, but we cannot say what signification is based on information. There are innate psychosomatic structures and dynamisms

¹⁰⁸ Anil K. Seth, “The cybernetic Bayesian brain: from interoceptive inference to sensorimotor contingencies” in *Open MIND* (MIND Group), eds. T.K Metzinger and J. Windt, pp. 1-24.

that constitute.”¹⁰⁹

For Simondon, language is instrumental, although the metalanguage, or “pure language” that is behind any implemented language, is not available to instrumentation. Nonetheless, linguistic expressions—the conveyance of information (i.e., inscriptions, texts, and so on)—are understood to be relational, collective and transindividual insofar as they provide for encounters of expression and the subject. We can say *what* information is based on by way of signification, but we cannot say what signification is based on by way of information. Signification is accounted for through a system of implementation. Signification is constituted at least in part by the logical grammar that is in tandem with certain syntactical rules of normative rank and is susceptible to commitment updating and epistemic change, or a logic of analogical reasoning. That is, language-as-extensional media maps a formal description of the systems' causal organization which speaks to structural alignment.¹¹⁰

For many of the aforementioned continental thinkers, explicitly Derrida, language is treated as a vessel for desire and a plurality of senses, operationally sewn and directed. This is why Derrida remarks that:

“[I]language is a structure—a system of oppositions of places and values and an oriented structure. Let us rather say, only half in jest, that its orientation is a disorientation. One will be able to call it a polarization. Orientation gives direction to movement by relating it to its origin as to its dawning. And it is starting from the light of origin that one thinks of the West, the end and the fall, cadence or check, death or night. According to Rousseau, who appropriates here a most banal opposition from the seventeenth century, language turns, so to speak, as the earth turns. Here neither the orient nor the occident is privileged. The references are to the extremities of the axis around which the globe turns (*polos, polein*)...”¹¹¹

According to Derrida, language lacks any formal constitution in and of itself. How, then, does its capacity for truth-bearing contextual dependency, i.e., belief-commitment, find itself linguistically structured? For Derrida, there is no suture,

¹⁰⁹ Gilbert Simondon, “Collective Individuation and the Foundations of the Transindividual” in *Individuation in Light of Notions of Form and Information*, trans. T. Adkins, Minneapolis, University of Minnesota Press, 2020, p. 345.

¹¹⁰ Robert Stalnaker, “The Problem of Deduction” in *Reasoning: Studies of Human Inference and Its Foundations*, eds. J.E. Adler and L.J. Rips, Cambridge, UK, Cambridge University Press, 2008.

¹¹¹ Jacques Derrida, *Of Grammatology*, trans. G.C. Spivak, Baltimore, Johns Hopkins Press, 1998, p. 216.

no smuggled signifier which becomes displaced within its chain of metonymic substitutions. Derrida's self-referential language lacks a theory of detachment and, accordingly, one cannot exit the terrain of metaphysics.

However, this by no means entails that we have to refute logocentrism. On the contrary, in unison with Brandom, we gladly note that "[w]e philosophers should be proud to acknowledge and affirm our logocentrism, but should also justify it by an account of the relations between meaning and use, conceptual content and discursive practice."¹¹²

Accordingly, scientific understanding is rational not because of its infallible foundation but because it is a self-correcting enterprise that "can put any claim in jeopardy, though not all at once."¹¹³ Accordingly, empirical knowledge, like its sophisticated extension—science—is rational. In turn, no concept is intelligible independent of others—no claim is immune to epistemic challenge—and scientific theorization unfolds historically via paradigm shifts that render variegated unique frameworks incommensurable. Contra Derrida, however, this does not entail that the conceptualization or theorization of formal language infrastructure is an irrational processes without a direction. Catarina Novaes refers to a processes of "de-semantification" and "re-semantification," which illuminate how formal languages can be detached and abstracted from any particular content in order to be applied to different contexts. The de-semantifying ability of formal languages is tantamount to the explicit re-enactment of mind outside of any particular individual experience or contextual meaning—formal language as the prosthesis of extended cognition and epistemic enablement.¹¹⁴

When language is understood as formally structured, and computable, it can be hierarchized (e.g., Chomsky's syntax arrangement's hierarchy: recursively enumerable, context-sensitive, context-free and regular).¹¹⁵ Like Chomsky, Novaes argues for a conception of "the formal" as that which is prone to de-

¹¹² Robert Brandom, *Between Saying and Doing: Towards an Analytic Pragmatism*, Oxford, Oxford University Press, 2010, p. 43.

