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Jason Barker*

Schizoanalytic Cartographies: On Maps and Models of Capitalism

A tourist prepares to take a photograph of the Grand Canyon. Overwhelmed by its sheer scale, she zooms in on the sublime vista in the hope that isolating a discrete portion of it will somehow capture its holistic essence. However, in a final gesture of resignation she ushers her friend into the frame. If a photograph can't do justice to the thing itself then at least it can testify to the missing context: "this" is where we were.

Was the photographer mistaken in her reasoning? A neo-Kantian or post-modern take on the incident would surely conclude, at least according to the best linguistic models currently available, that in an age when, "Every day, we create 2.5 quintillion bytes of data—so much that 90% of the data in the world today has been created in the last two years alone,"[1] any such representation of the whole, even in part, is impossible. Acutely aware of this technology-induced shortfall, contemporary psychoanalytic and set theoretical discourses content themselves with transforming an epistemological deficit into an ontological datum. The analysand's resistance to the analyst is by no means incompatible with the truth of the symptom; nor is the mathematician any less remote from the concept of infinity by working in abstractions. On the contrary, in either case the limits of knowledge can be fixed as the property of a universe, as e.g. when the analysand works through the symptom herself rather than being treated by the analyst, or the mathematician proves that the subset of the set of reals is a neighbourhood of the set of natural numbers.

In this essay I want to move beyond the Lacano-Žižekian approach to the representation of capitalism. Alberto Toscano and Jeff Kinkle's *Cartographies of the Absolute* offers the occasion for considering precisely what's at stake when the limits and barriers of the type we associate with the social forces and relations of

[1] "Bringing big data to the enterprise," IBM website, no date. Online. https://www-01.ibm.com/software/data/bigdata/what-is-big-data.html.

*Kyung Hee University, School of Global Communication, South Korea

production are *not* given as abstract objects. There is a tendency, in the Hegelian ontology practised by Žižek, to be able to describe social relations through binary relations, so that for any ordered pair (x, y) the output y is a function of the input x where every input fed into the machine gives a corresponding output. So, for example, if "Donald Trump" is the absolute of pathological capitalism (its probability 1), and "Hilary Clinton" its reasonable argument, then the domain of Hilary Clinton inputs can nonetheless still be mapped on to the codomain of Donald Trump outputs apart from the differentiation of the antagonists themselves. The medium is certainly *not* the message here. Who is speaking, not what is being said or how it's conveyed, is decisive. In the above example it makes no difference if certain Donald Trump outputs have no corresponding inputs or "argument." In the latter case, negative access to the Absolute is miraculously transformed into the "Absolute itself as negativity," as Žižek puts it.[2] In set theory the bijective function or mapping of positive integers on to even numbers where $n \rightarrow 2n$ provides one example of the negative absolute: an infinite set of smallest cardinality $\aleph_0$.

But what happens when every input from the domain, or indeed most of them, *cannot* be mapped on to an output of its codomain? What happens when the machine, the miraculous "black box" whose inner workings remain hidden to us, confounds our expectations? Or, to adopt Toscano and Kinkle's perspective, what happens when the map hinders the mapping so that the data provided is not an index of what remains hidden, but becomes a feature of absolute dislocation and disorientation?[3] We might agree with Michael Hardt that "capitalism functions by breaking down."[4] The point, however, is how to go about reorienting ourselves in relation to it—let alone change "it"—when the breakdown scatters all the coordinates. Indeed, what if from within the radically changing world of "capitalism" there were no longer any fixed points at all?

Ray Brassier has previously highlighted Alain Badiou's practice of separating thought from calculation in order to distinguish truth procedures from ideological *doxa*. This "venerable distinction" between thought and calculation,

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2 Slavoj Žižek, *The Parallelax View*, MIT Press, MA 2006, p. 27.

3 Alberto Toscano and Jeff Kinkle, *Cartographies of the Absolute*, Zero Books, Winchester 2015, p. 4.

4 *Marx Reloaded*. Dir. Jason Barker, ZDF/Arte/Medea Film/Films Noirs, 2010.

