Technological Forecasting & Social Change 145 (2019) 105–112

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

journal homepage: www.elsevier.com/locate/techfore

# From hacking to simulation: Periodizing digitally-inspired social theory

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ARTICLE INFO

*Keywords:*
Hacking
Simulation
Critique
Postcritique
Periodization
Digitalization

ABSTRACT

Interrogating the question of whether critique can be reimagined through inspiration from the world of digital computing and hacking, this article explores the work of four theorists who converged on that very topic in major texts published just after the turn of the millennium. Structured as a historical literature review, the article compares this body of theory with recent work by the same authors. The literature is, in turn, analyzed through the lens of a theoretical framework that stipulates that in any given "machinic era", social theory tends to operationalize conceptual models abstracted from dominant technologies.

The article makes three claims. First; in the early 2000s, theorists were challenging traditional, hermeneutic modes of critique by replacing motor metaphorics with conceptual models borrowed from computing. Secondly; when reviewing more recent work of these same authors, this project appears to be abandoned. Instead, there is now a shared interest in computer simulations, inasmuch as they act as proxies for comprehending the stakes of the Anthropocene. Thirdly; this suggests that digitally-inspired social theory – construed as a period of thought emerging after the demise of the motor-based machinic era – itself needs to be periodized.

> Can a machine be made to be supercritical?
>
> Turing (1950: 454)

> If men create intelligent machines, or fantasize about them, it is […] because they secretly despair of their own intelligence
>
> Baudrillard (1993a {1990}: 51)

## 1. Introduction

When approaching the notion of the digital transformation of social theory, one is tempted to approach it as an interrogation of *contemporary* social thought. After all, digitalization tends to be billed as one of the mega or macro trends that constitute the present state of affairs. In other words, digitalization is construed as situated on the leading edge of the modernization front, constituting "the new" in our understanding of time. (Osborne, 1995) However, as we know from historians of technology, the digital computer has been "new" for quite some time now. As such, it has already had profound impact on significant *historical* developments and formations of thought.

For instance, one may point to how the computer simultaneously influenced Cold War planners and the cognitive scientists of the 1950s and 1960s (Edwards, 1996), or how it was mobilized in the rise of the counterculture and New Communalism of the 1960s and 1970s (Turner, 2006). The computer has "haunted" the social imagination and public life (21) during a lion's share of the 20th century, not least within the Anglosphere, which tends to be the context of the most famous computer historiographies. Nevertheless, there are prominent examples of the computer haunting imaginations of non-American, non-English thinkers. For example, note the work of Jean Baudrillard, whose digitally-inspired interventions in social theory have gone in and out of fashion over the past fifty years or so.

In short, the digital era not only represents a "now", but also a "then". Taking its cue from this historicizing approach, but focusing on the developments of the first two decades of the 21st century, this article will interrogate how ideas and metaphors sourced from the world of digital computers have influenced the development of social thought. More specifically, it will start from the following question: *What impact, if any, has the computer-inspired notion of hacking had on social theoretical conceptions of critique*? In pursuing this inquiry, the argument starts by revisiting the author's earlier attempt to answer that same question. (von Busch and Palmås, 2006) From this 2006 text, it will reexamine four theorists who – during the first half of the first decade of the 2000s – converged around the question of rethinking critique by drawing inspiration from the world of computers and hacking. These theorists are (in order of appearance): Bruno Latour, McKenzie Wark, Alexander Galloway, and Nicolas Bourriaud. However, the convergence among these authors was a momentary one, which will be evident as the article goes on to survey the more recent work of these four theorists. Thus, the text will explore how the invitation to rethink critique has fared over time, and interrogate where the thoughts of the four authors have

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https://doi.org/10.1016/j.techfore.2019.05.008
Received 15 October 2018; Received in revised form 18 March 2019; Accepted 6 May 2019
Available online 24 May 2019

diverged – and where they have re-converged – today. This allows for a *periodization* of the different ways in which the digital has influenced social thought, with a focus on comparing social theory of the early 2000s to that of the mid-2010s. As such, the approach can be placed alongside other periodizations of the digital era, be it the sequential "three distinct waves" of cybernetics sketched by Hayles (1999: 7), or the "nested historical cycles" of file sharing outlined by Andersson Schwarz (2014: 92). These periodizations complicate the idea that there is a uniform digital era: The "then" of the digital era is not one, but several.

The argument is structured as follows. After a short section on the method of this article, the subsequent section (Section 3) will revisit the argument from von Busch and Palmås (2006), in order to retrieve a general theoretical framework for understanding and historicizing social theory in relation to three "machinic eras". Then, Section 4 will turn to the four above-mentioned theorists, surveying their attempts to reimagine critique by moving away from interpretation-based sensibilities, in instead embrace hacking-inspired ones. The article will thereafter (in Section 5) trace these same theorists on to present time, demonstrating how the problematic of a hacker-inspired reimagining of critique has been usurped by another problematic; how to theorize the Anthropocene. Here, the influence of digital computers re-emerges through the increased social significance and epistemological status of simulations. This leads on to a discussion on the periodization of digitalized social thought. This contextualizes of the current interest in simulation, and explores whether periodization is in itself indicative for digitally-inspired social theory (Section 6). The article ends with a short conclusion.

## 2. Method

The methodological problem at stake in this article can be articulated as follows: How does one make claims regarding the broad field of social theory? For one, there is no consensus on how to delineate social theory from cultural theory, or from other related theoretical domains. Likewise, one may dispute one specific theorist's centrality to, or representativeness for, this particular domain. In order to counter this problematic, the method of this article is that of a historical literature review, for which the von Busch and Palmås (2006) study acts as a point of entry.