¹¹³ Wilfrid Sellars, *Empiricism and the philosophy of mind*, ed. R. Rorty, Harvard, MA, Harvard University Press, p. 250.

¹¹⁴ Reza Negarestani, *Intelligence and Spirit*, pp. 321-322.

¹¹⁵ Noam Chomsky, *Aspects of the Theory of Syntax*, Cambridge, MA, MIT Press, 1965.

semantification and computability (although she argues that these must be kept apart). More broadly, Novaes identifies three variations of the formal that correspond to abstraction from subject-matter and content—the formal as: i) topic-neutrality; ii) abstraction from intentional content; iii) de-semantification. De-semantification, in treating symbols with a purely formal character (i.e., as having no meaning at all and non-symbolic, much like Meillassoux's kenotype)¹¹⁶ corresponds to “the familiar idea that the abstraction in question concerns abstraction from all meaning whatsoever, i.e., that it amounts to what we could refer to as a process *de-semantification* of some portions of (written) language.”¹¹⁷ In this sense, to be “purely formal” amounts to rendering symbols as blueprints or inscriptions that have no meaning at all. This is not the self-referential scaffold of Derrida, however, nor the Aristotelian abstraction of form from matter. Novaes’ notion of formality corresponds to *ignoring* specifically the meaning or content of signs so as to render a universal language of computability, a Carnapian transformation of pure mathematical objects where symbols are no longer “signs,” properly speaking. In turn, derivation is formulated within a constitutional system with a set of transformation rules so as to define relationships *between* axioms. As is the case with science and the media objects with which we shape and record science’s purposive progress, this allows for the expansion of objectivity.

For Derrida, words only refer to other words—an infinite regress—yet they do not form such a closed system that allows for a tractable model of objectivity. Since, for Derrida, language emerges from “nonlanguage,” it is always the artefact that comes first. Accordingly, caves paintings and inscriptions pre-date the possibility for formal linguistic identity.

Reconstituting the Freudian death-drive as the Derridean archive-drive,

¹¹⁶ The kenotype is posed against the semantic correlations in languages that pertain to the domain of sense (qualitative specificity) and, therefore, the subject’s experiential world. Thus, “the kenotype would be nothing other than the concept of a sign considered as a mark, as a material and individual thing pending its designation [...] The kenotype would then be nothing more than a concept: the concept of ‘a’ that is instantiated by this or that material a.” Quentin Meillassoux, “Iteration, Reiteration, Repetition: A Speculative Analysis of the Sign Devoid of Meaning,” trans. R. Mackay and M. Gansen, in *Genealogies of Speculation: Materialism and Subjectivity Since Structuralism*, Bloomsbury, London, 2016, p. 167.

¹¹⁷ Catarina Novaes, *Formal Languages in Logic*, p. 13.

Stiegler similarly negotiates metaphysics from within, producing a quasi-materialist ontology that positively addresses the Hegelian Objective Spirit as the inscription of object-ified knowledge, according to which “objectified knowledge is the consequence of the epiphylogenetic formation that arose in life with the practical activity of human beings.”¹¹⁸ Stiegler’s explanatory ontologization of grammatization is akin to a half-formed functionalism that engages solely on the level of empirical content—it characterizes a system as functional in nature by treating its function in terms of stimulus-response dispositions. Stiegler does not differentiate conceptual activity from non-conceptual activity. For the early Hegelian theorists of externalization/projection, the *Dasein* of *Geist* supervened upon ontogenesis but, for Stiegler, there is no differential identity of acquisition. This is why, for Stiegler, metalanguage is not foundational for spoken language but simply a technic once it is externalized. Consider the following remarks:

“Today, Chomsky [...] distinguishes innate language, which he also calls private language, or I-language (for ‘internalized language’), from cultural languages, E-language (for ‘externalized language’). This kind of notion is what leads Jerry Fodor to refer to what he calls ‘mentalese’. And it is a catastrophe [...] I myself consider that language, just like writing, involves a recoding of prelinguistic cerebral functions (communicational and cognitive—for example, categorization functions), but that language nevertheless did not exist prior to this recoding. As for ‘private language’, it is an internalization by psychic individuation along a circuit of transindividuation that is originally social [...] The writing of which Wolf speaks is a more advanced form of that placing into exteriority that lies at the origin of language—an advanced form that changes language itself. But this is possible only because language is an originally social system founded on the artificial organ that the ‘word’ already is.”¹¹⁹

Stiegler thinks that the distinction between private and external language is “catastrophic” because sociality precedes any idea of internalization. Yet, mentalese, or the language of thought, is never independent from socialization in its acquisition. It merely is not externalized (or, to recall Leroi-Gourhan, who Stiegler liberally quotes, “exosomatized”). Stiegler conflates the conditions for genesis of language with the conditions of its reproduction, as if Fodor thought

¹¹⁸ Bernard Stiegler, *The Nanjing Lectures: 2016 – 2019*, London, Open Humanities Press, 2020, p. 270.

¹¹⁹ Bernard Stiegler, *The Nanjing Lectures*, p. 218.

that one could learn mentalese in a vacuum. Stiegler is apparently taking issue with the fact that mentalese expressions are analogs of sentences and the syntax of spoken languages, claiming that Fodor takes what is a social artefact as a natural kind (i.e., the word). For Fodor, however, thought precedes spoken language and is not prior to thought. Thought is more primitive than discursive cognition and has a syntactical structure which mirrors some formal languages and much of natural languages.¹²⁰ Stiegler, however, subordinates psychic individuation to techno-social individuation, and, therefore, "secondary retentions" (memory) to "tertiary retentions" (artefacts). In turn, Stiegler unwittingly ignores the discursive experience of giving and asking for reasons in language games.

An inferentialist treatment of mediation requires adjustments and, in turn, sees judgments as mediate. This political process of adjusting one's dispositions in order to configure and state immediate and mediate judgements in response to the conflicts that transpire from exercising them is the what Hegel designates as "experience." "Experience," however, is not just on the level of reception, as Stiegler describes, but drives the development of concepts, because it is the process of determining their content. By *applying* conceptual norms we are also simultaneously engaged in the process of instituting them, wittingly or not. The conceptual content in question is determinate because they are inferentially determined, i.e., entangled in the negotiation between that which is authoritatively acknowledged and the process of administering at times opposed authorities of particulars and universals when in disagreement.¹²¹

Consider the following scenario, plucked from Brandom. In Brandom's terms, what distinguishes the non-conceptual activity of a parrot that squawks "the rose is red!" from the conceptual activity of a human who says "the rose is red!" is that parrots do not have or understand the concept of "red" (or "redness"), as parrots cannot exchange commitments to "redness." Nonetheless, both humans and parrots *can* share reliable differential responsive dispositions, or response-selectivity, but only meta-language bearers can commit themselves to and can be

¹²⁰ Jerry A. Fodor, *LOT 2: The Language of Thought Revisited*, Oxford, Oxford University Press, 2008.

¹²¹ Robert Brandom, *Recollections of Idealism*, trans. F. Hamann and A. Shoichet, Berlin, Suhrkamp Verlag, 2015, p. 284.

held accountable for what they express as having a reliably biased differential disposition towards objects and their properties.¹²² Traditionally, non- or pre-linguistic animals and machines are understood to not deploy concepts or acquire beliefs, but are attributed informational states that functionally resemble the conspecifics of sapience.¹²³ For Brandom, just as for Fodor, thought precedes spoken language and is more primitive than discursive cognition because it has a syntactical structure that mirrors the structure of natural languages and some formal languages (e.g., computational programming languages).