truth and ideology, "Alan Turing subverted from inside mathematics itself" in his response to Hilbert's *Entscheidungsproblem*.[5] I shall return to Turing in due course. Badiou's demotion of calculus is arguably his most non-Marxist trait as a mathematician, given the crucial importance Marx attributed to it towards the end of his life.[6] According to Leibniz, where y is a function of x, i.e. $y = f(x)$, derivatives of the function can be derived according to the differential equation dy/dx. So, for instance, the derivative of velocity (dependent variable y) can be taken in respect of time (independent variable x) as an infinitesimal change in y governed by the ratio of the two variables; or, more precisely, as the quotient of the infinitesimal increment of y by x. Marx's objection, thoroughly materialist in motivation, was that Leibniz's formula fell down on the question of derivatives due to the "mystical" and "metaphysical" foundations of the calculus itself. According to Marx, what was missing from calculus was the dialectic, the means by which *movement* is grasped as a dynamic process of change, or as true *variables*, rather than as a ratio of disappeared quantities which Marx denoted as $dy/dx = 0/0$.[7] Marx's conviction was that both Leibniz and Newton's respective equations for differential calculus merely papered over the cracks of the long-running "crisis of infinity," underway since the Pythagorean discovery of irrational numbers, through the fallacious use of symbolic formulae and unfounded concepts, which enabled them to avoid the problem of how "infinitely small magnitudes" could ever converge on a limit (this of course being one of Zeno's four paradoxes, "Achilles and the Tortoise").[8] We need not delve here into Marx's mathematical manuscripts, as fascinating as they are in themselves and for the present discussion, since their philosophical orientation was famously

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5 Ray Brassier, "Nihil Unbound: Remarks on Subtractive Ontology and Thinking Capitalism," in ed. Peter Hallward *Think Again: Alain Badiou and the Future of Philosophy*, Continuum, London 2004, p. 55.

6 In his *Logics of Worlds* Badiou does of course go on to consider the relational differentiation or logics—the "appearing"—of multiple-beings in worlds, irrespective of any subject or of the binary choice of "infinity or nothing" that confronts and defines the latter in the process of its becoming. Cf. Alain Badiou, *Logics of Worlds, Being and Event, 2*, trans. Alberto Toscano, Continuum, London 2009, p. 195; Alain Badiou, *Being and Event*, trans. Oliver Feltham, Continuum, London 2005, p. 221.

7 See Karl Marx, "On the Differential" in *Mathematical Manuscripts*, ed. S. A. Yanovskaya, New Park, London 1983.

8 Useful points of reference here include C. Smith, "Hegel, Marx and Calculus" in Karl Marx, *Mathematical Manuscripts*; and E. T. Bell, "Chapter 13: From Intuition to Absolute Rigor" in *The Development of Mathematics*, Dover Publications, New York 1992.

set out by Engels in his *Dialectics of Nature*.[9] However, it is worth highlighting the lacklustre approach of both psychoanalytic and set theoretical discourse when it comes to the question of the "real movement which abolishes the present state of things," which needless to say is the central thesis of Marx and Engels's own "idea" of communism. Marx makes it abundantly clear in his manuscripts that mathematics is no less immune from its own history than any other product of the social forces and relations of production. Marx would certainly have balked at Badiou's conviction that mathematics is a mere condition of *philosophy,* of thinking the novelty of events, rather than a description of matter in motion ("an abstract science which is concerned with creations of thought, even though they are reflections of reality," as Engels will say[10]). Then again, it is equally no secret that on more than one occasion Marx insists a little too eagerly on the dialectical "laws" that ensure the real "movement," particularly in his famous passage from the German preface to *Capital*:

> Intrinsically, it is not a question of the higher or lower degree of development of the social antagonisms that result from the natural laws of capitalist production. It is a question of these laws themselves, of these tendencies working with iron necessity towards inevitable results. The country that is more developed industrially only shows, to the less developed, the image of its own future.[11]

Quite obviously it was statements of this kind that would lead Althusser, Badiou and Žižek away from Marx and his critique of political economy in the first place, toward a wholly other Marx, into the realm of speculative philosophy. I am certainly not in the habit of defending any scientific Marxist "orthodoxy". However, Toscano and Kinkle's work brings to mind the following observation from E. Kol'man, in his commentary on Marx's manuscripts, on the *capitalist* dynamics of scientific abstractions, which is certainly worth recalling:

9 Whether Engels was entirely correct in his unfinished elaboration of his and Marx's shared position is of course another matter entirely.

10 Friedrich Engels, "The Dialectics of Nature" in *Marx and Engels Collected Works*, *Volume 25*, Lawrence and Wishart, 2010, p. 495. Electronic edition.

11 Karl Marx, "1867 Preface to the First German Edition" in *Capital. A Critique of Political Economy*, trans. Samuel Moore, Edward Aveling and Friedrich Engels, Progress Publishers, Moscow 1887, n.pg. Online edition. https://www.marxists.org/archive/marx/works/1867-c1/p1.htm.