The selection of the four theorists – Bruno Latour, McKenzie Wark, Alexander Galloway, and Nicolas Bourriaud – is not, however, primarily based on their theoretical import in the context of the 2006 study. After all, von Busch and Palmås (2006) has not been hugely influential in its own right – Google Scholar suggests that it has gathered some seventy citations. However, it can be argued that the four theorists in question comprise a representative selection of influential authors the computer-inspired social and cultural theory of the time. (See table for the specific works covered in this review, and the respective citation counts, as obtained from Google Scholar, 17 March 2019.)

| | First period: Early -00s | Second period: Mid -10s |
|---|---|---|
| Bruno Latour | "Why has critique run out of steam: From matters of fact to matters of concern", 2004, 3716 citations | *Facing Gaia: Eight lectures on the new climatic regime*, 2017, 188 citations |
| McKenzie Wark | *A Hacker Manifesto*, 2004, 761 citations | *Molecular Red: Theory for the Anthropocene*, 2015, 205 citations |
| Alexander Galloway | *Protocol: How control exists after decentralization*, 2004, 1602 citations | *Laruelle: Against the digital*, 2014, 92 citations |
| Nicolas Bourriaud | *Postproduction: Culture as screenplay – how art reprograms the world*, 2002, 985 citations | *The Exform*, 2016, 17 citations |

As already hinted, the literature review will divide these authors' work into two temporal categories – works published in the first half of the 2000s, and works published in the mid-2010s – allowing for a periodization and comparison to be made. The reason for selecting the first period is, again, that some key theoretical texts – visibly inspired by the digital, specifically hacking – were published just after the turn of the millennium. The second time period is selected on two grounds. First, there is a point in trying to establish where social theory is situated at the present time (or at least relatively recently), but secondly, there is also a pragmatic reason: It is a period in which all four authors have published major contributions. This does however mean that other, important works – and, consequently, other digitally-inspired socio-theoretical thematics – will be excluded from this review. For instance, Latour has published extensively (Latour, 2010, 2011; Latour et al., 2012) on how digitalization may reshape social theory and method, but primarily done so in between the two studied periods. Thus, the expansive and promising field of digital social method (Lupton, 2015; Marres, 2012, 2017) will be outside the scope of this review.

## 3. Metaphors, machinic eras and social thought

As stated above, the aim of this article is to interrogate the impact of the computer-inspired notion of hacking on social theoretical conceptions of critique. This aim dovetails with that of *Abstract Hacktivism: The making of a hacker culture* (von Busch and Palmås, 2006), whose point of departure is described as follows:

> In the past few years, there has been much discussion about hacking, open source, protocols and mesh networks in settings that bear little relation to actual computer networks. What do we make out of this phenomenon?
>
> (63)

This section will briefly revisit the original argument of von Busch and Palmås (2006), with the primary focus of examining how it explains the influence of digital technology on social theory. In conjunction with this examination, it will also explore other accounts of how machine metaphors shape human thought.

The 2006 argument sets off from a number of examples in popular culture that suggest that the concepts borrowed from digital computers seem to have seeped into the understanding of how society functions. For instance, it cites the influential countercultural magazine *AdBusters*, which postulates:

> Capitalism is the almighty operating system of our lives […] So here's the big question: can we the people – civil society – take charge? Can we rewrite the capitalist code?
>
> (Adbusters, 2006, cited in von Busch and Palmås, 2006: 79)

In other words, in some parts of the popular discourse on society in general – in this case the capitalist system – a new ontological understanding of the world seems to emerge. As we shall see in the next section, this emerging worldview can also be found within more academic discussions on social theory. However, before moving on to the theories of the four key authors which constitute the empirics of this historical literature review, let us first examine the place of metaphors in human thought. More specifically, what is at stake in the relation between machine metaphors and social theory?

> "Metaphor", Gareth Morgan writes in his classic study *Images of Organization*,
>
> encourages us to think and act in new ways. It extends horizons of insight and creates new possibilities.
>
> (Morgan, 1997: 351)

This emphasis on the creative powers of the metaphor illustrates what concepts like hacking can bring to thought. The addition of a new metaphor implies cognitive innovation. This is because metaphor –

which may be defined as "understanding and experiencing one kind of thing in terms of another" (Lakoff and Johnson, 1980: 5) – is not a matter of "mere words". Rather, as Lakoff and Johnson proposes, "human *thought processes* are largely metaphorical". (6, italics in original) Further, they point out, metaphors are not solely matters of the intellect: Metaphors give shape to our thoughts, but they also shape our actions in society, even in the mundane and everyday.

The specific interest of this paper is – following Lakoff and Johnson's definition – the "understanding and experiencing" of society "in terms of" digital technologies. This may suggest technological determinism: Is there a general tendency for technological innovation to precede socio-theoretical innovation? Indeed, some orthodox readings of Marx would lead us to answer this question in the affirmative: As metaphorical jargon would have it, "the base determines the superstructure". There are nevertheless important accounts that refute such blanket claims. For instance, in Barry's (2001) study of the institutions of the European Union, the network metaphor flows seamlessly from computer and telecom networks, to the network as a mode of European integration, to the idea of EU member states being network societies – and back again. Thus, he points out, the "social acts as a metaphor and a model for the technical as well as vice versa" (87). Indeed, there are further examples of the social acting as metaphor for digital technology – note for instance the piracy metaphor used for describing online file sharing. (Andersson Schwarz, 2014: 37) Moreover, there are anthropomorphic and biomorphic metaphors used in the understanding of the digital – such as the idea of the web as a global brain. (Heylighen and M. Lenartowicz, 2017; Heylighen, 2017; Roth et al., 2017) Further, there are skeuomorphic metaphors (Hayles, 1999; Larsson, 2013), in which new digital technologies are understood through older technological artifacts, such as the "downloading" metaphor in online file sharing (Andersson Schwarz, 2014: 35), or the "engineering" (Bryant, 2000; Jemielniak, 2008) and "cathedral and bazaar" (Raymond, 1999) metaphors applied to software development.