The normative description of mind allows cognition to be subject to an evaluation of success or failure within a socialized system, such that the potential for *malfunction*, *misperception*, or *error* is determined along a physical, phenomenological, discursive or social gradient. Such functional descriptions thus describe non-cognitive systems as behaving in a purpose-oriented manner, making use of intentional and teleological vocabulary while attributing sapience with extra-representational content. For Stiegler, however, the language of thought is treated as dependent upon socialization in its acquisition.¹²⁴ Stiegler—unlike Simondon¹²⁵—designates the even the purest *a priori* and all necessary knowledge we may hold in our mind's eye as emerging from the depths of organic-technological encounters.

We ought to also note, in the spirit of the scientific image and our rationalist ethos, that Derrida and Stiegler's program has now been unobjectionably evidenced as incorrect, in part due to Scott H. Frey's research with functional magnetic resonance imaging and retrieved stored praxis representations in minimally informative stimuli response to randomly ordered verbs denoting

¹²² Particularly as responsiveness relates to objects' properties via *sensa/qualia/epiphenomena*.

¹²³ Brandom, *Making It Explicit*, pp. 889-900.

¹²⁴ This is evident when Stiegler remarks that: "it is because the word is already an artificial organ that the written word can come to replace the spoken word (this is what underlies Derrida's reasoning in 1967 in *Of Grammatology*). Speakers internalize words and individuate themselves by exteriorizing this internationalization in what one calls expression, and thereby contribute to the formation of circuits of transindividuation. The study of such circuits falls within general organology, and what Vygotsky called the instrumental method, which studies instrumental acts, which in turn rest on what we call tertiary retention." Bernard Stiegler, *The Nanjing Lectures*, 31.

¹²⁵ Despite Stiegler is often grouped most closely with Simondon, I thus claim that he is much more akin to Derrida.

familiar tool-use actions or communicative gestures.¹²⁶ Frey's work provides neurological evidence consistent with hypothesized links between the origins of tool use and language, including the suggestion that tool use may have played a causal role in the evolution of gestural communication, but did not bring it forth.

§ VIII

CONCLUSION: INTERACTION, DISCRETE-STATES & DIGITALITY

According to Hegel's conception of Absolute Spirit, we transcend egocentricity through the dialectic of labor that operates through tools, reaching towards world-comprehension.¹²⁷ With its interwoven Hegelian plexus, Negarestani's *Intelligence and Spirit* defends the Enlightenment notion of enabling constraint(s) and positive freedom, using the veritable scaffolding of intelligence as a practical canalization of interactive constraining and mutual limitation, rigorizing and sorting. Drawing out the terms of his computationalist functionalist program, Negarestani distinguishes two kinds of computation: i) *intrinsic-mechanical computation*, where computation is unbound from the semantics of utility; and ii) *logical-algorithmic computation*, where computation implements an algorithmic process that corresponds to goal-oriented behavior. For Negarestani:

“[i]f by computationalism, we mean a general view of computation in which computation at the level of causal mechanisms and computation at the level of logico-conceptual functions are indiscriminately joined together and there is no distinction between different classes of computational function or computational models with their appropriate criteria of applicability to algorithmic and non-algorithmic (interactive) behaviors, then nothing except a naïve bias-riddled computational culture comes out of the marriage between functionalism and computationalism.”¹²⁸

In turn, *Intelligence and Spirit* finds Negarestani negotiating Hegel with Carnap,

¹²⁶ Scott H Frey et al., “Tool use, communicative gesture and cerebral asymmetries in the modern human brain” in *Philosophical Transactions of the Royal Society*, Biological Sciences, vol. 363, pp. 1951–1957.

¹²⁷ Arran Gare, “Consciousness, Mind and Spirit,” *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 15, no. 2, 2019, p. 243.