> The increasing difficulties offered to the mathematics of complicated forms of motion, piling up in an ascending series in leaps from mechanics to physics, from physics to chemistry, from there to biology and onwards to the social sciences, do not, in the dialectical materialist conception, entirely block its path, but allow it the prospect of even "determining the main laws of capitalist economic crisis."[12]

Capitalism's seamless continuum of vertical hierarchies of discipline and surveillance (from ground-level CCTV cameras to communications satellites in the upper reaches of the atmosphere) to horizontal hierarchies of physical and political geography (the dependent and "contingent" variables of birthplace and resource distribution, aided and abetted by all manner of in/visible barriers) sets down a challenge to dialectics: namely, to confront and re-appropriate capitalism's frictionless freewheeling transitions, to assert that the seamlessness *both is and is not real*, and that matter in motion, rather than simply being the object of measurement, is also part and parcel of the system of classification. To assume, as Kol'man does, that this type of motion is "capitalist"—or that there exist such things as "laws of capitalist economic crisis" (Kol'man is quoting Marx[13])—is of course a moot and complex point. Indeed, the ability to identity capitalism as *a system* in movement where, crucially, variables are not merely rendered as constants, and where the subjects are able to identify *themselves* as variables or as values thereof (i.e. gain consciousness) is, following Jameson, the aim of Toscano and Kinkle's stimulating work. However, let us not forget in passing, in the context of "cognitive mapping," that Jameson and other neo- and post-Marxist thinkers besides him are usually credited with having relegated the vulgar base/superstructure model (the famous "topography" dismissed by Althusser as a mere spatial "metaphor,"[14] and by Jameson as a "starting point and a problem"[15]) to the backwater of philosophical reflection. Moreover, where Marx could once write that "the material transformation of the economic conditions of production [...] can be deter-

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12 E. Kol'man, "Karl Marx and Mathematics," in Karl Marx, *Mathematical Manuscripts*, pp. 252—53.

13 See Marx's letter to Engels, 31 May 1873 in *Marx and Engels Collected Works, Volume 44, Letters 1870—73*, Lawrence and Wishart, 2010, p. 504. The translation reads "to determine mathematically the principle laws governing crises" with no mention of "capitalist".

14 Louis Althusser, "Ideology and Ideological State Apparatuses (Notes towards an Investigation)" in *On the Reproduction of Capitalism*, trans. Ben Brewster, Verso, London 2014, p. 237.

15 Fredric Jameson, "Marxism and Postmodernism" in *New Left Review* I/176, July/August 1989, p. 42.

mined with the precision of natural science,"[16] today Alain Badiou even makes the opposite claim: namely, that where "the predictions of economic 'science' are still more uncertain than those of meteorology,"[17] the state apparatus can itself count as one a totality of denumerable parts or subsets.[18] One wonders where this "utopian" impulse might leave the mapping of capitalism as such and, given the state's absolute autonomy from the material reality of the economic, what sense the "anarchy of production"[19] could continue to have, not least in the political sense Badiou clearly intends for this slogan, aside from ascribing to capitalism, as a mode of production, purely "random" social effects.

Ways of Seeing

Given capitalism's ubiquitous and ill-defined boundaries cognitive mapping is to be understood as a speculative attempt at the *visible* representation, or "picturing," of a self-referential paradox: a decision problem. Taking their cue from the preface to Fredric Jameson's *The Geopolitical Aesthetic*, Toscano and Kinkle remark that, "The phrasing is important here: [Jameson] didn't announce its existence [i.e. the aesthetic of the cognitive mapping of capitalism], detecting its presence in a corpus of works, but stressed instead the political need for its elaboration in both theory and practice." They continue:

> Works emerging under the banner of this aesthetic would enable individuals and collectivities to render their place in a capitalist world-system intelligible: "to enable a situational representation on the part of the individual subject to that vaster and properly unrepresentable totality which is the ensemble of society's structures as a whole." While such artworks and narratives would not be merely didactic or pedagogical, they would of necessity *also* be didactic or pedagogical,

16 Karl Marx, "Preface" in *A Contribution to the Critique of Political Economy* [1859], Progress Publishers, Moscow 1977, n.pg. Online edition. https://www.marxists.org/archive/marx/works/1859/critique-pol-economy/preface.htm.

17 Alain Badiou, *Ethics. An Essay on the Understanding of Evil*, trans. Peter Hallward, Verso, London 2001, p. 31.

18 See Badiou, *Being and Event*, trans. Oliver Feltham, Continuum, London 2006, pp. 105—6: "It is this one-effect that Marxism designates when it says that the State is 'the State of the ruling class.' If this formula is supposed to signify that the State is an instrument 'possessed' by the ruling class, then it is meaningless... [I]n posing that the State is that *of* the ruling class, it *indicates that the State always re-presents what has already been presented*."