The remainder of this article will approach this problematic with reference to the work of philosopher of science Michel Serres, who also features as a key reference for von Busch and Palmås (2006). Serres explores "the parallel development of scientific, philosophical, and literary trends" (Serres, 1982: xi, cited in von Busch and Palmås, 2006: 21), arguing "that there exists a passage (or passages) between the exact sciences on the one hand and the sciences of man on the other" (Serres, 1982: xi), even though these passages may be rare and labyrinthine. One key characteristic that makes Serres' work useful for the purposes of this article is that it suggests that there are paradigmatic historical formations of thought. These, in turn, can be mapped onto the traditional pre-modernity > modernity > postmodernity three-stage periodization of social history. DeLanda (1991) operationalizes Serres' approach by recasting them as "machinic eras": the clockwork age; the motor age; and the age of intelligent machines. The transition from one age to another is not a matter of a "simple addition of a new brand of machines" in society, but – more fundamentally – "a complete break with the conceptual models of the past" (273).

A case in point is Serres' account of how the steam engine and the Carnot cycle (the abstract, thermodynamic description of the steam engine) ended up becoming "the universal model of knowledge in the nineteenth century, a construct that always functions in the same way in the all cultural domains – from Marx to Freud, from Nietzsche to Bergson, or from Zola to Turner" (Serres, 1982: xix). DeLanda (1991) points to the time that may pass for the completion of this "abstraction" of concepts from machines: "In 1824, a century after it was born as a concrete assemblage, the steam motor was given a completely abstract description by Carnot" (142), and could subsequently be incorporated in social thought, notably that of Marx, Freud and Nietzsche. As suggested in the introduction to this article, we can assume that a similar process has taken place from the mid-twentieth century and onwards: The abstract principles of digital computing have slowly become detached from actual computing machines, and operationalized elsewhere. As a further example of this process, note how philosopher Spencer Brown transposed the digital logic NOR gate, used in electronic circuits, into the "cross" concept in his *Laws of Form*. (Roth, 2017; Spencer-Brown, 1979).

Similarly, the four social theorists surveyed in this review have also been partaking in this process of abstraction, though in relation to the socio-theoretical notion of critique. Indeed, if critique-as-we-know-it operates on conceptual models from the motor age, how can critique be reimagined by the adoption of new concepts abstracted from digital computers?

## 4. Critique inspired by the digital: from hermeneutics to hacking

This section will explore what a computer- and hacking-inspired conception of critique may imply, as proposed by the four reviewed authors. However, to place that project in context, it is useful to first highlight how the traditional mode of critique draws upon motor metaphorics. Since Ricœur (1970), this has been dubbed a "hermeneutics of suspicion", inasmuch as it endeavors to produce interpretations of cultural artifacts, with a view to expose an underlying truth. Thus, there is a focus on unmasking, exposing, unraveling, demystifying (Felski, 2015: 5) of various phenomena as mere "epiphenomena". Moreover, this implies that critique operates on a mood or sensibility of suspicion, knowing, and vigilance (6), as well as a spatial metaphor of "digging deep" (7). For Ricœur (1970), this approach to critique can be traced back to Marx, Freud and Nietzsche – the "masters of suspicion". However, following Serres' and DeLanda's argument above, we also know that this mode of critique can be traced back to motor metaphorics. Under surface appearances, there is a hidden "motor" that acts as the true cause, and the role of the critic is to expose this motor.

In a well-cited article, Bruno Latour (2004) takes issue with this mode of critique, pointing to the ways in which it is being mobilized against climate science. If spin gurus are cynically sowing the seeds of suspicion around the claims of scientists, trying to unmask the supposed underlying agendas, where does that leave critique? Searching for a means to describe an alternative mode of critique, he cites an example from Alan Turing's famous paper on how to build and evaluate machine intelligence. In the example, Turing is dealing with the challenge put forward by Ada Lovelace – how to construct thinking machines that do more than what we simply tell them to do. He thus compares a hypothetical artificial mind to atomic piles, whose sizes may be sub-critical or super-critical, highlighting that only piles with super-critical sizes can give rise to chain reactions.

> Is there a corresponding phenomenon for minds, and is there one for machines? There does seem to be one for the human mind. The majority of them seem to be "sub-critical," *i.e.* to correspond in this analogy to piles of sub-critical size. An idea presented to such a mind will on average give rise to less than one idea in reply. A smallish proportion are super-critical. An idea presented to such a mind may give rise to a whole "theory" consisting of secondary, tertiary and more remote ideas. Animals' minds seem to be very definitely sub-critical. Adhering to this analogy we ask, "Can a machine be made to be super-critical?"
>
> (Turing, 1950: 443, cited in Latour, 2004: 247)

From this analogy, Latour asks; "can we become critical again, in the sense here offered by Turing?" (cited in von Busch and Palmås, 2006: 55) This implies a shift from critique as debunking to critique as assembling, from deconstruction to construction. (Latour, 2004: 246) In this call for an alternative form of critique – one that emphasizes sensibilities that run counter to suspicion – the notion of hacking appears to be a suitable candidate, at least to the extent that it is associated with the hacker ethic of building things, rather than with the practices of the cracker who destroys things. (Raymond, 2001) Here, the ambitions of Latour intersect with those of cultural theorists McKenzie Wark and Alexander Galloway, whose work can be understood as attempts to re-

theorize notions of critique and power in a society that operates as a computer. In *A Hacker Manifesto*, Wark (2004) reorients Marx and Engels for a computerized world, pitting the creative hacker class against the controlling vectorialist class, which "wages an intensive struggle to dispossess hackers of their intellectual property" (§21). Similarly, Galloway's (2004) *Protocol: How control exists after decentralization* outlines the principles of power that emerge in a computerized world, governed by communication protocols. Like Wark, he defines hackers as existing in an intricate relation to protological control: "hackers *are created* by protocol, but in another, hackers are protocological actors par excellence" (158).