¹²⁸ Reza Negarestani, “Revolution Backwards: Functional Realization and Computational Implementation” in *Alleys of Your Mind: Augmented Intelligence and Its Traumas*, ed. M. Pasquinelli, Lüneburg, meson press, 2015, p. 141.

as, for Negarestani, "cognition is always a recognition."¹²⁹ How does Negarestani's implicit Carnap square with Putnam's early "machine state functionalism," given Putnam's attempt to model the human mind as a probabilistic automaton with Turing machine input-output states? If Putnam's attempt was to configure a successor theoretical framework to the Kantian investigation into invariant structures of cognition, then Negarestani's project can be understood as a successor concept to the Hegelian concept of *Geist* vis-à-vis a computationalist-functional register. Nonetheless, Negarestani's Hegel is also recognizably co-opted from Brandom, as Negarestani retains the methodological demarcation between metaphysical and transcendental dimensions of subjectivity. In fact, it is via this distinction that Negarestani is able to account for the multiple-realizability of intelligence as a normative and discursive phenomenon, "through which the intentionality of the mind is understood in its social structure."¹³⁰ Like Brandom, Negarestani's constitution of concepts is mapped onto how norms are socially instated, prompting a discursive space of interactivity between multiple agents. This is, in turn, how *Geist* obtains intelligence which is deprivatized. Wielding an interactionist approach to computation, whereby intelligence's artificialization is historically implicit, Negarestani's canalization of human-level intelligence can only be re-realized within the cumulative trajectory of a multi-agent system, or a social system of discursive constraints. Similarly, the objective world, as Hegel argued, is a *recognitive* accomplishment of public structuration and, consequently, Negarestani demonstrates that the interrelational order of compositional symbols allows relations between varied patterns, or "world-picturings," to be "encoded, structured, singled out, and elaborated."¹³¹ Such symbol-to-world relations are socialized as they are pattern-governed through regularities in order-relations through language and logic. But what, exactly, is patterned for Negarestani and is it solely that which is recognizable insofar as it is discrete, or does his confidence in a Carnapian universal learning machine presume that events are explicated in terms of qualitative predicates or function-symbols without lapsing into an infinite regress?

Discretization is, of course, by no means a novel program and it has become

¹²⁹ Reza Negarestani, *Intelligence and Spirit*, p. 353; p. 421.

¹³⁰ Daniel Sacilotto, *Saving the Noumenon*, p. 139.

¹³¹ Reza Negarestani, *Intelligence and Spirit*, p. 303.

the subject of much philosophical debate in the last decade, particularly in discourses related to continuous computation. In his seminal work on "Logical Computing Machines," Turing foresaw of a "universal machine" with "unlimited time and unlimited storage capacity."¹³² Further detailing the prospects of a "digital computer," Turing wrote of "discrete state machines," or a machine that, despite its ability to move through different states continuously (re: internal inputs and signal processing), appears as if it is, behaviorally speaking, moving through a succession of disparate instants.¹³³

Interestingly, Turing creates a dialectic between the discrete state machine and continuous computation where the discrete is empirically set between perception and its elliptical object in the evolutionary configuration of natural consciousness. For Turing, "[a] digital machine must essentially deal with discrete objects, and in the case of the ACE [Automatic Computing Engine] this is made possible by the use of a clock. All other digital computing machines that I know of except for human and other brains do the same."¹³⁴ The Turing machine's "head and tape" is distinguished from the software, or the "program," as well as from the inputs involved but, despite the machinery of any organic cognitive systems is not *entirely* identical to the read-write head, "[a]ny algorithmic machine can be logically mapped into a universal Turing machine and a Turing machine program is logically isomorphic to any other model of universal computation. Thus, we consider Turing machines, parallel processors, Lambda calculi, Post machines, and many other models to all equivalently be computers."¹³⁵ The question then arises: if the justified use of expressions is what gives language the right conditions for commitment, how can these inferential relations be embedded in purely computational practices?