19 Badiou, *Ethics*, p. 31.

> recasting what political teaching, instruction or even propaganda might mean in our historical moment.[20]

In *Malign Velocities*: *Accelerationism and Capitalism* Benjamin Noys argues that so-called "accelerationist" theory's mapping of (or modelling in the sense of *aping*) capitalism has taken a wrong turn toward "the libidinal fantasies of machinic integration."[21] Such moral judgements are of no interest to Toscano and Kinkle. For them the integration or immersion instead raises the challenge of developing new ways of seeing, new faculties of sense. Why subscribe to the fiction of (reasonable) limits? For the authors the mapping of the absolute (absolute mapping?) would be "a precondition for identifying any 'levers,' nerve-centres or weak links in the political anatomy of contemporary capitalism."[22] As well as presumably for ascertaining whether in fact the emperor is naked and the pulleys and levers that supposedly keep the system turning are simply being manipulated in order to prevent people from realising that "the system" is really nothing other than the kind of fake nerve-centre Dorothy encounters in *The Wizard of Oz*.

Marx was dedicated to retrieving the "vanishing quantities" of calculus in an attempt to conceive socioeconomic crisis as a determinate magnitude. But in what sense or to what extent, according to Toscano and Kinkle, might capitalism be a question of scale? The authors devote ample attention to the "cinematic mode of production" or to the big screen dimensions of the capitalist totality. Albeit "totalities" plural: "each epoch develops cultural forms and modes of expression that allow it, however partially and ideologically, to represent the world—to 'totalise' it."[23] The theme that stretches from Vertov's Kino Eye through to so-called post-cinematic film theory is omniscient or God's eye narration. The Soviet filmmaker for his part imagines that, by dispensing with God, he can go beyond the problem of representing the social world and its "chaotic movements" and take on the universe instead (with quantum physics): "Freed from the boundaries of time and space," Vertov declares in his famous manifesto of 1923, "I co-ordinate any and all points of the universe, wherever I want them to be. My way leads to-

[20] Toscano and Kinkle, *Cartographies of the Absolute*, pp. 7—8.

[21] Benjamin Noys, *Malign Velocities. Accelerationism & Capitalism*. Zero Books, Winchester 2013, p. 47.

[22] Toscano and Kinkle, p. 8.

[23] *Ibid*.

wards the creation of a fresh perception of the world."[24] With statements of this kind Vertov portrays himself as an experimenter in a science of cinema, or techno-science, rather than a philosophy. However, such "science" is somewhat at odds with a form of cinematic narration that aims to represent workers as more than simple cogs in a machine, the spare parts of the plan. In *The Sixth Part of the World* Vertov can succeed in freeing "you" from the boundaries of time and space (albeit not from ideological interpellation), make you inhabit two places at once, provide for the total immersion in the freedom of socialist work, all on condition of there being an external *capitalist* market, and thus another totality, to export to.[25] In passing, the idea of Kino Eye as a new and revolutionary faculty of sense-making, of "seeing" in three or four or more dimensions, from somewhere inside the blind totality of the real subsumption, remains a seductive idea, even if it carries with it the real spectre of dead labour.[26] I am thinking here of one application of Vertov's "fresh perception"; namely, the coordination of "any and all points of the universe" in the form of the geographic information systems (GISs), unlimited in their coverage, that are able to laser capture and convert large swathes of physical data into topographical models. (One such cameraless technology was used in the making of Radiohead's "House of Cards" music video[27]).

This leads to another variety of "cinema," that of economic productivity *as its own* representation, "the 'making' or 'fixing' of the economy as a fundamentally representational problem" to be solved with graphs and charts. "In this story," the authors tell us, "the eighteenth-century invention and stability of diagrams and images of the economy marks a kind of epistemic shift with significant repercussions for the very idea of representation."[28] Ian Hacking argues in a similar vein when he talks of another epistemic shift, in the nineteenth century this time, of a dual process of the rise of indeterminism in the physical sciences and the accompanying "feedback effect" in the human sciences.[29] For Hacking, if physical processes are deemed contingent and/or non-deterministic then their

24 Vertov qtd. in John Berger, *Ways of Seeing*, Penguin, London 1972, p. 17.

25 Toscano and Kinkle, pp. 91—2.

26 *Ibid*, pp. 235—36.

27 See Radiohead, "The Making of 'House of Cards' video," 2008. Online video. https://www.youtube.com/watch?v=cyQoTGdQywY.

28 Toscano and Kinkle, pp. 33—4.

29 Ian Hacking, *The Taming of Chance*. Cambridge University Press, Cambridge 1990, p. 2.

representation requires order and precision, for the sake of the higher *social* order, which in Hacking's view has been achieved through statistical analysis and population management. In Toscano and Kinkle's example, disciplinary mapping ultimately brings with it the alienation of work and employment in the abstract "science" of "economic management," enabling the experts to seek refuge in times of economic and social crisis behind the complexity of "financial instruments" that none of them can explain, not least for being linked to a financial "movement" of trades too fast for the naked eye.[30]

The unrepresentability of capitalism through indeterminism provokes the "feedback effect" whereby the subjugated populations discipline their own behaviour, or it is disciplined for them, and in so doing aggravate or increase the unrepresentability and/or indeterminism—the abstract and ideological impression that things are beyond human intervention and that "there is no alternative"—thereby exacerbating the forces of free market sovereignty and its dead labour. A methodological question emerges here regarding the presumed "unrepresentability," the negative abstractness, of the system. Is it the system or its representation that is abstract? Or, alternatively, are we dialectically bound to view any such distinction as a relatively *philosophical* abstraction that assumes the existence of what it sets out to explain, i.e. the system?

