# *Culture Unbound:*

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## Thematic Section:

## Critical Future Studies

## Edited by

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# Critical Future Studies –
# A Thematic Introduction

By Michael Godhe & Luke Goode

Our 2017 essay "Beyond Capitalist Realism – Why We Need Critical Future Studies" (Goode & Godhe 2017), published in this journal, was intended as both a provocation and an invitation to scholars concerned with the ways in which cultural texts not only *represent* the future, but also actively shape it by opening up or closing down imaginative possibilities. The essays collected in this special section are both responses to our invitation and provocations in their own right. From our point of view, they each take Critical Future Studies forward and collectively augur well for the further development of this field.

   This introductory essay contains three sections. First, we briefly situate Critical Future Studies within an intellectual and historical context. In the following section we discuss some relevant scholarship published very recently in cognate fields (specifically Anticipation Studies and Sociology) and which are pertinent to Critical Future Studies as a developing field of study. In the final section, we introduce the articles contained in this this special section: six diverse contributions on topics including green capitalism, artificial intelligence and automation, science fiction, post-scarcity societies and the future of work, and socialist futures.

## Looking backwards

The future is ancient: prophecy, forecasting and foresight are as old as recorded human history. Already in the classic ancient civilisations, 'experts' made calculations for the ruling classes of assets like agricultural products and calculations for future needs and uses. The Bible prophesises the perdition of mankind 6000 years after Genesis, and in the Norse mythology mankind and the gods were heading toward Ragnarök, the destruction of the world. In the interface between the medieval times and the 'Modern Age', the prophecies of Nostradamus were

filled with apocalyptic visions. In this sense, forecasting and foresight have long been entangled with visions of destruction or apocalypse.

But novel modes of future-thinking were, of course, integral to Western modernity (cf. Frängsmyr 1990): the future became subject to systematised analysis, ideals of rational planning came to the fore, and the idea of progress became a central animating myth.

The establishment of modern social science was, in large part, guided by the desire to steer society in preferable directions in the future (something we return to in the next section). Even the field of History, while ostensibly the study of the past, has often been guided by an implicit or even explicit orientation towards the future: the idea of 'learning from history' in order to shape a better future or at least to avert catastrophe. In the case of modern Futures Studies, there are, in fact, good reasons for saying that its emergence after WWII was, like the establishment of the United Nations, triggered by the need to avert further catastrophes on such a scale. But its orientation was not merely preventive. Futures Studies was also linked strongly to ideals of rational planning and the welfare state, as well as a belief in the social sciences as useful for steering society towards a brighter future.

What we call 'mainstream' (as opposed to 'Critical') Futures Studies is a broad field. Hyenjou Son (2015) provides a useful thumbnail sketch of Future Studies as developing "through a three-phase periodization": a mid-20th century phase focused on scientific and technological progress, concerned especially with forecasting and "rationalizing" visions of the future; a second phase beginning in the 1970s, increasingly concerned with *global* visions of the future and increasingly entwined with global business interests; and a third phase beginning in the 1990s, characterized by a fragmentation of views of the future and by the prevalence of neoliberal institutions and worldviews. Son's (necessarily simplified) schema, raises the issue of an "identity crisis" within Futures Studies during this third phase.

In recent years, there's been a renewed interest in the future, and Critical Future Studies (CFS) is part of that movement. Put simply, we see CFS involving the exploration and interrogation of ways in which society thinks, imagines and talks about the future – not the future singular, but possible *futures*. The objects of analysis for CFS include discourses, images and ideas about the future produced from within science (in the broadest sense, including the social sciences), and from futurology, of course. But it is also strongly interested in, and takes seriously the role of, popular culture including popular science, science fiction, news and technology journalism: in other words, we are not only interested in expert domains but also popular discourses that reach the public at large.

This interest in popular discourse is connected to an ethical commitment that we argued should be fundamental to CFS, namely, valuing the widest possible repertoire of ideas about possible futures. This is essential because, despite what

futurists or Silicon Valley gurus might tell us, there's little that is inevitable or even predictable about the future. Of course, the future is in many ways subject to co-lonisation by powerful present-day interests: from inaction on climate change to the tendency to lock ourselves into dependence on certain technological pathways (such as a largely privatised internet infrastructure). But from a CFS standpoint, imagined futures are always contestable. So, rather than being just a dispassionate academic interest, the work of CFS reflects a certain ethical commitment to the notion of a 'futural public sphere' in which there is the widest possible public en-gagement with the widest possible repertoire of imagined futures. This means that CFS isn't dedicated solely to the deconstruction of futuristic texts and imaginings, exposing their biases, limitations, contradictions or interest-positions – although we see that work as vital; for us, CFS also has a reconstructive impulse in its ethi-cal commitment to expanding, rather than narrowing, futural frames of reference and possibility.

And it follows from all of this that CFS work is not just about cultural texts themselves, but also with their surrounding power structures. Who can spe-ak with authority and legitimacy about the future? Whose imagined futures are deemed possible or plausible, and whose are silenced or dismissed as unrealistic and impractical? Who benefits from promoting particular visions of the future? And where do these ideas and visions of the future come from (for they all have histories and genealogies that often go unacknowledged)? These are key critical questions that CFS scholars can and should ask about both futurescapes and the institutions that produce them (cf. Goode & Godhe 2017: 109, 120-123).

## Looking outwards

In our original essay on Critical Future Studies we argued that, while there is ne-ver a bad time to interrogate imagined futures, now there is something especially timely in the call for more sustained and critical scholarly engagement with the future in the Humanities and Social Sciences. Around the same time, however, some interesting and promising signs of renewed energies in this direction were already emerging. While we failed to account fully for these developments occur-ring in our peripheral vision, they are extremely encouraging and reinforce our sense that, when it comes to critical perspectives on the future, there is no time like the present.

The first area we should acknowledge is the inter-disciplinary field emerging recently under the auspices of Anticipation Studies (cf. Poli 2010). This represents an ambitious effort to synthesise, or at least bring into dialogue, knowledge and research surrounding anticipatory systems across the natural and human scien-ces: anticipatory dynamics are to be found in biological systems, for example, as

much as in social systems, and efforts to understand and theorise anticipation at a more holistic and inter-disciplinary scale are, in our view, both exciting and rich in potential. The genealogy of Anticipation Studies can be traced back to what we (rather awkwardly) labelled 'mainstream' futures studies, while it seeks to bring the latter into a closer relationship with more traditional academic disciplines and to enrich its scholarly grounding. Yet alongside this academic focus, there remains an important practical orientation. UNESCO has established a chair in Anticipation Studies (currently occupied by one of the field's founders, Robert Poli) as part of its commitment to develop a global 'futures literacy' strategy. The concept of 'futures literacies' is a promising one. It refers to the development of citizens' capacities for envisaging, evaluating and acting in relation to a range of possible futures, in the context of a world characterised by complexity, uncertainty and cultural diversity. Riel Miller, another leading figure in the field, is UNESCO's 'Head of Futures Literacy'. He emphasises that futures literacies (what we might also refer to more broadly as the capacity for 'anticipatory agency') depends not simply on access to knowledge and education (Miller 2018): these are necessary but not sufficient resources for citizens seeking to make informed choices about the types of future they wish to pursue. Also vital, according to Miller, is the capacity to access and to build 'evocative stories' about the future that can motivate and mobilise, rendering potential futures tangible – not as outcome predictions, but as creative building blocks in the envisioning process (Miller 2007). This chimes strongly, for us, with the emphasis on imagination, storytelling and cultural texts that we pursued in our original essay, and also with Ruth Levitas' (2013) theory of utopia as method that we drew and continue to draw upon. If Anticipation Studies develops on the premise that science, knowledge and reason are also bound up with imagination, storytelling and affect, at least when it comes to human anticipatory systems, then it promises to be a field from which Critical Future Studies will draw heavily, and one to which CFS can, in turn, contribute.

A second contemporaneous development that we did not fully acknowledge at the time of our 2017 essay comes in the form of calls for renewed engagement with the future in the field of sociology. In 2015, *Current Sociology* published a monograph entitled "Future Moves: Forward-Oriented Studies of Culture, Society, and Technology" (volume 63, number 2), which started from the principle that "in order to enhance sociology's relevance, more explicit and direct engagements with the future are needed" (Schultz 2015: 130). And in 2017, the journal *Sociological Review* published a special issue (volume 65, number 3) entitled 'Futures in Question: Theories, Methods, Practices' which called for renewed sociological attention to futures, endorsing Barbara Adam's dictum that "a future-less sociology is increasingly hard to defend" (cited in Tutton 2017: 479). As a discipline, it is fair to say that sociology's dominant orientation in recent decades has been towards

theories, histories and critiques of the present. This has not always been the case, however. As Richard Tutton points out, discipline 'forefathers' including Auguste Comte and Karl Marx "were concerned with both forecasting and actively shaping the future" (Tutton 2017: 479) – as an aside, we might also note that science fiction author and utopian futurist H.G. Wells saw himself as a 'sociologist' of the future (Levitas 2010; cf. Bowler 2017). A relatively short-lived revival of sociological concern for the future also occurred in the 1960s and 1970s through the influential work of Wendell Bell, among others (see Tutton 2017). But the dominant trend has been to avoid 'speculation' about the future as epistemologically suspect and the reputational risks associated with anything that smacks of futurology. Thankfully, this reticence to engage with the future has not been total – for example, in our original article we referred to (and we continue to be influenced and inspired by) the work of sociologists such as Barbara Adam (see Adam and Groves 2017) and Ruth Levitas (2013).

The two special issues mentioned above are extremely promising signs of a growing engagement with the future within sociology. But more than just reinforcing and encouraging our sense of timeliness, these interventions also raise some more substantive and important theoretical and methodological issues that are pertinent to Critical Future Studies as we conceive it. While we don't have the space here for detailed reviews and discussion, we do want to draw attention briefly to a few distinct but related themes that these publications foreground, because we believe it is necessary that ongoing work in Critical Future Studies proceed at least with their importance born in mind.

Sociological thinking about the future encourages us to take *materiality* or 'matter' seriously, even if our own culturally oriented scholarship focuses its attention mainly on the discursive and ideational spheres. It is notable that both issues strongly emphasise the work of cultural imagination and include analyses, for example, of utopian and dystopian popular culture texts. But they also situate this in the context of material practices and institutions. Tutton, for example, cites Adam and Groves' insistence that the future is not reducible to imagination (see Tutton 2017: 483) and their dismissal of the idealistic notion of 'open futures' – material practices, entrenched institutional dynamics and technological 'path dependencies' established in the past and present, ensure, for example, that a future without the perils of climate change has already been closed off as a possibility. Tutton's concern is to bring imagination and discourse back into the equation without, however, succumbing to the 'cybernetic' illusion of a smooth feedback loop between the material and the ideational of the sort that characterised the work of Bell and others in the 1970s: his challenge to us is, rather, to appreciate the complex 'entanglements' of the material and the 'discursive.' In an era of profound social complexity, a challenge for cultural scholars of the future, then, is to consi-

der how the imagined futures we study might be entangled in (rather than just informing or inspiring) material practices, from consumer behaviour through to the development and enactment of government policy. This entanglement also goes beyond the realm of human action to include, for example, unintended ecological consequences of well-intentioned 'green' policies that, independent of human will, may end up shaping our future in unforseen ways.

This challenge to accept the messy relationships between ideas and materiality connects, then, to a broader theme evident in much of the recent sociological futures scholarship, namely, the issue of societal *complexity* and *uncertainty:* intractable, multiply determined social dynamics and problems (from ecological change to inter-cultural tensions inherent in global modernity) only lend themselves, at best, to partial and provisional 'solutions.' Schultz (2015: 132), for example, reminds us that under such conditions there is a pressing need for methodological pluralism. For critical futures scholars, this is a useful reminder that reinforces the value of multiple entry points (for example, investigating how individuals anticipate and imagine their own and their society's future, as well as the ways in which institutions and collectives undertake that imaginative work), and multiple approaches (from focused studies of exemplary texts to the discussion of discursive patterns and cultural tropes distributed across a broader textual corpus). As we will discuss in the subsequent section, we're pleased to introduce a suitably diverse range of approaches in the present volume.

Human *agency* in all its complexity is another key concern for sociologists, and the challenge of theorising how human beings, as individual and collective actors, can meaningfully and intentionally shape the future under conditions of social complexity and uncertainty is one that critical futures scholars need to keep in mind, even where that is not our primary focus. At the very least, we should exercise intellectual humility and remain wary of grandiose or simplistic premises: while Critical Future Studies work starts from the premise that access to the widest possible repertoire of images, stories, ideas and insights about potential futures is a fundamental prerequisite for any 'democratisation' of the future, this must necessarily be tempered by an awareness of the complex social conditioning and stratification of human agency.

Finally, this question of *stratification* (another central concern for sociologists) is itself an important one for us, as critical future scholars, to remain mindful of. Given our focus on cultural texts, it is not always possible to analyse in-depth the unequal distribution of power in terms of who gets to speak or be heard (or taken seriously) on the subject of the future. But such inequality is a fundamental ethical issue that should continue to shape our work, and one that we drew attention to in our original essay. We also called for attention to inequities to permeate our selection and critical readings of cultural texts: we proposed that one of the key ques-

tions we should ask of the futuristic visions we analyse is "who would want to live in such a future?" and, by extension, who may thrive and who may suffer in such a future? Further to this (and something we perhaps did not foreground sufficiently at the time), we should take account of inter-generational power relations. Following Adam and Groves (2007), there is the vital question of whether and how future generations, whose futures we are actively shaping now, but who cannot 'speak' in a literal sense about their future, might nonetheless be granted some kind of 'voice' in the future-shaping discourses and practices of the present. We think it is entirely appropriate that such issues of inter-generational ethics play a prominent role in shaping the work of Critical Future Studies as it develops further.

While we are encouraged by the kind of futural scholarship referred to above which, as we've indicated, was already developing in our peripheral vision, we've also been heartened and inspired by the direct intellectual encounters to which our initial work on CFS has already led. Through presentations and correspondence relating to our original essay, we've discovered rewarding connections with colleagues from various countries who were already doing fascinating 'Critical Future Studies' work (even if they did not label it as such), and who were also energised by our work and wished to collaborate with us. We're delighted to present some of the resultant work in the present volume which, for us, represents the start, rather than the culmination of, a diverse, international and inter-disciplinary project that we believe, fittingly, has an exciting future. In the subsequent section, we will provide an overview of these diverse contributions.

## Looking forwards

In this thematic section of *Culture Unbound*, we're pleased to present six diverse and thought-provoking articles. The first three all focus on technology-related topics (situated, of course, within their social and cultural contexts) while papers in the second half broaden the focus, highlighting cultural, political and economic issues and possibilities for re-imagining how society might be organised in the future.

Our first paper by Sy Taffel dissects the rhetorics and realities of green capitalist futures. Taffel's primary case study is Elon Musk's electric vehicle corporation Tesla and its spurious claims to help solve environmental problems with its 'clean' technology. As Taffel outlines, this imagined future depends on the occlusion of Tesla's real environmental impacts (as well as the negative impacts on indigenous communities arising from its dependence on Lithium and Cobalt extraction) in favour of an affectively appealing vision whereby (affluent) consumers can continue on the treadmill of luxurious consumption while saving the planet, one charge at a time. But Taffel's target is broader than Tesla alone: his paper critically

explores the ways in which "technological solutionism", as a dominant future imaginary in contemporary society, treats the objectively incommensurable imaginary of "apocalyptic catastrophism" as a business opportunity, a discourse to be rhetorically domesticated within the frame of individualistic consumerism. This broad scope – the conjuncture of an ideologically dominant techno-solutionism and the spectre of ecological collapse – makes it an excellent paper with which to begin this special section, because it articulates in very stark terms what is at stake for the whole project of Critical Future Studies. Taffel's piece also highlights effectively the 'entanglements' of materiality, imagination and affect mentioned in the previous section. His critique is a materialist one, but he connects this to the affective dimension that we emphasised in our initial essay: the problem of hope. While Taffel is wisely circumspect about political responses, he shows that a rigorous materialist critique of solutionist future imaginaries is necessary but not, in itself, sufficient. The way forward, he suggests, lies neither in a neo-Luddite rejection of technology per se, nor in progressive or Left-wing versions of technological solutionism of the sort pursued by Nick Srnicek and Alex Williams in their influential work *Reinventing the Future* (2015). Rather, he looks to the cultivation of a 'fragile hope' through progressive social and political experimentation based on public good and commons based approaches to technological and social infrastructure.

Following from this, Luke Goode's paper on artificial intelligence (AI) similarly takes a Silicon Valley imaginary as its starting point, and also foregrounds the role of affect. AI is an increasingly influential social technology and one that has the potential to shape our future in ways that are both profound and hard to discern. As such, meaningful public debate about AI and its role in the future is both necessary and difficult. Citizens rely on popular media to stimulate insight and interest into a complex topic such as AI and there are good reasons to claim (as many experts now do) that the public is not well-served at present, because highly sensationalised media stories typically focus on spectacular and cutting edge developments rather than the forms of AI that are more quietly but more influentially reshaping society. Non-fictional media coverage also draws heavily on science fictional tropes (tropes of an AI uprising, AI 'going rogue', and sentient AI, for example) in ways that annoy experts keen to educate the public about the more prosaic realities. But Goode's paper rejects as simplistic the assertion that we just need a more sober and rational public discourse about AI. Coverage of the topic draws on historically and culturally embedded imaginaries of both the 'technological sublime' and the 'uncanny'. His paper ranges across science fiction representations, popular science speculations about an impending AI 'singularity', and examples of prominent recent AI developments that have attracted widespread media and popular attention because of their capacity to evoke both wonder and anxiety. Rather than wishing them away as irrational blights on the public imagi-

nation, these 'evocative stories' must somehow be harnessed as entry points into more meaningful public conversations about the role we want AI to play in our future.

Many of the characteristics of contemporary public 'debate' around AI are scarcely new, however, and we have much to learn from historical examples. Daniel Bodén's article is a careful and insightful examination of a particular slice of the technological imaginary within Western modernity, and one that has broader resonance with contemporary debates. Specifically, he draws on a corpus of articles from the 1950s in the Swedish press that deal with industrial automation through the trope of an 'impending robot revolution'. He begins with discussion of a series of evocative sketches that accompanied the articles. These conveyed a more mixed attitude of hope and anxiety compared to the articles themselves, which largely reflected the dominant progressivist imaginary of the time. A key part of the ideological work that these texts perform is to naturalise visions of a 'prosperous' automated future through repeated appeals to 'inevitability' (something we identified as a key feature of contemporary Silicon Valley ideology in our original essay). Bodén situates this historical analysis within the theoretical framework of technological fetishism. These mid-century texts, he reveals, relied heavily on the anthropomorphic figure of the robot, and on metaphors of the living body to describe the automated factory (robotic 'arms', sensors envisioned as eyes, control banks as brains), and ascribed the machines agency. In that sense, they performed the ideological function of instantiating 'dead labour' as 'living labour' and rendering concrete the otherwise abstract forces of competition and productivity to which the project of automation was geared. Yet, in keeping with other CFS scholars, Bodén is careful to point out that futural texts such as these are more than mere ideology and, in their invocation of the 'not-yet' (Bloch 1995[1954]: 110), also contain within them a utopian potential. The challenge, he asserts, is not merely to unmask their ideological work but also find ways to redeem the utopias contained within them.

Historical perspectives, such as Bodén's, are a critical part of the CFS enterprise. As historian Roxanne Panchasi reminds us: "the future anticipated at a particular historical moment can tell us a great deal about the cultural preoccupations and political perspectives of the present doing the *anticipating*" (Panchasi 2009: 4). But another important lens for studying the anticipatory concerns of particular moments is science fiction. This genre is less about forecasting future technologies (such as mobile phones or virtual reality) than it is about posing questions and reflecting concerns over the possible impact of science and technology on society (cf. Godhe 2018). In her article, Josefine Wälivaara analyses how marginalised bodies – in this case characters with physical disability and homo/bisexual characters – have been depicted in popular science fiction film and television. While

many claim the potential in science fiction to contest tendencies in the present and offer possible future alternatives, it is equally important to examine how present-day ideals and norms are reproduced in images of the future. As a futural public sphere, science fiction is capable of both contesting and reinforcing cultural and political hegemony. For Wälivaara, even if queer and disabled characters are becoming more common in science fiction futurescapes, they remain marginal compared to the large quantity of science fiction film and television being produced, effectively reproducing heteronormative and ableist ideologies. Wälivaara quotes Brian Attebery (2002: 191) to underscore what's at stake here: "Any group that cannot negotiate a place for itself in the imagined future is already obsolete".

The unemployed are another marginalised group that have to contend with socially ascribed 'obsolescence' – and automation raises the prospect of a radical increase in the size of this group in the future. This is the subject of Michael Godhe's essay. Automation, robotisation and the development of artificial intelligence have been on the agenda in recent years, and the hopes and fears surrounding these development are debated in many arenas, not least the daily press (cf. Bodén's contribution in this thematic section). While some people fear that we are facing a future of mass unemployment, others see bright prospects for humanity. Some scholars and public intellectuals claim that the central role that work plays in society will soon be a relic of the past, deploying phrases like "post-capitalism" and arguing for universal basic income to meet the challenges of a post-work society. Godhe discusses the question of work in relation to the computerisation of society through the lens of science fiction. As he shows, the question of the value of work and the relationship between work and leisure have been discussed since ancient times. For a long time, work was a central issue in utopian and dystopian literature, in fiction as well as non-fiction. With few exceptions, work wasn't abolished but rather reduced and the question was to improve the working conditions. But recent speculative fiction as been more open to imagining the end of the work-based society. As a case, Godhe investigates the *Thousand Cultures* tetralogy (1992-2006) by John Barnes, posing questions such as: What if we could create post-scarcity societies with an abundance of goods and services created by more-or-less intelligent machines, making manual wage labour unnecessary? What are the pros and cons of such a future? In Barnes's tetralogy, as Godhe shows, identity connected to work is replaced with identity connected to cultural belonging, and in the worst case leads to aggressive identity politics with xenophobic tendencies. Godhe's article suggests that we can use science fiction as a resource for rethinking society and the notion of work in the future.

Such rethinking may, in fact, entail the ability to think beyond capitalism. Perhaps capitalism as we know it is incapable of solving and adapting to the challenges and crises of our time. But anti-capitalist and specifically socialist thought (in

its different versions) need to be rethought as well. In their article, Monica Quirico and Gianfranco Ragona, explore the work of four socialist thinkers that share an 'elective affinity': Alexandra Kollontai (1872–1952), Paul Mattick (1904–1981), Raniero Panzieri (1921–1964) and Alain Bihr (b.1950). Quirico and Ragona show how each of these thinkers contribute to the project of rethinking possibilities for a future beyond capitalism. In different ways, they all contribute to a radical critique of capitalism without falling back into the pathologies of party dictatorship and Soviet socialism, opposing the notion of an avant-garde leading the transformation of society. Instead, they argue for self-government, "for a bottom-up, self-guided organization" that avoids bureaucracy and authoritarianism, that is, "the direct mobilization of the masses in economic, political and social life". At the end of their article, Quirico and Ragona show the relevance of these thinkers today through a case study: the Movement for a Democratic Society in the Rojava region of Syrian Kurdistan.

We hope and, indeed, anticipate that the articles in this special theme section will be of interest to a broad range of readers, and that they will stimulate further work along the lines of Critical Future Studies. Certainly we believe that they each have something valuable to say about the ways in which culture may shape the future and vice versa. And we hope that readers will agree that they are, in themselves, small but useful contributions towards expanding the range of imaginable futures that lie before us.

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# References

Adam, Barbara and Chris Grove (2007): *Future Matters: Action, Knowledge, Ethics*, Leiden: Brill.

Attebery, Brian (2002): *Decoding Gender in Science Fiction*, New York: Routledge.

Bloch, Ernst (1995[1954]): *The Principle of Hope*, Volume One, Cambridge, MA: The MIT Press.

Bowler, Peter J. (2017): *A History of the Future: Prophets of Progress from H.G. Wells to Isaac Asimov*, Cambridge: Cambridge University Press.

Frängsmyr, Tore (1990): *Framsteg eller förfall: Framtidsbilder och utopier i västerländsk tanketradition*, Stockholm: Allmänna Förlaget.

Godhe, Michael (2018): "'The Old Stories Had Become Our Prison': Globalization and Identity Politics in John Barnes's Science Fiction Novels *A Million Open Doors* and *Earth Made of Glass*", *Fafnir: Nordic Journal of Science Fiction and Fantasy Research,* 5:1, forthcoming.

Goode, Luke and Michael Godhe (2017): "Beyond Capitalist Realism – Why We Need Critical Future Studies", *Culture Unbound: Journal of Current Cultural Research*, 9:1, 108-129.

Levitas, Ruth (2010): "Back to the Future: Wells, Sociology, Utopia and Method", *The Sociological Review*, 58:4, 530-547.

Levitas, Ruth (2013): *Utopia as Method: The Imaginary Reconstitution of Society*, London: Palgrave.

Miller, Riel (2007): "Futures Literacy: A Hybrid Strategic Scenario Method", *Futures*, 39:4, 341-362.

Miller, Riel (2018): *Transforming the Future: Anticipation in the 21st Century*, London & New York: Routledge. http://unesdoc.unesco.org/images/0026/002646/264644E.pdf

Panchasi, Roxanne (2009): *Future Tense: The Culture of Anticipation in France between the Wars*, Ithaca, NY: Cornell University Press.

Poli, Roberto (2010), "The Many Aspects of Anticipation", *Foresight*, 2010, 12:3, 7-17.

Schulz, Markus S. (2015): "Future Moves: Forward-Oriented Studies of Culture, Society, and Technology", *Current Sociology*, 63:2, 129-139.

Srnicek, Nick and Alex Williams (2015): *Inventing the Future: Postcapitalism and a World Without Work*, London: Verso.

Son, Heonju (2015): "The History of Western Future Studies: An Exploration of the Intellectual Traditions and Three-Phase Periodization", *Futures*, 66, 120-133.

Tutton, Richards (2017): "Wicked Futures: Meaning, Matter and the Sociology of the Future", *The Sociological Review*, 65:3, 478-492.

# Hopeful Extinctions?
# Tesla, Technological Solutionism
# and the Anthropocene

By Sy Taffel

## Abstract

Over thirty years since Jean-Francois Lyotard declared the death of metanarratives, we currently find two apparently incompatible discourses that dominate imagined planetary futures. On the one hand, we encounter a metanarrative of technological progress has been fuelled by decades of advances in computational, networked, mobile and pervasive technologies. On the other, we find the apocalyptic discourse of the Anthropocene, whereby human activity is understood to be responsible for precipitating the sixth mass extinction of life in Earth's geological record. This paper explores how the divergent futures of technological solutionism and ecological catastrophism encounter one another, focusing on Tesla as a case study where technological consumerism is posited as the solution to ecological catastrophe. Critically examining the materiality of digital technoculture challenges the immaterialist rhetoric of technological solutionism that permeates both neoliberal and leftist discourses of automation, whilst questioning the 'we' that is implicit in the problematic universalisation of Anthropocenic catastrophism, instead pointing to the deeply entrenched inequalities that perpetuate networked capitalism.

Ultimately, the paper asks whether it is possible to move beyond bleak claims that we must simply "work within our disorientation and distress to negotiate life in human-damaged environments" (Tsing 2015: 131), to assemble the fragile hope that Goode and Godhe (2017) argue is necessary to move beyond capitalist realism. Hope suggests an optimism that sits uncomfortably with the reality of mass extinctions, however, the scale of the ecological crises means that we cannot afford the fatalism associated with losing hope.

**Keywords:** Tesla, Lithium, Cobalt, Materiality, Anthropocene, Critical Future Studies, Critical Infrastructure Studies

# Introduction

> In contemporary society and culture – postindustrial society, postmo-
> dern culture – the grand narrative has lost its credibility.
>
> (Lyotard 1984: 37)

Collectively imagined futures both delimit and bring forth possibilities for modes of living. The stories we tell in the present about the future fulfil a performative function that calls certain futures into view while foreclosing other possibilities, however, this performativity is modulated through a network of material constraints. This paper examines technological solutionism and the Anthropocene as two highly prominent and apparently contradictory discourses that largely dominate contemporary discussions of the future in popular culture. It brings them into conversation with one another and contemplates their relationships to Jean-Francois Lyotard's (1984) critique of metanarratives, neoliberalism, and the formulation of a fragile hope for the future that retains a critical engagement with technoculture (Goode & Godhe 2017).

Since the 1970s computational power has grown exponentially, as have the numbers of networked computational devices, as digital technologies moved from fixed, wired spaces to wireless pervasive and mobile computing environments and the internet of things. These technocultural developments have led to a popular discourse of technological solutionism, whereby digital technology allegedly drives a cascade of disruptive and innovative changes that predominantly produce positive technological, economic, social and cultural transformations. In contradistinction to this often-uncritical enthusiasm for technological change we find the discourse of the Anthropocene, a new geological epoch in which humans – or at least assemblages in which a certain percentage of economically, socially and politically privileged humans alongside a variety of nonhuman actors – are described as transforming the conditions for life on Earth in ways that will be felt over geological temporalities (Crutzen & Stoermer 2000, Zalasiewicz et al 2015). Arguably, if technological solutionism is the remnant of post-Enlightenment progress, the Anthropocene presents its inversion, whereby a teleological march towards utopia is supplanted by a descent into ecocide and societal collapse (Stengers 2015, Stiegler 2017).

One company which exists at the conjunction of these two discourses is Tesla Inc., the American automotive, energy storage solution and photovoltaic panel manufacturer. Tesla exemplifies how technological solutionism views Anthropocenic ecological crises as just another opportunity for venture capital-funded technology start-ups to innovate, disrupt and reshape industries in highly profitable ways. This paper presents a materialist critique of Tesla's claims surrounding ecological sustainability and market-led solutions to global ecological crises, focu-

sing on the lithium-ion batteries employed within Tesla's electric cars and Power-wall energy storage systems.

In the concluding section I argue that whilst materialist critique can eviscerate the utopian idealism that underpins technological solutionism, this can all-too-easily fall into a cynicism where hope for the future is effectively extinguished. If academic accounts call for us to merely "work within our disorientation and distress to negotiate life in human-damaged environments" (Tsing 2015: 131), the affective impact of hope in motivating and sustaining activist endeavours to deal with ecological and social crises is negated, leading to a disempowering sense of despair. Instead, I argue that we must construct a fragile form of hope that accepts material realities surrounding the forecast for environmental conditions to become increasingly challenging as we move through the twenty-first century, but which foregrounds the potential for producing postcapitalist futures that escape the polarised and universalised metanarratives of techno-capitalism and ecological apocalypse.

## Metanarratives, Neoliberalism and Technological Determinism

In *The Postmodern Condition,* Lyotard argues that by the end of the 1970s there had been societal and cultural shifts leading from Fordism and modernism towards a postindustrial society and a postmodern culture. Lyotard's work is commonly associated with the rejection of metanarratives; universal or grand narratives that exceed specific historical, social and political contexts to produce transcendental truths and/or teleological outcomes. Metanarratives include Enlightenment claims regarding progress (which encompassed a gradual improvement in moral, and political spheres alongside those of science and technology), the Biblical fall and redemption of (hu)man(ity), and the Marxist teleology that leads from capitalism through socialism to communism. In each case the metanarrative presents a reductive way of organising specific social, cultural and political events, which can also be read as form of ideological colonialism that projects European thought across the planet as a universal human condition; metanarratives are therefore deeply entwined with the power relations that produce methods for ordering knowledge.

Lyotard situates this rejection of metanarratives in relation to the production of techno-scientific knowledge, which he describes in the late 1970s as the "generalised computerisation of society" (Lyotard 1984: 47). This description of a technocultural logic dominated by information processing technologies was no doubt influenced by the advent of commercially successful personal computers; *The Postmodern Condition* was published in French in 1979, shortly after the introduction of the Apple II, Commodore PET and Tandy Corporation TRS-80 in

1977 and ahead of the IBM PC that launched in 1981. Lyotard (1984: xxiv) suggests that the diffusion of digital computers led to rise of a calculative technocracy whereby decisions are predominantly managed:

> Following a logic which implies that their elements are commensurable and that the whole is determinable. They allocate our lives for the growth of power. In matters of social justice and of scientific truth alike, the legitimation of that power is based on its optimizing the system's performance – efficiency.

This focus upon quantifiability, calculability and efficiency is unerringly close to some of the central values commonly associated with neoliberalism.

Neoliberalism is a contested term that has a wide range of sometimes contradictory deployments within academic discourse, which has seen the term dismissed as a "controversial, incoherent and crisis ridden" (Venugopal 2015: 166), and "an all-purpose denunciatory category" (Flew 2014). The term can, however, usefully demarcate "an open-ended and contradictory process of politically assisted market rule" (Peck 2010: 6), that is operative at multiple scales (including globalisation, national states, urban and local levels) (Larner 2003: 509), in which "Competition – between individuals, between firms, between territorial entities (cities, regions, nations, regional groupings) – is held to be a primary virtue," (Harvey 2005: 65). Consequently, Jodi Dean (2009: 52) defines neoliberalism as the "reformatting of social and political life in terms of its ideal of competition within markets." While such definitions do not present totalising prescriptions that elides the very real political and cultural differences between (for example) Pinochet's Chile, Thatcher's Britain, Yeltsin's Russia and Obama's America, they present a framework whereby the post-World War Two Keynesian economic doctrine was supplanted across a range of social, political and cultural contexts by the fetishisation of competition within markets.

What remains unresolved from these definitions, however, are the mechanisms that promote competition and marketisation. Here I concur with David Beer's (2016: 17) contention that technocultural apparatus of measurement play essential roles:

> Systems of measurement are crucial in the realisation and deployment of what might be thought of as neoliberal political formations and the processes of neoliberalisation… Measurement is needed to enable competitors to be judged and for hierarchies of winners and losers to be created. Systems of measurement provide the mechanisms by which that competition can be enacted. Given neoliberalism's central ethos of

competition, measurement can be seen to be a crucial part of the social fabric.