While systems often cannot be effectively computed on with a finite state machine (e.g., a von Neumann computer), they *can* often be efficiently approximated. Comparatively speaking, the Turing machine merely gives us a behavioral account of imitating consciousness for an unsuspecting human which,

¹³² Alan Turing, *The Essential Turing*, ed. B. Jack Copeland, Oxford, Oxford University Press, 2004, p. 413

¹³³ *Ibid.*, p. 391.

¹³⁴ *Ibid.*

¹³⁵ Eric B. Baum, *What is Thought?*, Cambridge, MA, MIT Press, 2004, p. 53.

as Searle's Chinese Room Experiment questions, apparently reduces intelligence into sequencing symbols—or syntactical language-to-world relationships—while omitting understanding.¹³⁶ But is this omission, as Negarestani comments, simply because Searle's Chinese Room is a case of syntax devoid of meaningfully conferred contentful roles, i.e., a “syntax, [which, in Searle's case, is *not*] under the right conditions”?¹³⁷

Searle's “derivation from axioms” is seemingly inattentive to the fact that formal computation programs are not merely representational structures but also engaged in representing activities. Searle's “understanding-deprived syntax” reduces the understanding of semiology to intentionality without specifying any success-conditions for this reduction. As Samson Abramsky's geometry of dynamic interaction demonstrates, semantics is not something that can be added on to symbols independently of their process-relative role, as semiology is essentially dependent upon the structure of such (interactive) processes. This is exemplified by the string sequencing produced in any typed programming language, where certain symbols (variables) are given concrete representational constraints (a certain range of specified values) by the processes that they are deployed in (the programs).¹³⁸

In agreement with Abramsky, Dina Goldin and Peter Wegner launch a similar critique that we can apply to the Chinese Room, as that Searle fits in the category of:

“intentional skeptics who believe that machines that simulate thinking cannot think,

¹³⁶ Confronting Searle's Chinese Room experiment, we ought to be wary of launching the “Brain Simulator response” of Patricia and Paul Churchland, Margaret Boden's “Robot response,” or any response that attempts to stump biological naturalism with complexity qua representational content—neurobiological causal processes are occurrent regardless of the complexity of neural states; rather, the question is relative to how representations and neural states acquire meaning and intentionality. The Turing machine is merely an abstract means of articulating what can and cannot be computed in the standard model of digital computation (which is equivalent to recursive functions and λ -calculus). Regardless of if a backpropagation-network can be simulated by a more complex program running on the digital computer system (to be precise: a system with Von Neumann architecture), Searle's “Chinese Room argument” still applies because it inherently *can* simulate such complex systems, regardless of the system's complexity. John R. Searle, “Minds, brains, and programs,” *Behavioral and Brain Sciences* vol. 3, no. 3, 1980, pp. 417-457.

¹³⁷ Reza Negarestani, *Intelligence and Spirit*, p. 338.

¹³⁸ Samson Abramsky, “Information, Processes and Games,” *Philosophy of Information*, vol. 8 (“Handbook of the Philosophy of Science”), eds. D. Gabbay and J. Woods, 2016.

because their behavior does not completely capture inner (intentional) awareness or understanding [...] Searle is an intentional skeptic who argues that passing the test intentionally did not constitute thinking because competence did not constitute inner understanding [...] Our assertion that interaction is more powerful than algorithms implies not only greater computing power but also greater thinking power of interactive machines.”¹³⁹

Accordingly, in order to properly conceive of how syntax under the right conditions amounts to contentful semantic interaction, we have to oppose interaction with algorithms, and consider how interaction provides a better model than Turing machines for object-oriented programming. The paradigm of interaction conceives of objects as interactive agents that can remember their past and provide time-varying services that are not expressible by algorithms. With Searle’s Turing machine-cum-Chinese Room and algorithms, the outputs in question are expressible by memoryless and history-independent inputs. This is not the case in interactive systems such as personal computers, airline reservation systems, and robots, which allot history-dependent services over time that can *learn from and adapt to experience*.¹⁴⁰ Contra Searle’s Chinese Room, interaction-machines transform closed to open systems and express behavior beyond that computable by algorithms.