Crucially, for both of these authors, the emergence of the digital world – with its concomitant emerging power relations – a new model of critique is needed. Wark (2004) posits that the now dominant "critique of representation always maintains an artificial scarcity of 'true' interpretation" (§211). Here, Wark's argument chimes with that of Latour (2004). However, for the latter theorist, the notion of 'true' interpretation is self-contradictory: Critique as we know it requires you to be an "antifetishist for everything you don't believe in" (such as religion, or a pop cultural artifact), "an unrepentant positivist for all the sciences you believe in" (sociology, for instance), and "sturdy realist for what you really cherish" (say, criticism itself) (Latour, 2004: 241). For Wark, though, the notion of a true interpretation is problematic as it "fits perfectly with the domination of education by the vectoral class, which seeks scarcity and prestige from this branch of cultural production". (§211) Thus, in a computerized world, critical theory becomes "hypocritical theory"; it poses as transformative, yet relies on maintaining control over codes. Therefore, the "one role of critique is to critique criticism itself, and thus open the space for affirmation." (§210) Such affirmation is exactly what hacking represents. "Hacking brings into existence the multiplicity of all codes […] it is the act of hacking that composes, at one and the same time, the hacker and the hack." (§212).

Similarly, when presenting his "protocological" mode of analysis of the computerized social world, Galloway (2004) notes that it "should be of particular interest to critical theorists […] that protocol is *against interpretation*". (52) Thinking protocologically therefore implies a shift away from "the sciences of meaning (representation/interpretation/reading)", in favor of "the sciences of possibility (physics or logic)". This proposition leads Galloway on to explore the place of hacking in this new world. "Protocol", he continually emphasizes, "is synonymous with possibility". (167, 168) As a mode of control, it channels rather than represses action. Indeed, to follow a protocol grants the user permission to exploit a given set of possibilities. Hacking implies "knowing protocol better than anyone else", pushing it "into a state of hypertrophy" (158), "further than it is meant to go" (206), extending the given possibility "in better and more interesting ways" (176). The practice of hacking does not necessarily run counter to protocol, but inside it, because "with protocol comes the exciting new ability to leverage possibility and action through code." (172).

So, to sum up, for both Wark and Galloway, the affirmative ethos of the hacker stands out as the model for how to engage in a new form of critique, which transcends the hermeneutic tradition. While these authors are writing in the context of theory, critique and political action, similar arguments can be made in relation to art. For instance, in a 2000 interview, DeLanda suggests that art students ought to "cut language down to size […] stop worshipping it as the ultimate reality [and] adopt a hacker attitude towards all forms of knowledge […] to hack reality itself". (Miller, 2000) Moreover, in *Postproduction*, the influential curator and art critic Nicolas Bourriaud (2002) surveys the field of contemporary art. In this study, subtitled "how art reprograms the world", he points to "the emergence of a new cultural configuration, whose emblematic figures are the programmer and the DJ" (35). For Bourriaud, the contemporary artist mimics the hacker when s/he sets off to create new works by "reprogramming" preexisting works. While practices like "citation, recycling, and *détournement* were not born yesterday", Bourriaud posits that "certain elements and principles are reemerging as themes and are suddenly at the forefront, to the point of constituting the 'engine' of new artistic practices". (8–9) More precisely, the novelty of these practices resides in the fact that they seek "not to 'devalorize' the work of art but to utilize it" (37). Or, to borrow the terminology of Latour (2004), the onus is on assembling rather than debunking, construction rather than deconstruction. In other words:

> The postproduction of work allows the artist to escape the posture of interpretation. Instead of engaging in critical commentary, we have to experiment, as Gilles Deleuze asked of psycho-analysis: to stop interpreting symptoms and try more suitable arrangements.
>
> (Bourriaud, 2002: 82)

Here, the now familiar call for an affirmative hacker ethic, and the concomitant abandonment of interpretation-based modes of critique, is coupled with a reference to philosopher Gilles Deleuze. Similar Deleuzian influences can also be found in the works mentioned above: Wark (2004) defines a hack as something that "touches the virtual—and transforms the actual" (§71); Galloway's (2004) introduction starts by stating that the book is about "a diagram" (3). Indeed, both of these two authors are implicitly drawing on Deleuze's (1995) proposition that history can be described as a succession of social diagrams (Deleuze, 1988; Foucault, 1977) – from the sovereign society, through the disciplinary society, to the control society. These three historical diagrams – which overlap with the three machinic eras outlined above – enables Wark's and Galloway's claims to have a widened scope. In studying a societal "diagram", they are not just examining computer practices, but a more general social formation.

Thus, while these authors are all drawing inspiration from the world of computers – and specifically the practices of hackers – it is worth bearing in mind that the authors are examining the virtues of hacking through the lens of a broadly Deleuzian theoretical framework. Hence the references to concepts such as "affirmation", "potential" and "multiplicity", put in the context of a particular understanding of the notion of "control". Wark (2004), Galloway (2004), Bourriaud (2002) – and arguably Latour's work (Berry and Galloway, 2016) – should therefore be understood in the context of a particular reading of Deleuze, which was dominant during this time period.