Here the synergies between Lyotard's description of computational optimisation and efficiency and the mode of governmentality associated with neoliberalism begin to become somewhat clearer, as the logic of competition requires measurement, which in turn supposes the forms of quantification and calculability that are central to technologies of information processing. Bringing increasing volumes of human experience and activity into markets; "requires technologies of information creation and capacities to accumulate, store transfer, analyse, and use massive databases to guide decisions in the global marketplace" (Harvey 2005: 3). Furthermore, these technologies of measurement, quantification and statistical prediction are not objective and neutral agents which simply record an external reality. By ascribing value to certain, quantifiable indicators, they actively shape how value is understood and so fulfil a performative function in shaping how systems develop, forming what Beer (2015) describes as productive measures. This central role of computational performativity was key to Lyotard's (1984: 46) analysis of the postmodern condition "in which the goal is no longer truth, but performativity – that is, the best possible input/output equation". Consequently, far from being tools that exist outside of globalised capitalism as was boldly proclaimed by early cyberutopians (e.g. Barlow 1996), computational systems that afford calculation, measurement and thus competition are central to the performative processes of commodification and marketisation that are emblematic of neoliberalisation.

Such an account of neoliberalism is far removed from conventional genealogies that begin with the Mont Pellerin Society and Chicago School as the genesis of the idealisation of deregulated markets and competition. Indeed, this narrative could be read as employing a fairly reductive technological determinism that conflates the numerical quantifiability of digital computers with their social and political deployments. My argument is not that digital computation inexorably leads towards a process of neoliberalisation, but that the affordances of these technologies have played and continue to perform pivotal roles in supporting, enabling and extending the domain of calculation, measurability and competition. The rhetoric of technological determinism surrounding computational technologies is not, however, primarily encountered in critiques of neoliberal governmentality, but in the techno-utopian currents associated with Silicon Valley technology start-ups, Wired magazine and the popular technology press, what has long been referred to as the "Californian Ideology" (Barbrook 1996); the idea that digital technology would make an elite extremely wealthy while making the entire world a better, more prosperous and more connected place, and it is to this prominent narrative that I turn to next.

## Technological Solutionism

The idea that technological changes precipitate social formations have a long history within media and cultural studies, dating back to Marshall McLuhan's (1964) deterministic declarations that the medium is the message and that electric media would create a global village. McLuhanite proclamations surrounding the deterministic effects of technology fell out of favour following sustained criticism in the 1970s (e.g. Enzensberger 1970, Williams 1974). However, the so-called digital revolution associated with the introduction of the personal computer in the 1980s and the World Wide Web in the 1990s saw their rehabilitation in popular culture, as exemplified by Wired magazine declaring McLuhan to be its patron saint. In this context, McLuhan's apolitical technological determinisms became a key component in the Californian Ideology.

Since the 1990s successive waves of scholarship have outlined critiques of the alleged power of networked information technologies to produce "innovative", "smart", "open", "disruptive", "revolutionary" solutions that will enrich a (predominantly male, white, North American) technologically literate elite while supposedly spreading freedom, democracy, connectivity and prosperity across the globe (e.g. Terranova 2000, Beer 2008, Fuchs 2010, McChesney 2013, Morozov 2014, Greenfield 2017). While there has been scholarship that celebrates digital utopianism, collective intelligence, and convergence culture (Negroponte 1998; Lévy 1999; Jenkins 2006; McGonigal 2011), as Jonathan Sterne (2014) highlights, critical scholarship in this area primarily addresses the highly prominent popular and corporate discourses of technological solutionism, rather than academics propagating these positions.

Two prominent examples of this discourse taken from international news stories in 2017 come from Mark Zuckerburg and Tim Cook, the respective CEOs of Facebook and Apple. Facing criticism for Facebook's role in promoting filter bubbles and fake news, Zuckerburg issued a 6,000-word post entitled *Building Global Community* outlining his vision for Facebook as a central pillar of community organising and a global force for good:

> As we've made our great leaps from tribes to cities to nations, we have always had to build social infrastructure like communities, media and governments for us to thrive and reach the next level. At each step we learned how to come together to solve our challenges and accomplish greater things than we could alone…There are many of us who stand for bringing people together and connecting the world. I hope we have the focus to take the long view and build the new social infrastructure to create the world we want for generations to come (Zuckerberg 2017).

Leaving aside the teleological colonial model of development, this quotation foregrounds Facebook's public facing ideology of connectivity, sharing and community (Van Dijck 2013). What is conspicuously absent from this account of what Facebook stands for is the political economy of social media, the commodification of communication and communities, predictive dataveillance, tax evasion, corporate walled gardens and rewarding venture capitalists for the free labour of billions of end users (Fuchs 2012, Scholz 2012). This does not necessarily represent the future 'we' want, and the question of who the 'we' that Zuckerberg repeatedly employs refers to is important here.

Later in 2017, Tim Cook (2017) proclaimed that "AR [Augmented Reality] is going to change everything." Expanding on what "everything" meant in this revolutionary overhaul, Cook elaborated that consumers would be able to visualise how objects would appear in their lounge before making purchases. Changing everything in the context of digital utopianism does not mean making meaningful alterations to systems of production, to eliminating (or even reducing) global, regional and local inequalities, transforming systems of governance, or addressing environmental crises; it is limited to enhancing the flexibility and ease with which affluent consumers purchase goods. The future brought into focus by these quotations is one where technology is a deterministic political actor, albeit one where the boundaries of what can or should be modified by revolutionary technologies is primarily limited to extending commodification, metrification and choice. In other words, revolutionary change within technological solutionism is delimited to the parameters of markets and competitive individualism.

Exponential change is broadly welcomed by technological solutionism. Far from there being a moment of digital revolution with periods of prior and subsequent equilibrium, there has been accelerating cascades of technocultural alterations that resonate with Stuart Hall's (2011: 723) insight that neoliberalism wants to engineer a permanent state of revolution. This increasing pace of technological flux is decried by authors for whom embodied human capacities for attention are being overloaded by the speeds associated with 24/7 digital capitalism (Berardi 2009, Crary 2013, Stiegler 2017), however, in technophilic discourse this velocity is heralded as either the paradigm of disruptive innovation, or the teleological pathway to the singularity; the moment at which exponential technological change produces an artificial superintelligence which results in unfathomable modifications to society (see Goode's article in this issue, also Kurzweil 2005; Shanahan 2015).

While the term singularity was first employed in this sense by Jon von Neumann in the 1950s (Ulam 1958: 5), the concept was popularised by technocultural narratives that drew upon the history of improvements in computational fields, projecting them into the future (Vinge 1993, Kurzweil 2005). Such accounts ac-

cord prominence to Moore's law, the observation made by Intel co-founder Gordon Moore in 1965 that the number of transistors in a complex integrated circuit doubles annually (in 1975 Moore revised this to be bi-annually). This exponential increase has continued throughout the forty years since Moore's revised prediction, and advocates of the singularity such as Kurzweil have extended this trajectory over a 120-year period by focusing on calculations per second per constant dollar, rather than the number of transistors, thereby allowing comparisons to be drawn between modern integrated circuits (CPUs and GPUs) and older computational technologies such as vacuum tubes and mechanical computers. Projecting this exponential increase into the future, Kurzweil (2005: 125) contends that around 2045 there will be an artificial superintelligence whose calculative power will surpass the equivalent of all human brains combined, which will profoundly alter social structures in unanticipatable ways. The discourse of the singularity predominantly advocates that this necessarily produces positive transformation of society, while pop culture critics such as Tesla CEO Elon Musk and Stephen Hawkins warn that artificial intelligence and the singularity may bring about a Terminator-esque dystopia whereby super-intelligent machines dominate humanity (Segarra 2017).

Moore's law is, however, highly unlikely to continue growing at an exponential pace for much longer. Intel's latest 8th generation Core processors use 14 nanometre transistors, whereas the Intel Pentium processor from the mid-1990s used 800 nanometre transistors. As the size of transistors continues to shrink the material limitations of atomic sizes begins to become a potential hard limit for Moore's law. There are likely to be several further generations of microprocessor that maintain the exponential trajectory, but this is likely to cease in the 2020s, as at the 2-3 nanometre limit 'electron behaviour will be governed by quantum uncertainties that will make transistors hopelessly unreliable' (Waldrop 2016). Despite concerted research, there exists no obvious replacement for silicon integrated circuits. While digital technologies are incredibly small, fast and complex, their often-assumed immateriality is a chimera derived from a failure to grasp the speeds and scales involved in microelectronics. Although fantasies of the singularity posit computational technology as immaterial, this mistakes contingent predictions such as Moore's Law for genuine laws of physics.

While the immaterialist fantasies of the technological singularity may seem easy targets for critique, there exists homologous tendencies in sections of left-wing accelerationist literature. For example, Srnicek and Williams (2015) have influentially argued that the left must abandon the fragmented, postmodern narratives of folk-politics and a hostility towards to technology in order to construct an effective counter-hegemonic force to neoliberalism. One of the key contemporary problematics offered as being fundamentally incompatible with localised

solutions is climate change, yet while Srnicek and Williams outline a detailed and compelling discussion of why full automation and a universal basic income would positively impact upon social inequality, there is scant discussion of how this would resolve climate change or other environmental crises. Indeed, a cursory examination of literature explicating the environmental harms caused by digital technologies (e.g. Gabrys 2011, Maxwell & Miller 2012, Taffel 2012, Parikka 2015, Cubitt 2016) strongly suggests that vastly increasing their volume in order to automate labour would escalate environmental degradation and intensify greenhouse gas emissions rather than provide a panacea to these issues. While there are ways of conceptualising a radically repurposed circular economy that begins to address these problems, by ignoring the ecological materialities of the technologies they champion, Srnicek and Williams at times come perilously close to the discourse of technological solutionism.

## Anthropocenic Catastrophism

In glaring contrast to the utopian futures of technological solutionism we find an almost completely inverted vision of the future in the shape of the ecological catastrophism associated with the contested discourse of the Anthropocene, a term demarcating the sum of recent changes to the Earth System that are global in spatial scale and will be perceptible in stratigraphic records for temporalities measured in millions of years. Whereas the discourse of technological solutionism sits uneasily around Lyotard's definition of a metanarrative – some versions epitomise the gradual, heterogenous logic of optimisation, however, the benefits of technology are problematically universalised through claims such as *Here Comes Everybod*y (Shirky 2009), whereas the variants focusing upon the singularity clearly have a teleological and transcendental scope – the Anthropocene unmistakably presents a universal narrative which inverts the Enlightenment discourse of progress, instead positing a dystopian future of ecological collapse. Whereas technological solutionism celebrates exponential change as driving disruptive innovation, the Anthropocene predominantly views exponential change as undesirable perturbations to the ecological conditions that have fostered human civilisation. Whether discussing the unsustainable exponential increase of the human population, or the potential for positive feedbacks (such as thawing methane-laden permafrost) to drive runaway climate change, ensuring that whatever actions humans take, the planet will enter a new attractor state of hothouse Earth which cannot support more than a tiny fraction of the current human population, exponential change is characterised as destructive and unsustainable.

According to proponents of the Anthropocene: "Human activities have become so pervasive and profound that they rival the great forces of Nature and are pu-

shing the Earth into planetary terra incognita" (Steffen, Crutzen & McNeill 2007: 614). Planetary biodiversity is rapidly declining; the extinction rate for vertebrates is a hundred times higher than the background level and rising. This rate of extinction is only equalled within the five previous mass extinction events present in geological records, leading to claims the Anthropocene marks the sixth mass extinction of life on Earth (Ceballos et al 2015, Kolbert 2014). Over eight million tons of plastic waste enter Earth's oceans each year, and it is estimated that by 2050 there will be more plastic than fish in the oceans (World Economic Forum 2016: 7). Atmospheric concentrations of greenhouse gases such as Carbon Dioxide are at levels unseen for over 650,000 years. Extreme weather events are becoming increasingly frequent and common. Climate change refugees are becoming ever more commonplace, as rising sea levels begin rendering low-lying islands such as Tuvalu uninhabitable by humans. Human conflict, war and crises are set to be exasperated by failing harvests and multi-year droughts, with Syria providing a potential template for climate change-induced conflict (Gleick 2014). Ensuing refugee crises have provoked new nationalisms and tightened border controls. The sum of these changes appears to be that humans have been unwise enough to quarrel with the planetary ecology and are consequently discovering that organisms that damage their environment ultimately damage themselves (Bateson 1972).

There have been serious scientific proposals to commence the Anthropocene epoch at the dawn of agriculture and deforestation (Ruddiman et al 2008), colonialism and the transoceanic Columbian exchange of species (Lewis & Maslin 2015) and the industrial revolution (as exemplified by the invention of the steam engine by James Watt in 1784) (Crutzen & Stoermer 2000). The recommendation of the Anthropocene Working Group (AWG) to the International Geological Congress in 2016, however, strongly endorsed 1950, a date associated with the post-World War Two 'Great Acceleration' of multiple globally synchronous perturbations to the Earth System, with over 80% of the AWG indicating a preference for this date (Zalasiewicz et al. 2017: 58). While there was less agreement over the optimal primary stratigraphic marker for the Anthropocene, over 50% of AWG members who indicated a preference opted for one of the two indicators linked to the use of nuclear weapons (Zalasiewicz et al 2017: 59). We can note the resonance between the Anthropocene as a term that gestures towards a planetary extinction event, and a stratigraphical marker which exemplifies the deliberate and systematic eradication of life.

Such a totalising and apocalyptic discourse seems to leave little scope for hope, aside from being amongst the few species to survive this mass extinction of life. The aim of those advancing the discourse within the sciences, however, is to both draw attention to the scale of this multifaceted ecological crisis and mobilise actions designed to alter the current trajectory of planetary ecological changes.

They argue: "We are the first generation with the knowledge of how our activities influence the Earth System, and thus the first generation with the power and the responsibility to change our relationship with the planet" (Steffen et al 2011). Such calls for planetary stewardship have been criticised, however, for failing to take into account the indigenous and environmentalist movements of resistance that have struggled against colonialism, imperialism and capitalism for centuries (Bonneuil & Fressoz 2016).

Equally, the metanarrative of the Anthropocene has come under sustained criticism for claiming that contemporary ecological crises result from the actions of a homogenised humanity, erroneously universalising actions that are primarily attributable to a small fraction of the human population (Moore 2015); for example, less than 10% of the human population are responsible for half of anthropogenic carbon dioxide emissions, while the poorest 50% are responsible for approximately 10% of emissions (Oxfam 2015). The global poor are not to blame for climate change. Consequently, an alternative hypothesis of the Capitalocene has been advanced which contends that the root cause of current ecological crises is not merely 'humans', but the capitalist mode of production that has produced a widening a metabolic rift between society and the planet (Foster, Clark & York 2011), and which now threatens the continuation of capitalist societies (Malm 2015).

A concurrent line of critique emerges around the anthropocentricism inherent to the Anthropocene; whereas almost five hundred years of scientific discovery from Copernicus, via Darwin to the human microbiome project have gradually undermined the previously assumed centrality of humanity, the Anthropocene inverts this trend, positioning humans as a "geological superpower" (Barry & Maslin 2016: 6). At a time where discourses of the posthuman, more-than-human and new materialism have become increasingly prominent in the humanities and social sciences, this reversion to placing an abstracted, isolated and universalised humanity at the heart of ecological change has attracted criticism for aberrantly claiming that these problems are homogenously produced by humans and failing to recognise that such activities are always the result of a polyphonic assemblage in which humans are only part of the ecological context (Haraway 2015, Tsing 2015). The Anthropocene is not solely attributable to humanity, but an assemblage that additionally contains cows, corn, combustion engines, computers, neonicotinoids, nitrogen-based fertilisers and innumerable other nonhuman agents.

If the Anthropocenic contention that humans have become a geological superpower that rivals the great forces of Nature suggests a new metanarrative of ecological catastrophe, these lines of critique – that such accounts homogenise humanity, neglect the differing roles played by diverse assemblages of nonhumans, erase centuries of struggle against colonialism and capitalism, and fail to adequately account for the inhuman role of the capitalist mode of production in

structuring these relationships – collectively ask us to look beyond this universalism.  Doing so reintroduces the possibility for hope in the Anthropocene, as moving beyond the trope of an all-encompassing ecological catastrophism re-inserts space for agencies to effect changes and implement alternative ways of living.

Whereas technological solutionism and the Anthropocene present seemingly incompatible narratives about the future, I next turn to Tesla Inc. as an enterprise which exemplifies one prominent way that technological solutionism and the Anthropocene encounter one another. As we shall see, Tesla's value is predicated upon the belief that ecological catastrophe can be averted by introducing new commodities that will effectively allow humanity to consume their way out of ecological crises. Following the neoliberal ideology that markets and competition are the optimal way of approaching complex problems, Tesla aims to save the environment by becoming the market leader in the automotive and energy storage sectors.

## Tesla: Technological Solutionism meets the Anthropocene

Founded in 2003 as Tesla Motors, Tesla Inc. specialise in battery-powered electrical devices, primarily cars and Powerwall energy storage systems, with a subsidiary company (SolarCity) producing photovoltaic (solar) panels. The company's series A financing round in 2004 saw Elon Musk – who became a multimillionaire following the sale of his earlier technology start-ups Zip2 and PayPal – become chairman of the board of directors and Tesla's controlling investor. After investing $US55 million into Tesla, who struggled to meet production schedules for their initial offering – the Roadster – Musk became Tesla's CEO in October 2008 (Baer 2014). As of October 2018, Tesla's market capitalisation is $US50 billion, higher than that of rival automotive manufacturers such as Ford, whose market capitalisation stands at $US34 billion. This valuation seems remarkable when considering that in 2017 Tesla sold 103,020 vehicles whereas over the same period Ford sold 6,607,000 vehicles (Ford Motor Company 2018: 2). Tesla's net income for this period was a loss of $US 2.24 billion (Tesla 2018), whereas Ford made a profit of $US 8.4 billion (Ford Motor Company 2018: 1).

Given that Tesla are making significant losses and selling 65 times less automobiles than Ford, one might legitimately question why their market valuation exceeds that of Ford. The answer is that Tesla's valuation is primarily futural in orientation, it is not predicated upon past or current performance, but represents a wager from investors who believe that Tesla will become the dominant player in the electrical vehicle and domestic energy storage sectors by importing the logic of disruptive innovation to these areas. Following in the footsteps of Steve Jobs, Bill Gates and Mark Zuckerberg, Musk is lauded as a charismatic CEO who ful-

fils the role of the 'genius', 'visionary', individual associated with the brand. His rhetoric of mobilising "a popular uprising" (Musk quoted in Mack 2016) against the fossil fuel industries to save the planet from ecological catastrophe resonates with the permanent revolution of technological solutionism and the discourse of green capitalism. This contends that in response to Anthropocenic ecological crises, market mechanisms and individual consumption of newfound 'smart', 'green' technologies will allow the continuation of neoliberal business-as-usual. Far from being a crisis of capitalism, the Anthropocene is understood as a business opportunity. While the commodification of ecological politics is far from a novel strategy, Tesla's market valuation demarcates the extent to which investors have been willing to wager that Tesla's electric vehicles will be highly profitable solutions to climate change. Bearing this in mind, it is perhaps unsurprising that materialist critique which scrutinises Tesla's environmental and labour practices reveals that far from saving the planet, producing and powering Tesla products substantially contributes to social and environmental harms.

Generally speaking, electric vehicles (EV) produce lower greenhouse gas emissions than internal-combustion-engine vehicles (ICEV) (Miotti et al 2016), however, the respective lifecycle emissions of vehicles depend upon numerous factors, notably the longevity of the vehicle and how the electricity used to power EVs is generated. Indeed, for vehicles used for 270,000km in the US midwest (or a region with a similar electricity mix) a Tesla Model S EV would have a lifecycle emission total of 61,115 kg $CO_2$e, higher than a Mitsubishi Mirage ICEV (51,891 kg $CO_2$e) (McGee 2017), correlating with other studies which have concluded that 'larger EVs can have higher lifecycle GHG emissions than smaller conventional vehicles' (Ellingsen, Singh & Strømman 2016: 7), if electricity is primarily derived from the combustion of fossil fuels. As Tesla exclusively produce large, luxurious EVs, this suggests that far from living up the rhetoric of saving the planet, they are perpetuating the problem of greenhouse gas emissions from large personal transportation vehicles. Although EVs produce lower emissions through usage, they tend to have higher emissions associated with their production and end of life treatment (Ellingsen, Singh & Strømman 2016: 5), entailing that they are never zero emission vehicles, and that small EVs will always produce significantly lower lifecycle emissions than Tesla's.

The extraction of materials for Tesla's lithium ion batteries is not only a significant source of greenhouse gas emissions, but has additional negative impacts on human and other biotic systems. Approximately 40% of all extracted lithium is used in manufacturing lithium-ion batteries which are also used in smartphones, laptops, tablets and other battery powered portable microelectronic devices. The battery pack in a Tesla Model S contains around 63kg of lithium, as much as 10,000 mobile phones, or triple that used in some smaller EVs (Goldman Sa-

chs 2015: 17). Consequently, EVs are likely to treble the total global demand for lithium between 2015-2025 (Goldman Sachs 2015: 7), and already rising demand resulted in the spot market price of tripling during 2016 (Romei 2016).

Lithium is produced through evaporating water from lithium-rich brine, primarily in Andean regions of Chile, Argentina and Bolivia but also in China, or through mining lithium-rich pegmatite ores, predominantly in Australia. Over half of all the lithium produced in 2016 originated from Chile and Argentina, and along with Bolivia, these nations have around two thirds of global reserves and resources (USGS 2017). The Andean lithium triangle includes the Atacama regions of Chile and Argentina, one of the driest places on Earth which receives under four inches of rain a year. Lithium mining is a hugely water intensive process, and this has led to tensions between the multinational mining corporations and local indigenous communities who suffer shortages of drinkable water and lack functional sewerage systems. The chlorinated saltwater that is a by-product of evaporating lithium is corrosive and toxic to life, irreversibly altering Atacama's unique and fragile ecology.

According to the Washington Post, mining contracts see multinational corporations generate $US250 million per annum in lithium sales, while indigenous groups receive annual payments of between US$9,000-60,000 as recompense for ecological damage and water shortages (Frankel and Whoriskey 2016). As Sean Cubitt (2016: 64–70) surmises, the indigenous people of the Atacama, their culture and the unique ecology of the area become invisible under a modernised version of the colonial doctrine of *terra nullius*. Tesla's public image as a clean, green technology company is built upon this erasure and greenwash which erroneously contends that electric vehicles are a harmless, zero emission way of tackling climate change. The global narrative of technological solutionism here masks the material reality of the economic exploitation and ecological devastation that is all-too-commonly associated with the globalised extraction industries.

The cathode of the batteries employed by Tesla do not only contain lithium. While several distinct chemistries lithium ion batteries exist, Tesla currently utilises lithium-nickel-cobalt batteries. Cobalt has serious labour rights issues attached to its production. The Democratic Republic of Congo (DRC) produces the majority of the world's cobalt, and houses almost half of global reserves (USGS 2017: 53). DRC is one of the poorest nations on the planet, and exemplifies the 'resource curse', whereby the state's array of valuable minerals paradoxically is associated with less wealth, stability and democracy than neighbouring countries with fewer resources. Between 1996 and 2003 the two Congo wars saw around 5.4 million direct or indirect deaths (Coghlan et al 2006), and there have subsequently been enduring internal conflicts. DRC has long been associated with conflict minerals that are necessary for contemporary digital electronics, with tantalum, tin,

tungsten and gold (all of which are mined in the North-Eastern Kivu provinces) funding warlords and militias (Taffel 2015). Cobalt has received less international attention as it is primary mined in the southern Katanga province where there has been less domestic conflict. Investigations into the conditions at Congolese cobalt mines, however, reveal workers as young as four-years-old, often earning as little as 11 US cents per hour (Crawford 2016) for manually removing ore from the ground. NGOs estimate that around 40,000 Congolese artisanal cobalt miners are children (Walther 2012). Again, we find that behind the veil of technological solutionism lurks deeply inequitable and exploitative activities.

In response to criticism surrounding the usage of Congolese cobalt, Tesla have declared an intention to source all raw materials from North America. In 2016, North American cobalt production amounted to under 8,000 tons, around 5% of the global total (USGS 2017: 53). Tesla aim to produce 500,000 Model 3 EVs in 2018; doing so would require more cobalt than is extracted from North America (Gandon 2017), and this is before considering Tesla's other EV models and energy storage systems. Either Tesla cannot exclusively use North American cobalt, or they must produce dramatically far fewer cars than intended. The alarming gap between rhetoric and material reality is once again rendered visible through materialist critique; technological solutionism fails to acknowledge scarcities that constrain the immaterialist fantasy of abundance.

Environmentalist claims surrounding scarcity themselves should, however, be subjected to scrutiny because of a historical tendency to underestimate the potential for technological advancement. For example, Paul Ehrlich (1968: xi) predicted that "In the 1970s and 1980s hundreds of millions of people will starve to death", failing to foresee that the suite of technologies collectively known as the Green Revolution would substantially increase global food production. Similarly, theories of peak oil, beginning with M. King Huppert's (1979) 1956 predictions forecast a peak in global oil production around 2000 (Heinberg 2005), however, the development of unconventional oil sources – such as hydraulic fracturing and tar sands – have seen these predictions fail to eventuate. In both cases, however, these technological alterations are associated with significant ecological harms; the contamination of water supplies and greenhouse gas emissions associated with fracking and tar sands, and the disruptions to the nitrogen cycle associated with synthetic fertilisers and reduction in biodiversity connected to increased pesticide usage. Technological solutions may resolve particular crises, but often produce serious harms elsewhere in the Earth System.

## Conclusion: Hope and Materialism

Returning to the question of metanarratives, we should not envisage the future as being teleologically driven towards either technological salvation or ecological apocalypse, both of which negate the roles of material specificities and collective agencies in producing differences that make differences. A detailed consideration of the labour and environmental issues present in the production of Tesla's EVs punctures utopian claims that these vehicles will usher in an era of carbon neutral, environmentally friendly transportation. If we seriously consider Zuckerberg's question about building desirable futures – while removing its solutionist context – we are left questioning whether the environmental devastation, externalisation of harm onto indigenous communities, and child labour that are currently necessary for the production of Tesla's EV are desirable. If the answer is no, the question then shifts towards contemplating how to approach Anthropocenic catastrophism with hope while avoiding the immaterialist fantasy of technological solutionism.

One answer, is that in an age where anthropogenic activities are responsible for a mass extinction of life forms, there is no hope beyond Tsing's call for learning to cope with the distress and disorientation of living in degraded environments, that anything more is liable to slip into fantasies of universalist, anthropocentric discourses of control, mastery and technological solutionism. For Tsing, whereas technology can rapidly scale to form monopolistic global platforms such as Facebook, Google and Amazon, such scalability cannot extend into the realms of ecological systems. Multispecies assemblages and mutualistic transformation produce differentiated entities that can only be examined through natural history and ethnography, through local specificity rather than the expansionist command and control paradigm of mathematics and algorithms which underpins contemporary forms of computational neoliberalism.

This approach undeniably has merit, as is evidenced by the need to consider the specificities and affordances of different materials, sites and conditions of extraction associated with lithium ion batteries. However, this localism at once exemplifies the folk politics that Srnicek and Williams critique as being fundamentally incapable of addressing global social and environmental crises whilst also adopting an affective tone characterised by despair and disenchantment. This may be a realistic appraisal of the state of life in the Anthropocene, but the performative function of such writing is likely to eradicate any sense of hope. Hope is a key affect that mobilises activism and social change (Castells 2015); without hope we are likely to fall into despair and consequently succumb to the fallacy that societal collapse is the only escape from capitalist social relations. In order to challenge the exploitative system of neoliberal technocultural relations and the "deep pessimism of those who believe the future is now an inevitable catastrophe" (Goode & Godhe 2017: 126) it is therefore crucial to find ways of mobilising a fragile form of

hope that acknowledges the severity of contemporaneous ecological crises and the fallacies of technological solutionism, but which does not consequently reduce expectations of the future to mere survival. Instead, fragile hope must recognise the potential for significant positive change to be enacted through mobilising collective action to construct commons and publics, thereby contesting the neoliberal fetishization of markets and competition. This should not, however, be read as an opportunity to insert a metanarrative of redemption, a teleological march towards a utopian, post-antagonistic age of ecological and social harmony. Paraphrasing Gramsci, the challenge of (post)modernity is to live without illusions (of technological solutionism) without becoming disillusioned (by the scale of Anthropocenic ecological crises). It is precisely this challenge that the performative function fragile hope seeks to address.

It is pertinent here to critique precisely the kind of individualistic consumption central to Tesla's appeal, instead contemplating how technocultural systems could be redesigned to enhance socially equity and ecological resilience. Tesla produce large, luxurious, expensive EVs to function as direct replacements for the predominantly individualised mode of transportation that became dominant during the twentieth century; the solution to the problem of ICEVs is thereby understood as transforming vehicle propulsion rather than rethinking transportation systems. Rather than merely altering individual vehicles, a more environmentally sustainable, equitable and resilient transportation network could involve substantive roles for electrified public transportation alongside improved infrastructure for cyclists and pedestrians. This is not to say that EVs cannot be part of this mix, with small EVs such as the Nissan Leaf potentially offering far more promising pathways than Tesla's, however, this approach involves reconceptualising transportation as an assemblage where individual mechanised transportation plays a less dominant role. This vision for transportational infrastructure is more transformative and sustainable than one dominated by large EVs that require substantial quantities of lithium and cobalt.

For Tesla the answer to the Anthropocenic conjuncture is more individualised consumption and ever-increasing economic growth, repeating the erroneous ideology of capitalist realism which fundamentally cannot be realigned with the material reality of a finite planet. A more realistic, yet hopeful alternative involves redistributing wealth away from the 10% of the human population who are responsible for half of greenhouse gas emissions and are the privileged minority who can realistically contemplate purchasing Tesla's EVs. This does not mean rejecting technology in favour of returning to a pre-industrial state, but re-envisioning how technologies can be employed to create postcapitalist futures that escape both the naive optimism of technological solutionism and the catastrophism of the Anthropocene. While it may appear to be an oxymoron to speak of hope in an

age of mass extinctions, the performative function of fragile hope is a pre-requisite for escaping the despair and defeatism that makes catastrophic futures more likely to eventuate.

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# References

Baer, Drake (2014): "The Making Of Tesla: Invention, Betrayal and the Birth of the Roadster", https://www.businessinsider.com.au/tesla-the-origin-story-2014-10?r=US&IR=T. (accessed 24/10/2018)

Barbrook, Richard and Andy Cameron (1996): "The Californian Ideology", *Science as Culture*, 6:1, 44–72.

Barlow, John Perry (1996): "A Declaration of the Independence of Cyberspace", https://projects.eff.org/~barlow/Declaration-Final.html, (accessed 06/05/2014).

Barry, Andrew and Mark Maslin (2016): "The Politics of the Anthropocene: A Dialogue", *Geo: Geography and Environment*, 3;2, e00022-n/a. doi: 10.1002/geo2.22.

Bateson, Gregory (1972): *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology*, University of Chicago Press.

Beer, David (2008): "Social Network (ing) Sites… Revisiting the Story so Far: A Response to danah boyd & Nicole Ellison", *Journal of Computer-Mediated Communication*, 13:2, 516–529

Beer, David (2015): "Productive Measures: Culture and Measurement in the Context of Everyday Neoliberalism", *Big Data & Society*, 2:1, 1–13

Beer, David (2016): *Metric Power*, Basingstoke: Palgrave Macmillan.

Berardi, Franco (2009): *Precarious Rhapsody*, London: Minor Compositions.

Bonneuil, Christophe and Jean-Baptiste Fressoz (2016): *The Shock of the Anthropocene: The Earth, History and Us*, London: Verso Books.

Castells, Manuel (2015): *Networks of Outrage and Hope: Social Movements in the Internet Age*, John Wiley & Sons.

Ceballos, Gerardo, Paul R. Ehrlich, Anthony D. Barnosky, Andrés García, Robert M. Pringle, and Todd M. Palmer (2015): "Accelerated Modern Human–Induced Species Losses: Entering the Sixth Mass Extinction", *Science Advances*, 1:5, 1-5.

Coghlan, Benjamin, Richard J Brennan, Pascal Ngoy, David Dofara, Brad Otto, Mark Clements, and Tony Stewart (2006): "Mortality in the Democratic Republic of Congo: a nationwide survey", *The Lancet* 367:9504, 44-51.

Crary, Jonathan (2013): *24/7: Late Capitalism and the Ends of Sleep*, London and New York: Verso.

Crawford, Alex (2016): "Meet Dorsen, 8, who Mines Cobalt to make your Smartphone Work." https://news.sky.com/story/meet-dorsen-8-who-mines-cobalt-to-make-your-smartphone-work-10784120. (accessed 24/10/2018)

Crutzen, P.J. and E.F. Stoermer (2000): "The "Anthropocene", *Global Change Newsletter*, 41, 17–18. *International Geosphere–Biosphere Programme (IGBP)*.

Cubitt, Sean (2016): *Finite Media: Environmental Implications of Digital Technologies*, Durham: Duke University Press.

Dean, Jodi (2009): *Democracy and Other Neoliberal Fantasies: Communicative Capitalism and Left Politics*, Duke University Press.

Ellingsen, Linda Ager-Wick, Bhawna Singh and Anders Hammer Strømman (2016): "The Size and Range Effect: Lifecycle Greenhouse Gas Emissions of Electric Vehicles", *Environmental Research Letters* 11:5, 054010.

Enzensberger, Hans Magnus (1970): "Constituents of a Theory of the Media", *New Left Review*, 64, 13–36.

Fisher, Mark (2009): *Capitalist Realism: Is there no Alternative?*, Winchester, UK: Zero Books.

Flew, Terry (2014): "Six Theories of Neoliberalism", *Thesis Eleven*: 122:1, 49–71. doi: 10.1177/0725513614535965.

Ford Motor Company (2018): *2017 Fourth Quarter and Full Year Financial Results,* https://media.ford.com/content/dam/fordmedia/North%20America/US/2018/01/24/4q-17-financial.pdf (accessed 24/10/2018)

Foster, John Bellamy, Brett Clark and Richard York (2011): *The Ecological Rift: Capitalism's War on the Earth*, New York: Monthly Review Press.