Negarestani, clearly influenced by Goldin and Wegner’s opposition of algorithms with interaction, makes the claim that:

“[a]ny unpredictable behavior of the environment is registered as a perturbation for the system. A Turing machine shuts out the environment during the computation, and interaction is rudimentary represented through sequential algorithms. But interaction as in concurrent processes and synchronous or asynchronous actions between agents is irreducible to the sequential interaction as it is represented by distributed parallel systems. In contrast to the Church-Turing paradigm, the interactive paradigm considers computation to be the natural expression of the interaction itself. The behavior of the system evolves in response to and in interaction with the inputs from the external environment.”¹⁴¹

According to Longo, the question between hardware and software as it relates

¹³⁹ Dina Goldin and Peter Wegner, “Principles of Interactive Computation” in *Interactive Computation*, eds. D. Goldin, S.A. Smolka, P. Wegner, New York, Springer, 2007, p. 30.

¹⁴⁰ *Ibid.*, p. 42.

¹⁴¹ Reza Negarestani, “Revolution Backwards,” p. 143.

to finite vs. discrete-state computation reiterates the distinction between object language and metalanguage, “as well as Tarski’s precise partition between syntax (the stepwise computations of a formal TM) and semantics (the class of computable functions, in extenso).”¹⁴² Longo has allotted a significant amount of attention to Turing’s work on discretization and continuous computation but also lifted these categories as conceptual ideals. In his writing with Francis Bailly, for instance, Longo specifies that whereas computing is conceived of, in its ideal form, through causal discretization, physics considers material phenomena according to their continuous nature. Building from the Recursion Theory of Per Martin-Löf, Longo distinguishes the computable world as discerned by the import and the interplay of a knowing subject and the surrounding world which does not intrinsically “reveal” itself because we understand causality only by continuous interactions and/or in continuous fields.¹⁴³ For Longo, a true object-oriented interaction of contentful semantics where the computational operation is of an interactive stripe (between agents) that represent different strategies of action requires an elliptical processual framework; this entails the discrete, arithmetical thinking of the universe as an elliptic coordinate system.¹⁴⁴

Longo’s work on continuous computation further details Turing’s idea of “radically separated software,” or “the programming or re-writing rules”¹⁴⁵ where what is formally implemented is the rule of replacement. This notion of iterative computational construction reminds us of Negarestani’s conception of digitization, where digitality is a byproduct of deletion that is followed by generative supplementation.¹⁴⁶ Thus, Negarestani and Longo’s rendering of the

¹⁴² Giuseppe Longo, “The difference between Clocks and Turing Machines,” *La Nuova Critica*, no. 29, 1994, p. 214.

¹⁴³ Francis Bailly and Giuseppe Longo, *Mathematics and the Natural Sciences: The Physical Singularity of Life*, London, Imperial College Press, 2011, p. 280.

¹⁴⁴ Drawing from Jacques Hadamard and Joseph-Louis Lagrange, Mark Wilson provides for such a program: re-express our governing equations in elliptic coordinates on a target system via a modification of Euler’s method to suit altered coordinates to supply reliable results at a much larger step size. *Physics Avoidance*, Oxford, Oxford University Press, 2018, p. 111.

¹⁴⁵ Giuseppe Longo, “Quantifying the World and its Webs: Mathematical Discrete vs Continua in Knowledge Construction,” *Theory, Culture and Society* vol. 36, no. 6, 2019, p. 67.

