M. Beatrice Fazi. *Contingent Computation: Abstraction, Experience, and Indeterminacy in Computational Aesthetics*. Rowman & Littlefield 2018. 248 pp. $135.00 USD (Hardcover ISBN 9781786606082); $44.95 USD (Paperback ISBN 9781538147061).

'That truth, whose immediate corollary is the future eternity of the world, no rational mind can doubt,' writes Borges in 'The Library of Babel.' M. Beatrice Fazi ascribes the thinking of indeterminacy to rational thought, re-evaluating the meaning of infinity in relation to finite units of knowledge. Fazi focuses on the infinite possibility of language as a problem of computation. Central to Fazi's argument is 'abstraction as immanently constitutive of the actualization of the computational process itself' (136). The author advocates a case for aesthetics that thinks the maximally indeterminate as a real function of computation.

Can computers create? Discourse in digital humanities begins and ends with this question. For Fazi it is a false problem, for it obscures the autonomy of computational logic with subjectivist interpretations of society and language. The relationship between man and machine becomes proxy for a logic internal to computing, thereby reducing computers as tools to be inscribed by external agents in order to dominate others. This belief has been spurred by a deep rift between logic and aesthetics, which can only be addressed in terms of immanence of one to the other. Fazi aims to disabuse thought as a process of formal deduction, which in confronting its own limits affirms the potential of computers to produce something new. The author's argument relies on two critical points: first, the autonomy of reason; and second, the disruption of continuum by the machine. The question is no longer what machines *are* but rather, what they are *capable* of doing.

Fazi's chief contention lies with the virtual as a floating cloud of possibilities that resists complete actualization in decisive action, and remains continuous. Fazi discerns the continuum of thought to be transcendental, which requires the grounding of reason in social milieu. The transcendental is thereby conditioned by the empirical in the form of sensation. Phenomena remain unintelligible except as an ideality grounded by the field of perception that defines subjectivity. Deleuze's brand of 'transcendental empiricism' is responsible for initiating the so-called affective turn in philosophy, whereby thought becomes inseparable from sensation. This allows him to advance the concept of 'a' virtual life, which infiltrates at every level of experience. Fazi finds an affect theory of technology to be untenable so long as indeterminacy remains immersed within lived experience. Virtuality is remiss of contingency because it cannot conceptualize discreteness. The author embarks upon the task of 'radicalizing Deleuze' in order to wrest thought away from sensation and make it amenable to logico-deductive abstraction of computational aesthetics.

Discrete analysis is critical of infinitesimals in differential calculus that render the infinite as the extreme limit of a function. The genius of Gödel's incompleteness theorem, later the foil for Turing's incomputability hypothesis, lies in proving how abstractive reasoning cannot be contained by the finite, resulting in the impossibility of closing systems of deduction. Discretization of infinity is a metaphysical problem concerning the reality of those entities whose existence may be known but cannot be proved through the finite axiomatic means of formal abstraction. Fazi's acumen lies in demonstrating how both incompleteness and incomputability can be engaged in disbanding Platonic theories of representation that inevitably find their way into affect theories based on intelligibility foreclosed to empirical phenomena. This results in the externalized superiority of a subject that perceives beings. As a result, intelligibility controls sensibility in accordance to preformed ideas. Fazi rejects 'an aesthetics of necessity' (101) which equates the concept of truth with beauty, exemplified by universal forms of harmony, order and grace. Fazi interprets necessity as the total determination

of the real by sufficient reason. However, Deleuze mobilizes the transfinite to give an account of the elevation of the soul to a higher plane in Leibniz's theory of individuation of an organism. Following Kant's disjunctive logic, he proclaims that the grounding of being transpires in a radical question that cannot be answered except as a quandary to be solved. This produces an endless series of possible solutions, which together form the discordant synthesis of differences. It allows Deleuze to formulate a logic of paradox in contradistinction to syllogism.