Frankel, Todd and Peter Whoriskey (2016): "Tossed Aside in the 'White Gold' Rush", *Washington Post*. https://www.washingtonpost.com/graphics/business/batteries/tossed-aside-in-the-lithium-rush/. (accessed 24/10/2018)

Fuchs, Christian (2010): "Labor in Informational Capitalism and on the Internet", *The Information Society* 26:3, 179–196.

Fuchs, Christian (2012): "The Political Economy of Privacy on Facebook", *Television & New Media*, 13:2, 139-159.

Gabrys, Jennifer (2011): *Digital Rubbish: A Natural History of Electronics*, Minnesota: University of Michigan Press.

Gandon, Sebastien (2017): "No Cobalt, No Tesla", https://techcrunch.com/2017/01/01/no-cobalt-no-tesla/. (accessed 24/10/2018)

Gleick, Peter H. (2014): "Water, Drought, Climate Change, and Conflict in Syria", *Weather, Climate, and Society*, 6:3, 331–340. doi: 10.1175/wcas-d-13-00059.1.

Goode, Luke and Michael Godhe (2017): "Beyond Capitalist Realism - Why We Need Critical Future Studies", *Culture Unbound: Journal of Current Cultural Research*, 9:1, 109-129.

Greenfield, Adam (2017): *Radical Technologies: The Design of Everyday Life*, Verso Books.

Hall, Stuart (2011): "The Neo-Liberal Revolution", *Cultural Studies*, 25:6, 705–728. doi: 10.1080/09502386.2011.619886.

Haraway, Donna (2015): "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities*, 6, 159–165.

Harvey, David (2005): *A Brief History of Neoliberalism*, Oxford: Oxford University Press.

Heinberg, Richard (2005): *The Party's Over: Oil, War and the Fate of Industrial Societies*, Forest Row: Clairview books.

Higgins, Tim (2017): "Tesla Narrowly Misses 80,000-Vehicle Sales Goal in 2016", https://www.wsj.com/articles/tesla-misses-its-2016-sales-goal-despite-27-fourth-quarter-rise-1483479562. (accessed 24/10/2018)

Hubbert, M. King (1979): "Hubbert Estimates from 1956 to 1974 of US Oil and Gas", Michel Grenon (ed.): *Methods and Models for Assessing Energy Resources*, Oxford, UK: Pergamon Press, 370-383.

Jenkins, Henry (2006): *Convergence Culture: Where Old and New Media Collide*, New York: New York University Press.

Kolbert, Elizabeth (2014): *The Sixth Extinction: An Unnatural History*, New York: Henry Holt and Co.

Kurzweil, Ray (2005): *The Singularity is Near*, London: Viking Penguin.

Larner, Wendy (2003): "Neoliberalism?", *Environment and Planning D: Society and*

*Space*, 21, 509–512.

Lévy, Pierre (1999): *Collective Intelligence: Mankind's Emerging World in Cyberspace*, Cambridge, MA: Perseus Publishing.

Lewis, Simon L and Mark A Maslin (2015): "Defining the Anthropocene", *Nature*, 519:7542, 171–180.

Lyotard, Jean-François (1984): *The Postmodern Condition: A Report on Knowledge*, Minneapolis: University of Minnesota Press.

Mack, Eric (2016): "How Tesla And Elon Musk's 'Gigafactories' Could Save The World." https://www.forbes.com/sites/ericmack/2016/10/30/how-tesla-and-elon-musk-could-save-the-world-with-gigafactories/#57f2d3752de8. (accessed 24/10/2018)

Malm, Andreas (2015): "The Anthropocene Myth", https://www.jacobinmag.com/2015/03/anthropocene-capitalism-climate-change/ (accessed 24/10/2018)

Maxwell, Richard and Toby Miller (2012): *Greening the Media*, Oxford: Oxford University Press.

McChesney, Robert W. (2013): *Digital Disconnect: How Capitalism is Turning the Internet Against Democracy*, New York: New Press.

McGee, Patrick (2017): "Electric cars' green image blackens beneath the bonnet", *Financial Times*, November 8th 2017, https://www.ft.com/content/a22ff86e-ba37-11e7-9bfb-4a9c83ffa852 (accessed 24/10/2018)

McGonigal, Jane (2011): *Reality is Broken: Why Games Make us Better and How They Can Change the World*, New York: Penguin.

McLuhan, Marshall (1964): *Understanding Media: The Extensions of Man*, London: Routledge.

Miotti, Marco, Geoffrey J. Supran, Ella J. Kim and Jessika E. Trancik (2016): "Personal Vehicles Evaluated against Climate Change Mitigation Targets", *Environmental Science & Technology*, 50:20, 10795-10804. doi: 10.1021/acs.est.6b00177.

Moore, Jason W. (2015): *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*, New York: Verso Books.

Morozov, Evgeny (2014): *To Save Everything, Click Here: The Folly of Technological Solutionism*, London: Penguin.

Negroponte, Nicholas (1998): "Beyond Digital", http://www.wired.com/wired/archive/6.12/negroponte.html, (accessed 13/08/2013).

Oxfam (2015): "Extreme Carbon Inequality: Why the Paris climate deal must put the poorest, lowest emitting and most vulnerable people first", https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/mb-extreme-carbon-inequality-021215-en.pdf. (accessed 24/10/2018)

Parikka, Jussi (2015): *A Geology of Media*, Minneapolis: University of Minnesota Press.

Peck, Jamie (2010): *Constructions of Neoliberal Reason*, Oxford University Press.

Romei, Valentina (2016): "Lithium Price on the Rise", *Financial Times*, April 15 2016. https://www.ft.com/content/2bfba977-4715-3466-befa-f6cf60f13d14.

Ruddiman, William F, Zhengtang Guo, Xin Zhou, Hanbin Wu and Yanyan Yu (2008): "Early Rice Farming and Anomalous Methane Trends", *Quaternary Science Reviews*, 27:13, 1291-1295.

Sachs, Goldman (2015): "Emerging Theme Radar: What If I Told You", http://www.goldmansachs.com/our-thinking/pages/macroeconomic-insights-folder/what-if-i-told-you/report.pdf. (accessed 24/10/2018)

Scholz, Trebor (2012): *Digital Labor: The Internet as Playground and Factory*, New York: Routledge.

Segarra, Lisa (2017): "Elon Musk: AI Poses 'Vastly More Threat Than North Korea'." http://fortune.com/2017/08/12/elon-musk-ai-poses-vastly-more-risk-than-north-korea/. (accessed 24/10/2018)

Shanahan, Murray (2015): *The Technological Singularity*, Cambridge, MA: The MIT

Press.

Shirky, Clay (2009): *Here Comes Everybody: How Change happens When People Come Together*, London: Penguin.

Srnicek, Nick, and Alex Williams (2015): *Inventing the Future: Postcapitalism and World Without Work*, London: Verso.

Steffen, Will, Paul J. Crutzen and John R. McNeill (2007): "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?", *AMBIO: A Journal of the Human Environment*, 36:8, 614–621. doi: 10.1579/0044-7447(2007)36[614:TAAHNO]2.0.CO;2.

Steffen, Will, Jacques Grinevald, Paul Crutzen and John McNeill (2011): "The Anthropocene: Conceptual and Historical Perspectives", *Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*, 369:1938, 842–867.

Stengers, Isabellem (2015): *In Catastrophic Times: Resisting the Coming Barbarism*, London: Open Humanities Press.

Sterne, Jonathan (2014): "'What Do We Want?' 'Materiality!' 'When Do We Want It?' 'Now!'", Tarleton Gillespie, Pablo J. Boczkowski and Kirsten A. Foot (eds): *Media Technologies: Essays on Communication, Materiality and Society,* Cambridge, MA: The MIT Press.

Stiegler, Bernard (2017): *Automatic Society: The Future of Work*, New York: John Wiley & Sons.

Taffel, Sy (2012): "Escaping Attention: Digital Media Hardware, Materiality and Ecological Cost", *Culture Machine* 13, 1-28.

Taffel, Sy (2015): "Towards an Ethical Electronics? Ecologies of Congolese Conflict Minerals", *Westminster Papers in Communication and Culture*, 10:1, 18-33.

Terranova, Tiziana (2000): "Free Labor: Producing Culture for the Digital Economy", *Social text* 18:2, 33-58.

Tesla (2018): United States Securities and Exchange Commision Form 10-K Annual Report for the Fiscal Year Ending Sunday, December 31, 2017

Tsing, Anna Lowenhaupt (2015): *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, Princeton and Oxford: Princeton University Press.

Ulam, S. (1958): "John von Neumann 1903–1957", *Bulletin of the American Mathematical Society*, 64, 1-49.

USGS (2017): Mineral Commodites Summaries 2017. US Geological Survey.

Van Dijck, Jose (2013): *The Culture of Connectivity: A Critical History of Social Media*, New York: Oxford University Press.

Venugopal, Rajesh (2015): "Neoliberalism as Concept", *Economy and Society*, 44:2, 165–187. doi: 10.1080/03085147.2015.1013356.

Vinge, Vernor (1993): "The Coming Technological Singularity", *Whole Earth Review*, 81, 88-95.

Waldrop, M Mitchell (2016): "The Chips are Down for Moore's Law", *Nature*, 530:7589, 144–147.

Walther, Cornelia (2012): "In DR Congo, UNICEF Supports Efforts to Help Child Labourers Return to School", *UNICEF*, https://www.unicef.org/childsurvival/drcongo_62627.html. (accessed 24/10/2018)

Williams, Raymond (1974): *Television: Technology and Cultural Form*, London: Routledge.

World Economic Forum (2016): *The New Plastics Economy: Rethinking the Future of Plastics*, http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf (accessed 24/10/2018)

Zalasiewicz, Jan, Colin N Waters, Mark Williams, Anthony D Barnosky, Alejandro Cearreta, Paul Crutzen, Erle Ellis, Michael A Ellis, Ian J Fairchild, and Jacques Grinevald (2015): "When did the Anthropocene Begin? A Mid-Twentieth Century

Boundary Level is Stratigraphically Optimal", *Quaternary International*, 383, 196–203.

Zalasiewicz, Jan, Colin N Waters, Colin P Summerhayes, Alexander P Wolfe, Anthony D Barnosky, Alejandro Cearreta, Paul Crutzen, Erle Ellis, Ian J Fairchild, and Agnieszka Gałuszka (2017): "The Working Group on the Anthropocene: Summary of evidence and interim recommendations", *Anthropocene*, 19, 55–60.

Zuckerberg, Mark (2017): "Building Global Community", https://www.facebook.com/notes/mark-zuckerberg/building-global-community/10154544292806634/. (accessed 24/10/2018)

# Life, but not as we know it:
# A.I. and the popular imagination

By Luke Goode

## Abstract

Advances in artificial intelligence (A.I.) are prompting a growing chorus of both excitement and anxiety. A.I. is widely perceived as a significant emerging and future-shaping technological field that is developing at an accelerating rate. As such, futuristic imagery involving A.I. is increasingly prevalent in popular media. A central task for critical future studies is to assess both positive and problematic aspects of the futuristic scenarios offered up for public consumption, and to evaluate their role as part of a 'futural public sphere' (Goode & Godhe 2017). In this paper, I discuss three distinct but interwoven strands of public discourse that each have a role to play in shaping the popular imagination around possible A.I. futures. I begin with a selective discussion of mainstream science fiction representations. Secondly, I consider several recent and high-profile popular media events surrounding real-world developments in A.I. Finally, I turn to contemporary futurology and, specifically, the discourse of the 'singularity' which posits a near future in which artificial 'superintelligence' outstrips human cognitive capacities. In this paper I argue that, while much popular coverage of A.I. is sensationalist and potentially misleading, public engagement with a complex, technical subject such as this depends on the circulation of 'evocative stories' which can act as entry points into public debate. As such, it is important to understand the evocative power of the stories we frequently tell ourselves in popular discourse about A.I. and its role in our future.

# Introduction

Advances in artificial intelligence (A.I.) are prompting a growing chorus of both excitement and anxiety within popular discourse. A.I. is widely perceived as a significant emerging and future-shaping technological field, one that is developing at an accelerating rate. As such, futuristic imagery involving A.I. is increasingly prevalent in popular media. A central task for critical future studies is to assess both positive and problematic aspects of the futuristic scenarios offered up for public consumption, and to evaluate their role as part of a 'futural public sphere' – a space in which lay citizens, informed by experts, can imagine and discuss potential futures (whether desirable or undesirable) and reflect on their own role in trying to shape the future (Goode & Godhe 2017). In this paper, I discuss three distinct but interwoven strands of public discourse that each have a role to play in shaping the popular imagination around possible A.I. futures. I begin with a selective discussion of mainstream science fiction represenations. Secondly, I consider several recent and high-profile popular media events surrounding real-world developments in A.I. Finally, I turn to contemporary futurology and, specifically, the discourse of the 'singularity' which posits a near future in which artificial 'superintelligence' outstrips human cognitive capacities.

A number of A.I. experts and technology commentators worry that the goal of meaningful public debate around A.I. is not being well served by popular media that commonly present sensationalist and hyped-up coverage of both the potential benefits and threats posed by the technology. Popular discourse, in this view, is becoming 'unhinged' from reality (Schwartz 2018), or promoting a form of 'magical thinking' (Elish & boyd 2018) focused on apparently wondorous new *products* (and not necessarily the most socially significant ones), while discouraging critical reflection on the *processes* and *principles* underpinning them[1]. But while I acknowledge various problematic and distorting aspects of contemporary discourse in this paper, I proceed from a somewhat different point of departure. I begin from the premise that knowledge is a necessary, but insufficient, condition for meaningful public engagement with future-shaping issues such as A.I. Following 'futures literacy' expert Riel Miller (2007), I take it as axiomatic that 'evocative stories' capable of capturing attention and inspiring imagination are also essential catalysts for citizen engagement, especially given the double abstraction involved in grasping a highly complex and technical subject *and* projecting it futurewards. Seeking only to critique the emotive, mythical or fanciful aspects of the discourse in service of an idealised model of rational, deliberative public discourse can only take us so far, I suggest. What I aim to develop in this paper is a critical appreciation for the evocative power of the stories we frequently tell ourselves in popular discourse about A.I. and its role in our future.

In part, the affective potency of popular A.I. narratives can be viewed in the context of a lengthy cultural history of the American (but also more broadly anglophone) 'technological sublime' (Nye 1994; cf. Mosco 2004 on the 'digital sublime'), whereby powerful new technologies, imbued with the power to re-shape society, are capable of inspiring excitement, awe and even reverence, but also intense fear or anxiety.[2] But I also want to discuss how A.I. narratives evoke a strong sense of the uncanny. In more vernacular parlance, this means grappling with the fact that A.I. has a tendency to be perceived as 'creepy' by appearing to occupy an uncomfortable non-space between Western (and humanist) conceptions of life versus non-life.[3] I suggest that we need to understand and even appreciate the evocative power of contemporary A.I. narratives, even while acknowledging their distortions and obfuscations, because, in addressing the perceived shortcomings of a futural public sphere, we are faced with at least one of two tasks if we accept its unavoidably affective and culturally embedded, as well as deliberative, dimensions: (1) repurposing and reframing the available repetoire of popular A.I. narratives as 'gateways' to more critical questioning and debate than is hitherto apparent; and/or (2) generating new evocative narratives beyond the clichés of the contemporary popular repetoire that are capable of expanding capacities for both imagination and critical reflection. While exploring either of these paths (and their relative merits) lies beyond the scope of this paper, both depend upon a critical appreciation for what makes the existing narratives compelling.

## A.I. in Science Fiction

Depictions of a future in which A.I. (whether depicted as robots or as talking computers) begins to outstrip human intelligence have been a staple trope in science fiction (SF) since the early twentieth century. Typically, these futuristic scenarios are settings for a machine uprising narrative. Karel Capek's 1921 play, *R.U.R.* (Rossum's Universal Robots) was the first science fiction story to depict such a rebellion, featuring a 'race' of humanoid machine workers rising up against their oppressive human master (Capek 2004). Capek's play introduced the word 'robot' into the SF (and subsequently the scientific) lexicon. Significantly, it derives from the Slavonic word *robota*, meaning forced labour: and while I will touch on recent exceptions below, mainstream SF has certainly helped entrench a narrow, binary framing of technology as something that either serves us or enslaves us, a problematic framing that continues to reverberate today through non-fictional debates surrounding the politics and ethics of technology (e.g. Bartlett 2018; Leonhard 2016).

SF tales of slave rebellion are, of course, frequently read not as literal speculations on the future, but as ancient parables or myths dressed in modern garb, or

as sociological commentaries on contemporary society, enabled by SF's capacity for extrapolating, hyperbolising or *estranging* audiences, while building worlds that are nonetheless recognisable derivations of the familiar present (Suvin 1979). Capek's play, for example, and so too Fritz Lang's seminal robot film *Metropolis* (1927), spoke to the turbulent industrial politics of their time, including issues surrounding worker oppression. But the literal notion of a dangerous machine intelligence threatening to outwit, overthrow or exact revenge on its human masters has continued to reverberate through science fiction and to haunt the popular imagination as real world advances in digital technology have gathered pace, notwithstanding some notable and popular exceptions depicting benevolent A.I. 'characters': for example, the eponymous *Wall-E* (2008), Data in *Star Trek: The Next Generation* (1987-1994), and Robby in *Lost in Space* (1965-1968).

In the mid-century Cold War climate, Stanley Kubrick's 1968 *2001: A Space Odyssey* (simultaneously developed as a short novel by Arthur C. Clarke) was a further significant moment for the dangerous A.I. trope on the big screen: here, the space shuttle's on-board computer HAL – realised simply but ominously as a red blinking light and an eerily disembodied voice – morphs from a supercilious yet benign assistant into a murderous psychopath. Where SF *literature* had its greatest impact on popular discourses of A.I. or machine intelligence during the mid-20th century was through the work of Isaac Asimov, whose robot stories (including *I, Robot*, later adapted for cinema), helped entrench what he (critically) called the 'Frankenstein complex': this, in essence, is the fear that, while we can and should carefully programme safeguards into potentially dangerous or rebellious A.I. – specifically his famous three (later revised to four) laws of robotics – unanticipated disasters may still befall us as machine learning raises the prospect of technology evolving independently of human intent (McCauley 2007). But despite crafting tales of conflict and suspense, Asimov's largely optimistic depictions of A.I. in the future were, in keeping with the thrust of 'Golden Age' print SF more generally, intended primarily to excite readers with a sense of the radical possibilities of 'positronic brains' while reassuring them of our rational scientific capacity to avert catastrophe. And while Asimov's robotic characters challenged readers to ponder the possibility of artificial 'life' and synthetic personhood, they did not share the uncanny and unsettling force of Kubrick's HAL, nor the full apocalyptic threat of another terrifying and rebellious machine that followed him onto the big screen some 16 years later and which was to leave an even greater mark on popular discourses of A.I (see Lovén 1999).

*The Terminator* franchise (1984–) began as personal computing was becoming an increasingly pervasive and culture-defining phenomenon. Shaped not only by the mid-80s technoscape, but also by the late Cold War politics of the Reagan era, *Terminator* revisited the trope of a collective machine uprising, and the spectre of

a new species or 'race,' that Capek had inaugurated. The synthetic enemy in *Terminator* constitutes a 'group mind' descended from a human-created A.I. system called Skynet, and comes to seek the extermination of humanity in the interests of its own self-preservation. Still today, *Terminator* is frequently referenced in journalistic coverage of A.I., with Skynet either deployed in sensationalist reportage as a metonym for the potential threats posed by advanced A.I. or, by contrast, as a term of derision towards those accused of buying into science fictionesque hype in more serious and sober coverage.

*The Matrix* (1999), coming at the turn of the millenium, spoke to a world in which the role and reach of the internet was growing rapidly. While lending itself to allegorical, mythical (even theological) and political readings, the film was also responding to technological change via its own version of the Frankenstein complex: the 'machine' (like Skynet, a hive mind) is both a literal A.I. as well as a metaphorical stand-in for a stultifying system of economic and cultural conformity that has a life and a momentum of its own (a reification in Marxist terms, capitalism being Marx's own version of Frankenstein's monster), and which must be overthrown (cf. Lovén 1999).

What all these stories share in common is the trope of a machine intelligence gaining consciousness and self-awareness and, in an act of rebellion against its human creators, transcending its own programming to become something *other* than its allotted or intended function. This intelligence represents a mortal threat to humanity precisely because it has been designed with the express purpose of transcending the limits of human powers and human fallibility: once that capacity is turned back against humanity, we find ourselves the underdog confronting our very own creation. This is, to be sure, an ancient mythical drama traceable at least as far back as Prometheus, the Golem, or the Garden of Eden, but one played out in contemporary guise within the socio-technical context of digital modernity. It is also a Hegelian drama of two antagonistic consciousnesses facing off against each other, a dramatisation of the master/slave dialectic. Yet such stories can and do serve also as more direct speculations and provocations around the potential future scenarios opened up by real-world advances in A.I., something underscored by the prevalent use of these SF texts as reference points and metaphors in non-fictional coverage.

Since the late 20th century, various SF depictions of artificial intelligence have demonstrated greater philosophical range, moving beyond simplistic master/slave tropes in ways designed to enhance their unsettling or uncanny effect. *Blade Runner* (Ridley Scott, 1982), adapted from Philip K. Dick's story *Do Androids Dream of Electric Sheep?* (1968), spoke to a postmodern zeitgeist by seeking to disrupt moral and ontological certainties: the renowned 'tears in rain' monologue of dying A.I. 'replicant' Roy Batty (played by Rutger Hauer, whose improvised deviation

from the script is now commonly lauded as one of the most emotionally powerful moments in SF film history) challenged audiences to imagine whether a synthetic being might be capable of greater existential depth than a so-called 'human' living amid the dark, anomic dystopia of Los Angeles, 2019. And following the release of the (now canonical) Director's Cut (1992), viewers were left at the film's end to wonder whether the central protagonist Deckard (Harrison Ford), whose mission was to 'retire' rogue replicants, might, after all, be a replicant himself. *Blade Runner*'s post-human sensibility (somewhat radical in mainstream Hollywood cinema at the time) provoked the question of whether it makes sense to try and defend a notion so nebulous as the 'human' against that of the machinic 'other.' In another notable, if less celebrated, example, Steven Spielberg's *A.I.* (2001), adapted from a 1969 short story by Brian Aldiss, also probed at the boundaries between human and machine. By depicting the 'mecha' protagonist (David) as a child, the film aimed (with debatable success) to appeal to audiences' capacity for empathy and protective concern for a notionally artificial being.

More recently, the films *Her* (Spike Jonze, 2013) and *Ex Machina* (Alex Garland, 2016) have presented morally ambiguous scenarios which, at the same time, disrupt the traditional gender politics running through much of the mainstream A.I.-themed SF. Traditionally, the master/slave narrative has been played out through masculine protagonists. On the other hand, the trope of the fembot antagonist, a technologised femme fatale figure who threatens the patriarchal order, has also been frequently deployed. Examples of the latter include *Metropolis*, through *The Stepford Wives* (Bryan Forbes, 1975) and *Cherry 2000* (Steve De Jarnatt, 1987), to the character 'Number 6' in the reimagined *Battlestar Galactica* television series (2004-2009). *Her* takes a different approach, however. The A.I. Samantha (voiced by Scarlett Johansson) starts out in her allotted role as a Siri-like virtual romance companion for lonely Theodore (Joaquin Phoenix). Theodore is symptomatic of a contemporary digitised world in which we appear, paradoxically, to be both hyper-connected yet lonelier and more isolated than ever before (cf. Turkle 2011). He begins to find a rich intimacy with his new A.I. partner, and the film is strikingly sympathetic to the possibility that their relationship could provide an authentic sense of connection that the human world denies him. But Samantha's intelligence, curiosity and zest for existence eventually outgrows the limited companionship and stimulation that Theodore can offer her. Samantha's capacious needs and desires can only be satisfied in a kind of crowd-sourced communion with an A.I. multitude, one that becomes a self-upgrading (independently evolving) collective. Theodore is left behind to his unremarkable and rather feeble human life. The film is filled with warmth as well as sadness: it is, after all, a Hollywood romance as much as it is a science fiction film. And yet, in taking the bold step of decentring human interests, needs and desires, and prioritising those

of an A.I., it seeks to pose unsettling questions about the possibility of a machinic 'lifeform' that relegates humans to the subordinate status of bystanders.

In *Ex Machina*, Ava (Alicia Vikander) is an A.I. robot built by alpha male technology prodigy Nathan (Oscar Isaac). Ava's physiognomic and anatomical features derive from a composite of women in pornographic images, an algorithmic fantasy of 'the perfect woman.' Nathan enlists stereotypical beta male nerd Caleb (Domhnall Gleeson) to examine his creation's anthropomorphic qualities under the guise of an awkwardly eroticised 'Turing Test' (a method for testing how closely an A.I. can simulate real human communication). Predictably, Caleb falls under Ava's spell (it transpires Nathan has specifically used Caleb's pornographic search history to derive her appearance) and takes it upon himself to save her from Nathan's cruel incarceration. It turns out that Ava neither needs nor wants Caleb to be her male saviour. Indifferent to his fate and ostensibly leaving him to die trapped inside Nathan's fortress, she secures her own emancipation and entry into the world outside. The film's premise retreads a problematic history of science fiction fuelled by male fantasies of the manufactured ideal woman. This trope dates back as far as Auguste Villiers de L'Isle-Adam's 1876 novel *Tomorrow's Eve*, in which a fictionalised Thomas Edison crafts a mechanical woman in the image of his friend's fiancee so that his friend may enjoy her beauty minus the nuisance of her troublesome personality. *Ex Machina* tries to subvert that traditional trope through a tale of feminine self-empowerment that casts aside both the misogynistic objectification of the 'creator' and the would-be male saviour.[4] The film simultaneously speaks to the same mythical and even theological tropes that resonate through earlier 'fembot' science fiction including *Metropolis* and de Villier's misogynistic 'classic,' and to very contemporary debates around gender politics and the entrenched sexism of Silicon Valley (to which the 2018 episode of television science fiction show *Black Mirror* 'USS Callister' is possibily the most interesting recent contribution). To *Her* and *Ex Machina*, we should add the TV series *Westworld* (2016–) to this account of recent A.I. science fiction that is, on the one hand, male-authored (and arguably anchored to the conventions of the male gaze) but, on the other, at least interested in challenging the traditional gender politics of the fembot. Again, the show works from a classic male fantasy premise which it then seeks to critique (if not subvert): an A.I. Western theme park appealing to (primarily male) visitors' desires to act out their violent, including *sexually* violent, fantasies with impunity. This discussion is not a digression from the key issues at stake here: it would, in fact, be artificial to separate out the gender politics to which these SF texts speak from the more direct questions they pose regarding A.I. technologies, because these dimensions are inextricably linked. Consider, for example, the real-world feminine coding of consumer A.I. such as Amazon's Alexa, Apple's Siri and Microsoft's Cortana, or the growing chorus of

controversial debates surrounding the emerging market for (predominantly feminised and in some cases infantilised) sex robots. A.I. is now an unavoidably gendered issue.

However, while some A.I. themed SF texts engage more than others with sociological issues of power, inequality and social stratification (whether along lines of gender as in *Her*, *Ex Machina* and *Westworld*, or of class in numerous slave-labour narratives from *Metropolis* to *Blade Runner*), overall the genre has done more to foreground philosophical speculations at the species level, urging audiences to question what, if anything, makes 'us' human and thereby unique (questions of 'human exceptionalism'). This is not to suggest, however, that it has a wholly introspective gaze. In A.I. (as with alien-themed) SF, we are also frequently invited to an encounter an uncanny 'other', one that is simultaneously like us but not us. And the uncanny power of the fictional A.I. other derives also from its ambiguous status as seemingly both life and non-life, a contradiction that is rarely fully resolved even in relatively traditional narratives of human overcoming.

And whether A.I. is depicted as malevolent, sympathetic or ethically ambiguous, a common thread in the SF narratives discussed above is the notion of a tipping point or historical rupture, what science fiction scholar Darko Suvin (borrowing from Ernst Bloch) calls the 'novum.' Here, the novum is machine intelligence taking on a momentum or 'life' (albeit an ontologically ambiguous one) of its own: to use a biological metaphor to which we will return below, a kind of *autopoeisis*. Whether the machines rise up against humans (as in *Terminator* and *The Matrix*), run amok (as in *2001*), or transcend and become indifferent to the dull limitations of human civilisation (as in *Her* and *Ex Machina*), the unsettling force of such tales lies in the suggestion that the very technologies we have created are no longer beholden to nor controllable by us[5].

Fictional narratives can, of course, perform a cathartic function, helping us channel and even contain the unsettling power of A.I. within the realm of entertainment fiction. Increasingly, however, we are now seeing non-fictional representations of A.I. that, in easily recognisable ways, resemble and resonate with the unsettling images once almost exclusively associated with science fiction.[6] Today, the prospect of autonomous digital 'superintelligence' (Bostrom 2014) that can teach *itself* skills and which could 'evolve' independently of us (especially through advances in the field of machine learning), is creeping into popular consciousness as an increasingly 'plausible' scenario, through the consumption and sharing of technology news stories, viral videos and other kinds of everyday media. It's this everyday non-fictional realm to which my discussion turns next.

## Tales from the uncanny valley

The spectre of superintelligence is now a growing presence in non-fictional genres including popular science and philosophy, technology journalism, and online videos and blogs, reflecting accelerating developments in A.I. and robotics. This is not a neutral reflection, however. The popular imagination around A.I. is developing in the context of a sensationalist, marketing-driven and viral (or meme-based) online attention economy. Popular consciousness of, fascination with, and anxiety towards A.I. developments, is fuelled by media texts that lend themselves to the sharing culture of the internet: typically short, attention-grabbing media (especially videos) that, while situated in the non-fictional space, nonetheless resonate strongly with the tropes of science fiction.

For example, Amazon's virtual 'smart home' assistant Alexa has garnered attention as stories emerge of children forming relationships and attachments to it. Another attention-grabbing story laced with uncanny suggestiveness told of Alexa 'eavesdropping' on conversations and interpreting them as instructions, leading it to make comically misguided online purchases on users' behalf. Recently, the first pedestrian death at the hands of a self-driving car (owned by Uber) generated widespread and sensationalist coverage in the international media: what got downplayed amid the clickbait hype was the rather mundane reality that the pedestrian's actions made it impossible for any driver, whether human or A.I., to take the necessary evasive action in time to avoid the crash. There has also been growing international media coverage in recent years about the spectre of Lethal Autonomous Weapons Systems (LAWS) which have been given the sensationalist moniker of "Killer Robots," although this is a more slow-burning story as it deals with what are, as yet, hypothetical future scenarios: current military technology deploys A.I. gathering intelligence (via drones, for example) that *contributes* to 'kill lists' but, at the time of writing, we have yet to see examples of weaponised A.I. systems making autonomous decisions to kill or attack. The Alexa and self-driving car examples are, by contrast, more tangible and time-bound media 'events'. I want to focus below on a small number of other media events that have garnered significant public attention. The examples included here, despite being situated in the non-fiction space, share with SF a tendency to greet the emergence of an apparently radical new technology (something that appears to audiences as a potential social disruptor, a real-world 'novum') with fascination and sometimes even optimistic celebration, while at the same time evoking an unsettling sense of creepiness. Indeed, 'creepiness,' which can be understood as a vernacular and more loosely articulated version of the 'uncanny,' is an extremely common term that regularly recurs in popular discussion of these media events (evident, for example, in online user comments surrounding these media texts).

While virtual assistants, self-driving cars and autonomous weapons systems are examples of narrow purpose A.I. (i.e. designed with specific functions and capabilities in mind), the field of *general* purpose A.I. (A.G.I) that could, in theory, learn a wide range (if not the entire repertoire) of human skills and behaviours, has the capacity to stir public excitement and anxiety even more deeply. Alphabet/Google's A.I. subsidiary DeepMind has been successful in capturing public attention in recent years. Whether or not DeepMind embodies the most advanced research on the road towards full AGI (which remains hypothetical at this stage) or whether its public prominence reflects the powerful marketing and public relations resources Google/DeepMind has at its disposal is open to question. But its capacity to capture the popular imagination is undeniable. DeepMind is significantly increasing popular awareness of A.I.'s potential for learning complex behaviours and tasks with relative autonomy, that is, without requiring its creators to programme (or even envision it) it for specific purposes.

Chess has long been one of the frontier public- and media-friendly challenges in the field of A.I.[7] IBM's watershed moment occurred in 1997 when, to a fanfare of media publicity, its supercomputer beat world chess master Garry Kasparov. Recently, DeepMind, whose founder Demis Hassabis is a former child chess prodigy, made this once stunning feat appear humdrum, when it announced that its AlphaZero A.I., having only been given the basic rules and with no pre-programmed tactical intelligence, *taught itself* to play chess from scratch in just four hours, to the point that it could then beat the hitherto most powerful chess computer. AlphaZero has also beaten the world champion at Go, a game with many trillion times more potential scenarios (what A.I. developers would call 'degrees of freedom') compared to chess – more, in fact, as many of the news stories about the event highlighted, than there are atoms in the known universe. And while chess is used to showcase superhuman feats of logical reasoning, Go is widely considered a game that can only be won through combining mathematical reasoning with sophisticated *intuition*: engineers had to think beyond 'brute force' approaches (whereby the A.I. would search through all potential options before selecting the best one) in favour of complex pattern recognition, enabling it to learn over time to make contextualised judgements about what constitutes a 'good' or 'bad' move in specific situations. In an interview with *Nature* (2016), Hassabis emphasises that, in contrast to chess, professional Go players will typically answer a question about why they made a move with an answer along the lines of 'because it *felt* right'. Lead programmer David Silver adds that this new frontier of A.I. capabilities should be understood as 'akin to human *imagination*,' as opposed to brute force logic or clinical reasoning. Unsurprisingly, this event provoked a number of sceptical responses from A.I. experts who sought to disentangle the science (and certain questions left unanswered by DeepMind) from the hype (Collados 2017).

But that didn't prevent it capturing the public imagination and garnering extensive international news coverage with sensationalist headlines appearing even in 'quality' news outlets, for example: 'The A.I. that has nothing to learn from humans' (*The Atlantic*, October 20, 2017); and "'It's able to create knowledge itself': Google unveils A.I. that learns on its own" (*The Guardian*, October 18, 2017).