So, a periodization of digital thought is emerging here: The reader may note that this section has been written in present tense, but it may as well have made use of the past tense. The next section will trace the four authors forward to the present time, and show how the these authors have moved on from the problematic of whether concepts borrowed from computers can generate a new mode of critique. This implies that a shift in theorizing has occurred, rendering the ideas presented above as expressions of a distinct, "early 2000s" phase in digitalized social thought. What emerges, then, is a sub-periodization *within* the wider periodization of machinic eras (presented in Section 3).

## 5. Theory for the Anthropocene: from critique to simulation

This section will revisit the four authors that are the focus of this historical literature review. It will do so in reverse order, examining how the theoretical themes covered in the previous section have fared over time. It will first seek to revisit the theme of reimagining critique, and then move on to explore the theme that has usurped that problematic, namely that of how to grasp and conceptualize the Anthropocene.

When examining where the theme of reimagining critique is located today, it is useful to first examine the recent work of Bourriaud. His most recent book, *The Exform* (Bourriaud, 2016) situates the reader in a world defined by its generation of waste, as evidenced by energy-squandering and atmospheric pollution.[1] "Waste, what the process of

[1] Here, he is in alignment with contemporary social theory – note Sassen's

production leaves behind", Bourriaud writes, "has assumed a preponderant position in politics, economy and culture." (97) Given that there is an ideological tendency to hide this fact, he argues, a contemporary "political theory of art" ought to be based on the realism of Marx and Freud. Such realism is found in "works that lift the ideological veils which apparatuses of power drape over the mechanism of expulsion and its refuse" (x), and more generally in art that "dispels thick clouds of ideology by making breaches through which the *Real* bursts in" (81). As such, Bourriaud reverts back to a more traditional notion of critique, based on the "unveiling" of truths glossed over by ideology. Whereas *Postproduction* (2002) proposed that the hacker was the emblematic figure of contemporary art, *The Exform* (2016) puts the rudologist it its place. Interestingly, Bourriaud emphasizes how rudology, the study of waste, examines "processes of *devalorization* generated by human activity" (86, italics added). In other words, the gesture of devaluing something – the rejection of which defined the hacker-inspired artists in *Postproduction* – is back in vogue. Indeed, Bourriaud suggests that this is return to normal, inasmuch as from its very conception, "modern art's destiny has been tied to *déclassement* [elsewhere in the book translated as downgrading]" (82).

Thus, in the writing of Bourriaud, one can detect two clear shifts between the early -00s to the mid-10s. First, the social world is not to the same extent placed in the context in digital media, but in the context of the environment, energy, pollution and waste. Secondly, the call for another critique, one that engages in affirmative experimentation and escapes the "posture of interpretation" (Bourriaud, 2002: 82) is abandoned, and replaced by a return to more orthodox modes of critique. The shift from the digital to the environmental will be discussed further below; let us first briefly explore the trajectory of the call for a new critique.

One should be careful to extrapolate from Bourriaud's all-out rejection of the project to reimagine critique. Through the 2010s, a discussion on the notion of "postcritique" has emerged as a "burgeoning field" within literary studies (Terrell, 2016: 787), art theory (Foster, 2012, 2015), and more broadly in cultural studies (Anker and Felski, 2017: 1). Further, the contours of a possible "postcritical theory" (Pruchnic, 2012) have been sketched. Among this polyphony of voices, many of whom responding explicitly to Latour (2004), there is a continuum of positions. First, there are those who fully embrace the term postcritique, and wish to distance it from the traditional, hermeneutic mode of critique (Anker and Felski, 2017; Felski, 2015). Secondly, there are voices that suggest that "postcritical" seems to imply "a necessary engagement, rather than dismissal of, the dominant vectors of recent critical theory" (Pruchnic, 2012: 642). There are also those who sympathizes with "the fatigue that many feel with critique today" (Foster, 2012: 6), yet feel that given the current state of the world – and the lack of attractive alternative positions – "a post-critical posture is of no use" (Foster, 2015: 124). However, for the purposes of this article, it is important to note that – apart from rare examples such as Rothman (2015) – this discussion on a reimagining of critique no longer draw inspiration from the world of computing, let alone hacking.

While Bourriaud's theorizing has expunged the digital, Galloway's more recent theoretical work has exploded it. In *Laruelle: Against the digital* (2014), he goes further than abstracting the operating principles of the digital world into the social world, using it to understand emerging societal modes of control. If *Protocol* (Galloway, 2004) was about a new understanding of *social* ontology, Galloway (2014) is about ontology. As such, it says "relatively little about computers, software, networks, the Web, and the like" (220), and instead interrogates the digital as something more fundamentally metaphysical: The "digital is the basic distinction that makes it possible to make any distinction at all […] the capacity to divide things and make distinctions between them". (xxix) From his perspective, then, "the four nucleobases of the genetic code or the twenty-six letters of the alphabet are just as digital as the base-two numeric encoding used in binary computers" (xix), vastly expanding the scope of his argument to the point where it is more metaphysical than socio-theoretical. Again, for the purposes of this article, the main point to note is that the practice of hacking, the event of the hack, or the figure of the hacker, has completely vanished from Galloway's theorizing.