Telling Stories

I want to depart slightly from the question of the system's substantial dynamism toward that of narrative. For the methodological or strategic question of cognitive mapping would appear to hinge on the representation of a system that takes in "all" of reality, a totality which also *subsumes* physical change or the "motion and rest" that Spinoza describes on the grand scale of extended substance, as well as the representation of a substance as the universal predicate poised behind each and every thing—implying the need for a camera with a lens of such precision as to be able not only to depict the subject itself *in toto*—cloning rather than representing, perhaps—but which in so doing might actu-

30 Toscano has dealt with this question separately in "Gaming the Plumbing: High-Frequency Trading and the Spaces of Capital" in *Mute Magazine*, 16 January 2013. Online article. http://www.metamute.org/editorial/articles/gaming-plumbing-highfrequency-trading-and-spaces-capital.

ally *be* or *present* the subject. Here one recalls Borges' forged novel *On Exactitude in Science*, where Suarez Miranda recalls the wayward imaginations of the mapmakers of yore:

> … In that Empire, the Art of Cartography attained such Perfection that the map of a single Province occupied the entirety of a City, and the map of the Empire, the entirety of a Province. In time, those Unconscionable Maps no longer satisfied, and the Cartographers Guilds struck a Map of the Empire whose size was that of the Empire, and which coincided point for point with it. The following Generations, who were not so fond of the Study of Cartography as their Forebears had been, saw that that vast map was Useless, and not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters. In the Deserts of the West, still today, there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography.[31]

Borges' literary "fragment" might serve as a model for the representation of capitalism as a system that can *only* be represented in fragments; a system no less real for the fragmentation, for the detachment of a piece of the jigsaw which approximates in part to our journey to this place—though crucially an ancient relic no less rich in heritage than the history that we have. Mapmaking as making history. However, the difficulty in mobilising this formalistic approach for strategic political ends is that, in the case of Borges' cartography, the "fragments" of the map turn out to be no more fragmentary than the territory they purport to map. The scale is 1:1. Perhaps one possible means of breaking out of this formalistic tautology would be to shift the *mode* of representation from narrative to drama. Consider for instance Brecht's criticisms of Lukács' formalism and his campaign for *both* a fully immersive *and* estranging theatre which, unlike Lukács' privileging of the novel as a means of self-withdrawal (catharsis as therapy), puts the audience in direct contact with an outside world.[32] As successful as Brecht's work may be at exposing literary form and forms of aesthetic mediation we should also note the no less ideological burden of Brecht's

31 Jose Luis Borges, "On Exactitude in Science" in *Collected Ficciones*, trans. Andrew Hurley, Allen Lane, London no date, pp. 704—5. Online edition. https://posthegemony.files.wordpress.com/2013/02/borges_collected-fictions.pdf.

32 See Fredric Jameson's "Reflections in Conclusion" in *Aesthetics and Politics*, trans. Ronald Taylor, Verso, London 1977, p. 202ff.

political aesthetics, which can be summed up in a single word: *epic* theatre. In other words, instead of capturing the real movement of people and things, of what Aristotle dubs the "all in action," Brecht may be just as reliant on didactic constructions, or politics at the level of "telling stories." Nevertheless it seems to me that by attending to such narrative questions we may still be able to prize apart and expose the false choice—the *ideological* abstraction—between the system "or" its representation. The interesting question here is whether the dramatic-showing (*mimesis*) or narrative-telling (*diegesis*) mode of representation is more suited to the kind of abstraction required to represent capitalism; or whether instead, as both Aristotle and (occasionally) Plato believed, each mode is a subgenre of *mimesis* as the all-encompassing concept of representational art. This would be the occasion for considering the extent to which our current obsession with capitalism as the totality of totalities could ever amount to anything *other* than a form of story-telling.

There is also a crucial issue here to do with the difference between the ethical and representational regimes of art respectively. Namely, the fact that in Plato's narrative theory, to exceed authorial responsibility carried with it certain psychological dangers and social prohibitions, even and especially in spite of those occasions where "Socrates" appears in the dialogues as a homodiegetic narrator.[33] Here there is a nagging proximity of ethical duty in relation to aesthetic perception; the recognition of a dialectic of compound narration and narrative, where both subject and representatum are parts of the story-telling process(es), and of stories wrapped up in stories. Here the challenge of mapping might be to unravel some labyrinthine conundrum—as e.g. in *The Name of the Rose*, *The Da Vinci Code*—whereby solving the mystery or breaking the code is the condition of charting one's course, equally virtuous as social work for being able to "recollect" forgotten history and past lives. The model I am thinking of is Plato's *Meno* and the egalitarian sources of knowledge Socrates divines from the mind of the slave.[34]

[33] Stephen Halliwell's work is illuminating on such questions. See for example his "Diegesis—Mimesis" in *The Living Handbook of Narratology*, 2012, n.pg. Online edition. http://www.lhn.uni-hamburg.de/article/diegesis-%E2%80%93-mimesis.