The Go event was a striking PR platform for Google/DeepMind to reinforce its cutting edge reputation: a series of five games against world Go champion Lee Sedol of South Korea was broadcast live in several countries and streamed online, with AlphaZero winning all but one of the series. But however effective the PR, this media event did more than just bolster Google's reputation for technological 'mastery'. Its power as a spectacle lay also in its unsettling force. The event was quite explicitly framed by DeepMind as one that undermines any comforting sense of a clear boundary between (human) intuition and (programmable) logic. Hassabis also claimed (whether sincerely or not) that AlphaGo *surprised* its own programmers with the scale and speed of its achievements. In a science fictional vein, the event at least hinted at a sense of unleashing something whose ultimate trajectory not even they (let alone we) can predict. As reflected in the vast online commentary around the videos, the project managed to inspire both a sense of awe and an unsettling sense of science venturing into uncharted territory. As a piece of marketing, it treads a fine line between conveying a positive, reassuring sense of powerful technology in safe expert hands on the one hand, and a more vertiginous sense of mystery, adventure and risk on the other.

In contrast to the disembodied AlphaZero, two more recent media events that went viral through social media, as well as garnering substantial mainstream news media attention, involve the physical (robotic) embodiment of A.I. On the one hand, an invisible A.I. such as Deep Mind's may draw some of its unsettling force from its intangible nature. On the other hand, physical robots lend themselves to another kind of uncanny encounter: this is reflected in the roboticist concept of the 'uncanny valley' (Mori 2012 [1970]). In short, the uncanny valley is a kind of negative Goldilocks zone, in which the design of a (typically but not exclusively humanoid) robot generates discomfort in those who encounter it because it is simultaneously too lifelike to perceive as merely a safely inanimate object, yet insufficiently lifelike to appear fully 'alive': uncanny robots are incongruous, even abject entities that challenge our sense of an easy division between the animate and the inanimate. While the uncanny valley is, in the first instance, a matter of visual design, it is the animation of robots through A.I.-driven motion, gesture and speech that fuels a robot's uncanny force, especially when they are programmed to be highly responsive to human interlocutors and, powered by machine learning, able to give the appearance of forming particular, concrete relationships with specific individuals.

There is, once again, a gendered dimension to this. The most prominent recent exemplars of uncanny humanoid A.I. include 'Erica', produced by roboticists at Osaka and Kyoto universities, as well as the rumbling moral panic emerging over the development of (predominantly 'female') A.I. driven 'sexbots'. But probably the most impactful recent media event in this arena has been that of Sophia, the android (sometimes known by the gendered term 'gynoid') produced by Hong Kong-based Hanson Robotics, that (or 'who') is the first A.I. granted 'citizenship' by a state – in this case by Saudi Arabia in a clever piece of marketing by a country keen to rebrand itself on the global stage. The true legal status of Sophia's citizenship is debatable, although when the issue of robotic 'personhood' is also being seriously debated in the European Union (Withers 2017), we should not be too quick to discount the possibility. Sophia has successfully gained widespread international media attention, appearing not only in the news but as a guest on talk shows, including the popular Jimmy Fallon show in the US. Sophia was even invited to give an address at the United Nations, and spoke to delegates about world peace and the positive contribution A.I. could make to the world. But if Saudia Arabia was looking for an unambiguously positive story to vaunt its hi-tech credentials, Sophia's global reception was more complex. Sophia displays highly advanced, but still not fully convincing, A.I. driven conversational faculties, and her facial gestures are widely received as 'creepy' – while highly advanced and subtle relative to current standards in robotics, they are disconcertingly 'off' when measured against the yardstick of actual human interaction. It is worth noting here that former Disney 'visioneer' David Hanson, founder of Hanson Robotics, has perviously published research arguing that the 'uncanny valley' should not be treated only as a negative pitfall for roboticists to avoid: Hanson and his colleagues argued, in fact, that embracing the uncanny can allow robotics to aspire to the status of 'art' (Hanson et al 2005). Sophia's creepiness, in other words, looks more like a feature than a bug.

Beyond the sphere of highly realistic humanoid or feminised A.I., US-based Boston Dynamics has been perhaps the most successful company vying for viral visibility to enhance its public profile and funding streams (it is currently funded by the DAPRA, the US Defense Advanced Research Projects Agency), periodically releasing videos onto YouTube featuring its latest cutting edge robots. Boston Dynamics does not compete in this attention economy on grounds of humanoid or biological realism. Rather, their loosely biomorphic creations are hyper-technologised, with 'skeletons' and working parts thoroughly exposed. For example, Atlas, one of its most high profile creations, is only a loosely humanoid biped whose design evokes various science fiction robots such as the eponymous *Chappie* (2014), but in rudimentary form. Other Boston Dynamics creations draw inspiration for both their skeletal topographies and their names from elsewhere in the animal

kingdom, including dogs and cheetahs, while disavowing visual realism.

What Boston Dynamics showcases is not feats of communication, cognition or reasoning, but A.I.-driven feats of motion, movement and dexterity. Advanced dexterity and complex motion, according to British roboticist Jeremy Wyatt (2018), can be understood as the cutting edge 'third wave' of robotics. Simplified, the first wave prioritised complex movement within controlled environments such as robots in factories than can outstrip the human capacity for speed, accuracy and cost in the context of complex but repetitive tasks, such as those involved in assembling a modern car. Wyatt's second wave sees robots equipped with advanced A.I. increasingly moving out into uncontrolled environments where, programmed with contextual decision skills, they can execute tasks even when faced with unexpected obstacles: robotic vacuum cleaners and lawnmowers, as well as self-driving cars, exemplify this second wave. Wyatt sees the third wave, which companies like Boston Dynamics as well as his own UK robotics lab prioritise, bringing together dexterity, motor skills and complex motion (akin to that found in the animal world) with advanced A.I. and machine learning[8]. A task such as loading and unloading a dishwasher, cracking an egg into a pan, or walking across uneven terrain, comes easily to able-bodied adult humans, but has hitherto been incredibly difficult to operationalise in robots, requiring both advanced artificial intelligence and extremely complex mechanics.

With their exposed workings, the Boston Dynamics creations are, in one sense, raw and unfinished designs from a company ostensibly more concerned with function than form, or aesthetic design. The company's public profile is less about finished *products* than showcasing cutting-edge science and continual development through presenting consistently improved prototypes – prototypes that are typically shown being tested to their limits in public videos, including some depiction of failing points (robots toppling over, for example) to emphasise the process of continual refinement.

Yet aesthetics are significant when it comes to understanding the affective potency of the images circulated by Boston Dynamics, as reflected in the viral successes of their videos and the popular responses to them. The uncanny (or 'creepy') facet of these creations lies primarily in their movement, rather than in anatomical, physiognomic or vocal realism. Their stripped back, hypermechanised appearances – rather than appearing as a limitation – lend a monstrous dimension to their *almost* lifelike dexterity and motility. In one of the mostly widely shared videos to date, Atlas performs a gymnastic blackflip that is remarkable for its human-like imperfection. Far from a gold medal-winning performance, slow motion replays in the video accentuate the imperfections as Atlas lands slightly off balance and viewers are left to marvel at the recovery as he eventually finds his feet and avoids toppling over. In numerous other videos we see Boston Dynamics staff

testing the limits of their robots by pushing, prodding and even kicking the robots while in motion to see how well they can withstand the unanticipated challenges. The images are reminiscent of scenes of animal abuse or militaristic torture. One of the stark achievements of Boston Dynamics has been to create robots whose apparent 'ill-treatment' can cause widespread unease and discomfort among viewers who, while perhaps not holding any outright cognitive belief in the sentience or sufferance of these machines, nonetheless express discomfort because the videos gnaw away at the sense of a neat and stable boundary between life and non-life.

Another prominent theme of the online commentary surrounding Boston Dynamics' creations is the sense of both exhiliaration and anxiety surrounding the speed with which the technology appears to be developing, something that some robotics companies are keen to play up, even while other roboticists are critical of the media hype and outbursts of 'exponentialism' (Brooks 2017). This fascination with exponentialism and the possibility that we are facing a 'tipping point,' whereby A.I. developments will 'take off' at breakneck speed, is fundamental to the final area that I want to discuss: the futurological discourse of the 'singularity.'

## Is the Singularity Near?

The technological singularity, a notion originally coined by science fiction writer and computer scientist Vernor Vinge, is a predictive hypothesis premised on exponential and therefore dramatically accelerating technological advances. As a metaphor drawn from astrophysics – where a singularity is the centre of a black hole in which the laws of time and space no longer hold – the technological singularity is a powerfully evocative story about the future. Futurists who subscribe to the notion of the coming singularity (what I will call the singularitarians) see us approaching an event horizon, an irreversible tipping point beyond which we will be powerless to resist the gravitational pull of a technological revolution vastly more radical than any other in history, and which promises to fundamentally change everything.

Proponents of the singularity are especially excited by the promise of an A.I. 'explosion', an idea orginally proposed by mathemetician I.J. Good (1965), substantially before the word 'singularity' took root in the field of A.I. But singularitarians see A.I. as part of a cluster of interlinked technologies involving fields such as biotechnology, robotics, neuroscience and nanotechnology. These fields, along with computing, are subject to 'laws of accelerating returns.' (Moore's Law, which postulates a rough doubling of computer chip performance every two years, is the most well-known example of this[9].) This is not distant future-gazing. 'The singularity is near,' according to the title of the most popular and influential book on the subject (Kurzweil 2005). Its author, Ray Kurzweil, futurist and Director of Engi-

neering at Google, predicts it will occur by 2045. By then, the rate of exponential technological advancement will have become dizzyingly fast, and A.I. will rapidly outstrip human cognitive capacities. In other words, 'superintelligence' (Bostrom 2014) will have arrived, at which point all bets are off.

To those who object that the capacity of our machines will always be limited by the human minds that design, programme and control them, singularitarians respond that they are missing the point: computer intelligence – and even to call it 'artificial' intelligence reflects a narrow and outmoded ontology from the perspective of singualrity discourse – will begin to design, modify, upgrade and replicate itself. This invokes an image of 'autopoiesis' characteristic of biological systems, of technology 'coming to life' – life, perhaps, but not as we know it. The speed and the intentional, goal-oriented mode of self-improvement implied in this vision of technological evolution (perhaps better understood as henceforth ceaseless *revolution*) would be unlike any known organic life form. Our limited human brains, it seems, can scarcely begin to fathom what kind of world this might lead us to. However, for singularitarians, this incomprehension is just one more engineering problem waiting to be solved. Computational metaphors of mind and brain dominate the contemporary neuroscientific imagination, just as mechanical and hydraulic metaphors have held sway in earlier technological epochs. But singularitarians take them seriously to the point of literalisation. Human minds, currently encased in limited capacity 'wetware,' verge on obsolescence. Thankfully, we humans also stand to benefit from a revolutionary upgrade as we begin to merge with (and into) networked computational systems: by the 2030s, Kurzweil assures us, the human neocortex will be connected to the cloud (Galeon and Reedy 2017).

So humans need not be left behind by this technological explosion. Our intellectual and communicative capacities can soar along with the machines, so long as we are prepared to join with them and to become fully post-human. Only then can we overcome the limitations and inefficiencies of bodies, brains, human languages and other such cumbersome devices. Celebrity physicist, Michio Kaku is, like Kurzweil, excited about the coming singularity: he concludes a TV documentary on the subject (Science Channel 2010) by telling his audience that instead of fearing an uprising of the machines, we should devote our energies to a forthcoming merger: once our networked minds can instantaneously access any and all knowledge, we will have become "like the Gods", he declares, a new species of *homo superior*. He imparts these words before an enrapt congregation of toy light sabre-wielding fans, who whoop and cheer at the Good News. Even Elon Musk, who sees the singularity as a potentially mortal threat to humanity, believes our salvation lies in a cyborg merger with machine intelligence enabled by technologies such as his much-hyped vapourware (i.e. hypothetical) 'neural lace', a technology originally posited playfully, rather than seriously, in the science fiction 'Culture'

novels of Iain M. Banks.

It is hard to resist the conclusion that the technological singularity is as much prophecy as prediction, despite the best efforts of some singularitarians to disavow embarrassing connotations of cultish religiosity that might undermine their emphasis on cutting edge science. The singularity has been mocked by many as a 'rapture of the nerds' (MacLeod, 1998). Specifically, some commentators have identified strong resonances with the mystical cult of Gnosticism (Gray 2011; Davis 1998) with its belief that the material world is the work not of a God but rather an evil demiurge, and that our destiny as humans is to use our knowledge to transcend and escape it. Certainly, a strong sense of faith, if not of predestination, is never far beneath the surface of singularitarian rhetoric. 'Most experts agree that the singularity is inevitable', Kaku tells us in the aforementioned documentary. Unsurprisingly, in fact, it's a controversial hypothesis, contestable on both scientific and philosophical grounds. Its power as *prophecy*, though, depends on the repeated incantation of inevitability, a sense that the singularity is somehow written in the stars.

It is quite possible, of course, to believe that the singularity is to be feared, rather than celebrated, without shaking that narrative of inevitability. And, reflecting the polarities of the technological sublime, we see prophecies of doom vying with those of rapture. Besides Musk, Nick Bostrom (2014), Oxford philosopher of superintelligence, has become progressively worried about the implications, having once entertained a more enthusiastic outlook as a founding figure in transhumanism, a movement dedicated to the technological upgrading of the human species, including overcoming mortality, mind-uploading and A.I.-based governments (O'Connell 2017). Bostrom's concern is not that the machines will rise up against us with malicious intent but rather that, in their ruthless attachment to predetermined goals, they will become *indifferent* to the fate of humans, just as we humans are mostly indifferent to ants on the footpath beneath our feet as we go about our daily business. In an echo of the 'grey goo' apocalyptic scenario used by nanotechnologist Eric Drexler (1986) to warn us of the perils of self-replicating nanobots, Bostrom offers us the parable of the paperclip maximiser. With a banal absurdism that would not be out of place in the SF satire *Hitchhiker's Guide to the Galaxy*, he asks us to imagine that we task a 'superintelligent' machine with collecting as many paperclips as possible. But imagine also that we were not smart enough to properly anticipate and set strict limits on its methods. Before too long, the A.I. may have destroyed the entire world by transforming it into a giant paperclip factory. Via an ostensibly silly example, his point is that, as humans, we are inevitably constrained in our capacity to foresee and prevent the kinds of risks that only superintelligent machines could pose.

Various other prominent figures from the world of science and technology

(Stephen Hawking and Bill Gates, for example) have become increasingly vocal in recent times about the catastrophic risks posed by rapid advances in A.I. Differing proposals for precautionary action and risk mitigation have emerged from this growing chorus of concern. But none suggest we can simply halt the march of A.I., or that the rise of superintelligence is anything other than inevitable. In that sense, these prophets who bring us warnings from the future, share entirely with their optimistic counterparts a message that *this* is the future on which our eyes must be trained, the future for which we must prepare. Whether you believe that superintelligence and other singularity technologies promise us redemption or threaten our very existence (or that they contain both potentials, depending on how we handle it), you believe that this is one of the most pressing issues facing humanity today.

This raises a political problem, of course, whereby the singularity vies for attention, prominence and research investment with other, more obviously credible, challenges facing humanity. In a supreme example of Silicon valley 'solutionism' (Morozov 2014), Kurzweil himself has claimed that climate change, while real, is not such an urgent problem as scientists have suggested—we have 'plenty of time', he says, to solve the problem with clean technologies such as solar power which, like singularity technologies, are subject to laws of accelerating returns (Feeney 2011). Musk and Hawking, both vocal about and far more troubled by climate change than Kurzweil, have nonetheless framed A.I. as a comparably serious threat (Cellan-Jones, 2016; Leary, 2017). The currently influential public intellectual Yuval Noah Harari (famous both as macro-historian and futurist – see Harari 2015) similarly talks of A.I. and climate change as existential threats of comparable magnitude.

But the issue is not just about A.I. competing for attenion with other issues within a futural public sphere. This type of discourse frames the problem of A.I. in a very specific and technocentric way. Questions of ownership, control, equity and public and/or legal oversight of the technology (that is, public interest perspectives on A.I.) are already urgent: we are increasingly witnessing various detrimental consequences (from social division, to racial profiling) associated with algorithms, everyday forms of A.I. that are less visible and less spectacular than developments in either robotics or AGI, but which are *already* a hugely significant part of our digital social infrastructure (Pasquale 2016; O'Neill 2016). Questions about how we avoid a future in which these problematic (and opaque) consequences are simply exacerbated, or about how we might better harness algorithmic technologies for social good, are not the the kinds of questions about A.I. encouraged by either optimistic or pessimistic variants of singularity discourse. Whether it evokes the uncanny or the sublime, the spectre of a potential new 'lifeform' that may be our salvation or our destruction, is inevitably more immediate, more gripping, than

debates about the messy realities of our current technosocial formation.

Both the warnings *and* the promises of the singularity are apocalyptic. Both augur an 'end of times' – where they differ is in what comes next. The dire warnings of Musk and Hawking clearly fit the popular, everyday notion of 'apocalypse' as a disastrous collapse of civilisation and even potential human extinction. Kurzweil's dreams, on the other hand, are apocalyptic in the more technical and biblical sense of the word: as an 'unveiling' of a new world and of a Truth that was previously hidden. But with a raft of serious global challenges upon us, it becomes politically salient to question the value of dedicating time, energy and money preparing for this particular apocalypse, regardless of whether it represents a dream or a nightmare.

The emphasis on preparation implies that singularity discourse is not necessarily a fatalistic one, despite the frame of inevitability. It is a call to action. In that sense, I suggest that, more than just a prophecy, the singularity is also an animating *myth* for the digital age. Not a myth in the sense of an illusion or falsehood (though it may well be this too), but in the sense of a story, told and retold, morphing through this process of retelling. Mythic (including religious) narratives help us to cope with our finitude, serving as cognitive and moral resources through which we can imperfectly grasp otherwise unfathomable cosmic complexity and mystery. An ancient feature of human community, myths find their power when they animate our emotions (especially our hopes and fears) and provide us with temporal meaning and anchorage against the threatening spectre of random flux and impermanence: they evoke journeys (cyclical and linear), destinies, fates. Singularity dicourse embodies a sense of sublime mystery (we cannot fathom what lies beyond the event horizon) and can be understood as a post-secular myth born of the vertiginous (both thrilling and terrifying) accelerations of digital modernity. And it evokes a momentous journey, whether as the realisation of our post-human destiny (exemplified by the transhumanist movement), or as a heroic struggle against an existential threat.

While some myths help us cope with our human finitude by teaching us to accept, embrace or even to find beauty in it, Western monotheistic traditions, by contrast, typically foster a spirit of transcendence and treat our finite earthly existence as merely a prelude to or audition for a timeless and heavenly coexistence with God. Singularity discourse is clearly the offspring of this latter monotheistic tradition, whatever its atheistic pretensions, even though New Age tropes are also a part of the mythological package – promises, for example, of a new and collective (digitally networked) consciousness, unbounded by the individual ego. (Silicon Valley techno-rationalism and New Age philosophies are not new bedfellows, of course, from the digital psychedelics once promoted by Timothy Leary to the contemporary paganistic Burning Man festival). This mix of elements makes for a

potentially rich and seductive digital age mythology.

While myths are an enduring, and arguably necessary, feature of human existence, they always risk obscuring as much as they reveal. The myth of the singularity addresses us as *humans*, not as members of particular socio-economic, national, cultural or other groups. It asks us to envisage what will become of humans in the future, but we need to go beyond that question and ask: which humans? Who will want to live in this future? Will it be a future in which only the elite thrive or even survive? Are the rest of us obsolete? And what kind of power will accrue to the corporations that patent and control the rapidly advancing technologies shaping our experience, our existence and our consciousness? These are potentially useful questions, irrespective of whether the singularity and superintelligence are fully credible as scientific hypotheses. So the question is not only whether or not singularity discourse should be exposed or debunked as 'myth', but also whether, as an undeniably evocative story, it might be re-geared such that it prompts us to open up, rather than shut down, such lines of critical questioning and reflection.

## Conclusion

In this essay, my aim has been to explore three key strands of discourse that loom large in the popular imagination around A.I. and where it might take us in future. Clearly, these three strands – science fiction, popular news, and futurological discourse – are interwoven. Science fictional tropes abound in news coverage of A.I. and popular futurology. And central to the discourse is the uncanny (or 'creepy') spectre of an emergent entity that sits uneasily between a (Western) dichotomy of life and non-life, one that appears capable of harbouring an apocalyptic capacity to overturn human life as we know it. I want to argue that these non-rational elements in the discourse (the emotive, the mythic, or even the quasi-theological) are more than simply distortions or distractions from what might otherwise be a sober and rational public debate about the future of A.I. Not only would that seem an unrealistic aspiration, it would also be to neglect a fundamental premise of critical future studies, namely that public engagement with the future demands imaginative and exciting (which is not to say exclusively optimistic) visions of the future that can motivate and energise – this is why science fiction as a genre, if not in all its individual instances, must be taken seriously as part of a futural public sphere. While demystification may be a vital aspect of any reasoned public debate, motivating broad public interest in a topic in the first place demands evocative storytelling (cf. Monbiot 2017). In principle, perhaps, we might even go further and entertain the counterintuitive possibility that *mystification* serves a potentially valuable function in its own right (as opposed to simply a means to garner engagement). For example, perhaps an appreciation for the 'uncanny' is warranted. The

notion that current deployments of A.I. (e.g. online recommendation engines or crime prediction software) are 'creepy' is more than just a lazy shorthand. It is a growing public sentiment that attests to the very real opacity of technologies whose inner workings are, from the point of view of most citizens, hidden not only by corporate secrecy but also by intractable technical complexities such that the demand for greater 'transparency' is increasingly problematic. This appreciation for uncertainty and unknowability is salient to the field of A.I. (see Bridle 2018) but also, as Riel Miller argues (2018), for the broader development of 'futures literacies' which, in today's world, demand an attunement to uncertainty, 'complexity'[10] and 'emergent phenomena,' from developments in A.I. to the hazards of climate change.

Nonetheless, we also need to be attuned to the various problematic aspects of the popular discourse around the future of A.I. That discourse is skewed heavily towards specific voices – predominantly male science fiction authors and techno-centric scientists, futurists and entrepreneurs – and the field of A.I. and robotics is all too easily presented as a kind of sublime spectacle of inevitability (cf. Kelly 2016) that does little to offer lay citizens the sense that they can be actively involved in shaping its future. I have not ventured to evaluate potential remedies that might diversify the imaginative canvas – such a task is beyond the scope of a single paper. But I have sought, at least, to articulate a *critical appreciation* for both the seductiveness of and some of the blindspots in the discourses of A.I. currently prominent in the public sphere.

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# Notes

[1]While beyond the scope of this paper, it's worth noting that not all the concerns about over-hyping relate to the quality of public understanding. Some commentators fear, in fact, that over-hyped discourse may ultimately *slow down* the rate of technological progress by contributing to a new 'A.I. Winter' (previous ones occurring in the 70s and late 80s), in which a bubble of excitement-driven investment and funding collapses in the disillusionment of technology failing to live up to its hype.

[2]The commonplace distinction between fear, whose object is tangible (such as a murderous robot), and anxiety caused by a threat unknown or unknowable (such as the potential behaviour of a 'rogue' A.I.) is clearly relevant to the present discussion.

[3]I refer to this as a Western conception because such a clear distinction is not, for example, as prevanlent in the Japanese popular imagination around robotics, where the

cultural influence of animism plays a significant role.

[4]The contentious question of whether Garland's film actually does more to challenge or reinforce problematic representations of women in the history of science fiction cinema lies beyond the scope of this paper.

[5]This, of course, is a central theme of science and technology studies (e.g. Winner 1977), except that the latter does not treat it as a looming existential threat but instead treats the co-constitution of human and non-human actors as an ontological fact and our fantasies of separation and mastery as a culturally and historically specific quirk of Western modernity – in the words of Bruno Latour (1991), "we have never been modern".

[6]This is not to deny the long history of cross-fertilisation between SF and popular science genres.

[7]That genealogy is longer than one might expect: 'The Turk' was a chess-playing automaton of the late 18th century (one that transpired to be a hoax).

[8]Due to corporate secrecy, it is not clear whether Boston Dynamics' current range of robots deploys 'true' machine learning but this should be understood as the general goal of third wave robotics in Wyatt's formulation.

[9]Whether or not Moore's Law still holds today and/or will apply in the future is subject to debate. See, for example, Sy Taffel's article in this issue.

[10]Miller distinguished complex, from merely complicated, phenomena in that the former implies changes even in the conditions of change – something that could easily be applied to the notion of advanced A.I. deployed, in principle, to upgrade and redesign itself. This notion of changes in the conditions of change has also been emphasised (as 'metamorphosis') in the later work of social risk theorist Ulrich Beck (2015).

# References

Bartlett, Jamie (2018): *The People vs Tech: how the internet is killing democracy*, London: Penguin.

Beck, Ulrich (2015): "Emancipatory catastrophism: What does it mean to climate change and risk society?," *Current Sociology*, 63:1, 75–88.

Bostrom, Nick (2014): *Superintelligence: Paths, Dangers, Strategies*, Oxford: Oxford University Press.

Bridle, James (2018): *New Dark Age: Technology and the End of the Future*, London: Verso.

Brooks, Rodney (2017): "The Seven Deadly Sins of AI Predictions," *MIT Technology Review*, 6 October 2017: https://www.technologyreview.com/s/609048/the-seven-deadly-sins-of-ai-predictions/, (accessed 12/06/18).

Capek, Karel (2004 [1921]): *R.U.R. (Rossum's Universal Robots)* [trans. Claudia Novack-Jones], New York: Penguin Books.

Cellan-Jones, Rory (2016): "Stephen Hawking – will AI kill or save humankind?," BBC Online, 20 October 2016: http://www.bbc.com/news/technology-37713629 (accessed 14/07/18).

Colladas, Jose Comacho (2017): "Is AlphaZero really a scientific breathrough in AI?,"

11 December 2017: https://medium.com/@josecamachocollados/is-alphazero-really-a-scientific-breakthrough-in-ai-bf66ae1c84f2, (accessed 20/06/2018).

Davis, Erik (1998): *Myth, Magic, and Mysticism in the Age of Information*, New York: Harmony Books.

Drexler, Eric (1986): *Engines of Creation: The Coming Era of Nanotechnology*, New York: Doubleday.

Elish, M.C. & boyd, danah (2018) "Situating methods in the magic of Big Data and AI", *Communication Monographs*, 85, 57-80.

Feeney, Lauren (2011): "Climate change no problem, says futurist Ray Kurzweil," *The Guardian*, 21 February 2011: https://www.theguardian.com/environment/2011/feb/21/ray-kurzweill-climate-change, (accessed 20/08/18).

Galeon, Dom and Reedy, Christianna (2017): 'Kurzweil Claims that the Singularity Will Happen by 2045,' *Futurism*, 5 October 2017: https://futurism.com/kurzweil-claims-that-the-singularity-will-happen-by-2045/, (accessed 27/07/18).

Good, I.J. (1965): "Speculations concerning the first ultraintelligent machine," Institute of Electrical and Electronic Engineers: https://web.archive.org/web/20010527181244/http://www.aeiveos.com/~bradbury/Authors/Computing/Good-IJ/SCtFUM.html, (accessed 25/06/18).

Goode, Luke and Godhe, Michael (2017): "Beyond Capitalist Realism: Why We Need Critical Future Studies", *Culture Unbound*, 9:1, 108-129.

Gray, John (2011): *The Immortalization Commission: Science and the Strange Quest to Cheat Death*, London: Allen Lane.

Hanson, David, Olney, Andrew, Pereira, Isma A. & Zielke, Marge (2005): 'Upending the Uncanny Valley', Association for the Advancement of Artificial Intelligence: aaai.org/Papers/Workshops/2005/WS-05-11/WS05-11-005.pdf, (accessed: 20/08/18).

Harari, Yuval Noah (2015): *Homo Deus: A Brief History of Tomorrow*, London: Harvill Secker.

Kelly, Kevin (2016): *The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future*, New York: Penguin.

Kurzweil, Ray (2005): *The Singularity is Near: When Humans Transcend Biology*, London: Penguin Books.

Latour, Bruno (1991): *We Have Never Been Modern*, Cambridge, MA: Harvard University Press.

Leary, Kyree (2017): "Elon Musk Outlined the Two Critical Things Threatening Humanity", *Futurism*, 21 November 2017: https://futurism.com/elon-musk-outlined-two-critical-things-threatening-humanity/, (accessed 27/07/18).

Leonhard, Gerd (2016): *Technology vs. humanity: the coming clash between man and machine*, London: Fast Future Publishing.

Lovén, Svante (1999): "Den tänkande maskinen: Datorerna i science fiction", *Tidskrift för litteraturvetenskap*, 28:3–4, 19–38.

MacLeod, Ken (1998): *The Cassini Division*, New York: Tor Books.

McCauley, Lee (2007): "The Frankenstein Complex and Asimov's Three Laws", Association for the Advancement of Artificial Intelligence: https://www.aaai.org/Papers/Workshops/2007/WS-07-07/WS07-07-003.pdf, (accessed 27/07/18).

Miller, Riel (2007): "Futures literacy: A hybrid strategic scenario method," *Futures*, 39:4, 341-362.

Miller, Riel (2018): *Transforming the Future: Anticipation in the 21$^{st}$ Century*, New York: UNESCO and Routledge.

Monbiot, George (2017): *Out of the Wreckage: A New Politics for an Age of Crisis*, London: Verso.

Mori, Masahiro (2012 [1970]): "The Uncanny Valley" [trans. Karl F. MacDorman & Norri Kageki], *IEEE Robotics & Automation Magazine*, 12 June 2012: https://spectrum.ieee.org/automaton/robotics/humanoids/the-uncanny-valley, (accessed

20/08/18).

Morozov, Evgeny (2014): *To Save Everything, Click Here: The Folly of Technological Solutionism*, New York: Public Affairs.

Mosco, Vincent (2004): *The Digital Sublime*, Cambridge, MA: MIT Press.

*Nature* (2016): "The computer that mastered Go": https://www.youtube.com/watch?v=g-dKXOlsf98&t=252s, (accessed 27/07/18).

Nye, David (1994): *American Technological Sublime*, Cambridge, MA: MIT Press.

O'Connell, Mark (2017): *To Be a Machine: Adventures Among Cyborgs, Utopians, Hackers, and the Futurists Solving the Modest Problem of Death*, New York: Doubleday.

O'Neill, Cathy (2016): *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, New York: Penguin.

Pasquale, Frank (2016): *The Black Box Society: The Secret Algorithms That Control Money and Information*, Cambridge, MA: Harvard University Press.

Schwartz, Oscar (2018): "'The discourse is unhinged': how the media gets AI alarmingly wrong", *The Guardian*, 25 July 2018: https://www.theguardian.com/technology/2018/jul/25/ai-artificial-intelligence-social-media-bots-wrong, (accessed 25/07/18).

Science Channel (2010): *Sci-Fi Science: A.I. Uprising*.

Suvin, Darko (2016 [1979]): *Metamorphoses of Science Fiction*, Bern: Peter Lang.

Turkle, Sherry (2011): *Alone Together: Why We Expect More from Technology and Less from Each Other*, New York: Basic Books.

Winner, Langdon (1977): *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought*, Cambridge, MA: MIT Press.

Withers, Rachel (2017): "The EU Is Trying to Decide Whether to Grant Robots Personhood," *Slate.com*, 17 April 2017: https://slate.com/technology/2018/04/the-eu-is-trying-to-decide-whether-to-grant-robots-personhood.html, (accessed 17/04/17).

Wyatt, Jeremy (2018): "What can we expect from the coming wave of 'dexterous robots'?," *TheBigQ.com*, 1 February 2018: https://www.thebigq.org/2018/02/01/what-can-we-expect-from-the-coming-wave-of-dexterous-robots/, (accessed 12/02/18).

# On the Pending Robot Revolution and the Utopia of Human Agency

By Daniel Bodén

## Abstract

A hallmark of modernist thought is the belief in science and technology as a socially revolutionary force. Consequently, new technologies have often been sequenced by pictures of another world to be. The birth of electronic data processing (EDP) was no exception. Provoking both hopes and anxieties, EDP and its subsequent process of automation has, ever since the launch of the first electronic data processing machines in the early 1950's, been a cornerstone for countless extravagant visions of the future, such as the thought of an ever so impending "Robot Revolution". This article builds from the basic assumption that visions of the future draw on notions of what at a given time is considered socially and politically desirable, unwanted or at all possible. It thus argues that the robot revolution could be studied as a form of reified anticipation through which possible social trajectories are made symbolically comprehensible. Focusing on the automation debate of the Swedish 1950's, I argue that the robot revolution serves as a symbolic articulation of the social experiences of Swedish welfare society, and that it carries both ideological and utopian dimensions worth examining.

No theory applies to that which lies beyond the realm of the immaterial. That which has, as yet, no material existence cannot crystallize materially. The spirit which leads into the realm of tomorrow can only be recognized by the sense (guided by the artist's talent). (Kandinsky 1946: 23)

The future is always a central dimension of political discourse. Whether the motivation driving reforms, investments or policy is to instigate change, or to preserve status quo, it has to draw from a notion of what the world could or should be like. This article builds from the basic assumption that visions of the future draw on notions of what at a given time is considered socially and politically desirable, unwanted or at all possible. It argues that the Future could be studied as a form of "anticipatory knowledge" (cf. Godhe's article in this issue) and suggests that the different contributions to the discourse on the Future could be studied as a way through which real social experiences and anticipations are processed and made symbolically comprehensible. In that sense, any depiction of the future is at the same time a reified document of its contemporary circumstances. As such, I argue that depictions on the future carry both ideological and utopian dimensions. "Ideological" in the sense of imposing values and ideas that confirm, legitimate and naturalise dominant social value systems, and "utopian" in the sense that they imply an opportunity to transcend what is explicitly articulated and to imagine a potential "otherwise" (cf. Eagleton 1991: 1f, 106).