¹⁴⁶ Negarestani recalls that the domain of the digital is that of mechanizability, realized by deletion: “discrete inputs, discrete states, and discrete outputs,” whereby “what is erased [...] has to be replaced by new supplements—every figure loses something but also is supplemented with new lines and diagrammatic

digital provides a meticulous reading of digitality as a concept. This is much more comprehensive an understanding in comparison to relegating the digital to exacting the eventual distinction upon something that was formally indistinguishable and, therein, conceiving of it as the transcendental functor of relational becoming (i.e., the digital as the exacting of a division or distinction).¹⁴⁷

If the digital in-itself is discretely composed of simple, indivisible minima insofar as it is analogously presented to observers, what of the analog, i.e., those media objects brought into relation? The analog system, in contrast, allows for infinite extractions of information (through relations, analysis and so on) and infinite extractions, as “reality in itself, though not epistemically *inaccessible*, remains an epistemically inexhaustible resource out of which knowledge is constructed.”¹⁴⁸ Here, Luciano Floridi, following Kant, takes the question concerning the ultimate digital/analogous status of reality as antinomical in nature, tracking the mutually translatable ontologies or “modes of presentation” of being. Whether in Bach's CTC memory-receipt feedback or with the embedding of index-measurements into a coordinated system, conceptual apprehension is met with the theoretical formalization of information. Accordingly, “the way a locator extracts information from raw data by modelling it is in any case relative to the dimensionality of a system’s coordinate/address system, which in cognitive systems is relative to the perceptual and cognitive capacities of the agent in question.”¹⁴⁹

In turn, “[t]he world, at least as we [...] experience it, might well be analogue, and the digital only a convenient abstraction or the result (and technical exploitation) of some physical features in our artefacts.”¹⁵⁰ The multiple tracking orders of representation in question are endowed with invariant structural properties which make up the ultimate ontological referents for scientific study. Here, in closing, we are once again brought back to metalanguage’s possible

configurations [...] the shift from the analogue to the digital should be regarded as a veritable worldmaking. In this process, continuities are deleted.” Reza Negarestani, *Intelligence and Spirit*, p. 430.

¹⁴⁷ As is Alexander Galloway’s position. *Laruelle: Against the Digital*, Minneapolis, University of Minnesota Press, 2014, p. 70.

¹⁴⁸ Luciano Floridi, *The Philosophy of Information*, Oxford, Oxford University Press, 2011, p. 331.

¹⁴⁹ Daniel Sacilotto, *Saving the Noumena*, p. 156.

¹⁵⁰ Luciano Floridi, *The Philosophy of Information*, p. 331.

world of extensional semantics. As with Novaes' model of "formal-as-desemantification," a "formal language" requires underlying rules for manipulation even when there is no interpretation at play. Despite there do exist formal languages which are meaningful and not uninterpreted languages, as in Martin-Löf's constructive type theory, "the idea of manipulating symbols as blueprints with no meaning at all by themselves is not sufficient to constitute a formal language (or a formal system/theory)."¹⁵¹ Explicit and exhaustive rules of *how* to manipulate the symbols are also required—these relations that are *made explicit* in and as laws which specify *what is necessary* and *what is possible*, i.e., induction vis-à-vis projectible predicates.¹⁵² Supplementing Brandom and Negarestani's conception of social commitment and socialized intelligence, we now point to socialization as it levels into the terrain of nonterminating behaviors and the necessity of memory-beliefs when conceiving of reliable reflective judgments through objects of mediation, whether they be tools, artefacts or machines.

¹⁵¹ Catarina Novaes, *Formal Languages in Logic*, p. 59.

¹⁵² According to Goodman "new riddle of induction" (and returning to Carnap's "simplicity"), in the definition of simple predicates there is no reference to temporality. Consider "grue," an emerald that, when first examined before t_1 (a point in the future) is green and when examined after t_1 is blue. At this point in time, we have only observed green emeralds. However, they are also "grue" because we have examined them at the point in time before t_1 . Are all emeralds "grue" (projective induction qua the unobserved) or "green" (projective induction qua the observed) then? Goodman remarks that predicates like "green" can also be defined in a way that makes explicit reference to time by introducing the predicate "bleen." An object is "bleen" if it is first examined before t_2 and is blue, or is not first examined before t_2 and is green. Goodman's remark re: valid inductive inferences are those we decide in accordance with those past regularities that we have picked out using constraints in language and, concurrently, decide upon other inductive inferences as invalid. See: Nelson Goodman, *Fact, fiction and forecast*, Cambridge, MA, Harvard University Press, 1983, pp. 74-95.