[34] Plato, *Five Dialogues: Euthyphro, Apology, Crito, Meno, Phaedo*, 2nd ed. trans. G. M. A. Grube and John M. Cooper, Hackett, IN 2002, 80-1a-b, pp. 70-1.

Algorithmic Practice

I shall conclude by pursuing these random and somewhat schizophrenic thoughts further in a direction which I dare say Toscano and Kinkle wouldn't remotely endorse, but which nonetheless strikes me as a legitimate course following their intervention. I set out from the premise that despite being a compound narrative, a history that goes "all the way down," there are ways and means, militant practises—even if the latter form part of the algorithm—for bringing "capitalism" back up; and even if the price to be paid for such (re)modelling is the kind of abstraction that threatens the very dynamism or real movement (in spatial terms of course) that the authors are keen to recover. There is a leading role for "calculation" in such practices (in keeping with Marx's quest to recover those "vanishing quantities") or at least for separating that which it's actively possible to calculate, or implement on the basis of a principle or axiom, and that which remains "active" in the realm of thought alone. Indeed, it might be said that the work of Alan Turing offers a blueprint for the dialectical distinction between dead and living labour, given the very practical dimension of what he understood "thinking" to mean.[35] Although renowned in popular culture for his contribution to computer design, code-breaking and artificial intelligence, Turing's most significant contribution to mathematics is to be found in his 1936 paper "On Computable Numbers, with an Application to the Entscheidungsproblem."[36] For Turing, "computer" had nothing to do with the specific hardware technologies or software applications that we take for granted today, but was the name he gave the algorithmic procedure by which it's possible to compute any computable sequence of numbers rendered in binary notation. Although Turing's paper was not remotely concerned with capitalism and the universal money-form or general equivalent, one need only consider, as a measure of its "common currency," the rapid spread of binary notation and its encoding of almost anything we possess or care to imagine as a series of 0s and 1s. Admittedly technocratic capitalism's use of statistics-based algorithms to eradicate "redundancy" from the system is reductive and nefarious in respect of the social and ethnic diversity of human populations, to say nothing of our common humanity, the one we col-

35 See for example Alan Turing, "Computing Machinery and Intelligence" in *Mind* 59, no. 236, 1950.

36 Alan Turing, "On Computable Numbers, with an Application to the Entscheidungsproblem" in *The Undecidable: Basic Papers on Undecidable Propositions, Unsolvable Problems and Computable Functions*, ed. Martin Davis, Hewlett, Raven Press, New York 1965.

lectively want. However, might Turing's work be used in order to compute—and so demystify?—the tautologies, iterations and recursions of the "random" market processes—the myth of *laissez faire* capitalism—that capitalists pretend amount to a system beyond any kind of social intervention or control?

Consider Marx's 1859 preface to *A Contribution to the Critique of Political Economy* in this respect:

> No social order is ever destroyed before all the productive forces for which it is sufficient have been developed, and new superior relations of production never replace older ones before the material conditions for their existence have matured within the framework of the old society.[37]

For all the algorithmic complexity of this statement might it be modelled in some restricted sense, as a formal analogue, for instance? We can immediately identify tautologies ("No social order is ever destroyed…" = social order is a constant) and iterations (attaining "superior relations of production" depends on the failure of the loop-continuation condition of the existing "material conditions…"). Let's define recursion simply as the ability to define an infinite number using a finite argument or algorithm. Can the "social order" of which Marx speaks be interpreted on such formal criteria? For example, reverting to more familiar philosophical language, is the social order *always* sublated during the process of being destroyed, i.e. retained and carried forward in the "superior relations of production"? Is it a matter of sublation ad infinitum? If we could come up with an algorithm for determining this question, for every "input" of a given social order, then we could model capitalism in what Noys describes, in reference to Marx's famous preface, as its "Nietzschean Marxist" mode;[38] and, in so doing, model the terms of capitalism's social transition.

Now, I am not suggesting we could model capitalism, or even one of its historical modes, on arbitrary input. Turing famously demonstrates that it is impossible to devise an algorithm for predicting whether an arbitrary mathematical statement will be accepted or rejected by some computer, or by what's referred to in light

[37] Marx, "Preface" in *A Contribution to the Critique of Political Economy*, n. pg.