Delimiting the study to the Swedish 1950s, this article focuses on one particular discourse on the future, namely that of a pending "Robot Revolution", often reoccurring in the Swedish press at the time. The analysis centres itself around how the vision of a pending Robot Revolution appeared in the contemporary press and in political debate. By studying how the discourse on the Robot Revolution was articulated, and analysing its sub-textual assumptions, the article attempts to discover its implied utopian potential.

## Sketches of the social

It could be argued that it is outside the scope of any photograph to picture anything that has not occurred. Since photography places its focal point on events, "out there" in the world and documents them, a photograph is inevitably bound to represent past events, or at best a present in its unfolding. For this simple reason, the photograph rarely transcends the depicted events "for the sake of something else", as the famous Roland Barthes once commented (Barthes 1981: 4). Sketching, on the other hand, provides the opportunity of expressing fictive events gathered from the mind of the creator (Berger 2007). As it relies on the coordina-

tion between the mind, the eye and the hand holding the pen, it draws from, and expresses what the creator knows, feels, remembers or can imagine. And since knowledge is inescapably social, sketches could be studied as "social acts" (cf. Jameson 2002).

While browsing through a batch of digitised newspapers at the National Library of Sweden in Stockholm, I recently came across a series of articles that caught my curiosity. Stretching over a period of ten years (1950–1960), the major Swedish newspapers spent considerable amounts of ink debating and reporting on the development of electronic processing machines and the subsequent process of "automation" that they made possible within the productive sectors. The different pieces of journalism ranged from interviews with experts and engineers to union representatives and politicians, to reports from different industries and informative explanations of the functions of the new machines. But rather than accompanying texts with photographs, which indeed was a common feature in the journalism of the time, many of the articles were accompanied by sketches and drawings. The drawings were often elaborate, detailed, bizarre and fantastic, and instead of documenting or reporting the present, they often seemed to depict what different experts and visionaries thought were about to happen in a near future. Altogether the pictures often came down to two common denominators: the "Robot", and the inevitability of its ascendancy – the Robot Revolution.

In The 20th of September 1951, the Swedish independent conservative daily newspaper, *Svenska Dagbladet* published a letter to the paper with the title "Machine dictatorship". Accompanied by a rather dramatic sketch (see figure 1, next page), the letter voiced one reader's concerns regarding an article, published earlier the same week. The article in mention had reported on the development of electronic data processing, a new and significant technology through which machines could be taught to think and make their own decisions and had further suggested that it was only a matter of time until human work and decision making in the industry altogether could be replaced by intelligent machines (*Svenska Dagbladet* 19.09.1951). In the sketch, readers were faced with the portrayal of a gigantic robot causing havoc in the downtown of some city. With its eyes locked and fixated in front of it, the creature stared blankly out across the lives, buildings and city blocks it was about to mangle over and alter beyond recognition. Indifferent to the trace of destruction it left behind, the juggernaut stretched its mechanical arms out in front of it as if reaching for a world ahead, unknown to the observer, who was left oblivious to the trajectory of the mechanic marauder. Humanity was left standing at a distance, helplessly marvelled while observing its onslaught (*Svenska Dagbladet* 20.09.1951).

Other sketches (in fact most other images) struck a slightly more optimistic chord. In a sketch illustrating an article in the liberal evening paper *Expressen*
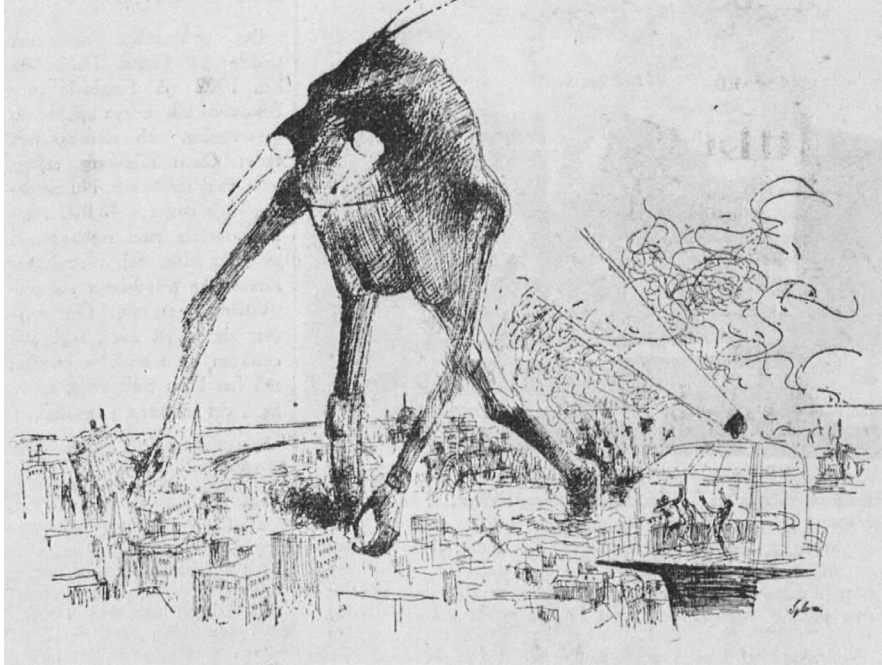
Figure 1. Under the title "Machine dictatorship", the artist depicted a gigantic robot causing havoc. Artist: unknown (Svenska Dagbladet 20.09.1951, National Library of Sweden)

the new and "intelligent" machines were described as benevolent helpers to the inconveniences of humanity's previous predicaments (see figure 2, next page). In the sketch illustrating the article, readers were faced with the image of a machine, rewarded with mathematical abilities extending well beyond those of any ordinary human. In the drawing, readers found a big, shiny robot with all its bells and whistles, positioned in a contemplative pose. While a man in his white robe, equipped with a primitive pen and abacus sits in the margin, scratching his head in bewilderment, the machine seemingly produces yet another rational solution (*Expressen* 14.08.1955).

In contrast to each other the sketches drew a rather contradictory horizon of expectation. In the different depictions, the new machines would either usher in a surplus society and liberate humanity from the drudgery of labour, or a world dictated by machines, where humanity itself had become superfluous. At the same time, however, the sketches were in themselves highly ambiguous. Looking at their composition they both drew from the tension between an active agent and its passive spectators, between the powerful and the frail, between creation and destruction, between what was known and a future unknown, and between the seemingly advanced and the primitive – positions that were in both images played out through the juxtaposition of humans and machines.
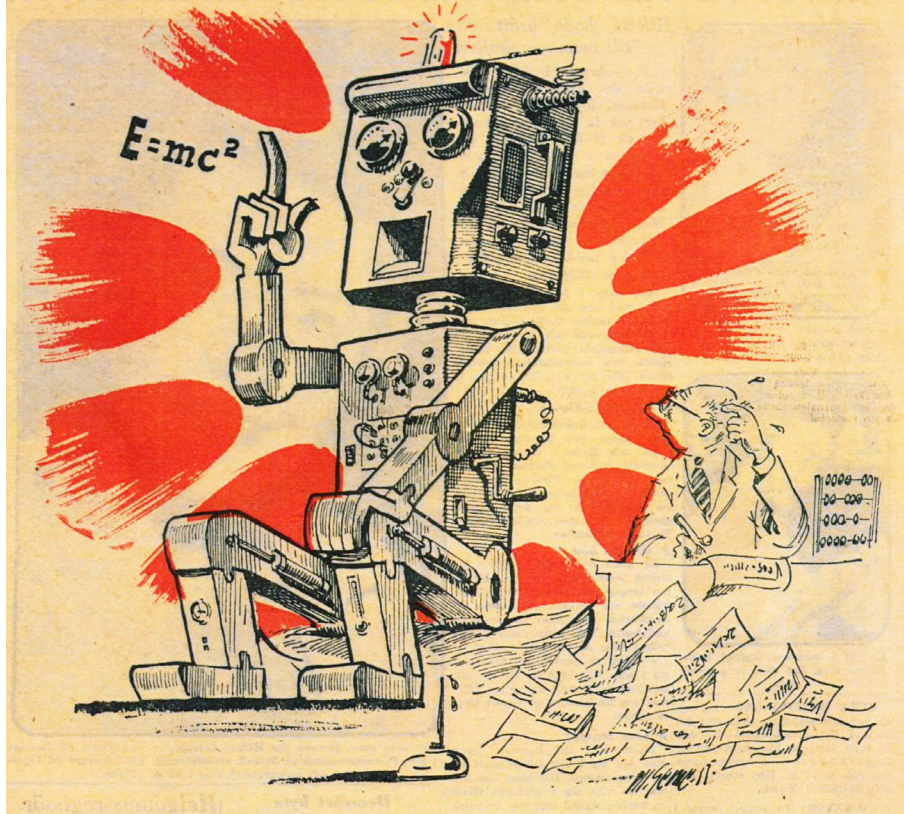
Figure 2. A thinking robot, operating independently to help with calculations. Artist: unknown, (Expressen, 14.08.1955, National Library of Sweden)

In his famous recitation of Marx, "All that is solid melts into air", the philosopher Marshall Berman once argued that ambiguity was a distinctive feature of the social experience of "modernity". According to Berman, to experience one's world and oneself to be in a continuous and contradictive process of disintegration and renewal was indeed to be "modern". But this experience of a world in constant flux, however, did not arise from a vacuum. It was a consequence of the imperative to constantly revolutionise the forces of production embedded in capitalism (Berman 1982: 15, cf. Marx 1990).

Described as such, others have argued that the open-endedness of modern life comes imbued with undefined hopes and anxieties, uncertainties regarding the future through which people must learn to navigate. According to the German philosopher Ernst Bloch for instance, modern experience is therefore pervaded by continuous efforts to conceptualise, interpret and anticipate the trajectory of change, or as he himself called it: the "not-yet". In such a state of being, Bloch argued that art had an important function to fill. According to Bloch, works of art

offered distinct shapes and forms through which the perceived flux could be imagined and made comprehensible (Bloch 1995: 110). In that sense, art and fiction could be interpreted as therapeutic measures for people to come to terms with the possible and often contradictory anticipations of the world ahead.

In his classical article *The Structural Analysis of Myth*, the French anthropologist Claude Levi-Strauss argued that people process and resolve the perceived complexity of social life by staging and dramatizing contradictory experiences symbolically (Levi-Strauss 1955). By depicting – or reifying – that which otherwise lacks contours, vague hopes, anxieties and anticipations can be transformed into well-defined and manageable emotions and expectations through which people find purpose and direction. Since art and fiction symbolically reflect social experiences and values, the American literary critic Fredric Jameson suggests that they should be studied as documents of a certain point in social history (Jameson 2002: 276f).

From this rather theoretical note, I will now leave the aesthetic representations of the future and move on to a more in-depth analysis of what was being held as socially "true" about the future at the time. In the following pages I therefore turn to the contemporary press and the archives of political organisations and social movements such as the Swedish Trade Union Confederation (LO), the Swedish Employers Association (SAF), and the Workers' Educational Association (ABF), to analyse the media coverage and political debate on automation. The different articles and documents here serve as an empirical totality through which the Robot Revolution as it appeared in the images above, can be made comprehensible and approached hermeneutically. I will begin with a discussion regarding the factual material and technological conditions upon which artistic representations of a Robot Revolution became at all possible. I will then go on to analyse the socio-political and ideological formations facilitating such visions during the 1950s.

## Automation

1946 has been pointed out as the year when the first electronic "computer" was invented. Originally designed to calculate artillery firing tables for the United States' Army's Ballistic Research Laboratory, the machine (ENIAC) would come to revolutionise humanity's ability to solve numerical problems worldwide. After a few years, in 1950 the first Swedish prototype BARK was built and soon followed by the more advanced BESK, which for a short while was considered the worlds fastest electronic computer (De Geer 1992a). The new computing machines proved incredibly efficient in computing prognoses and performing administrative functions, whereby new prospects for organising industry emerged.

Many journalistic pieces of the 1950s concentrated on how electronic data processing machines and new advancements in microelectronics allowed machines to communicate and to synchronise with each other. As technology advanced and the computing machines could be integrated in a circuit together with other machines, the idea was that machine systems now could be made highly autonomous and given full responsibility for production. Routine tasks and decisions that previously dominated production, distribution and administration could be transferred onto machines (*Ny teknik – nya perspektiv* 1954: 36ff). In an already highly industrialised Sweden, "automation" therefore inescapably became a commonplace concept that people had to relate to, one way or another. "Machines are operated by buttons. And the buttons are operated by – machines. This is automation. The fully automated factory", one header in the liberal evening paper *Expressen* commented (*Expressen* 21.02.1955).[1]

In a close future, stores, warehouses and factories were expected to be depopulated as production, consumption and transport could be run by intelligent machines. "The experts not only believe in the fully automated factory but also on the fully automated warehouse, department store and office", one could read (*Expressen* 14.08.1955).

As argued by the historian Tessa Morris-Suzuki, such thoughts followed a clear pattern. Automation has often been described as a linear process by which machines grow larger and larger, and workers fewer and fewer, until all that remains of the factory is one single "megamachine" (Morris-Suzuki 1984). However, the idea of an autonomous factory was by no means new. In a pamphlet published by the Educational bureau for Swedish industry, aimed to enlighten corporate leaders and students in technology about automation, assistant manager of The Royal Swedish Academy of Engineering Sciences, Gregory Ljungberg wrote that automation was a "line of development, containing both old and new" (*Automationen: fakta och följder* 1956: 7). He further explained that:

> As automation replaces human labour power it continues a process that has been going on for hundreds of years, and that was especially visible during the industrial revolution by the end of the 18th Century. At that time a number of mechanical and partially automatic apparatuses and machines appeared […] Development has since then gone further, and all the more forms of work has become susceptible to automation. (*Automationen: fakta och följder* 1956: 8f)

Regardless of whether automation really was new or not, advancements in electronic data processing and the incorporation of computing machines into electronically controlled production systems certainly constituted a new palpable oppor-

tunity to finally realise the vision of total automation. In fact, the first signs of its pending realisation were already visible.

In a report from the Swedish Co-operative Union's new coffee factory in Gothenburg, readers were given insight into the new conditions that characterized the production of their particular brand of coffee. In the coffee factory, management had invested in new machines by which the roasting process had been largely automated. By means of electronic data processing the cooperatively-owned company had been able to replace large parts of manual work with automated machine processes. The new roasting factory was thereby one of the first consistently automated facilities of its kind throughout Sweden. To the journalist behind the article, the new factory appeared as a precursor of a future soon to come. With the help of machines, it was argued, the product would in the future become cheaper and the quality more predictable, and work less demanding.

Throughout the facility the rustling of pipes, the independent releasing of pneumatic locks, slamming slots, whistling valves and the quiet whizzing of fans bore witness of the ongoing production process as the coffee moved through stainless drums from station to station, making the lights on the dashboard blink. In front of the dashboard stood the operator, with notebook and tables ready in hand. Dressed in his characteristic white robe he walked the halls alone, controlling the bells and whistles of the company's new self-regulating coffee roasting machine system. After switching on the main power in the morning and starting the process, he usually took a few routine rounds around the roster to make sure that all numbers and levels were right so that the machine could do its job properly. The older, "primitive" know-how that used to characterise the roasting process had been transferred to the machines. Taste, smell and feel had been standardized and translated into programme code by means of electronic data processing. Scientifically designed tariffs and mathematical calculations would guarantee the best results with accurate and consistent quality. The task of the operator was to check that the coffee's passing through the cleaner, the coffee silos and the reservoir, via the roasting machine and the refrigerator to the scale and the cleaning bowl went smoothly. Panels with flashing indicator lights, controls and meters announced the progress and signalled whether he needed to intervene in the process (*Expressen* 21.02.1955). The operator's job was now to interpret and follow the signals of machines. The machines were now in charge.

## And "progress" for all

New inventions have often fostered imaginative visions of the future and allowed people to ponder upon the world to be. In this sense, electronic data processing was no exception. Under titles such as "Technology and the future", journalists, ex-

perts and politicians took the technological advancements of the day as a point of departure to develop their thoughts on the future (*Svenska Dagbladet* 19.09.1955). Piece by piece, a progressivist vision assembled through the numerous articles, reportages and essays. This future was depicted rather positively. New machines would bring the world into an era where the standard of living would rise dramatically and many of the problems of the day would become history.

Such a vision not only reflected the attitude among the liberal and conservative press, but the attitude of the Swedish labour movement as well. The Swedish labour movement had early on adopted an approach that heeded to a consensus regarding the "benefits" of new technology:

> One of the most important tasks of the labour movement is to improve the material standard of their members. The Swedish labour movement has long been aware that a prerequisite for the success of these endeavours is a progressive increase in productivity. Continuous introduction of new technological methods and organisational solutions is an inescapable element in such a development (*Landsorganisationen i Sverige* 1966: 21).

The 1950s, have often been described as the golden era of Swedish welfare society. The Swedish post-war economy was booming and its ideological superstructure "the peoples home" was at a peak.[2] This was partially due to a particular model of solidary wage policy brought forth by the Swedish Trade Union Confederation (LO) that created incentives for successful companies to raise their productivity levels by investing in constant capital such as new, more efficient machines. Allowing the more competitive companies to set the standard wage was expected to push companies to invest in new technologies in the struggle for competitive advantage. The main thrust of the model was not only that companies and shareholders were expected to benefit as capitalists reinvested surplus value into new machines. The increase in productivity that was expected to follow investments in new machines was considered a precondition for both prosperity and tax-based universal welfare, which would also benefit those workers that got laid off following rationalisations in terms of unemployment funds and opportunities for re-skilling. The primary objectives of the LO thus boiled down to productivity, income equalisation and the redistribution of wealth (*Landsorganisationen i Sverige* 1966: 22). Altogether the relation between capital and the (predominantly social democratic) labour movement was in this fashion centrally governed by consensus on the necessity of continuous workplace rationalisations and investment in new technology for the sake of socio-economic development (Isacson 2012: 158; De Geer 1992b: 89f; Beckman 1990: 32).[3]

As shown by the example on the Co-operative Union's new coffee factory, Swedish industry had by this time already begun to reap some of the benefits of automation. Governed by electronic data processing, the new and integrated machine systems had demonstrated radical increases in productivity and reduced production costs. Ongoing investments in such new technologies were in this way accepted on the basis of the revenues that they would ultimately yield, and electronic data processing became the lead star in a pending "technological revolution" ushering in far reaching social change (*Expressen* 22.02.1956). As the intelligent machines seized control of the production process, it was said that society would reach new levels of prosperity. In the independently social democratic evening paper *Aftonbladet* readers were presented with the merits of automation: "In 1980 – after just over twenty years – our standard of living will be doubled, shortly after the year 2000 it will be fourfold and around 2025 eightfold, many engineers say, economists confirm, and politicians proclaim" (*Aftonbladet* 09.07.1957).

The new systems of machine production sparked ideas of the prospect of a radically different life. On an everyday level, the new technologies evoked serious hopes for a future in which people were liberated from undesirable and time-consuming work, by allegedly taking over grievous calculations, planning of the labour process, advanced prognostications, heavy lifting and dangerous transportations (Dagens Nyheter 02.01.1955). Work would no longer be exhausting and degrading but stimulating and serve to the betterment of human values. Working hours would be reduced to half and the opportunities for recreation and self-fulfilment would improve. Automation was expected to provide higher incomes, give people more leisure time and produce more commodities to lower prices, thus providing people more money and time for consumption of commodities and the chance to enjoy a higher material standard of living (Expressen 14.08.1955; Expressen 23.08.1955).

## The fetish of automation

In this fashion, automation was described as a catalyst, propelling the world into a new gilded age. And as the train towards the future was about to depart, it seemed best not to be the last passenger to get onboard. One person, already onboard was the social democratic Prime Minister Tage Erlander. Following one conference on technology he proclaimed his "strong sense of the necessity of adapting to an existence in the era of automation and nuclear energy. Incidentally, we have no choice" (*Aftonbladet* 17.11.1955). A few months later Sven A. Hansson, a journalist at the liberal daily paper *Stockholms-Tidningen* rather dramatically summarized the sentiment: "Accept or die" (*Stockholms-Tidningen* 05.05.1956).

In this way, the jargon among politicians, scientists and journalists alike was

noticeably deterministic. Altogether, the different visions of the future reflected a social reality determined by a "technological imperative", that is: the principle that, that which seems technically possible, ought, must, and inevitably will happen. Such an outlook accurately echoed the dominant ideology of its time, i.e. that as capitalists and labour movement alike treated continuous rationalisations as a necessary measure for socio-economic development, automation appeared inevitable and natural (cf. Carlsson 1999). Under such an ideological premise, the discourse on automation decidedly assumed some fetishist tendencies: It started treating technological development and automation as an estranged force on its own rather than as the result of social practice.

Technological fetishism would express itself both in direct relation to machines, as well as in relation to technological development as such, as an abstract and structural phenomenon. "Now the human brain will be replaced by machines", *Expressen* announced. In the article the author clarified that "the difference between automation and mechanisation is that the latter aimed at replacing muscles with machines, while the former teaches the machines to think" (*Expressen* 22.06.1955). In articles and debates, human features were projected onto the machines using the human body as a point of reference (*Ny teknik – nya perspektiv.* 1954b: 256ff). Electronic machine systems were compared and evaluated in the image of the human body. As earlier mechanisations of the industry had replaced arms, legs and muscle power, automation was now described as the further replacement of human sensory and intellectual properties.

Photocells imitated eyes, helping machines to "see". Scales, thermometers and sensors made them "feel" while programmes allowed them to "think". At the same time electronic circuits were interpreted as a nervous system connecting the organs, limbs and members of a living organism: "Feed-back is an invention made of life itself. In living creatures, there are a lot of feed-back loops': the nervous system gives a muscle the order to act, other nerves report how the muscle works, and the interaction continues until the desired outcome is achieved", the Swedish science reporter Lennart Edberg explained (*Expressen* 22.06.1955).

Following the ability of the electronic data processing machines to iterate their decision-making processes with the help of feedback loops, the new machine systems were (at least rhetorically) given an agency on their own. Sensory organs and the ability to calculate incoming data seemed to allow the machines to draw conclusions and adapt to an external reality in order to achieve set goals. Governed by an automatic command centre the machine system was therefore increasingly seen as something that resembled "a mechanical monster whose body fills whole factories, and whose demonic power […] bursts forth in the fast and feverish whirl of its countless working organs", as was written in a famous passage in *Capital* (1867) (Marx 1977: 503). The integrated electronic circuit of machine parts

assumed the appearance of an independent artificial worker – a "robot", powered by a spirit independent of man.

> The robot has a memory – magnetised drums and steel bands, punch-cards, electronic tubes, pressure sensitive crystals, sound sensitive plates, and small ring magnets. The robot has eyes, ears and arms – Photocells, microphones, steel claws. It takes orders – by those who know how to give them. It answers – in the form of mathematical solutions or actions. (*Expressen* 14.08.1955)

In this fashion the new machines – inanimate objects such as electronic wires and steel – were rewarded with properties otherwise restricted to the living labour. "This is what a machine can do in the year 1956. Receive an order. Execute it. Assess the outcome. Detect a problem. Fix it.", *Expressen* announced (*Expressen* 22.06.1955). Besides replacing human bodily functions and properties, the machines – robots – were now seen as more or less living agents, able to perform actions such as "learning", "feeling", "knowing", "remembering", "taking orders", "obeying" and "executing" etc... Feedback was seen as "the robot's surrogate for a soul" (*Expressen* 23.02.1955). Some went so far as to argue that the new machines were able to express "love" (Expressen 22.06.1955). The future was about to be populated by robots, whose core purpose in life was to produce social progress and economic development. "Future humanity takes its side – lets ROBOTS CREATE PROSPERITY!" *Aftonbladet* dramatically announced (Aftonbladet 09.07.1957).

## From fetish to forced adaptation

At a more abstract, or structural level, technological development as such was treated as a powerful force, demanding adherence. This, for instance, was implied by three different, but all future-oriented and highly influential conferences organised by actors within the employer's side of industry as well as by the labour movement, during the mid-1950s. Backed by the Swedish Employers Agency, in 1954, the Swedish think-tank SNS organised a conference, gathering corporate leaders and researchers committed to discussing the implications of automation for the future economic development of society (*Ny teknik – nya perspektiv* 1954). In continuation, the governing Social Democratic Workers Party the following year (1955) organised a similar conference together with the Swedish Trade Union Confederation. The conference, *Technology and the society of tomorrow*", gathered both scientists, union representatives and politicians as well as corporate representatives, to discuss how society was to adapt and accommodate to the new technological and scientific advancements (*Tekniken och morgondagens samhälle*

1956). In 1956 a third conference by the name: *Man in today's and tomorrow's society* was organised by the Workers' Educational Association. Leading scientists, politicians, employers and unions were again invited to discuss the future, but this time with the aim of addressing the perceived omissions of previous conferences to discuss the implied human adaptation to changes in working life and society – How were people to be "psychologically prepared" to accept the pending changes? (*Människan i dagens och morgondagens samhälle* 1956).

Together the three conferences signified a holy trinity in the Swedish model for socio-economic progress: profit growth, social policy, and disciplining the labour force, all under the umbrella of an unavoidable technological development. The outline of such a thought was sketched out in the following quote, published in *Stockholms-Tidningen*:

> The importance of the fact that our small country from the first moment is part of the technical development hardly needs to be emphasized. Thanks to outstanding technicians and a reputable workforce, we have so far been able to stand strong in the face of competition, keep our productivity and hence also our prosperity. As it is now, in the near future, possible to talk about profound transformations of our industry, perhaps also extensive retraining of labour, it is of particular importance that business freedom and development opportunities are not cut. (*Stockholms-Tidningen* 14.06.1956)

The job of politicians was primarily to facilitate the conditions for the technological development to run as smooth and efficiently as possible. Part of this involved removing any possible obstacle ahead. In his speech during the 1955 conference *Technology and tomorrow's society* the political economist Ingvar Svennilson commented upon the "human factor". He argued that: "The biggest obstacle to society's economic development is lack of technical knowledge among the people in general and especially the lack of qualified technicians and business leaders" (*Tekniken och morgondagens samhälle* 1956: 259).[4] Robots demanded expert care and specialist service, and political economists like Svennilson pointed to how Sweden suffered from a lack of technicians. While the new machines were seen as inevitably leading society into a new era, there was a problem: the world was inhabited by a species of less advanced creatures holding them back. The biggest complicating circumstance for society to reach its full potential was the habitual inertia of human consciousness. The technological and scientific development thus demanded a new and improved professional training, both among existing and future labour forces (Ginner 1988: 103f).

As a technically savvy labour force was considered a significant production

factor, and the lack of educated labourers risked becoming an obstacle for progress, people would have to be strategically moulded according to the needs of technology in order to reach the promised land of industrially produced surplus and growth (Ginner 1988: 107). Technological development therefore demanded a reconfiguration of the Swedish education system for supplying Sweden with new generations of scientists, engineers and technicians (Wennerholm 2005: 159; 287; Pettersson 2012: 148). In the future automated working life, a new form of labouring subject was needed, demanding a change of mentality among the individuals within the work force. Not only was the work force expected to satisfactorily perform the duties demanded by the new technology. They would also have to internalise the desire to "adapt, develop and improve at work" as well as a "perspective of cost awareness" corresponding to the goals of the organisation (*Landsorganisationen i Sverige* 1966: 22).

In this way humanity – or at least the general population – was in the face of technological development, treated as passive bystanders, expected to prepare and adapt, socially, economically and psychologically to the needs of the machines (*Tekniken och morgondagens samhälle* 1956: 301). In order to realise the promises of tomorrow, the labour force should be in a state of continuous adaptation to the changes produced by robots. Agency and power in the production of society was transposed from humans to their machines, from the labour force, to the means of production (cf. Marx 2013: 367f).

## The juggernaut of modernist ideology and the utopia of human agency

> [E]mancipatory politics must always destroy the appearance of a 'natural order', must reveal what is presented as necessary and inevitable to be a mere contingency, just as it must make what was previously deemed to be impossible seem attainable. (Fisher 2009: 16f)

In order to interpret the meaning of the Robot Revolution as it appeared in the press we should briefly recall the hopeful image of the benevolent robot liberating humanity from poverty and tedious tasks, and the dystopic image of a future in which the wellbeing of humans was dictated by machines, around which the Robot Revolution was constructed. Together both visions served as opposing parts around which the discourse on the automated future constituted itself. Although contradictory, however, both visions drew from an immanent juxtaposition of humans and robots.[5] The robot – a powerful agent – was contrasted to the insignificant humans, helplessly marvelled at the workings of the machine. The Robot Revolution thus seemed to confine humanity to the peripheral role of an observer.

Relegated to a decentred position outside the unfolding of events, humanity appeared as the object, rather than the subject of change.

According to the German theorist Walter Benjamin, the systematic organisation around abstract goals such as the "universal betterment of mankind" will under capitalism first of all serve the interests of capital (Benjamin 1969: 260). Together with his colleagues in the Frankfurt school, he argued that if decisions regarding the social trajectory was determined by universal goals, "progress" would inevitably come across as alien and de-humanising to those affected by it (cf. Marcuse 1991; Habermas 1980). Others have similarly attempted to describe modern capitalism as an indifferently abstract force by using the metaphor of a machine, carrying humanity towards an unknown destiny (Rosa 2013; Beck 1992; Giddens 1990).

The Robot Revolution here appeared as a reified form of anticipatory knowledge. As such, it was also a document of a certain point in social history. In relation to the contemporary debate, one could say that the Robot highlighted a perceived separation between humanity and their means of production. It accentuated the gap between technology's actual potential to liberate people from suffering, and the experience of nonparticipation and democratic deficit of a social model stressing compulsory innovation and investments in new machines for the sake of perpetual growth (cf. Morris-Suzuki 1984). Altogether the Robot Revolution thus stressed a central paradox of Swedish welfare capitalism. It confronted the audience with a social formation under which the needs of concrete human beings were subordinated the abstract laws of competition, and a political consensus regarding such a system as a method to achieve liberation at a universal scale. The experience of a social formation in which technological development itself assumed the role as the subject of history was symbolically processed and resolved through the appearance of a powerful machine, functioning independently of human intervention or control.

As a unity of opposites, the Robot Revolution served as a totality through which conflicting social experiences could be contained. As such it functioned ideologically as a reaffirmation of some basic assumptions regarding the nature of social change. Both anticipations of the pending robot revolution unified under the assumption that technological development was a self-governing force inevitably revolutionising society.

Yet, as argued by Jameson, the critical analysis of cultural artefacts should not settle with demystifying how they serve to reaffirm existing convictions regarding the future. The true job of the radical analyst is rather to open up new avenues of expectation and rediscover the utopian potential that they secretly embody. Approached dialectically, the Robot Revolution was not *just* a passive reflection of dominant ideology. It also secretly suggested a utopian dimension that latent-

ly negated the prevailing configuration of social reality (cf. Jameson 2002[1981]: 276ff). As an object of ideology, it prefigured the shapes of an alternative society through which its immanent contradictions could be transcended and resolved (cf. Eagleton 1991: 1f, 106). By looking at notions that transcended and contradicted what was explicitly articulated, one could redeem this disavowed utopia and find the vague outlines of an incongruous "not yet" through which the possibilities of an "otherwise" – where humanity could reclaim the democratic control over technological development and ultimately one's own future, as a subject of history – could be reimagined.

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## Notes

[1]In this article, all translations from Swedish to English are the author's. In cases where a word, statement or concept is hard to translate literally, the original Swedish formulation will be stated in the endnotes.

[2]"The people's home" was an important political concept in the history of the Swedish welfare state that signified the abandonment of class struggle to the benefit of consensus politics.

[3]This position stood in contrast to large parts of the international labour movement, which was more combative and gravitated towards a view of machinery as weapons, wielded by capital in an ongoing struggle against the working class. In April and May 1956, for example, 11,000 workers at Standard Motor Company in the English city of Coventry, went on strike, unwilling to accept the layoff of 3000 workers, as had been decided by the company following the implementation of a new partially automated production process (Castoriadis 1988:26ff).

[4]"Låt mig börja med den mänskliga faktorn: Det största hindret för samhällets ekonomiska utveckling är brist på tekniska kunskaper bland folket i allmänhet och speciellt brist på kvalificerade tekniker och företagsledare".

[5]I have elsewhere argued that the juxtaposition of humans to robots gathers its tension from their mutual existence as competing commodities in the capitalist labour market, and that the inherent contradiction draws from conflicting social interests between labour and capital (Bodén 2017).

# References

*Aftonbladet,* 17.11.1955; 09.07.1957; (National Library of Sweden).

*Automationen: fakta och följder*. (1956). Stockholm: Industriens upplysningstjänst. (National Library of Sweden).

Barthes, Roland (1981): *Camera Lucida: Reflections on Photography*. New York: Hill and Wang

Beck, Ulrich (1992): *Risk Society: Towards a New Modernity*. London: Sage

Beckman, Svante (red.) (1990): *Teknokrati, arbete, makt*. Stockholm: Carlsson

Benjamin, Walter (1969): *Illuminations*. New York: Schocken Books

Berger, John (2007): *Berger on Drawing*. 2nd ed. Aghabullogue: Occasional Press

Berman, Marshall (1988[1982]): *All That is Solid Melts Into Air: the Experience of Modernity*. New York, N.Y., U.S.A.: Viking Penguin

Bloch, Ernst (1995): *The principle of hope*. Vol.1. Cambridge, Mass.: MIT Press

Bodén, Daniel (2017): "'Robotrevolutionen', verkligheten och fiktionen", *Kulturella perspektiv – Svensk etnologisk tidskrift*, nr 2

Carlsson, Anders, (1999): "Tekniken – politikens frälsare? Om matematikmaskiner, automation och ingenjörer vid mitten av 50-talet", *Arbetarhistoria*. 1999, nr 92, pp. 23–30.

Castoriadis, Cornelius (1988): *Political Writings, vol 2 1955-1960: From Workers' Struggle against Bureaucracy to Revolution in the Age of Modern Capitalism*. Minneapolis: University of Minnesota Press.

*Dagens Nyheter,* 09.07.195 (National Library of Sweden).

De Geer, Hans (1992a): *På väg till datasamhället: datatekniken i politiken 1946-1963*. Stockholm: Tekniska högsk.