Let us then turn to the two remaining authors in this review – McKenzie Wark and Bruno Latour – whose recent work is converging, but in a new context. As is evident from its subtitle, Wark's (2015) *Molecular Red: Theory for the Anthropocene*, sets off to engage theoretically with a new concept that has garnered considerable public and scholarly attention in during the 2010s. Having arisen from Earth System Sciences, the term "Anthropocene" is the name of a new geochronological epoch, in which the planet's geology and ecosystems cannot be understood without taking human action into account. In other words, the term suggests that human civilization has become a planetary force – a force that acts on an immense temporal and spatial scale, previously thought to be the exclusive domain of purely natural forces. For Wark (2015), this shift is fundamental, indeed more fundamental than the rise of the abstraction-based, informational mode of production that gave rise to the hacker and vectorialist classes (as discussed in Wark, 2004). In the Anthropocene, we are living through "the end of pre-history" (Wark, 2015: xii), and are now forced to reconsider who we are: "The human is no longer that figure in the foreground which pursues its self-interest against the background of a wholistic, organicist cycle" – that is, nature. Thus, beyond the idea of representing a definitive temporal break, the Anthropocene also inspires a reengagement with long-standing debates within social theory, such as the relation between the human and nature – in the Anthropocene, the delineation between human and natural history collapses (Chakrabarty, 2009). As also suggested by the quote above, the term also invokes a reconsideration of fundamental concepts like "whole" and "totality". Indeed, the notion of the Anthropocene is hotly debated precisely because – despite the seemingly unifying term "the age of Man" – there is little consensus on what to include as fundamental components in that whole.

Latour's major intervention into the debate on the Anthropocene, *Facing Gaia* (Latour, 2017a), also engages with the nature-culture problematic, as well as that of wholes and totalities. As the title suggests, the project involves invoking the figure of Gaia – taken from the theory of earth as a living entity, developed by James Lovelock and Lynn Margulis – as that thing or creature that "intrudes" on us (Stengers, 2015) in the context of climate change. It is useful to think of this entity as a counterpoint to earlier figures of nature, such as "Mother" nature. (Latour, 2017a: 82) The intrusion of Gaia implies a realization that earth is no longer "a solid but distant and faithful background" – that it has become "an *actor*, at least an *agent*, let's say an *agency*" (Latour, 2017b: 62, italics in original). In other words, there has been a "complete reversal of the favorite trope of Western philosophy", in which human societies are now assuming "the role of the witless object", while nature plays "the role of the active subject". (Latour, 2017a: 73) In relation to the theme of wholes, Latour is at pains to dissociate the idea of Gaia from any kind of providence, teleology, or totality. For him, this is a crucial and necessary move, in order to create a new understanding of our new home. Borrowing from Peter Sloterdijk's (2014) study of the European history of imagining the cosmos on the basis of the perfect, unified, abstract globe, he argues that only a "destruction" of such "globalized" thought can make us attuned to our new place in the universe. Faced with this great unknown, Latour suggests, it is climate science that constitutes our primary pathway to knowing our new home.

Here, a curious and – for the purposes of this article – crucial twist emerges. The notion of the Anthropocene has generated a surge in theoretical interest in the material world: The authors surveyed in this

(*footnote continued*)
(2014) *Expulsions* – as well as Douglas' (1966) classic account of dirt.

review have recently sharpened their attention on energy, pollutants, and waste (Bourriaud), as well as the earth, geology, ecosystems (Wark and Latour). In the early 2000s, the same authors tended to emphasize other aspects of social reality – information, abstraction, symbol-manipulation. However, as Latour and Wark are keen to point out, we can only know about this new world through *in silico* computer modeling. As Wark (2015: 178) puts it: "Models emerge as a relatively new category of knowledge production, when the basic metaphor becomes one of code-causality." Both authors point to Edwards' (2010) study of the computational history of climate science, which highlights the knowledge infrastructure (including sensors, supercomputers and algorithms) on which the scientific knowledge about the climate rests. Edwards also shows how the science is tied to a particular "epistemic culture", which recognizes that this simulation-based knowledge[2] is based on "models almost all the way down". (Edwards, 2010: 263–264) In other words, the climate models have acquired "the capacity to create a certain quality of the data set itself" (Wark, 2015: 176), and models are tested not with reference to data, but with reference to other models:

> Simulating data to test simulation models; using one model's output to measure another one's quality: welcome to the mirror world of computational science.
>
> (Edwards, 2010: 267, cited in Wark, 2015: 177)

So, ironically, in the Anthropocene we must accept that our knowledge stands and falls with the "code-causal" artificial reasoning of computer simulations. This implies that a new point of contact has emerged between digital computers, on the one hand, and social theorizing, on the other.

While Latour and Wark concur on the centrality of computing- and simulation-based climate science for knowing where we are in the world, it is nevertheless interesting to note where they diverge. For Latour, as we have already seen, climatology is a means to gradually compose a new figure of nature, which – unlike the previous one – is not a totality. Wark, in contrast, *does* seek an understanding of totality through simulations; "it is with the aid of this simulation of the totality that we might understand the finitude of the earth". The vast infrastructure of "planetary computation" that Wark calls "third nature", now running on about seventeen terawatts per day, is the thing that "makes the Anthropocene apparent". Crucially, for Wark, the totality in question is that of the climate, as bound up with the totality of capitalism. A new chapter in the history of totalities is to be written; a chapter that captures how "puts one simulation up against another: earth science versus financialization". (Wark, 2017).

In this way, both theorists accept the *epistemological* premise that knowing our new world is a matter of seeking truth in computer simulations. This proposition is incidentally shared by DeLanda, whose recent work (DeLanda, 2011) is precisely "a philosophical examination of the epistemology of simulations". Where Wark and Latour differ is on the point of the *ontological* status of this new world, which we can only know through computer simulations.