[38] Noys, *Malign Velocities*, p. 8.

of his work as a "Turing machine."[39] Simply put, *we cannot model (or compute) random processes*. However, we can still compute some enormously complex ones by recursive means; or, in other words, devise computer programs for the infinite decimal expansion of any rational number and certain transcendentals, such as π and *e*.

In passing, and notwithstanding the massive social and economic disinvestment surrounding the dead labour of "machine work" (deskilling as "class war" in no uncertain terms), let's make it abundantly clear that there is nothing *inherently* technocratic, capitalist or neoliberal in the social application of Turing's mathematical concept of computing or calculating. This is a crucial point. In his comments on the design of "instruction tables"—the "code" of contemporary computer programmers—Turing could even be described as a social visionary.[40] Although the question of exactly how and under what social conditions such "armies" might be mobilized for common ends was not remotely Turing's concern, ironically Fredric Jameson has recently ventured onto such terrain.[41]

How appropriate is it to think that this degree of abstraction—i.e. modelling infinite totalities with computing machines—could result in any knowledge of capitalism as such? The question is misleading in the sense that we should at least treat with scepticism the idea that some adequate representation of capitalism depends on maintaining a certain threshold beyond which it escapes our grasp (although of course the idea of there being other universes or "multivers-

[39] This is known as "the Halting problem." In summary form: Let U be a machine that can simulate any Turing machine (TM) behavior on a string of data *x* so that U halts and accepts *x* if the TM does; halts and rejects *x* if the TM does; or, loops on *x* if the TM does. Is there a way for U to decide in advance, or in other words without running what is essentially a simulation, whether and how the TM will halt for data *x*? No, not without actually running the simulation. Although, "there are certainly machines for which it is possible to determine halting by some heuristic or other: machines for which the start state is the accept state, for example." See Dexter C. Kozen, *Automata and Computability*, Springer, New York 1997, p. 230; see also pp. 231–34.

[40] Turing, "Proposed electronic calculator" [1945] in *Alan Turing's Automatic Computing Machine*, ed. B. Jack Copeland, OUP, Oxford 2005, p. 392: "This process of constructing instruction tables should be very fascinating. There need be no real danger of it ever becoming a drudge, for any processes that are quite mechanical may be turned over to the machine itself."

[41] Fredric Jameson, *An American Utopia: Dual Power and the Universal Army*, ed. Slavoj Žižek, Verso, London 2016.

es" apart from the one we inhabit is consistent with so-called digital philosophy). Toscano and Kinkle illustrate the point nicely with the short film *Powers of Ten* (1977) in which a camera ascends from ground level in God's eye perspective to a distance of 10^{24} metres before zooming back down to Earth to inspect a man's hand at 10^{-16} metres. From the quarks of a carbon atom to the outer reaches of space, the film represents "the upper and lower bounds of the then known universe."[42] Is capitalism up there or down here? Is it all any more visible on earth than in the outer, or inner, reaches of space? The authors might also have cited Tom Tykwer's short film *Der Mensch im Ding* in which the freeze-framing of an urban street scene enables the camera to navigate things without relations. "The textile industry is one of the oldest and major branches of manufacturing," the voiceover informs us, as we hover in extreme close up over the fabric of a woman's skirt, handbag and boots. "Based on Palaeolithic foot and leg skeletons we know that people wore shoes 40,000 years ago. In the Middle Ages handbags were male accoutrements."[43] The narrator then reels off a list of low-wage textile producing countries: China, India, South Korea, Taiwan. Every "thing" here is concretized labour the history of whose dead labour ordinarily remains invisible to us. But what are we seeing in extreme close up that we fail to see in everyday life? In Tykwer's film social relations boil down to forms of *matter* in the sense of the intimate "stuff" that the commodity abstracts, or subtracts from the real. Our shared social history as social fabrics: a handbag, skirt and boots, leather and cotton…

For Toscano and Kinkle the representation of capitalism and the resulting knowledge is a question of in/visibility, especially where the latter becomes a screen memory or stand in for something other. But might we pass from things to matter to real numbers without loss of resolution, given what the authors describe as capitalism's "shipwreck *of* the spectator"?[44] Would such passage affect (accelerate or decelerate, for instance) the capitalist "engine"? In his *Malign Velocities* Noys observes how "accelerationists" tend to argue that the more we abstract ourselves from the concrete social realities of capitalism, the more authentic or real our experiences of its abstract dynamics become. Noys' "machinic integration" is perhaps a misleading expression when it comes to

42 Toscano and Kinkle, p. 2.

43 *Der Mensch im Ding*. Dir. Tom Tykwer. 2008.