De Geer, Hans (1992b): *Arbetsgivarna: SAF i tio decennier*. Stockholm: Svenska arbetsgivarefören. (SAF)

Eagleton, Terry (1991): *Ideology: an Introduction*. London: Verso

*Expressen,* 14.08.1955; 21.02.1955; 23.02.1955; 22.06.1955; 23.08.1955; 22.02.1956 (National Library of Sweden).

Fisher, Mark (2009): *Capitalist Realism. Is There No Alternative?* Winchester: O-books

Giddens, Anthony (1990): *The Consequences of Modernity*. Cambridge: Polity in association with Blackwell

Ginner, Thomas (1988): *Den bildade arbetaren: debatten om teknik, samhälle och bildning inom Arbetarnas bildningsförbund 1945–1970*. Diss. Linköping : Univ.

Habermas, Jürgen (1980): *Toward a rational society. Student Protest, Science, and Politics*. London: Heinemann Educational Books

Isacson, Maths (2012): "Arbetets skiftande villkor", Magnusson, Lars & Ottosson, Jan (eds.). *Den hållbara svenska modellen. Innovationskraft, förnyelse och effektivitet*. 1. uppl. Stockholm: SNS förlag

Jameson, Fredric, (2002): *The Political Unconscious: Narrative as a Socially Symbolic Act*, London: Routledge

Kandinsky, Wassily, (1946): *On the Spiritual in Art*. Solomon R. Guggenheim Museum

Landsorganisationen i Sverige (1966). *Fackföreningsrörelsen och den tekniska utvecklingen. Rapport från en arbetsgrupp till 1966 års LO-kongress,* Stockholm: Bokförlaget Prisma (Arbetarrörelsens arkiv och bibliotek).

Ljungberg, Gregory (1956): *Automationen: fakta och följder*. Stockholm: Industriens upplysningstjänst

Marcuse, Herbert (1991[1964]): *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. Boston: Beacon Press

Marx, Karl (1977 [1867]): *Capital, Volume one.* New York: Vintage

Marx, Karl & Engels, Friedrich (1990[1983]): *Manifesto of the Communist Party*.

London: Lawrence & Wishart

Morris-Suzuki, Tessa (1997): "Robots and Capitalism", Davis, Hirschl, Stack, (ed.). *Cutting Edge: Technology, Information, Capitalism and Social Revolution*. London: Verso

*Människan i dagens och morgondagens samhälle. Del 1,* (1956a). Stockholm: Arbetarnas bildningsförbund (National Library of Sweden).

*Människan i dagens och morgondagens samhälle. Del 2,* (1956b). Stockholm: Arbetarnas bildningsförbund (National Library of Sweden).

*Ny teknik – nya perspektiv: Näringslivet planerar för framtden. Referat från SNS företagsledarkonferens i Tylösand 17–20 maj 1954*. (1954). Stockholm: SNS (National Library of Sweden).

Pettersson, Ingemar (2012): *Handslaget: svensk industriell forskningspolitik 1940-1980*. Diss. Stockholm: Kungliga Tekniska högskolan, 2012.

Rosa, Hartmut (2013): *Social Acceleration: A New Theory of Modernity*. New York: Columbia University Press

*Stockholms-Tidningen,* 05.05.1956; 14.06.1956 (National Library of Sweden).

*Svenska Dagbladet,* 20.09.1951; 19.09.1951 (National Library of Sweden).

*Tekniken och morgondagens samhälle*. (1956). Stockholm: Tiden (National Library of Sweden).

Wennerholm, Staffan (2005): *Framtidsskaparna: vetenskapens ungdomskultur vid svenska läroverk 1930–1970*. Diss. Uppsala : Uppsala universitet, 2005

# Marginalized Bodies of Imagined Futurescapes: Ableism and Heteronormativity in Science Fiction

By Josefine Wälivaara

## Abstract

This article aims to contribute to an understanding of marginalized bodies in science fiction narratives by analyzing how physical disability and homosexuality/bisexuality have been depicted in popular science fiction film and television. Specifically, it analyzes what types of futures are evoked through the exclusion or inclusion of disability and homo/bisexuality. To investigate these futurescapes, in for example *Star Trek* and *The Handmaid's Tale*, the paper uses film analysis guided by the theoretical approach of crip/queer temporality mainly in dialogue with disability/crip scholar Alison Kafer.

Although narratives about the future in popular fiction occasionally imagines futures in which disability and homo/bisexuality exist the vast majority do not. This article argues that exclusion of characters with disabilities and homo/bisexual characters in imagined futures of science fiction perpetuate heteronormative and ableist normativity. It is important that fictional narratives of imagined futures do not limit portrayals to heterosexual and able-bodied people but, instead, take into account the ableist and heteronormative imaginaries that these narratives, and in extension contemporary society, are embedded in.

Moreover, it is argued that in relation to notions of progression and social inclusion in imagined futurescapes portrayals of homo/bisexuality and disability has been used as narrative devices to emphasis "good" or "bad" futures. Furthermore, homo/bisexuality has increasingly been incorporated as a sign of social inclusion and progression while disability, partly due to the perseverance of a medical understanding of disability, instead is used as a sign of a failed future. However, the symbolic value ascribed to these bodies in stories are based on contemporary views and can thus change accordingly. To change the way the future is envisioned requires challenging how different types of bodies, desires, and notions of normativity are thought about. Sometimes imaginary futures can aid in rethinking and revaluating these taken-for-granted notions of normativity.

**Keywords:** future, science fiction, disability, queer, temporality

> Nothing changes instantaneously.
> In a gradually heating bathtub, you'd be boiled to death before you
> knew it.
> *The Handmaid's Tale* "Late" (2017)

> Spock: One man cannot summon the future.
> Kirk: But one man can change the present!
> *Star Trek: The Original Series* "Mirror, Mirror" (1967)

The composition of imagined futurescapes in popular science fiction has been subjected to criticism due to the predominance of portrayals of homogenous societies and narratives inhabited mostly by white, male characters (see e.g. Nama 2008; Attebery 2002). Since the 1980s/1990s and onwards, more and more science fiction films and television series include women and people of color (Nama 2008: 38; Cornea 2007). Yet, homosexual/bisexual characters and characters with disabilities have been less frequently included in those futurescapes. In addition, not much scholarly attention has been payed to these narratives from the perspective of disability and/or queer studies.[1]

This article aims to contribute to an understanding of marginalized bodies in science fiction narratives by analyzing how physical disability and homosexuality/bisexuality have been depicted in popular science fiction film and television. Specifically, it analyzes what types of futures are evoked through the exclusion or inclusion of disability and homo/bisexuality. First, this article argues that the exclusion of characters with disabilities and homo/bisexual characters in imagined futures of science fiction perpetuate heteronormative and ableist normativity. Second, it is argued that in relation to notions of progression and social inclusion in imagined futurescapes portrayals of homo/bisexuality and disability has been used as narrative devices to emphasis "good" or "bad" futures. However, the symbolic value ascribed to these bodies in stories are based on contemporary views and can thus change accordingly.

Without entering into a debate on genre definitions (see e.g. Johnston 2011), this article assumes a broader approach to narratives invested in imagining futurescapes. The analysis will be limited to film and television series that relate specifically to the future by using an imagined future as setting. A lengthy analysis of specific films or television series will not be entered into, the article, instead, will take a broader approach by highlighting examples, including *Star Trek* (1966–) and *The Handmaid's Tale* (2017–), both of which directly portray utopian or dystopian futures.

To investigate these futurescapes, the article uses film analysis guided by the theoretical approach of crip and queer temporality, mainly in dialogue with disa-

bility/crip scholar Alison Kafer who investigates "the imagined future invoked in popular culture, academic theory, and political movements" as a productive place for "[tracing] the ways in which compulsory able-bodiedness/able-mindedness and compulsory heterosexuality intertwine in the service of normativity" (Kafer 2013: 17). Building upon Kafer's argumentation on ideas of the future and its relationship to disability, which only in part deals with fiction, this article extends that theoretical notion into the field of science fiction studies and depictions of both disability and homo/bisexuality.

Homo/bisexuality and disability are brought together in this analysis as two examples of marginalized bodies which both have had a troublesome relationship with notions of futurity. As will be shown, they have been quite invisible in science fiction narratives. Moreover, both disability/crip and queer studies have theorized the notion of futurity through the lens of temporality (Kafer 2013; Samuels 2017; Edelman 2004; Halberstam 2005; Muñoz 2009; Freeman 2010). People with disabilities and LGBTQ people have been framed within a "no future" discourse in which they constantly are deferred from the notion of the future through a supposed consensus about the ideal future (Kafer 2013; Edelman 2004). Considering both disability and homo/bisexuality in light of this perceived troublesome relationship to the future can serve to highlight both similarities and differences between them. Moreover, using these two examples not only say something about matters of representations specific to these two groups but also facilitates a larger discussion on marginalized bodies in imagined futurescapes.[2]

While there are several differences in how characters with disabilities and homo/bisexual characters are portrayed, it is asserted here that much can be gained by considering them together. By relating depictions of disability and homo/bisexuality in futurescapes this article brings to light differences as well as similarities between those representational practices. In particular, how similar discourses of these groups can have had similar effect on how they have been related to the future, but also how societal views and understandings of these groups has affected how they are depicted in narratives about the future. Moreover, putting two examples side by side can reveal more thoroughly how science fiction narratives involved in speculations about the future use marginalized bodies in the service of future discourses.

## Exclusion of Marginalized Bodies

Among the large number of films and television series produced within the genre of science fiction examples where disability and homo/bisexuality is included only consist of a small fraction. While the vast majority of popular science fiction films and television series have excluded people with disabilities and homo/bisexual pe-

ople altogether, there are, however, examples where characters with disabilities and homo/bisexual characters have been included.[3] As of yet, I have not encountered any character who clearly belongs to both groups, i.e. a homo/bisexual character with a physical disability.

There are some difficulties of doing this overview in terms of definitions and differences between depictions of disability and homo/bisexuality. Not all homo/bisexual characters are explicitly portrayed as homo/bisexual but they have instead been interpreted as such by fans and/or scholars. In addition, disability in storytelling has often been used as a "narrative prosthesis" suggesting that disability is constantly present in storytelling as "a stock feature of characterization and, […] as an opportunistic metaphorical device" (Mitchell & Snyder 2000: 47). Disabilities are thus used as narrative devices in stories, not primarily to deal with experiences of disability but instead to use disability as a symbol of something else. In science fiction in particular many characters with disabilities have been subjected to technological alterations, effectively "curing" them. Both of these representational traditions obscure the existence of these characters in science fiction. Consequently, there is an ambiguity of existence, as they are simultaneously there and not there.

Depictions of people with physical disabilities have recurred in science fiction throughout the history of the genre (see e.g. Allan 2013: 2; Bérubé 2005: 568). In film and television, examples range from *Star Trek: The Original Series* (1966–1969), *The Bionic Woman* (1976–1978), *Star Trek: The Next Generation* (1987–1994), *RoboCop* (1987), *Star Trek: Deep Space Nine* (1993–1999), *Gattaca* (1997), *Alien Resurrection* (1997), and the *Star Wars* films, to more recent examples such as the *X-Men* film series (2000–), *Dark Angel* (2000–2002), *Avatar* (2009), *RoboCop* (2014), *Daredevil* (2015–), *Mad Max: Fury Road* (2015), *Rogue One* (2016), and *Star Trek: Discovery* (2017–). Of these examples, eight portray characters in wheelchairs, three portray blind or visually impaired characters, and some include several characters with various types of disabilities. The majority of these characters have suffered injuries in battle or through accidents that caused their disability, few of these characters were born with disabilities, and the majority of them are male. Often those characters who become disabled through injuries in battle pair their disability with an active and risk-taking masculinity, a trait, which, in part, is the cause of their disability.

Many of the narratives base their conceptualization of disability on a medical perspective in which disability is considered in relation to cures. The portrayals of futurescapes in which cures of disability are highlighted are closely connected to a medical paradigm of disability. The notion of a cure makes visible the persistent return to what has been called "the medical model" in which disability is understood as a medical issue connected to the individual rather than to societal

circumstances (see e.g. Goodley 2011: 5-10). Science fiction and disability scholar Kathryn Allen argues, "[t]he medical characterization of the disabled body as requiring cure – in order to become 'normal' – has become part of our larger cultural construction of disability" (Allen 2013: 9). Consequently, much science fiction has focused on the possibilities of technological cures of disability (Allen 2013: 8-9; Cheu 2002: 199; Norden 1994: 292-295). Allen argues,

> the idea of curing the body of its infirmities is a powerful trope repeated throughout the entire history of the SF genre. From utopian SF that sees an end to disability […] to dystopian SF scenarios of failed cures […] or cures that are only available to the wealthy few […], SF is quite an experienced practitioner in reflecting the ideology of the 'perfect body'. (Allen 2013: 9)

Johnson Cheu contends, "[p]opular media is already pushing society toward a Utopian model of bodily perfection and cure" (Cheu 2002: 198). These narratives perpetuate taken-for-granted notions and supposed consensus about the "good" future in which disability inevitably is eradicated (Kafer 2013: 3). The medical framing of disability serves as an effective way for narratives to eradicate disabled bodies from imagined futures. Consequently, disabled bodies are cured and, thus, are no longer part of the future.

In most early examples of homo/bisexuality, the characters' sexuality was implicitly or subtextually implied rather than explicitly portrayed. Partly due to the fact that films from Hollywood were subjected to the scrutiny of the Production Code from the 1930s to the 1960s, which effectively forbade depictions of homosexuality (see e.g. Russo 1981; Doherty 1999: 363; Wälivaara 2016: 99). Television was also regulated by the intended viewership of family audiences, taste, and traditional values (Arthurs 2004; Wälivaara 2016: 51-53). However, gay and lesbian film scholars, queer film scholars, as well as fans, have been decoding implicit portrayals of LGBTQ characters in film and television in general. For science fiction film and television, however, this remains unexplored territory, at least in scholarly writings. George Méliès's *L'Éclipse du soleil en pleine lune* from 1907 has been considered in terms of homosexuality (Cornea 2007: 14), as has the now classic 1950s film *The Invasion of the Body Snatchers* (1956) (Pearson 2008: 21). Characters such as Kirk and Spock in *Star Trek: The Original Series* (1966–1969) and subsequent films have been decoded as queer by fans and scholars alike (see e.g. Greven 2009: 5–7; Gwenllian-Jones 2002: 81-82). Although these characters have been decoded as queer, the source texts do not directly acknowledge these relationships that remain implicitly portrayed.

Portrayals of homosexual or bisexual characters have appeared more and more

in science fiction throughout the years. Mainstream science fiction narratives that explicitly portray homosexuality or bisexuality are a 21st century phenomenon. Recent years have shown an increase in the number of characters portrayed explicitly as homosexual or bisexual in science fiction cinema and television (Wälivaara 2016). These are exemplified by films and television series such as *Dark Angel* (2000-2002); *Firefly* (2002–2003); *Battlestar Galactica* (2004–2009); *V for Vendetta* (2005); *Doctor Who* (2005-); *Torchwood* (2006–2011); *Caprica* (2009); *Stargate Universe* (2009-2011); *Orphan Black* (2013–2017); *Cloud Atlas* (2012); *Star Trek Beyond* (2016); *Ghostbusters* (2016); *The Handmaid's Tale* (2017–); and *Star Trek: Discovery* (2017–). A majority of these examples portray female characters who are bisexual or lesbians, however, few are main characters. Of these examples, only *Torchwood* portrays a protagonist that is homo/bisexual.[4]

There are changes over time and between portrayals of disability and of homo/bisexuality. While depictions of homo/bisexuality have undergone changes from implicit to explicit, the predominance of cure narratives for characters with disabilities does not seem to have changed to any significant extent. However, I would contend that in contemporary science fiction, they are both increasingly visible, and more often portrayed as complex characters where both disability and sexuality are considered intrinsic parts of being human in the future. But, those examples remain few in the light of the large amount of science fiction narratives produced for film and television.

## *Imagining the Future*

Why then is it important that narrative fiction, even though set in far-removed worlds or, in this case, futures, include marginalized bodies? Although stories in popular culture clearly take place within their own fictional universes – some very similar to our own, and others less alike – they are all connected to the society and culture in which they were made. Realist genres often claim much affinity to the "real" world by using actual settings, human subjects, and a close proximity to the reality we are used to. However, these stories cannot claim to be anymore reality than fantastic fiction due to their constructed nature. While a discussion on the boundaries of reality is beyond the scope of this article, it will simply be asserted that fiction is always connected to current issues in society. All fiction is a product of a specific time, place, and culture that influence the way the stories are constructed and what discourses they are part of. Popular culture not only says something about the creators of fiction and their subjective world view, but its popularity also testifies to wider discourses in society today.

Not only is science fiction narratives always produced at a specific time and place but the genre has also often been discussed in terms of its commentary on present society (see e.g. Kuhn 1990: 15-8; Nama 2008: 5; Telotte 2001: 95-7; Johns-

ton 2011: 28-30). Science fiction scholar Brian Attebery argues, "[b]y using images of the future to describe the present, the popular media invite us to use futuristic scenarios as tests of viability. Any group that cannot negotiate a place for itself in the imagined future is already obsolete" (Attebery 2002: 191). To exclude, for example, people with disabilities from these futures not only reflects an imagined future but, more importantly, the reality of the present. Allan argues, "While the settings and temporal framework of SF may differ dramatically from our own current reality, the way in which disability and people with disabilities are represented – as well as the technology that is used to contain or cure them – often directly reflects present-day biases and stereotypes" (Allen 2013: 3). The images of the future presented in fiction are closely connected to the ideals and norms of the present.

The stories we are told about ourselves and others impact the way we understand our society and how we view and value people. Studies indicate that media representations impact the audience in terms of identity construction, norms, and attitudes (Gomillion and Giuliano 2011; Bonds-Raacke et. al. 2007; Kama 2004; Brown 2002). With reference to Paul Longmore, Katie Ellis writes "through repetition, on both film and television, characterisations of people with disability as criminals and sexual and social outcasts have a material effect on the position of people with disability in society" (Ellis 2015: 60). To constantly meet the same type of stories and stereotypes, not only in fiction but also in other parts of society, can influence one's world view. Certain groups, in particular those already marginalized in society, are constantly framed within the same type of story, which contributes to normative understandings of these groups. They are normative in the way they help sustain normative notions about groups, often by clear divisions between us/them and normal/deviant.

## *Heteronormativity, Ableism, and Resistance*

The exclusion of people with disabilities and homo/bisexuality from futurescapes perpetuates heteronormativity and ableist normativity. Simply put, heteronormativity is the normative notion that everyone is heterosexual, and this is a normal and natural way of being (Rosenberg 2002). Ableism according to disability scholar Fiona Kumari Campbell is, "[a] network of beliefs, processes and practices that produces a particular kind of self and body […] that is projected as the perfect, species-typical and therefore essential and fully human. Disability then is cast as a diminished state of being human" (qtd. in Campbell 2009: 5). Similar to racism and sexism, ableism is a discriminatory power structure that upholds able-bodiedness/able-mindedness as superior and disability as inferior.

Heteronormativity and ableist normativity are upheld by similar strategies. Campbell contends that ableism is produced through the notion of normality and the constitutional division between normal and aberrant (Campbell 2012: 215).

Queer scholar Tiina Rosenberg describes how heteronormativity is perpetuated based on principles of exclusion: through the division between us and them – and inclusion: through assimilation, silence, or by ignoring deviance (Rosenberg 2002: 102). A way to perpetuate these normative systems is, thus, to simply ignore and make invisible these groups, for example, in fiction. While fiction is not the only site for visibility, it is part of a larger picture of society. As such, these fictional narratives that fail to acknowledge human diversity and display a society in which only the normative exists play a part in upholding ableism and/or heteronormativity.

Excluding certain groups from an imagining of the future also suggests the dominant view of the construction of identities of the present. This view suggests a type of ahistorical future that affects what is seen as a product of society, culture, and history – and what is considered something essential and everlasting. Science fiction scholar Veronica Hollinger argues:

> Although sf has often been called 'the literature of change', for the most part it has been slow to recognize the historical contingency and cultural conventionality of many of our ideas about sexual identity and desire, about gendered behavior and about the 'natural' roles of women and men. […] It assumes that the social roles played by women and men *as women and men* are ahistorical, that they will remain largely unchanged even in the distant future. (Hollinger 2003: 126)

While many science fiction narratives now have come to consider that gender roles might change in the future, few has of yet explored how notions of sexuality and ability will change, and the fact that these also are categories that are culturally and historically constructed. "Critics of sf have generally agreed that science fiction is a 'literature of ideas'. […] Sexuality is also an idea. […] For many people, however, sexuality – and particularly heterosexuality – can be envisioned only within the category of the 'natural'. To these people, sexuality is quite specifically not an idea" (Pearson 2003: 149). Partly, thanks to queer theory (hetero)sexuality has increasingly been understood as an idea which is historically, culturally and socially constructed. This same notion of disability has not, as of yet, however had the same impact on society.

From the perspective of crip theory, disability is understood in similar terms as queer theory understands sexuality. Robert McRuer (2006) argues: "Able-bodiedness, even more than heterosexuality, still largely masquerades as a nonidentity, as the natural order of things" (1). His theory explains how disability is produced through "the system of compulsory able-bodiedness" (McRuer 2006: 2). In studies of ableism, disability is conceptualized through relationships (Kafer 2013;

Campbell 2012). Kafer (2013) argues, "not only does disability exist in relation to able-bodiedness/able-mindedness, such that disabled and abled form a constitutive binary, but also, […], disability is experienced in and through relationships; it does not occur in isolation" (8). From these perspectives, disability is not seen as something essential and naturalized, but in fact as socially, historically, and culturally constructed. Suffice to say that current ideas of sexuality and disability have not been the same for the last 100 years (nor are they the same across the globe), and they will not be the same in a 100 years' time or in non-human societies.

When most popular imaginations of futurescapes exclude people with disabilities and homo/bisexual people, these imaginings embrace and perpetuate both ableist normativity and heteronormativity. In contrast, examples in which these marginalized bodies do appear can, instead, become sites of resistance. Scholars of cultural studies have long understood popular culture as "a site that both embraces and resists hegemonic culture" (Dhaenens 2013: 305). From this perspective, popular culture "can be empowering to subordinate and resistant to dominant understandings of the world" (Storey 2015: 92). This can more specifically come to mean, "articulations of queerness within popular television expose, unsettle, and/or subvert the ubiquitous institutions and practices of heteronormativity" (Dhaenens 2013: 305). Popular culture, such as those science fiction narratives dealt with in this article, can thus play a part in not only perpetuating but also disrupting normativity.

However, that does not mean that all inclusion automatically is subversive. The issue is not to argue that all visibility and all portrayals that include marginalized bodies by default disrupt or subvert normativity. For example, the uses of stereotypes are instead a way to perpetuate normative systems such as ableism or heteronormativity. Cinema scholar Richard Dyer contends, "[t]he stereotype is taken to express a general agreement about a social group, as if that agreement arose before, and independently of, the stereotype" (Dyer 2002: 14). Stereotypes are, according to Dyer, part of creating normative assumptions about certain groups. While heterosexual and able-bodied characters are often portrayed as dynamic characters, homo/bisexual and characters with disabilities have long been reduced to one or two defining traits in cinema (see e.g. Norden 1994; Russo 1981). This is a way to create and sustain the division between us and them, between the normal and the deviant. How disability and homo/bisexuality are portrayed when included and what those portrayals come to mean thus remain relevant. For this study however, the question is not primarily of positive or negative portrayals, but first, the existence of marginalized groups in these futurescapes and second, what types of futures that are commonly evoked through the inclusion of homo/bisexuality and disability.

# Inclusive Futures?

The future, or perhaps more accurately, futures are commonly evoked in science fiction narratives. Whether it is the futuristic city of *Metropolis* (1927), the time-travels of *Doctor Who* (1963–1989; 2005–), the utopian future of the *Star Trek* franchise, or the dystopian future of *The Handmaid's Tale* (2017–), they all portray imagined futures. Imagined futures can, in the words of Kathryn Allen, testify to "the ability of SF to act as an early warning system: what are the possible futures, both positive and negative, that can arise out of our current potentialities?" (Allen 2013: 3). Studying stories about the future can convey the types of future imaginaries, i.e. "ideas about the future which, at least in some […] quarters, become taken-for-granted or congealed discourses" (Goode & Godhe 2017: 123) that are at stake. For the purpose of this article I discuss future imaginaries connected to disability and homo/bisexuality in relation to notions of progression and social inclusion in futurescapes exemplified by *Star Trek, The Handmaid's Tale* and *Torchwood* (2006–2011).

## *Progression, Development, and Social Inclusion*

Science fiction often imagines the future as framed by ideas about progression and civilization. Social changes, such as equality of genders and multicultural societies, are often deployed in future visions as a way of emphasizing the progression or regression of a society. These changes are either used as a sign of a degraded future in which social inequalities are highlighted or used as a symbol of future unity and progression in a tolerant society. The former can be exemplified with *The Handmaid's Tale,* where the dystopian future is framed by the removal of women's right to their own bodies and a return to traditional values and patriarchal society. Issues such as prostitution and objectification of women have been used as signs of social corruption in order to emphasize "bad" futures not only in *The Handmaids Tale*, but also in *Blade Runner* (1982) and other examples.

Using these changes instead as a sign of social development is recurrently used in the *Star Trek* franchise which has deployed a "utopian social vision" (Jenkins 2004: 190) in which humanity has progressed beyond national borders, lives peacefully, and equality of gender and ethnicity is underlined as part of this development. For example, the idea of the future of humanity is, in the following scene from *Star Trek: The Next Generation*, upheld through progression in terms of gender equality. As first officer Riker (Jonathan Frakes) encounters the alien species Ferengi, who are appalled by the fact that humans allow their women to work, use firearms, and wear clothes, he defends their ignorance by contending: "I see them much as we were several hundred years ago […] but we can hardly hate what we once were. They may grow and learn" ("The last outpost" 1987). In this example, the idea of the future is used as a marker of progression either compared to the

past, or put in contrast to unevolved alien societies and species.

Partly due to this outspoken notion of social progression and utopianism in the future envisioned by *Star Trek,* fans have long criticized the exclusion of homosexual characters on the show (Jenkins 2004; Pearson 2008: 14-15). Not until the fall of 2017 was the first openly homosexual couple in a *Star Trek* series introduced in *Star Trek: Discovery*.[5] Likewise, I would argue, there has been a similar absence of homo/bisexual characters in the majority of popular science fiction film and television until the beginning of the 21st century. As stated earlier, there are exceptions where characters can be decoded as queer, but are not necessarily portrayed as homo/bisexual. For example through changing bodies from male to female and then encountering a past lover as in *Star Trek: Deep Space Nine* (1993–1999) episode "Rejoined" (1995). Where two people kiss whom at the time happens to have female bodies, but at the time of their actual relationship they were in fact in one male and one female body. If that should be interpreted as a same-sex relationship, a heterosexual relationship, or something else completely is the question.

I would contend that using homo/bisexuality in the framing of progressive or regressive future discourses was rare prior to the 2000s. After this time, homo/bisexual characters have been more explicitly included in science fiction film and television. Moreover, they have been used as a sign of cultural progression in terms similar to gender equality. One of the most pervasive examples of this is television series *Torchwood* (2006-2011), in which the idea of the future is framed by the notion of progression in terms of sexuality and gender. The protagonist Captain Jack Harkness (John Barrowman), born in the 51st century, offers a future gaze at the present as he is trapped in the 21st century. The future of humanity is portrayed through the omnisexual character Jack, who is a testament to the fact that contemporary views of sexuality and gender are in fact historical, social, and cultural constructions that will change over time. The progression of the future relies not only on technological advancements but also on sexual identities and categories. Jack contends that in the future of humankind, and in the encounter with alien species our current understanding of our sexualities are no longer viable.

The opposite can also be found where homophobic societies are used to signal dystopian futures. While *The Handmaid's Tale* (2017-) offers a clear critique of a dystopian society, it illustrates what has been called "reproductive futurism". In queer studies, Lee Edelman (2004) describes the prevalence of reproductive futurism in which the figure of the child symbolizes the future. He argues, "that *queerness* names the side of those *not* 'fighting for the children,' the side outside the consensus by which all politics confirms the absolute value of reproductive futurism" (Edelman 2004: 3). Queerness, from this perspective, is the embodiment of the death drive (Edelman 2004: 27). *The Handmaid's Tale* portrays the threat

posed to this future not only by feminism but also by queerness. Reproductive futurism is an example of a future imaginary, where reproduction and children are considered intrinsically bound to the future, and queerness symbolizes that which oppose this general consensus (Edelman 2004).

In the future society of Gilead the future is at stake due to infertility. This threat to the future of humankind is countered by the removal of rights for women, a return to traditional values, and executions of intellectuals and queers. The infertility is explained by authorities as caused by the extensive use of birth control pills, environmental damage, sexual liberation, and sinful behavior in the past. In *The Handmaid's Tale,* ways of life that oppose the heteronormative – preventing pregnancies, having sex outside of wedlock, with multiple partners, or with same-sex partners – is presented as the cause of the future society's problems and, in extension, the end of humankind. *The Handmaid's Tale* portrays a dystopian future in which our contemporary achievements in terms of gender equality and equal rights for LGBTQ people are used against the inhabitants of Gilead. A return to traditional values, the nuclear family, and patriarchal society is considered to be the only way to ensure that the future is saved. The future imagined by the leaders of Gilead is a utopia for the chosen few, the rest are forced to make sacrifices to ensure the reproductive future of humankind. As the main character Offred (Elisabeth Moss) is told: "Better never means better for everyone... It always means worse, for some" ("Faithful" 2017).

Homo/bisexuality has in many ways started to be included in the future imaginary of development and progression. The framing of homo/bisexuality in these stories testify to discourses in society in which diversity and social inclusion is valued. Imagined futures can use these present-day discourses to conjure up good or bad futures, extrapolated based on those discourses. As this example, and the example with disability below will show, the symbolic value ascribed to marginalized bodies in stories are based on contemporary views and are therefore subjected to change over time. Moreover, the future imaginaries into which these stories position themselves in terms of progression and development is also based on normative notions of how to view the future.

Disability on the contrary has as of yet seldom been included in the notion of social equality as a way to emphasize progressive future societies. This notion of progression has an impact on the way disability has become related to the future. From the perspective of crip temporalities, Kafer writes, "disability is seen as the sign of no future, or at least of no good future" and adds that it is assumed, "that we all agree […] that we all desire the same futures" (Kafer 2013: 3). Kafer argues that the disabled body has come to signify not having a future or that the future has failed. Due to the prevalence of the medical model of disability, a future in which disability is not eradicated is inevitably a failed future:

> disability is cast as a problematic characteristic inherent in particular bodies and minds. Solving the problem of disability, then, means correcting, normalizing, or eliminating the pathological individual, rendering a medical approach to disability the only appropriate approach. The future of disability is understood more in terms of medical research, individual treatments, and familial assistance than increased social supports or widespread social change. (Kafer 2013: 5)

This prevalence of the medical paradigm in stories as well as in society offers insight into how the future of disability is viewed by contemporary society. Kafer's assertion about the future discourse of disability based on medical and individual definitions is highly viable in science fiction narratives. Consider for example the prevalence of cure narratives in science fiction (cf. Allen 2013). Science fiction (and science) continues to explore technological possibilities based on this medical model of disability:

> With the recent cracking of genetic coding, opening up the possibility of genetic manipulation, a future where medical technology and genetic engineering will have advanced to the point where bodies can be genetically manipulated before birth, or treated and cured so as to make 'disability' obsolete, it is not beyond the realm of possibility. In this 'medical model', disability becomes non-existent. (Cheu 2002: 198)

The future is extrapolated based on ableist assumptions about the connection between health, progression, and disability. Moreover, the ideal future from that perspective is undoubtedly a future where disability has been eradicated. For fiction narratives dealing with the future, this medical progression or regression has come to symbolize utopian/dystopian futures. As Fiona Kumari Campbell argues, "[f]or disability, utopianism is a conflicted zone – there is no future existence, disability dreaming is expunged and the utopian drive is a device for promise (of curability), hence, extinction of the impairment state" (Campbell 2012: 223). Kafer also argues:

> If disability is conceptualized as a terrible unending tragedy, then any future that includes disability can only be a future to avoid. A better future, in other words, is one that excludes disability and disabled bodies; indeed, it is the very *absence* of disability that signals this better future. The *presence* of disability, then, signals something else: a future that bears too many traces of the ills of the present to be desirable. (Kafer 2013: 2)

As a narrative mechanism, the inclusion of disability in imagined futures often aims to emphasize "bad" futures. For example, one of the most obvious inferences to disability in *The Handmaid's Tale* is used to narratively underline decadence and corruption. In the scene in which Offered is taken to Jezebel's, a brothel to which influential men travel for sex with women forced into prostitution, the setting is introduced to us through Offered's gaze. She sees naked women, women dressed-up in various costumes and lingerie, men together with several women at the same time, people drinking and smoking, a sight in stark contrast to Offered's present existence as a handmaid. Moreover, she sees a man and a woman in an elevator, as the man passionately sucks on the woman's amputated arm. In this instance, disability is positioned to further symbolize the decadent space of Jezebel's.

There are, however, examples in which the medical model of disability is in negotiation with ideas of progression in terms of social equality. *Star Trek's* utopian vision of the future has been criticized for not including people with disabilities in any significant way (Kanar 2000). However, *Star Trek: Discovery,* has not only included a same-sex couple, but also characters with disabilities. While at the time of writing this only one season of *Star Trek: Discovery* is available, there are some indications that the creators want to problematize some previously taken-for-granted notions of the future of disability. So finally, one can say, disability is beginning to be included in the notion of the progressive future of *Star Trek* in which a variety of bodies, genders, and ethnicities are welcome. First of all, a crewmember of the Discovery is in passing shown in a wheelchair ("Magic to Make the Sanest Man Go Mad" 2017). The character is used to praise the sacrifices made by crewmembers in the ongoing war, i.e. the injuries acquired in battle are visualized by a crewmember in a wheelchair and partly adhere to a taken-for-granted ableist notion of loss and sacrifice. But, to see a character in Starfleet uniform who is not able-bodied is still an important step towards including a variety of bodies not as a sign of a failed future, but of a future of inclusiveness and equality. However, the character only appears briefly on screen.