So, in summing up this section, we can note two points regarding the intellectual trajectories of the four theorists studied in our review. First, the theme of re-imagining critique as something more constructive and affirmative has faded from view for these theorists. In the case of Bourriaud (2016), we can see an outright reversion back to the traditional, hermeneutic, truth-unveiling mode of critique. The discussion does, however, still exists elsewhere, under the banner of "post-critique", but – and this is crucial for the purposes of this article – it no longer references the world of computers or hacking. Moreover, none of the studied authors who explicitly, in the early 2000s, referred to the figure of the hacker as a critical or cultural ideal no longer do so. Secondly, none of the studied authors are, to the same extent, emphasizing the informational, abstraction-based, symbol-manipulating aspects of social ontology. Latour, Wark and Bourriaud are engaging in social ontologies of the earth, geology, pollutants, and waste; Galloway engages with more fundamental metaphysics. Curiously, however, the work of Latour and Wark clearly demonstrates how the present time is more fundamentally enmeshed with digital computers, as the only way for us to know and understand our new world is through computer simulations.

## 6. Discussion: on simulation and periodization

In the introduction, it was stipulated that this article would periodize the digitalization of social theory. As already hinted, this suggests a sub-periodization *within* the larger three-stage periodization of machinic eras. This section will discuss and problematize the meaning of such periodization. How do we make sense of the rapid pace with which the hacker has been adopted and rejected? However, before exploring that question, we will place our new reliance on simulation in a historical context.

Let us start by returning to Turing's idea of intelligent, "supercritical" machines. As highlighted in Section 4, this served as the positive inspiration for Latour in his search for a new mode of critique. Continuing from the previous section's elaboration on the role of simulations today, we may ask: Do the supercomputers used by climate science measure up to Lovelace's challenge of doing more than "whatever we know how to order it to perform"? (Turing, 1950: 450) Well, not quite. As Edwards (2010) shows, the process of "making data global" (187–285) does imply using computer models to generate data. This is done in order to compensate for the lack of sensor-based empirical data points, distributed perfectly in space (in a global grid), back in time. As hinted above, this suggests code-causality, but not supercriticality. Nevertheless, Turing (1950) is still relevant to this story. As French (2000) shows, the historical reception of Turing's article has shifted over time, and during the 1980s, it was tied precisely to simulation, and to the relation between *in silico* and *in vivo*. Is a hurricane in a computer the same as a real hurricane? (Hofstadter, 1981).

With this renewed societal significance of computer simulations, social theory seems set to loop back to themes that haunted the imaginations of previous generations of digitally-inspired social theorists. Indeed, given the argument of the previous section, one could do worse than to reintroduce Jean Baudrillard – even though Latour (2004: 228) is "ashamed" to recognize him as a compatriot. Baudrillard's supposed postmodern nihilism aside, here is a social theorist who, already in the 1970s, described digitality as a cultural condition, more general than the mere mediated encoding of zeros and ones. (Baudrillard, 1993b {1976}) Moreover, and more importantly for this argument, Baudrillard remains the key to the understanding of simulation in relation to social theory. (Gane, 2006) While he tends to be associated with the later argument about "the precession of simulacra", in which "hyperreality" annihilates reality (Baudrillard, 1994 {1981}), he also proposed a three-stage historical periodization based on three "orders of simulacra". (Baudrillard, 1993b {1976}) In terms of time periods, this roughly corresponds to the other three-stage periodizations that we have already encountered in this text – that is, the machinic eras of Serres/DeLanda and the succession of diagrams of Deleuze/Foucault. What Baudrillard adds, however, is a focus on the historically shifting guises of simulacra. Thus, the classical period is associated with the *counterfeit* (such as stucco imitations of nature), was superseded by the industrial period is associated with *production* (the rise of infinite series of identical copies). Our time, "[t]he current phase that is controlled by the code", Baudrillard (1993b {1976}: 71) suggests, has seen the rise of the *simulation*-based simulacrum, in which the simulacrum is no longer secondary to the original. Note the similarity with the epistemic culture of climate science, which accepts that sometimes "models with simulated data predict better than ones with actual observations". (Wark, 2015: 177).

[2] For another treatment of the relation between weather forecasting and computing, see Plantin et al. (2017).

Aside from possible over-interpretations of how a simulation-based order may annihilate the real in favor of a hyper-real, the problematic raised by Baudrillard does seem to have gained a new significance. Remember, as concluded in the previous section, Latour and Wark both agree on the point that we have to resign ourselves to seek the truth about the climate through the computer simulation of that real-world system. In a sense, simulations act as proxies when trying to comprehend the stakes of the Anthropocene. Clive Hamilton writes, commenting upon Latour's project to outline the contours of a new figure of nature: "to think is to miss Gaia […] thinking is what the deniers do to contain the horror, to keep themselves from the abyss of Gaia's awesome power. […] At best, peering at Gaia illuminated by the light of reason can reveal no more than Gaia's silhouette." (Hamilton, 2014).

Here, Hamilton presents a point of contact with aesthetics. After all, "horror" in the face of nature has been a long-standing feature of aesthetics, particularly in relation to the notion of the sublime. But there is more to the connection with aesthetics. For instance, one may note that Latour's recent engagement with the notion of Gaia has been partly based on relations to the arts. Moreover, theorists like Toscano (2012) point to the prospect of rejuvenating "the sociological imagination" through aesthetics, specifically on the issue of totalities,[3] which – as discussed in the previous section – served as the key sticking point between Wark and Latour. (Again, should simulations be mobilized for the fleshing out of socio-ontological totalities, or should the computer modeling of climatologists should furnish an ontology of non-totality?) What, Toscano asks, can sociologists who wish to "see the whole" learn from contemporary artistic efforts to represent social totalities?