44 Toscano and Kinkle, p. 67.

understanding the political aesthetics of capitalism. It relies on a restricted conception of machines, computers and technology that seems dated and ill-suited to the problem of social abstraction. Recall that for Toscano and Kinkle the subject's total integration into the machine, as they find it in Vertov's cinema for example, is visually inadequate for mapping the totality:

> The visual analysis [in Vertov's *A Sixth Part of the World*] breaks up and recomposes the labour-process but removes its proper logic and complexity, together with its agency, creating a socialist abstract labour subsumed by the flow and the plan.[45]

One way to respond to the threat of machinic integration is to point out that Turing's "machine" defines an algorithmic procedure in terms of a *practical* procedure for mathematical computation. Simply put, his "computer" means "one who computes." Turing sets out to prove that a human being with pencil and paper can, under finite conditions, compute any computable sequence of numbers regardless of their assumed complexity or degree of abstraction.[46] The instructions "the computer" follows in order to compute the sequence (its behaviour) will result in an "output." Crucially there is no minimum speed and hence no acceleration conditioning this process. In the case of the human being the output will be the marks or symbols she writes down on the paper. The instructions can be converted into a description of the behaviour (its algorithm), with each unique behaviour describable by a finite "description number" (a computer program written in binary code) which can then be universally simulated or modelled by any computer. In the days of mainframe computers with limited writable memory the output would be reams of paper or card, usually with holes punched in the surface; these programs would then be fed back through any computer conversant in the same language to be simulated in turn. Today of course even local, non-writable memory vastly exceeds the stored memory capacity of the early digital computer prototypes.

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45 *Ibid*, p. 90.

46 For an accessible and sophisticated blow by blow account of Turing's "On Computable Numbers" see Charles Petzold, *The Annotated Turing: A Guided Tour through Alan Turing's Historic Paper on Computability and the Turing Machine*. Wiley, Indianapolis 2008. For an Althusserian reading of Turing see Barker, "Are We (Still) Living in a Computer Simulation? Althusser and Turing" in *Other Althussers*. Special issue of *diacritics. A Review of Contemporary Criticism*, ed. Jason Barker and G. M. Goshgarian, 43.2, 2015.

Taking inspiration from the abstract modelling of all variety of human behaviours as computable programs and their universal language, popular culture envisions our contemporary society as the Meta-Machine comprising machine parts (ours) in which, ironically, machines are also said to rule over all aspects of "our" lives. Needless to say on this basis the idea that the subject is subsumed by capitalism and its machinic processes, or is the product of them, should be treated with caution. What does "machinic integration" mean exactly? Does it refer to capitalism's sublime dominance as a social system, as in the case of the "state capitalism" of Vertov's *A Sixth Part of the World*? Or, on the contrary, might any social system (capitalism, socialism...) thereby deprived of its subjects go on functioning at all? How realistic is it to assume that a system could operate effectively without the reproduction of subjects, or without what Althusser calls the "interpellation" of individuals as subjects, i.e. without the inputting of individuals into the machine and its outputting of subjects? We might thus be inclined to turn the question of the subject completely around, wondering instead whether its elision through machinic integration might have the unexpected effect of disabling the system rather than disempowering the subject. Could there be any "social order" at all without the subject?[47]

In conclusion, having strayed off the charts mapped out so exquisitely by Toscano and Kinkle, let me suggest that the direction in which we might wish to pursue the mapping or modelling of contemporary capitalism is not so much toward the *computation* of (a singular) randomness, the one envisioned by the fanatical desire of capitalism's high frequency traders or "flash boys"[48] —"one-armed bandits" might be more apt—to colonize or "invent" the future. On the contrary the more realistic and democratic alternative would surely be to attempt to imagine the consequences of randomness as *uncomputability*, given Gregory Chaitin's ground-breaking work in computation theory.[49] Perhaps something akin to Vertov's imaginary science of cinema is not so improbable after all for re-imagining the system ("freed from the boundaries of time and space") in all its *incompressible* variety; a system, in other words, *with all the*

[47] Frederic Jameson defines utopia as a desubjectified "statistical population" and, further on, as a period of "great social ferment but seemingly rudderless, without any agency or direction: reality seems malleable, but not the system." See "The Politics of Utopia" in *New Left Review* 25, January/February 2004, pp. 39—40, 45.

[48] See Michael Lewis, *Flash Boys: A Wall Street Revolt*, New York: W. W. Norton & Co., 2014.

[49] See Gregory Chaitin, *Meta Math! The Quest for Omega*, New York: Vintage, 2005.

"redundancy" left in.[50] A true cinema, open to different ways of seeing, albeit one that so far has only shown us "filmed Victorian novels,"[51] to quote the authors quoting Peter Greenaway, rather than the engine of capitalism itself.

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50 See my "Are We (Still) Living in a Computer Simulation? Althusser and Turing."

51 Greenaway qtd. in Toscano and Kinkle, p. 275n.

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