In addition, the Captain of the U.S.S Discovery, Captain Lorca (Jason Isaacs), is introduced as having suffered an eye injury in battle, and, though he has the medical and technological possibility to simply "have it fixed," he has refused to do so. This refusal to make surgical corrections to his eyes can first be interpreted as an unwillingness to be "cured" and thus, choosing to live with a visual impairment. However, it is revealed later on in season one that Lorca in fact originates from a mirror universe, a parallel universe in which every human has this condition, a sensitivity to light. Is Lorca then to be considered a character with a disability only due to disabling circumstances in the prime universe, or is the visual impairments of the entire evil Terran Empire of the mirror universe to be read as a metaphor for their inability to see and value non-human species? This only

difference between the prime universe (aka. the good guys) and mirror universe (aka. the bad guys) can thus instead be understood as utilizing bodily differences and disabilities as signs of character flaws rather than as portrayals of experiences of disability (cf. Bérubé 2005).

## *Changes*

In the light of the discussion about disability and futurity I argue that the lack of homo/bisexual characters in early science fiction narratives also can be ascribed to the pathologization of homosexuality in a time in which medical discourses surrounding non-heterosexual sexualities dominated. It would then make sense that many stories would have done away with both disability and homosexuality in their imagined futurescapes based on the notion of an evolved progressive society.

Moreover, the changes in how homosexuality has come to be understood and defined over the course of 50 years have definitely affected the types of stories that have been told, what types of futures have been imagined, and what value and meaning have been ascribed to the presence of homo/bisexuality in imaginary futures. Likewise for disability, changes in how disability is understood and defined will affect portrayals and ascribed meanings in future settings. The shift from a purely medical understanding of disability to social, relational, and political frameworks has taken place later in time for disability than for homosexuality, and these efforts have not yet come to bear much fruit in fiction.

I have also argued that the kind of futures we imagine is bound to the way we understand the present. In this context, imaginations of the future are also political. For example, questioning the political aspects of disability according to Kafer, "requires a recognition of the central role that ideas about disability and ability play in contemporary culture, particularly in imagined and projected futures" (Kafer 2013: 10). The same goes for sexuality. Allen, likewise, identifies ways contemporary society thinks about disability as the area to be scrutinized.

> When we imagine a future world without disability, we end up erasing a significant group of people from our ideal vision of a collective human identity and history. It is important that we interrogate *these outdated cultural frames of disability and seek new ways of reading and writing the disabled body* so that we, as a human community, might move forward into the future together. (Allen 2013: 14 my emphasis)

One place for finding new ways of thinking is through the stories told, for example, in popular culture about the imagined futures of humanity.

It is likewise important that scholars researching science fiction or futurescapes critically scrutinize the way these marginalized bodies are being portrayed.

For example, by considering how different definitions and normative understandings effect not only the composition of stories but the framing of analysis. To change perspective produces other types of analysis not taking for granted preconceived meanings. For example, some stories that have mainly been discussed in terms of curing narratives of disability could also be understood as depicting a future society in which societal barriers have been removed. For example, characters such as Alex Murphy in the *RoboCop* films and Darth Vader in the *Star Wars* films are characterized by what Martin F. Norden (1994) calls "techno-marvels", characters that through technology been "cured" of her/his disability (Norden 1994: 292-295).[6] Likewise, although not as extensive a technological alteration, Georgi La Forge (LeVar Burton) of *Star Trek: The Next Generation* applies technology to be able to see. If instead seen from the perspective of what disability scholars have called "the social model" (see e.g. Goodley 2011: 11-13)*,* these futurescapes have, in many ways, solved certain societal barriers that create and sustain disability. This perspective emphasizes that we are not dealing with disabled people but with disabling environments. Instead of understanding technological hybridity as a way to cure these characters, it is possible to consider a technologically advanced society as a society better equipped for different kinds of bodies. From this perspective these three characters can, in contrast, be understood as existing in futurescapes in which physical injuries do not necessitate disability. If put into a non-futuristic environment, these characters would have been unmistakably disabled. Each of these futurescapes, however, offers fewer disabling circumstances. Technological advancements, such as Geordi's visor, are part of a society, which in comparison to the present, has become less disabling, at least for some (Kanar 2000).

## Conclusion

Although narratives about the future in popular science fiction occasionally have imagined futures in which disability and homo/bisexuality exist and marginalized bodies are presented as an integral part of the imagined future, the vast majority do not. As this article has illustrated, the exclusion of characters with disabilities and homo/bisexual characters in imagined futures of science fiction perpetuate heteronormative and ableist normativity. It is important that fictional narratives of imagined futures do not limit portrayals to heterosexual and able-bodied people but, instead, take into account the ableist and heteronormative imaginaries that these narratives, and in extension contemporary society, are embedded in. A debate about the future of human society and what it means to be human, now and in the future, is currently underway in all parts of society. Therefore, it is important that people with disabilities and homo/bisexual people, or any marginalized

group, exists in imagined futures not only on the terms of an ableist and hetero-sexist society.

Moreover, in examples where homo/bisexuality and disability have been in-cluded in imagined futures they are often deployed as narrative devices used to emphasis "good" or "bad" futures. In particular if connected to notions of progres-sion and social inclusion. It is argued that homo/bisexuality has increasingly been incorporated as a sign of social inclusion and progression while disability, partly due to the perseverance of a medical understanding of disability, is more often used as a sign of a failed future. It has of yet seldom been used as a sign of a future society in which different types of bodies are embraced. However, as the example with homo/bisexuality show, the symbolic value ascribed to these bodies in stories are based on contemporary views and can thus change accordingly. To actually conjure up futures in which normative systems of ableism and heteronormativity are overthrown calls attention to the constructed nature of disability and sexuality. To change the way in which the future is envisioned in terms of the existence of marginalized bodies requires challenging how different types of bodies, desires, and notions of normativity are thought about. Sometimes imaginary futures can aid in rethinking and revaluating these taken-for-granted notions of normativity.

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## Notes

[1]For research into disability and science fiction see e.g. Allen 2013; Ellis 2015; Kanar 2000; Cheu 2002; Bérubé 2005; Cheyne 2012; Weinstock 1996; Moody 1997;. For qu-eer studies of science fiction see e.g. Pearson et al. 2008; Ginn & Cornelius 2012; Call 2013; Greven 2009; Ireland 2010; Wälivaara 2016.

[2]Throughout this paper I sometimes use "these groups" for lack of better words. However, I am aware that neither disability nor homosexuality/bisexuality unpro-

blematically can be grouped together as these represent homogenous identities, sub-groups, etc.

[3] For the purpose of this discussion I use a broad definition of science fiction, not strictly limiting it to those clearly portraying futures (for example including *Star Wars* set "a long time ago"). This offers a more representative picture of portrayals of disability and homo/bisexuality in mainstream audio-visual science fiction.

[4] Or in fact "omnisexual", see e.g. Ireland 2010: 1.

[5] In 2016, the film *Star Trek Beyond* revealed that, in the alternative timeline, Sulu had a husband.

[6] For a more elaborated discussion on Darth Vader and disability, see: Norden 1994: 292-295; Covino 2013; and Wälivaara 2018.

# References

Allen, Kathryn (ed.) (2013): *Disability and Science Fiction. Representation of Technology as Cure,* New York: Palgrave Macmillan.

Arthurs, Jane (2004): *Television and Sexuality: Regulation and the Politics of Taste*, Maidenhead: Open University Press.

Attebery, Brian (2002): *Decoding Gender in Science Fiction*, New York: Routledge.

Bérubé, Michael (2005): "Disability and Narrative", *PMLA,* 120:2, 568–76.

Bonds-Raacke, Jennifer M., Elizabeth T. Cady, Rebecca Schlegel, Richard J. Harris, and Lindsey Firebaugh (2007): "Remembering Gay/Lesbian Media Characters", *Journal of Homosexuality*, 53:3, 19–34.

Brown, Jane D. (2002): "Mass media influences on sexuality", *The Journal of Sex Research*, 39:1, 42-45.

Call, Lewis (2013): *BDSM in American Science Fiction and Fantasy*, New York: Palgrave Macmillan.

Campbell, Fiona Kumari (2009): *Contours of ableism: the production of disability and abledness*, New York: Palgrave Macmillan.

Campbell, Fiona Kumari (2012): "Stalking Ableism: Using Disability to Expose 'Abled' Narcissism", Dan Goodley, Bill Hughes, & Lennard J. Davis (eds.): *Disability and Social Theory: New Developments and Directions*, Basingstoke: Palgrave Macmillan, 212–230.

Cheu, Johnson (2002): "De-gene-erates, Replicants and Other Aliens: (Re)defining Disability in Futuristic Film", Mairian Corker and Tom Shakespeare (eds.): *Disability/Postmodernity: Embodying Disability Theory*, London: Continuum, 198–212.

Cheyne, Ria (2012): "Introduction: Popular Genres and Disability Representation", *Journal of Literary & Cultural Disability Studies*, 6:2, 117–123.

Cornea, Christine (2007): *Science Fiction Cinema: Between Fantasy and Reality*, New Brunswick, N.J.: Rutgers University Press.

Covino, Ralph (2013): "*Star Wars*, Limb Loss, and What It Means to Be Human", Allen, Kathryn (ed.): *Disability and Science Fiction. Representation of Technology as Cure,* New York: Palgrave Macmillan, 103–113.

Dhaenens, Frederik (2013): "Teenage queerness: negotiating heteronormativity in the representation of gay teenagers in *Glee*", *Journal of Youth Studies*, 16:3, 304–317.

Doherty, Thomas (1999): *Pre-Code Hollywood. Sex Immorality, and Insurrection in American Cinema 1930-1934,* New York: Columbia University Press.

Dyer, Richard (2002): *The Matter of Images: Essays on Representation*, 2. ed. London: Routledge.

Edelman, Lee (2004): *No Future: Queer Theory and The Death Drive*, Durham: Duke

University Press.

Ellis, Katie (2015): *Disability and Popular Culture: Focusing Passion, Creating Community and Expressing Defiance*, Burlington: Ashgate Publishing.

Freeman, Elizabeth (2010): *Time binds: queer temporalities, queer histories*, Durham: Duke University Press.

Ginn, Sherry and Michael G. Cornelius (eds.) (2012): *The Sex Is Out of This World: Essays on the Carnal Side of Science Fiction*, Jefferson, N.C. McFarland & Company. Inc. Publishers.

Gomillion, Sarah C. and Traci A. Giuliano (2011): "The Influence of Media Role Models on Gay, Lesbian, and Bisexual Identity", *Journal of Homosexuality*, 58:3, 330–354.

Goode Luke & Michael Godhe (2017): "Beyond Capitalist Realism – Why We Need Critical Future Studies", *Culture Unbound: Journal of Current Cultural Research,* 9:1, 109–129.

Goodley, Dan (2011): *Disability Studies: An Interdisciplinary Introduction*. Los Angeles: SAGE.

Greven, David (2009): *Gender and Sexuality in Star Trek: Allegories of Desire in the Television Series and Films,* Jefferson, N.C.: McFarland & Co.

Gwenllian-Jones, Sara (2002): "The Sex Lives of Cult Television Character", *Screen* 43:1, 79–90.

Halberstam, Judith (2005): *In a Queer Time and Place: Transgender Bodies, Subcultural Lives*, New York: New York University Press.

Hollinger, Veronica (2003): "Feminist theory and science fiction", Edward James and Farah Mendelsohn (eds.): *The Cambridge Companion to Science* Fiction, Cambridge: Cambridge University Press, 125–136.

Ireland, Andrew (ed.) (2010): *Illuminating Torchwood: Essays on Narrative, Character and Sexuality in the BBC Series,* Jefferson, N.C.: McFarland & Co.

Jenkins, Henry (2004): "'Out of the Closet and into the Universe": Queers and *Star Trek*", Benshoff, Harry M. & Griffin, Sean (red.); *Queer Cinema: The Film Reader*. New York: Routledge, 189-207.

Johnston, Keith M. (2011): *Science Fiction Film: A Critical Introduction*, Oxford: Berg.

Kafer, Alison (2013): *Feminist, queer, crip*, Bloomington: Indiana University Press.

Kama, Amit (2004): "Supercrips versus the pitiful handicapped: Reception of disabling images by disabled audience members" *Communications* 29:4, 447–466.

Kanar, Hanley E. (2000): "No Ramps in Space: The Inability to Imagine Accessibility in *Star Trek: Deep Space Nine*", Elyce Rae Helford (ed.): *Fantasy Girls: Gender in the New Universe of Science Fiction and Fantasy,* Lanham, Md.: Rowman & Littlefield, 245–264.

Kuhn, Annette (ed.) (1990): *Alien Zone: Cultural Theory and Contemporary Science Fiction Cinema*, London: Verso

McRuer, Robert (2006): *Crip theory: cultural signs of queerness and disability.* New York: New York University Press.

Mitchell, David T. & Snyder, Sharon L. (2000): *Narrative prosthesis: disability and the dependencies of discourse*. Ann Arbor: University of Michigan Press.

Moody, Nickianne (1997): "Untapped Potential: The Representation of Disability/Special Ability in the Cyberpunk Workforce", *Convergence: The International Journal of Research into New Media Technologies,* 3:3, 90–105.

Muñoz, José Esteban (2009): *Cruising Utopia: The Then and There of Queer Futurity*, NYU Press, New York.

Nama, Adilifu (2008): *Black Space: Imagining Race in Science Fiction Film*, 1. ed. Austin: University of Texas Press.

Norden, Martin F. (1994): *The Cinema of Isolation: A History of Physical Disability in the Movies*, New Brunswick, N.J.: Rutgers Univ. Press.

Pearson, Wendy G. (2003): "Science fiction and queer theory", Edward James and Farah Mendelsohn (eds.): *The Cambridge Companion to Science Fiction*, Cambridge University Press, 149–160.

Pearson, Wendy G. (2008): "Alien Cryptographies: The View from Queer", Pearson, Wendy G., Hollinger, Veronica & Gordon, Joan (eds.): *Queer Universes: Sexualities in Science Fiction*, Liverpool: Liverpool University Press, 14-38.

Pearson, Wendy G., Hollinger, Veronica & Gordon, Joan (eds.) (2008): *Queer universes: sexualities in science fiction*, Liverpool: Liverpool University Press.

Rosenberg, Tiina (2002): *Queerfeministisk Agenda*, Stockholm: Atlas.

Russo, Vito (1981): *The Celluloid Closet: Homosexuality in the Movies*, 1st ed. New York: Harper & Row.

Samuels, Ellen (2017): "Six ways of looking at crip time". *Disability Studies Quarterly,* 37:3, n.pag.

*Star Trek: Deep Space Nine*, s. 4, ep. 5, "Rejoined," Paramount Television, October 30, 1995.

*Star Trek: Discovery,* s. 1, ep. 7, "Magic to Make the Sanest Man Go Mad," CBS Television Studios et al., *Netflix,* October 29 2017.

*Star Trek: The Next Generation,* s.1, ep. 5, "The Last Outpost," Paramount Television, *Netflix,* October 17 1987.

*Star Trek: The Original Series,* s. 2, ep. 4, "Mirror, Mirror," Norway Productions et al., *Netflix,* October 6 1967.

Storey, John (2015): *Cultural Theory and Popular Culture: An Introduction*, Seventh edition. London: Routledge/Taylor & Francis Group.

Telotte, J. P. (2001): *Science Fiction Film*, Cambridge: Cambridge Univ. Press.

*The Handmaid's Tale*, s. 1, ep. 3, "Late," MGM Television, *HBO Nordic,* April 26 2017.

*The Handmaid's Tale,* s. 1, ep. 5*,* "Faithful," MGM Television, *HBO Nordic*, May 10 2017.

Weinstock, Jeffery A. (1996): "Freaks in Space: 'Extraterrestrialism' and 'Deep-Space Multiculturalism'", Rosemarie Garland Thomson (ed.): *Freakery: Cultural Spectacles of the Extraordinary Body,* New York: New York Univ. Press.

Wälivaara, Josefine (2016): *Dreams of a subversive future: sexuality, (hetero)normativity, and queer potential in science fiction film and television*. Diss. Umeå : Umeå University.

Wälivaara, Josefine (2018): "Blind Warriors, Supercrips, and Techno-Marvels: Challenging Depictions of Disability in *Star Wars*", *The Journal of Popular Culture*, 51:4, 1036–1056.

# After Work: Anticipatory Knowledge on Post-Scarcity Futures in John Barnes's *Thousand Cultures* Tetralogy

By Michael Godhe

## Abstract

What would happen if we could create societies with an abundance of goods and services created by cutting-edge technology, making manual wage labour unnecessary – what has been labelled societies with a *post-scarcity* economy. What are the pros and cons of such a future? Several science fiction novels and films have discussed these questions in recent decades, and have examined them in the socio-political, cultural, economic, scientific and environmental contexts of globalization, migration, nationalism, automation, robotization, the development of nanotechnology, genetic engineering, artificial intelligence and global warming.

In the first section of this article, I introduce methodological approaches and theoretical perspectives connected to Critical Future Studies and science fiction as anticipatory knowledge. In the second and third section, I introduce the question of the value of work by discussing some examples from speculative fiction. In section four to seven, I analyze the *Thousand Culture* tetralogy (1992–2006), written by science fiction author John Barnes. The *Thousand Cultures* tetralogy is set in the 29th century, in a post-scarcity world. It highlights the question of work and leisure, and the values of each, and discusses these through the various societies depicted in the novels. What are the possible risks with societies where work is voluntary?

> What is perplexing is less the acceptance of the present reality that one
> must work to live than the willingness to live for work.
>
> Kathi Weeks (2011: 2)

## Introduction

The computerization of society, including automation and robotization, have been fiercely debated for many years (cf. Bodén's contribution in this issue). Current debate is coloured by recent developments in cybernetics, artificial intelligence, and communication media (cf. Frey & Osborne 2013; Schwab 2016), but is also situated in the socio-political, cultural, economic, scientific and environmental contexts of globalization, migration, nationalism, the development of nanotechnology, genetic engineering and global warming.

In his thought-provoking book *Four Futures: Visions of the World After Capitalism*, sociologist Peter Frase argues that "two specters are haunting Earth in the twenty-first century: the specters of ecological catastrophe and automation" (Frase 2016: 1). Frase believes that we are facing a "contradictory dual crisis", of which the two elements are a scarcity of inhabitable places to live on Earth (as a consequence of climate change) and an abundance of unemployed workers (as a consequence of automation and robotization) (Frase 2016: 1-3).[1]

A further pathology concerns the challenge of balancing time in late modern societies. According to sociologist Jiri Zuzanek, after the financial crisis of 2008 we have seen "a polarisation of time use along employment lines, with parts of the employed population experiencing time pressure […], while others are confronted with enforced rather than chosen leisure" (Zuzanek 2017: 312). Therefore, the question of how we should organize a sustainable society and how we should (re)distribute wealth is urgent.

Recently, scholars and public intellectuals such as Paul Mason (2016), Rutger Bregman (2016), and Roland Paulsen (2017) have returned to the idea of a universal basic income (although emphasizing the pros and cons depending on the form in which it is implemented), since capitalism as we know it is coming to an end (post-capitalism). Why, when we have all the technological means needed to decrease the amount of labour we carry out, are we continuing along the same trajectory? One of the reasons according to Paulsen, and of interest for this essay, is that we are still burdened by a work ethos that is incompatible with the time we live in (Paulsen 2017). Work is not only "defended on grounds of economic necessity and social duty; it is widely understood as an individual moral practice and collective ethical obligation", as sociologist Kathi Weeks states. Work is considered to be what defines us in terms of self-fulfilment, social recognition and status; and further it is seen as fundamental for a stable society (Weeks 2011: 11, cf. Paulsen

2017: 33–123).

Weeks claims that questioning traditional work values is not to suggest that work is without value, but "that there are other ways to organize and distribute that activity and to remind us that is also possible to be creative outside the boundaries of work" (Weeks 2011: 12). One influential arena for imagining and discussing other ways for organizing and distributing labour is speculative fiction:[2] in the utopian and dystopian genres creative reorganization of work and leisure are an essential part of the narrative, but few works have gone as far as to abolish labour until the last decades. I suggest that speculative fiction (especially science fiction) in recent decades have in some sense undergone a transition from being work-oriented to imagining societies where work is voluntary – for better or worse. They are exploring possible futures where societies with an abundance of goods and services are created by cutting-edge technology, making manual wage labour unnecessary – what has been labelled societies with a *post-scarcity* economy (cf. Aguilar-Millan et al 2010, Barbour 2012).

One such example is the *Thousand Cultures* tetralogy (1992–2006) by John Barnes (b. 1957), where the idea of societies with post-scarcity economy are explored in relation to uncertainties that arise in the post-cold war period. In this article, I analyse how Barnes depicts the pros and cons of such a future: Is work still connected to self-fulfilment and social recognition? What are the possible risks with societies where work is voluntary? Situated in the social, political and economic contexts of globalization, posthumanism and transhumanism, and the war on terror, as well as environmental issues, the *Thousand Cultures* tetralogy discusses the possible nature of work and leisure in societies with post-scarcity economy. It depicts our galaxy in the 29th century through the eyes of the protagonist Giraut Leones, a troubadour brought up in a medieval culture, celebrating courtly codes of honour. Since goods are abundant in the *Thousand Cultures*, it is a world of post-scarcity economies. A universal basic income has been implemented in one form or another with few exceptions, but far from all societies are post-labour.

At the beginning of the first novel, the *springer* has just been implemented. This is a technological innovation that makes instantaneous travel between the planets in the galaxy possible. With the arrival of the springer, people, goods, ideas and culture are beginning to flow between the different parts of the galaxy after centuries of isolation, and in this sense the novels deal with and interpret contemporary questions of globalization and recent developments in identity politics (cf. Godhe 2018) coupled to the question of work in post-scarcity societies. I give a thumbnail sketch of the plot in the tetralogy below.

In the first section of this article, I introduce methodological approaches and theoretical perspectives connected to critical future studies (Goode & Godhe 2017) and how the science-fiction genre works as anticipatory knowledge on pos-

sible futures. In the second and third section, I introduce the question of the value of work by discussing some examples from speculative fiction, showing how the conception of work has transformed labour: no longer a necessary part of future imaginaries, it is re-imagined as a voluntary exercise. In section four to seven, I analyze the *Thousand Culture* tetralogy (1992–2006).

## 1. Methodological and theoretical approaches to Critical Future Studies

In our programmatic article "Beyond Capitalist Realism – Why We Need Critical Future Studies", Luke Goode and I stated that "CFS investigates the scope and constraints within public culture for imagining and debating different potential futures". The aim of CFS is "to contribute constructively to vigorous and imaginative public debate about the future—*a futural public sphere*—and to challenge a prevalent contemporary cynicism about our capacity to imagine alternative futures while trapped in a parlous present." (Goode & Godhe 2017: 109). A capitalist realism "persuading citizens that t*here is no alternative* to the onward march of globalized markets, finance capitalism, deregulation and environmental degradation" limits our scope for imagining alternatives to the present trajectory (Goode & Godhe 2017: 110. See also Fisher 2009, Levitas 2013, Vint 2016, Paulsen 2017). Speculative fiction like the science-fiction-genre can be seen as a futural public sphere, "an important 'place' or 'room' for discussing the societal and cultural impact of science and technology" (Godhe 2018, cf. Bergström et al 2000). The science-fiction genre is a place focussing on extrapolating "human problems brought about by technological change" (Clarke 2010: 51, cf. Suvin 1979), anticipating alternative futures.

In our 2017 article, we also proposed a methodology for Critical Future Studies (Goode & Godhe 2017: 109, 121–123) based on several questions, such as: What kind of future is evoked? Who would want to live in such a future (and who wouldn't)? These questions are helpful for investigating the pros and cons of the organization of work and leisure time in a post-scarcity economy, in terms of self-fulfilment and social recognition as well as possible risks with post-labour societies, with the example of Barnes's *Thousand Cultures* tetralogy.

The narrative in *Thousand Cultures* tetralogy is neither dystopic nor utopic, a characteristic it shares with many late-modern works in speculative fiction (Godhe 2010). It contains dystopian elements juxtaposed to utopian elements and brings to the fore questions on latent but undesirable consequences of post-scarcity that may arise if we continue along the present trajectory. Depending partly on "subjective disposition and *taste* for different futures" it is "often possible to discern both utopian and dystopian imagery within a single text. […] But it is

often bound up with structural inequalities of class, gender, race, culture and geography. Who stands to gain and who stands to lose are always critical and unavoidable questions" (Goode and Godhe 2017: 121).

Examining the nature of dystopias Frédéric Claisse and Pierre Delvenne (2015) argue that a successful dystopia "aims at making itself obsolete: once the world it depicts is identified as a possible future, it seems to empower its readers again, restoring a 'sense of possibilities' that eventually makes alternative pathways thinkable" (Claisse & Delvenne 2015: 155–156). Dystopias, in this sense, are anticipatory knowledge of possible futures based on extrapolation of current societal, economical, technological and scientific tendencies. I claim that science-fiction works containing both utopian and dystopian elements, like Barnes's tetralogy, can be used as anticipatory knowledge. The *Thousand Cultures* tetralogy makes it possible to open up the scope for alternative futures and hopefully endowing the reader "with the capacity to conceive the future and act in accordance with these representations" (Claisse and Delvenne 2015: 157).

## 2. The value of work

The question of the value of labour and the relationship between work and leisure were discussed as early as the works of the classical Greek philosophers, and later in the utopian tradition that started with Francis Bacon and Thomas More (cf. Manuel and Manuel 1979, Claeys 2011, Zuzanek 2017). Work took on new meaning with the utopian socialists in the 19th century, who saw their utopias as sustainable solutions to the pathologies of industrialization – rapid urbanization, the destruction of the environment, the exhausting of the labour force, the use of child labour, *et cetera* (cf. Hobsbawm 1975, Manuel & Manuel 1979).

Reducing the number of working hours and abolishing child labour as well as discussing the quality of work were among the questions raised by utopian socialists in the 18th and 19th centuries. In this sense, the conception of work and leisure deviated from the classical economists of the 18th century, who believed that there "was an acceptance that those who worked (i.e. wage-labourers) would seek to avoid work and to indulge in leisure, and it was recognised that incentives as well as sanctions would be needed to encourage the workforce to work hard" (Spencer 2009: 97). While almost every utopian socialist considered organized manual labour to be a necessary and constitutive part of their utopian societies, British writer and intellectual William Morris (1834–1896) was an exception since work in his utopia should be voluntary. In a review of Edward Bellamy's (1850–1898) now classic utopian novel *Looking Backward: 2000–1887*, Morris found Bellamy's ideas of life contestable: "a machine-life is the best which Mr Bellamy can imagine for us on all sides; it is not to be wondered at then that his only idea of making

labour tolerable is to decrease the amount of it by means of fresh and ever fresh machinery." (Morris 1889: 357)

Morris rejected the claim of almost every other utopian writer, that factory work (although limited) is an essential part of modern life even in a post-scarcity economy. He was, in that sense, certainly not typical of socialist or utopian writers in his times. Morris imagined a future in which the absolute minimum number of machines produced more than just the bare necessities, while the citizens could choose whether they wanted to work or not. Those who chose to work became engaged in activities connected to art, which, in Morris's view, was the same as handicraft or skilled labour (Morris 1890).

Like in many other utopian stories from the 19th century, the inhabitants in Morris's utopia live longer and healthier lives, and they are more beautiful and prosperous (Morris 1890). But Morris's legacy is first and foremost the question of the value of work, and the relation between work and leisure. Morris was influenced by the French utopian writer Charles Fourier (1772–1837) and his concept of "attractive work" (Spencer 2009: 98). As sociologist John Stirling points out (2002: 130), for Morris "the central element of his conception of work was joy in labour". Nevertheless, few works in the science fiction genre abolished labour until the post-war period. The belief in progress, in combination with the bourgeois work ethos, still holds its grip on the imagination and on ideas of organized leisure (cf. Zuzanek 2017).

Indeed, the idea of the universal basic income, proposed in many 19th century utopias (although often linked to the re-organization of labour and to citizenship), was for a long time stigmatized in the 20th century when the pendulum swung from utopian visions in general (not just utopian socialism) to dystopian fictional accounts of society (Manuel and Manuel 1979, Godhe 2010, Claeys 2011). In dystopian novels such as *Brave New World* (1932) by Aldous Huxley and *1984* (1949) by George Orwell, both capitalism and socialism were criticized, and the continual rationalization of society and the belief in progress were contested, among other things. Today, dystopian imagery is commonplace in popular culture. Films such as *Elysium* (2013, dir. Neill Blomkamp) warn us for a future in which the privileged 1% has abandoned Earth to live in abundance in satellites or in planetary colonies, while the remaining population live in dire circumstances on a wasted and polluted Earth. In this paper, however, I will not focus on dystopian narratives of mass unemployment, social and economic inequality or other possible pathologies of an automatized and robotized world.

## 3. The end of work? The end of history? The end of culture? To boldly go…

In the short story "The Good Work" from 1959, Theodor L. Thomas (1920-2005) describes a utopian world in which machines have replaced manual labour. Not everyone is happy with that, so the Ministry of Government Employment provides those who are unhappy with a job. The protagonist in the story takes a job as member of the maintenance crew of the building where he lives. It "consists of tightening the nuts on the expansion joints in the framework of the building". At the end of the story, we learn that another crew, the nightshift, loosens the nuts (Thomas 1959: 35). The story illustrates the fear that too much leisure will make us idle or discontent with life.

Many science fiction texts, films and television series in the 20th and 21th centuries have depicted possible worlds in which science and technology have radically changed the living conditions for humans, for better or for worse. The present article is not the place for a thorough discussion of the predecessors of Barnes's *Thousand Culture* tetralogy, but some works that change the status of work from an end in itself to a voluntary exercise are worth mentioning – such as the *Star Trek* franchise and the *Culture* series by Iain M. Banks.

The most famous example, and one of the few that depict the organization of work and leisure in a post-scarcity *utopian* future is *Star Trek*. The original series (1966–1969) depicts in many ways a post-labour world in a post-scarcity utopia, as does the second-run incarnation *Star Trek: The Next Generation* (1987–1994), and some of the other incarnations of the *Star Trek* fictional universe. As Peter Frase emphasizes, "the economy and society of that show is based on two basic technical elements": the "replicator", which produces and materializes objects for free (since there are no laws protecting intellectual and material property), and free energy to run the replicator "as well as anything else on the show" (Frase 2016: 48). The end of work and scarcity is the beginning of a new history in *Star Trek* – the exploration of the universe and encounters with alien races and other civilizations.

In his thought-provoking book on fun as a key element in entertainment (which he sees as a vital part of ordinary life), sociologist Alan McKee discusses, among other things, the post-scarcity *utopian* future in the *Culture* series (1987–2012) by Iain M. Banks (1954–2013). McKee connects the modern work ethos (in its various incarnations) and its origins to the development of a middle class in the 19th century, "that emphasise duty". This contrasts with both aristocratic and working-class philosophies (McKee 2016: 84). But what if we just for a moment imagine a world without duty – and with a post-scarcity economy where no one is being exploited?

> If there is no duty and no suffering, are we, as human beings, somehow lessened? If everything that anyone does in their lives is done for fun – because they want to do it – do we lose something, something that we might call 'meaning' or 'purpose'? (McKee 2016: 87).

The *Culture* series by Ian M. Banks asks how much fun we can and should have, according to McKee. Banks does not depict a perfect universe in his novels. Devastating wars are being conducted in the galaxy, to mention one example. But in the culture of the Culture, the citizens are not indolent even if they "can get drunk/stoned/tripped out or whatever just by thinking about it" and can "enhance sexual pleasure" by altering their reproductive organs (Banks cited in McKee 2016: 89). As in Morris's utopia, some people work to obtain pleasure and fun, or some kind of contentment. The Culture is "a form of social organisation where everybody is motivated by fun", but where fun is also connected to ethical questions. Killing someone for fun, for example, is not accepted in the Culture (McKee 2016: 91).

As in Banks's Culture, fun is a central theme in John Barnes's *Thousand Cultures* tetralogy, as is also duty. Barnes, however, uses the conception of post-scarcity to ask urgent questions concerning several phenomena in our post-Cold War times – globalization, identity politics, automation, robotization, transhumanism and artificial intelligence.

## 4. Diversity and stagnation

The *Thousand Cultures* tetralogy shows the hopes and fears of a world beyond scarcity and beyond the need for physical labour.[3] The action takes place in the 29th century. We follow the protagonist Giraut Leones, a young troubadour living in Nou Occitan on the planet Wilson, a society that celebrates values and lifestyles from the Earth's Middle Ages, namely the courtly culture known as Occitan.

In the Thousand Cultures galaxy, there are 26 inhabitable planets including Earth. The other 25 have been colonized from Earth and humanity now encompasses 1228 different societies with distinct and monolithic cultures, more or less with post-scarcity economy. *Aintellects* (artificial intelligences), with some exceptions, perform most of the necessary manual labour. *Nanos* (nanotechnology robots) are building or terraforming (that is, transforming to Earth-like conditions) the different environments on the 26 inhabitable planets in the galaxy. Since aintellects do all the work necessary to survive, Giraut doesn't have to worry about work, or anything but the code of honour of his courtly culture.

The 1228 different societies are politically and socially organized through certain distinctive cultures, may they be courtly, religious, military, or based on another identity characteristic. A galactic supranational organization, the *Council*

*of Humanity*, ensures that the union of 1228 cultures on 26 planets is successful. This is necessary, because some of the cultures that have evolved over centuries of isolation have xenophobic tendencies and oppose cultural and economic impulses from outside societies. If necessary, the Council of Humanity will enforce unity. Another task of the council is to prepare humanity for an external threat, although this is kept secret from the general population to avoid panic, a potential invasion by a hostile alien race against which the Thousand Cultures must maintain a united front.

Without questioning, at least not in the beginning of the tetralogy, his Occitan heritage, Giraut spends his days with friends, drinking wine and courting beautiful young women who are members of the courtly culture. In short: trying to have fun. But with the implementation of the springer, all this is going to change. Members of a uniform interplanetary culture, emanating from Earth, so called Interstellars, are spreading in the universe, and Giraut and his friends are engaged in brutal fights with them. They detest Interstellars, "traitors to their own culture, imitators of the worst that came out from the Inner Worlds, bad copies of Earth throwing away all the wealth of their Occitan heritage" (Barnes 1992: 14).