The Turing machine aims to find possible solutions through finite processes of computation. Its incomputability function entails that no method can decide on the truth claim of a statement in advance of its calculation. On the one hand, it must disregard actual infinity in order for abstraction to take place. The computer is operable insofar as it 'do[es] not exceed the limits of the formal structure upon which the deductive system itself is modelled' (125). On the other hand, incomputability involves indeterminacy due to the openness of the system. Fazi emphasizes the ineluctability of the infinite as it ingresses each finite process of computation. While 'computation is *already* contingent' (129), the possibilities of abstraction cannot be given beforehand, except within the actuality of computation itself. 'In this sense, incomputability … discloses the unknown dimension' (127) of computational deduction, no longer dependent on the perennial flow of living matter, but as a rational faculty capable of grasping sensation as Idea. Fazi thereby argues that aesthetics conditions logic, and not vice versa. It is a bold claim, which affirms the potentiality of computers to create endless permutations beyond human capacity for prediction. However, whether this discourse elicits an aesthetics of the real is another issue.

Deleuze's rejection of Euclidean geometry with its categories of postulates introduces the real within the ontological. Unlike Leibniz, the discrete nature of matter is not based on actual infinity, but a real one where the total number of outcomes itself is unknown. Deleuze distinguishes the real from the end of things in ontology, which defines the actuality of each repetition as the last one, ordering the series in accordance with a principle of void. Hence, actions remain opaque to thought, the repeated word empty echolalia. Contingency only makes sense of actuality through repetition, when the selected outcome is distributed along new channels of permutation. To act is to give a concrete semblance to concepts. Actualization is a process. Deleuze refuses to regard incomputability as an end product because it is contingent. Code is yet to be written. Formalism posits the actual nonexistence of things. In this regard, Fazi is far closer to Meillassoux's negation of finitude than she realizes. However, she shies away from his notion of absolute contingency by avowing that everything is 'already coded' (34).

We are no longer confronted with the case of scientific objectivity, such as of computers, but an altogether different objective, which is neither the ideal of transcendentalism, nor the phenomena of empirical sense-data, but rather the immaterial trait of the erasure of being. This quasi-materiality is the support of distribution that divides the present moment as it engenders new combinations of spatiotemporal reality through relative determination. The open is not given within the chain of distribution as an empty space-holder conditioning successive outcomes. Rather, it is a belief in the future of a reality different from the present one. The virtual is opposed to the absolute space and time of utopia. Deleuze maintains the immanence of being to thought instead of a continuum of being. Becoming-molecular implies that distinct entities do not act independently of each other, but are entangled, opening up the linear conception of cryptography to a multi-modal, multi-dimensional and pluralistic understanding, making computation exponentially expedient. Such is the promise of quantum computing, which aims to bypass the constraint of time.

Radicalizing Deleuze requires us to deliver time from *horror in infinitum* in order to free thought for aesthetic production. The objective is to free life from the fear of death, in order to create

difference. In his disquisition on Kant, Deleuze explains that pure reason abandons speculative reason in its own interest. It may no longer seek its higher principle within itself, but in an Other, allowing the interplay of at least two entities, each intoning its difference, such that one exceeds the other. In Deleuze's theory of abstraction, the continuum generated sustains itself by partaking of a force outside life. Deleuze ascribes to it a terrible power emanating from the finitude of beings.

Fazi's ingenuity lies in enunciating an immanent concept of event based upon actuality of the finite as the irreducible foundation of reality. She subscribes to Whitehead's ontology, which is a process of actualization resulting in logicization of the abstract beyond materiality. Fazi identifies the problem of reason within analytic philosophy as emanating from Russell's paradox, which is unable to plumb the potential of a break in analysis. '[O]pen-ness should be understood as computation's aperture towards its own self-actualisation' (134). Whitehead's relational ontology allows Fazi to criticize Simondon's notion of technology as a continuous relation between finite elements operating without knowledge of external reality. Fazi appears to be echoing Badiou's contention with the virtual as a synonym for simulacra. However, Fazi deviates from Badiou in a key aspect: the real as a form of non-Euclidean space. Fazi thereby redeems Deleuze as a confabulator of reality, refuting Cantor's convergence of the series of real numbers as rational numbers, which fails to deliver a true concept of contingency. Fazi's work is germane in its relentless distillation of openness, initiating a fresh dialogue between continental and analytic traditions on reason.

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