Interestingly, within aesthetically-oriented social theory, there seems to be an emerging discussion about how computer simulations may be deployed to compensate for our inability to make sense out of the horrific scales of the Anthropocene. For example, Kane (2018) discusses how, in conveying ecological crisis, traditional landscape photography is now challenged by computer-simulated images. Within the classical Kantian scheme, Kane (2018: 124) points out, we engage with the sublime in a three-step process. When exposed to representations of the sublime in nature, our first instinct is to be overwhelmed by its beauty and grandeur. Then, as we fail to comprehend its magnitude, we are thrown into a state of fear. Finally, in a third step, the faculty of reason steps in, producing a sense of exaltation. In the current situation, these latter steps seem out of reach. Either we get stuck in the horror, as reason cannot come to the rescue – or we don't even get to the horror stage. Hence the inclination for contemporary art to rely on computer simulation. On this account, Baudrillard's contention – used as an epigraph for this article – seems correct: Maybe we do construct intelligent machines because we despair of our own failure to comprehend?

At this point, the reader may be forgiven for thinking that there is something "retro" about the re-enactment of late-seventies/early-eighties Baudrillardian themes. Could it be that – like in other cultural fields – digitalized social theory is stuck in a rut on non-invention, rehearsing of theories of the past, as "cultural time has folded back on itself"? (Fisher, 2014: 9) Or could it be that we are facing the opposite problem? In concluding this discussion, let us turn to the few pages in which Galloway (2014) does discuss the computer-social theory relation. Interestingly, he does so through a re-reading of Deleuze's (1995) thesis about the societies of control, previously mentioned in Section 4 as central to both Galloway (2004) and Wark (2004).

As discussed towards the end of Section 4, at least three of the authors in this review – Bourriaud, Wark and Galloway – relied heavily on Deleuze in the early 2000s. Moreover, in a recent interview, Galloway suggests that Latour's work is to be understood as a kind of Deleuzianism. (Berry and Galloway, 2016: 159–161) In the same interview, he suggests that we "forget Deleuze", or at least "a certain kind of Deleuzian School that has arisen since his death [in 1995]" (8) Similarly, Bourriaud (2016: xv-xvi) also distances himself from the Deleuzianism that "gripped [his] generation". Still, it is when re-reading Deleuze's text on the societies of control that Galloway (2014) makes a new and unexpected observation. Deleuze's text, he argues, should not solely be placed in the Foucault (1977) tradition of theorizing surveillance, whether panoptic or panspectric. (Palmås, 2011) Nor is the text solely periodizing technological eras or "diagrams". Rather, the "ultimate lesson" of it is about periodization itself.

Isn't it, Galloway (2014: 109) asks, "deliciously ironic that in recent years periodization seems to be appearing with increased frequency, an increased periodicity of periodization"? This delicious irony implicates the argument of this article, which set out to demonstrate that the "then" of the digital era is not one but several. For Galloway, this desire for incessant re- and sub-periodizing is a symptom of malaise among social theorists. To place this claim in context, it is worth noting Osborne's (1995) suggestion that sociology and social theory was founded on the premise of periodizing and describing the "coherent whole" (6) of modernity. In particular, the Marx-inspired critical project has always is also premised on the identification of extended periods of coherent modes of production, with the added difficulty of knowing that our capacity for social analysis is doomed to lag behind the technological base. The challenge of establishing such a unified vision of the "coherent wholeness" of our time, Galloway argues, is frustrated by the fact that the digital is "accelerating the opportunities and channels for critical thought to infinity and therefore making it impossible to think historically in the first place". (Galloway, 2014: 109).

So, while the Galloway of 2004 lauds the hacker's creative "hypertrophy", the Galloway of 2014 laments that social thought "has metastasized and reduplicated into a super state of recursive channels". The central challenge, then, is "to rescue history from its own consummation". Thus, the world of computers no longer seems to inspire new modes of social thought, but rather threatens to undermine it. This analysis may be rejected as a computer-oriented re-hashing of the postmodernity-as-fragmentation trope (Berthon et al., 2000). Nevertheless, it is tempting to read this development of Galloway's thought as shorthand for how the hopes and dreams of the early -00s have been smashed during the -10s. Given the centralization and platformization that has characterized the digital realm during the past decade (Zittrain, 2008; Andersson Schwarz, 2017), such a darkening of the socio-theoretical state of mind is neither surprising nor unwarranted.

## 7. Conclusions

Following the assumption that social history can be categorized by machinic eras, in which the conceptual models of social theorists tend to be in congruence with the logics of dominant technologies, this article set off to interrogate the question: *What impact, if any, has the computer-inspired notion of hacking had on social theoretical conceptions of critique*? As it turns out, the word "had" is the operative word. The influence, the article has argued, can be periodized, and placed in a particular historical and intellectual context of the early 2000s. The authors who were involved in this rethinking critique by referencing conceptual models from digital computers have recently turned to new concerns. Nevertheless, in the present turn towards "theory for the Anthropocene", the digital computer has reemerged through a renewed interest in the social significance and epistemological status of computer simulations.

The review suggests that from the early -00s, to the late -10s, a gloomier socio-theoretical view of the digital seems to have set in. First, we may not that while there is an ongoing discussion on how to reinvent critique, the digital is no longer mobilized for conceptual innovation. Still, more fundamentally, the theorists in this review seem to converge around the idea of the digital as increasingly bound up with the defective cognition and incomplete knowledge of the human mind.

[3] For another periodization of the digital that deals with the sociological tradition of seeing the whole, see Boullier (2016).

One view holds that the technology that once seemed to extend our conceptual horizons is now undercutting our critical faculties. Another view holds that we – given our failure to comprehend the scales of the Anthropocene, and ineptitude in processing the impending apocalypse – are increasingly reliant on *in silico* simulations. Ultimately, it is this despair of our own intelligence that signifies this particular period in the age of intelligent machines.

## Declaration of Competing Interests

The author does not have any competing interests to declare.

## Acknowledgements

The author is grateful for the productive comments on this argument, as provided by Fredrik Svensk (The Valand Academy of Arts, University of Gothenburg) as well as the three anonymous reviewers.

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