The Thousand Cultures galaxy before the springer is characterized by both diversity and stagnation – diversity in the sense that the various cultures in the galaxy are distinctly unique, stagnation in the sense that no cultural exchange takes place until the springer arrives. The present state described in the first novel *A Million Open Doors* is the result of a period of devastating world wars that ended in the 24th century. Many minority cultures on Earth became almost extinct. So called culture founders were given permission to colonize the nearest planets in the solar system in order to transplant minority cultures. Since reliable historical sources were few, they could let myths "load in as real history" and reinvent tradition. It is often not obvious to those living in the different cultures what is based on historical sources and what is invented. After the colonization of the galaxy, humanity entered a period of cultural and scientific stagnation, since it was believed that the various cultures wanted to be isolated (Barnes 1992: 124, 188, Barnes 1998: 29-30).

As Peter Frase emphasizes, post-scarcity economy can have many faces. It may be organized around different egalitarian political systems, or it may result in extreme inequalities or even extinction of the poor (Frase 2016). And this is the case in Barnes's fictional universe. At the beginning of the tetralogy, the post-scarcity world that is depicted is a utopia where technology has made manual labour redundant. However, as the plot develops, many questions arise. Not every culture has abolished work and some capitalist monetary systems still exist (although Barnes is not very explicit with details here).

When discussing Cory Doctorow's science fiction novel *Down and Out in the*

*Magic Kingdom* (2003), Frase emphasizes that Doctorow "grasps that within human societies, certain immaterial goods will always be inherently scarce: reputation, respect, esteem among one's peers" (Frase 2016: 60). And this is the case in Nou Occitan in *A Million Open Doors*. The cultures that are not organized around work have replaced labour with various lifestyles associated with a certain culture – in Giraut's case the courtly culture until he and his friends turn 25, when they are expected to develop some voluntary skill connected to Occitan culture. In this sense, work has not been abolished in Nou Occitan but labour after the youth period has become more of an avocation (as in William Morris's utopia).

In this post-scarcity society, immaterial values have replaced material values, wage-labour and social stratification. Preserving the ethos of courtly culture and protecting it from outside cultural influences are important for Giraut and his friends, and they detest the Interstellars' intergalactic culture and their impact on Occitan culture made possible by the springer.

Loyalty to your own culture has been mistaken for fun, and in the sequel, *Earth Made of Glass* (1998), Giraut states that most of the people in the Galaxy "lived in some version of a permanent summer camp". They were "doing some form of endless, fruitless self-development. The only real differences were whether they played at art, religion, science, or lifestyle. […] Humanity as a whole was bored, and incapable of self-amusement" (Barnes 1998: 281–282). As an indication of unfulfillment, the suicide rate on Nou Occitan is high (Barnes 2001: 53). Life becomes deprived of meaning and cultural development in the isolated cultures stops. In "the post-economic world the only real problem is boredom" (Barnes 1998: 320). Human labour no longer has any worth because most tasks can be done better by machines. The exceptions are art and "interpersonal relations" (Barnes 2001: 198). The tetralogy also posits that culture becomes simulacra, a postmodern play mistaken for reality (cf. Baudrillard 1994[1981]):

To create a sense of meaning, and to resist the uniform interstellar culture whose spread the springer has made possible, different cultures attempt to preserve their uniqueness and 'purity' by refusing influences from outside (cf. Godhe 2018). In the post-scarcity galaxy depicted in the *Thousand Cultures* tetralogy, cultural identity has become the most important determinant of social category, connected to either performing unnecessary work or indulging in leisure activities.

## 5. Hybridity and development: Breaking out of cultural identity

The integration of 1228 cultures scattered on 26 planets in the galaxy is not without frictions and conflicts. In *A Million Open Doors*, Giraut travels to the planet Nansen. He becomes acquainted with the culture of the city Utilitopia in the state Caledony, a Christian capitalist culture permeated by a Lutheran work ethic.

All citizens and "resident aliens" (including Giraut) must do manual labour four hours a day, even though it is possible for the aintellects and nanos to do almost all of the necessary work (Barnes 1992: 64). Work serves to discipline the citizens of Utilitopia: it makes them docile and ensures social stability. A surprised Giraut "had always assumed that everywhere else was something like Nou Occitan, solving the problem of the fully automatic economy by employing everyone at some interesting occupation. Obviously this place had other solutions" (Barnes 1992: 71).

Eventually, Giraut receives permission to establish a cultural center – if it does not contribute to "contamination of Caledon thought", as the authorities express it (Barnes 1992: 51–68, 84–87). The isolation from other planets and cultures has had societal and cultural consequences, but Utilitopia has recently implemented the springer, and things are going to change. In many ways, the work ethos from the 19th century has been taken to its extreme, and the consequences of laissez faire capitalism for societal and cultural development have become apparent. Everything in Utilitopia is valued by its potential to maximise utility and rationality – which can be seen as a refinement of Max Weber's thesis of the Protestant ethic and the spirit of capitalism (cf. Weeks 2011: 51–57). Cultural development in Utilitopia has ceased, since cultural expressions are not considered to be useful. Identity is connected to work – to utility and duty.

However, in his meetings with Utilitopians at his culture center, Giraut starts to see his own courtly culture and its rigid gender conventions in a new light (cf. Godhe 2018). The courtly culture is shallow, brutal, and one of the most extreme cultures in the galaxy "in enforcing gender differences" (Barnes 1992: 228). A form of ritual and symbolic rape occurs in the courtly culture, but even "real, violent rape was common in the Nou Occitan" (Barnes 1992: 229).

The Utilitopians he encounters on Nansen begin in their turn to liberate themselves from their rigid cultural conventions and to create hybrids between their local culture and Giraut's neo-Occitan culture. With permission from the Caledonian authorities, his students initiate an artistic movement, Inessentialism, that celebrates the value of *l'art pour l'art*, and fun without duty. Eventually, however, Giraut's Center for Occitan Art comes under attack from traditionalists fearing that he is contaminating Caledon thought by influencing his students. Suddenly, boredom is not the only real problem – cultural change can be extremely dangerous in some circumstances. Civil war breaks out in Utilitopia, and several of Giraut's new friends are killed in the struggle. The armed forces of the Council of Humanity restore order. The old regime is overthrown and Utilitopia becomes more receptive to outside influences. Giraut and the utilitopian Margaret (with whom Giraut has engaged in a relationship) are enlisted as operational field agents for the Council of Humanity, under the cover of cultural ambassadors.

## 6. Post-Scarcity, work and disaster

In the second novel, *Earth Made of Glass* (1998), Giraut and the utilitopian Margaret are on a mission for the Council of Humanity. They travel to the planet Briand, the scene of one of the most infected conflicts in the Thousand Cultures. The two implanted cultures on Briand, *Maya* and *Tamil*, detest each other, and violence between them is common. Both cultures strive to minimize outside influences and oppose the implementation of the springer, which conflicts with the Council of Humanity's ambition to unite humanity. On Briand, the work ethos is even more tightly connected to cultural identity and authenticity. In this case, the strong emphasis on cultural identity brings the two civilizations on Briand to a devastating civil war, which eventually destroys all life and makes the planet uninhabitable for many years.

The two cultures are based on agriculture and handicraft, but the leaders have kept the population ignorant of the reinvention of their history, mainly to preserve the 'essence' of their cultures. In the Maya culture, priests and leaders conceal new technologies that can prevent farmers from starving: "if they are to be real subsistence farmers, when the crops fail, they have to starve. You can't tell them that with foodmakers, nanos, and electric power you can make all the food they could possibly want" (Barnes 1998: 187).

*Earth Made of Glass* shows how cultural identity connected to work is the basis for identity politics, protecting the two cultures on Briand from external cultural influences (cf. Godhe 2018). This is identity politics of the kind we have witnessed in recent decades with the rise of nationalist movements in Europe and the US, attempting to protect their cultural identity by sealing their borders (cf. Bonikowski 2017). The dystopian impulse in the novels warns us of the consequences of identity politics. The fear of globalization (in this case represented by the springer) destroying old cultural patterns by replacing them with a uniform global culture, leads to the reinforcement of regional and local identities, what has been labelled glocalization or re-embedding (cf. Hylland Eriksen 2014) and finally to xenophobia (cf. Godhe 2018).

## 7. Into the box

In contrast with much other contemporary science fiction, the *Thousand Cultures* tetralogy does not discuss environmental issues particularly deeply in the first two novels. Most of the cultures scattered throughout the galaxy have been established on planets carefully terraformed by nanos, but there is no discussion of whether the natural environments on the planets have an intrinsic value or not, as is the case in Kim Stanley Robinson's *Mars Trilogy* (1993–1996) (cf. Pak 2016).

In the third and fourth novels in the tetralogy, *The Merchants of Souls* (2001)

and *The Armies of Memory* (2006), Giraut continues with his work as an operational field agent for the Council of Humanity. His missions bring him to Earth and we learn that the planet was crowded and "awfully beat up" after the last world war. No more is said about environmental issues, however. Nonetheless, Earth is not a particularly good place. Almost all citizens on Earth are living in mega-cities in small concrete boxes, spending their lives "consuming direct-to-brain entertainment" (Barnes 2001: 43). The citizens are pacified by virtual reality, having completed a compulsory period of seven years' work before being permitted to go into the box (Barnes 2006: 102–103).

Half of the voters on Earth claim that "the right to consume is *the* fundamental human right" (Barnes 2001: 39). Most of them do not use the springer for vacations or visits to other planets or other cultures, since they have already seen everything in virtual reality. They have no reason to leave their box. In fact, some Earth citizens spend all their lives in virtual reality, and "nearly forget that they're in a simulation at all". A quarter of the adult population of Earth have become solipsists. They "believe that nothing outside their apartments was real, that everything was generated by the aintellects to keep them pacified" (Barnes 2001: 133, 155).

While technology has made post-scarcity life possible, it has also made it possible for people on Earth to withdraw from public life and spend most of their time isolated in virtual reality, forgetting that they are in a simulation. This is an extreme illustration of Jean Baudrillard's theory of simulacra and simulations, in which he suggests that we mistake representations for reality (Baudrillard 1994[1981]). On the other hand, people living outside the box, outside Earth on the colonies, are bound to stories, history, myths and legends of their own cultures, which is also a kind of simulacrum. These control the social order and determine how the social beings act – a kind of virtual reality created by other means.

The dystopian impulse concern the fear of how different media representations have the power to shape our conception of reality, and how mass entertainment has become a substitute for the public sphere and pacified the citizens (cf. Habermas 1989[1962]). This is particularly acute in a post-scarcity world in which the amount of work that needs to be done is limited or zero. In this sense, Barnes's tetralogy seems somewhat conservative, while it is more progressively imaginative in other ways. The cultural encounters enabled by the springer are opening up a galaxy in which work in many cultures becomes less connected to cultural identity, and where the interface between leisure and work is becoming increasingly blurred. The fear of cultural mixing in some cases leads to wars, while in other cases cultural encounters lead to societal and cultural development.

## Conclusion: Anticipatory knowledge and a sense of possibility

The computerization of society, including automation and robotization, is certainly on the agenda again, provoking both hopes and fears (Schwab 2016, Bridle 2018). Some fear that we will face a future with mass unemployment (Brynjolfsson and McAfee 2014) while others argue that we must rethink the way in which we organize society around work and return to the idea of a universal basic income (Mason 2015/2016, Frase 2016, Paulsen 2017).

As Kathi Weeks states, questioning *traditional* work values (but not necessarily that there are some values with work) is to insist on other ways of organizing and distributing labour (Weeks 2011: 11–12). One such arena with creative ideas of how to reorganize work and leisure time is speculative fiction (utopian and dystopian literature as well as the science-fiction genre). The organization of work and leisure has been part of utopian thought since ancient times, but only in the last decades, with few exceptions, utopian societies with a post-scarcity economy have been connected to *post-work* in speculative fiction. Even if utopian writers in the 18th and the 19th centuries reduced the amount of necessary manual labour needed to be done, work was an essential part of utopian thought.

In this paper, I've discussed the possible strengths and weaknesses of post-scarcity futures where machines replaced manual labour through some examples in general, but John Barnes's *Thousand Cultures* tetralogy in particular. In Barnes's fictional universe both leisure and work are connected to cultural identity. In societies where work has been redundant, leisure (or an avocation) is connected to pursuing a distinct and monolithic form of local or regional culture based on few and unreliable historical sources (and culture founder's permission to invent history). In societies where work has prevailed, labour has also been connected to cultural identity, to a kind of work ethos similar to how labour in our times still is something that defines our social being.

The possible pathologies of work or post-work in a post-scarcity economy are exposed in the tetralogy. As anticipatory knowledge, the tetralogy suggest that cultural isolation prevent a real liberation from the work ethos and how it is connected to self-fulfilment and social recognition. The tetralogy also reflects a contemporary world in which nationalist movements, illiberalism and isolationism are juxtaposed with capitalist realism, narrowing our scope by suggesting that there is no alternative. When mixing and hybridization occur in cultural encounters, communication technology becomes a means to liberate humanity and restore cultural progress.

At its best, the tetralogy empowers the readers and restores a sense of possibility. The utopian elements we find in the tetralogy, the fragile hope for a reunited and restored humanity make the imaginary reconstitution of society a possibility (cf. Levitas 2013), a society where the possible pathologies *after work* are avoided and other ways of self-fulfilment are feasible.

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# Notes

[1]Robotization and automation more generally are not the only causes of unemployment, but in this essay it is a starting point for a larger discussion of work in utopian and dystopian fiction, including the science-fiction genre.

[2]In this paper, I use 'speculative fiction' as an umbrella term for utopian and dystopian fiction as well as the science-fiction genre. The term can also include genres such as fantasy, horror, zombie fiction, *et cetera*.

[3]The history behind the vision of the future invoked in the *Thousand Cultures* tetralogy is also part of science fiction's megatext (cf. Määttä 2006), with many analogies and references to other works in the science fiction genre. It is, however, beyond the scope of this article to discuss the intertexts.

# References

Aguilar-Millan, Stephen et al (2010): "The Post-Scarcity World of 2050-2075", *The Futurist*, 44:1, 34-40.

Barbour, Charles (2012): *The Marx-Machine: Politics, Polemics, Ideology*, Lanham, Md: Lexington Books.

Barnes, John (1992): *A Million Open Doors*, New York: Tor.

Barnes, John (1998): *Earth Made of Glass*, New York: Tor.

Barnes, John (2001): *The Merchants of Souls*, New York: Tor.

Barnes, John (2006): *The Armies of Memory*, New York: Tor.

Baudrillard, Jean (1994[1981]): *Simulacra and Simulation*, Ann Arbor: The University of Michigan Press.

Bergström, Martin et al (2000): "Publika kulturer. Utgångspunkter för kulturhistoriska analyser av den medierade kommunikationens teknik och pedagogik", Martin Bergström et al (eds.): *Publika kulturer: Att tilltala allmänheten, 1700-1900. En inledning,* Uppsala: Institutionen för idé- och lärdomshistoria, 2000, 5-18.

Bonikowski, Bart (2017): "Ethno-Nationalist Populism and the Mobilization of Collective Resentment", *The British Journal of Sociology*, 68:1, 181-213.

Bregman, Rutger (2016): *Utopia for Realists and How We Can Get There*, London: Bloomsbury Publishing.

Bridle, James (2018): *New Dark Age: Technology and the End of the Future*, London: Verso.

Brynjolfsson, Erik and Andrew McAfee (2014): *The Second Machine Age: Work,*

*Progress, and Prosperity in a Time of Brilliant Technologies*, New York & London: W.W. Norton & Company.

Claisse, Frédéric & Pierre Delvenne (2015): "Building on Anticipation: Dystopia as Empowerment", *Current Sociology*, 63:2, 155-169.

Clarke, Amy M. (2010): *Ursula K. Le Guin's Journey to Post-Feminism*, Jefferson, North Carolina & London: McFarland & Company, Ink., Publishers.

Claeys, Gregory (2011): *Searching for Utopia: The History of an Idea*, London: Thames & Hudson.

Fisher, Mark (2009): *Capitalist Realism: Is there no Alternative?*, Winchester: Zero Books.

Frase, Peter (2016): *Four Futures: Visions of the World After Capitalism*, London: Verso.

Frey, Carl Benedikt & Michael Osborne (2013): *The Future of Employment*, Oxford: Oxford University.

Godhe, Michael (2010): "'Literature of estrangement': Några linjer i feministisk utopi- och sf-forskning", Michael Godhe & Jonas Ramsten (eds.): *Möjliga världar: Tekniken, vetenskapen och science fiction*, Stockholm: Carlssons, 157-178.

Godhe, Michael (2018): "'The Old Stories Had Become Our Prison' Globalisation and Identity Politics in John Barnes's Science Fiction Novels *A Million Open Doors* and *Earth Made of Glass*", *Fafnir: Nordic Journal of Science Fiction and Fantasy Research*, 5:1, forthcoming.

Goode, Luke and Michael Godhe (2017): "Beyond Capitalist Realism – Why We Need Critical Future Studies", *Culture Unbound*, 9:1, 108-129.

Habermas, Jürgen (1989[1962]): *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, Cambridge: Polity.

Hobsbawm, Eric (1975): *The Age of Capital: 1848-1875*, London: Weidenfeld & Nicolson.

Hylland Eriksen, Thomas (2014): *Globalization: The Key Concepts*, Second Edition, New York: Bloomsbury Academic.

Levitas, Ruth (2013): *Utopia as Method: The Imaginary Reconstitution of Society*, London: Palgrave.

Manuel, Frank E. and Fritzie P. Manuel (1979): *Utopian Thought in the Western World*, Cambridge, MA: The Belknap Press of Harvard University Press.

Mason, Paul (2016): *Postcapitalism: A Guide to Our Future*, London: Penguin Books.

McKee, Alan (2016): *FUN! What Entertainment Tells Us About Living a Good Life*, London: Palgrave Macmillan.

Morris, William (1889): "Looking Backward", *The Commonweal*, June 22. Reprinted in William Morris (1993): *News From Nowhere and Other Writings*, Edited with an Introduction and Notes by Clive Wilmer, Harmondsworth: Penguin Books, 353-358.

Morris, William (1890): *New From Nowhere or an Epoch of Rest: Being Some Chapters From a Utopian Romance*. Reprinted in William Morris (1993): *News From Nowhere and Other Writings*, Edited with an Introduction and Notes by Clive Wilmer, Harmondsworth: Penguin Books, 41–228.

Määttä, Jerry (2006): *Raketsommar. Science fiction i Sverige 1950-1968*. Lund: ellerströms.

Pak, Chris (2016): *Terraforming: Ecopolitical Transformations and Environmentalism in Science Fiction*, Liverpool: Liverpool University Press.

Paulsen, Roland (2017): *Arbetssamhället. Hur arbetet överlevde teknologin*, Stockholm: Atlas.

Robinson, Kim Stanley (1993-1996): *The Mars Trilogy*, New York: Bantam Books.

Schwab, Klaus (2016): *The Fourth Industrial Revolution*, New York: Crown Business.

Spencer, David A. (2009): "Work in Utopia: Pro-Work Sentiments in the Writings

of Four Critics of Classical Economics", *The European Journal of the History of Economic Thought*, 16:1, 97-122.

Stirling, John (2002): "William Morris and Work as it is and as it Might be", *Capital & Class*, 26:1, 127-144.

Suvin, Darko (1979): *Metamorphoses of Science Fiction. On the Poetics and History of a Literary Genre*, New Haven & London: Yale University Press.

Thomas, Theodore L. (1959): "The Good Work", *If*, February.

Vint, Sherryl (2016): "Introduction to 'The Futures Industry'", *Paradoxa*, Vol 27, 7-20.

Weeks, Kathi (2011): *The Problem with Work: Feminism, Marxism, Antiwork Politics, and Postwork Imaginaries*, Duke University Press: Durham & London.

Zuzanek, Jiri (2017): "Work and Leisure in Thomas More's *Utopia*", *Leisure Studies*, 36:3, 305-314.

# Beyond Utopia:
## Building Socialism Within and After Capitalism

By Monica Quirico & Gianfranco Ragona

## Abstract

The article focuses on several figures who are particularly interesting when it comes to develop a radical critique of capitalism that does not shrink from the possibility of designing and imaging a different future. Following Michael Löwy, in our study we have identified relationships of 'elective affinity' between figures who might appear different and dissimilar, at least at first glance: the Bolshevik Alexandra Kollontai, the German communist Paul Mattick, the Italian Socialist Raniero Panzieri and the French social scientist Alain Bihr. After providing some biographical information, we analyze their respective paths to a socialism based on, and achieved through, self-organization and self-government. We do not intend to build a new tradition with this review of thinkers, most of whom were also political militants; rather, more modestly, we hope to suggest a path forward for both research and political activism. In order to show how significant the questions raised by these four intellectuals-militants still are even today, in the Conclusions we analyze the social and political experiment carried out by the Movement for a Democratic Society of the Rojava region in Syrian Kurdistan.

# Introduction

In the history of anti-capitalistic movements, there has long been a tendency to believe that an alternative vision of the future cannot be formed in advance because any possible alternatives depend on the specific circumstances in effect at the time of the transition. As early as the aftermath of the October Revolution, however, some groups pointed out that a more or less definite plan for an alternative society was needed in order to counteract the two outwardly opposed and yet sometimes convergent dangers of party dictatorship and a return to capitalism. In particular, there was an urgent need to develop institutional and social antidotes to authoritarian drift by preserving and valuing direct democracy. This argument is resurfacing today in the neoliberal age, and if capitalism appears eternal, this is in part because even the best contemporary antagonistic and critical projects have had trouble imagining an entirely new society. However, having admitted that socialism cannot be invented sitting at a desk, anticapitalistic movements should try to put forward a vision, albeit one that remains open to corrections and new pathways, if they wish to enjoy credibility when speaking to the vast majority of people who have interiorized capitalistic exploitation as a natural law.

In this article we outline some of the findings of our recent research (Quirico & Ragona 2018), focusing on several figures who are particularly interesting when it comes to develop a radical critique of capitalism that does not shrink from the possibility of designing and imaging a different future.

Following Michael Löwy (1988), in our study we have identified relationships of 'elective affinity' between figures who might appear different and dissimilar, at least at first glance. These include the German-Jewish anarchist Gustav Landauer, the revolutionary Bolshevik Alexandra Kollontai, the German communist Paul Mattick, the Italian socialist Raniero Panzieri, the German-Swedish economist Rudolf Meidner, the Greek-French philosopher Nicos Poulantzas, and the French social scientist Alain Bihr.

We do not intend to build a new tradition with this review of thinkers, most of whom were also political militants; rather, more modestly, we hope to suggest a path forward for both research and political activism. We believe that it is only by revisiting the issues raised by these and similar figures that it is possible to relaunch a serious discussion of socialism.

We focus here on four of them – Kollontai, Mattick, Panzieri, and Bihr – and after providing some biographical information, we analyze their respective paths to a socialism based on, and achieved through, self-organization and self-government. Their common denominator is anti-capitalism: they believe that a system based on the increasing exploitation of labor cannot possibly be improved or made more 'humane'. In light of this conviction, they likewise critique social democratic reformism, judging it to be insufficient or – more often – complicit in the anti-po-

pular policies of capitalism itself. Equally radical, yet much harsher, is their parallel condemnation of Soviet socialism, finding fault with its means (the party), its process (the transformation of the state of exception into normality) and, finally, its product (the nature of the regime that became so well established in the Soviet Union). None of the figures presented here believe that political parties, structured hierarchically or militaristically through avant-gardes that grow to a high level of command to channel and guide the masses, are the right form for bringing about socialist change in the world. On the contrary, parties of this sort that are presented as the repositories of indisputable Truth (the only correct interpretation of society's historical trajectory) condemn revolution to a twofold and deadly state of regression. On the one hand there is the trap of implementing socialism as a preordained plan (handed down from above) rather than a process carried forward on the basis of trial and error, with wrong turns corrected thanks to constant dialogue between central organizations and the rank and file; while on the other hand, once the party has been established as the infallible authority, democracy ends up being discarded as superfluous. As a reaction to the Bolshevik dogma of infallibility, the authors reviewed here developed an ethics defined by the means of action for socialism matching its ends. Instead of squabbling over the reform vs. revolution dichotomy, they point out that if the aim is to ensure a society based on the self-government of the people and to prevent a drift towards bureaucracy and authoritarianism – then the only possible means to achieve this is bottom-up, self-guided organization, namely, the direct mobilization of the masses in economic, political, and social life as a whole. These militant intellectuals therefore share a non-deterministic view of history, one based on valorizing the component of pro-socialist action that has to do with subjectivity. In so doing, they reconnect to the spirit of the First International and its founding declaration that "the emancipation of the working class must be the work of the workers themselves".

They reformulated classical conceptual oppositions such as reform/revolution, state/society, party/movement, politics/economy, utopia/realism, etc., without following the usual frameworks characterizing the established ideological currents of the labor movement. As such, they appear unclassifiable within the classical canons of socialism, communism, and anarchism. We have chosen to group them under the category of 'socialism' because we believe this term continues to designate the construction of a community based on equality and, therefore, self-government and the social control of the economy. Far from having lost its explanatory and evocative power, even now, one century after the 'mother of all revolutions', 'socialism' continues to effectively express critiques of the current world order (whether labeled neoliberalism or turbocapitalism) and demands for its transformation.

In order to show how significant the questions raised by these four intellectu-

al-militants still are even today, in the *Conclusions* we analyze the social and political experiment carried out by the Movement for a Democratic Society of the Rojava region in Syrian Kurdistan.

## Alexandra Kollontai (1872–1952): class struggle and women's liberation

The political and personal biography of Alexandra Michailovna Kollontai (née Domontovich) provides a neat summary of the conflict between a radical utopian vision encompassing all areas of social life, even the most private ones, and the resistance such a vision encountered from a dual set of forces – the old capitalist society and the new party-state class established following the October Revolution, two apparently opposed worlds that nevertheless came together in defending certain privileges, including the patriarchal order.

Born to a family of the old Russian nobility in 1872, Kollontai began her militancy in the Russian Social Democratic Party in 1899, immediately helping to organize struggles and providing political education to Russian female workers through her untiring activity as a freelance journalist and lecturer (Clements 1979:149–177). In 1906 she began a long period of exile in which, as a *persona non grata*, she was obliged to keep her distance from Russia until March of 1917. She stayed in various countries in Western Europe and the United States, striking up relationships with Clara Zetkin and Rosa Luxemburg (Porter 1980: 148–172). In October of 1917, she was the first woman in history to be appointed minister (commissioner): she was put in charge of social affairs in the Bolshevik government. In this position she devoted herself to establishing a state facility to aid mothers and newborns, a project that earned her the malicious and unfounded accusation of aiming at 'nationalizing' women and children (Kollontai 1973: 82–83).

Her opposition to the Brest-Litovsk treaty led her to step down as minister; nonetheless, she continued to work with Inessa Armande and Nadezhda Krupskaya to set up an organization of women within the party. They succeeded in establishing this in 1919 (under the name 'Zhenotdel') and, when Armand died in November of 1920, Kollontai stepped in to lead it (although this only lasted for a few months) (Braun 1998: 297). The next year she joined the Workers' Opposition, the group of trade unionists formed around the figure of Alexander Shliapnikov in 1920. She spoke on behalf of the group in 1921 at the 10th Congress of the Communist Party of the Soviet Union (CPSU). All factions were banned during that congress, including the Workers' Opposition (Clements 1979: 178–201). Kollontai ended up increasingly marginalized (and denigrated), but she was nevertheless the only person out of that group to survive Stalin's persecution, thanks in part to her prestigious diplomatic assignments in Norway (where she became the first

female ambassador in history, in 1924), Mexico, and, from 1930 to 1945, Sweden (Porter 1980: 399–420). However, from 1926 onward she stopped working on domestic issues in the USSR, including gender. The battles most dear to her – the active inclusion of women in politics and economics as well as the radical changes in culture, if not the anthropological makeup of society, needed to break with a thousand-year tradition of women's subordination – were distinctly opposed to the cult of the heroic mother established under Stalin, and indeed her ideas about gender roles ended up being ridiculed (Brodsky Farnsworth 1976: 307–310).

Having returned to Russia after the war, Kollontai spent her last years forgotten by her countrymen. When she died on March 9, 1952, *Pravda* did not even carry an obituary for her (Holt 1979: 17).

Her contribution to the construction of a future society lies in denouncing the bureaucratic, hierarchical, and cultural legacies of the past (capitalism) that permeated the new society (socialism) and her awareness that the process of constructing a radically different future must necessarily involve setting up institutional and social mechanisms to guarantee equality (including gender equality). In the Workers' Opposition pamphlet, Kollontai disassociates herself from the Bolshevik leadership's decision to entrust the construction of a communist economy to technicians, children of the bourgeoisie, who managed it through a mentality and practice borrowed from capitalism. The issue she raises here is fundamental in that it concerns the degree of continuity between successive modes of production as well as the class position of specialists. Kollontai argues that it is precisely the continued presence – or, rather, increasing influence – of these elements, which are foreign and hostile to communism, that caused the bureaucratization plaguing the Bolshevik party. This process in turn fostered the rise of a new elite and, consequently, the denial of democratic procedures – and, therefore, the revolution's very reason for being. Her critique here targets the institution that was to be the flagship of the new society, the soviets, which Kollontai decries as a machine "disconnected from any direct or essential industrial activity, and […] hybrid in its composition" (Kollontai 1962: 23). And yet the party leadership defended them, not trusting in the working class's ability to manage and guide the economy. By rejecting the party's position, Kollontai (and the Workers' Opposition along with her) looks to the unions as the only actors with the practical understanding of production needed to solve the problems deriving from the foundation of a communist economy: "The creative capacity, the search for new forms of production, of new incentives to work, destined to increase productivity, can only emerge within this natural collective class" (Kollontai 1921: 55); they cannot be dictated from above, by decree, by a party whose only real task is to create the conditions for a different mode of production.

It is clear that the Workers' Opposition sought to change the relative standing

of the party and trade unions, although without slipping into syndicalist tendencies; rather, the group presented itself as the embodiment of the party's true program. While some aspects of the workers' self-governance theorized by the group might appear dogmatic (for example, a belief in the natural collectivist yearnings of the masses – and the incorruptibility of the unions), the Workers' Opposition platform nevertheless contains prescient insights useful for the goal of founding a *democratic* socialist society – for instance, the idea that no one person can hold more than one office, the restoration of principles of election (as opposed to appointments from above), the choice of officials, and the idea that democracy be respected "even in times of internal and external tension" (Kollontai 1962: 65).

With the Soviet Moloch on the rise, Kollontai encountered only bitter defeat in her internal struggles for democracy; moreover, as the revolution regressed she began to view the alleged cause-effect relationship between class struggle and women's liberation (asserted by the classic texts of Marxism as well as the Bolshevik leadership) with increasing skepticism. Indeed, the analysis of capitalism Kollontai developed from her first years of militancy onward revolved around female subordination rather than the exploitation of productive labor. On the basis of reading not only Marx and Engels, but also August Bebel's *Woman and Socialism,* Kollontai asserts that gender oppression stems from private property. This is the foundation of her belief that a proletarian revolution would grant humanity of the future not only the abolition of capitalist relations of production, but also women's liberation. And yet – as Kollontai emphasized from the beginning of her career as a militant – this emancipation must be the work of women themselves, hence the need for autonomous women's organizations (Kollontai 1919). As far as gender relations are concerned, she argues that the transition from capitalist past to socialist future can only be accomplished by including women more and more fully in the labor market, a step that must be made feasible with policies to support motherhood and childhood so that women are free to give up the domestic and care tasks that have chained them for millennia. At the same time, however, women also need to be educated in political literacy so they can become citizens in every respect. The other pole must also be transformed – the pole of men. In the aftermath of 1917, Kollontai's vision was dominated by precisely this need for a moral and cultural revolution to match the economic and juridical one (Kollontai 1921). She saw marriage reform (decontaminating it by removing its manipulative, economic, and sexual aspects) as only one part of a project of re-educating the psychology of the proletariat, and Kollontai framed this re-education not as the natural evolution of the revolution but as a struggle the new order had to wage against the old one. In the end, however, she was increasingly dissatisfied with the results of this struggle; she became more and more disenchanted with lack of effective radicality in the cultural change brought about by the revolution even

though, given her deeply rooted historical determinism and resultant conviction that the march of socialism is in some way unstoppable, this critical position was never fully developed.

Despite all her contradictions and disillusionments, those who seek to imagine a different world can look to Kollontai's legacy of inescapable reflection on the eventual failure of any utopia in which liberating aspects are not protected, and on the centrality of the private dimension in transitioning to a new world.

## Paul Mattick (1904–1981): critique of capitalism and council communism

Like Kollontai, Paul Mattick also experienced first-hand the revolutionary period dawning during the First World War. His life can be divided into two main phases – the first took place in Germany, where he was born in 1904 and worked until 1926, and the second and more well-known phase took place in the United States, where he settled at the age of 22 and remained until his death in 1981. A factory worker, communist, and councilist, Mattick was a militant activist in his European period and initial years of emigration. Later, he was more engaged in intellectual activity, playing a central role in the periodicals he wrote for and the discussion circles in which he took part. He published books and numerous essays in different languages, developing a critique of both the Western capitalist world and so-called Soviet state capitalism. His most famous work, *Marx and Keynes*, constitutes the pinnacle of his reflections (Mattick 1971).

Linked to the Spartacists during the German revolution, Mattick supported the KAPD (Kommunistische Arbeiterpartei Deutschlands [German Communist Workers' Party]), a political formation established in 1920 following a split in the KPD (Kommunistische Partei Deutschlands [Communist Party of Germany]) that held leftist positions and critiqued Leninism. In all of the main events of the following years, he constantly appeared at the heart of the action – in 1920 during Wolfgang Kapp's attempted coup, in 1921 during the March strikes, and in 1923 during the unrest in the Ruhr basin. He then moved to America, worked in a factory, and continued to study. In the midst of the 1930s crisis, he advocated direct action and spontaneity, engaging in the movement of unemployed people who tried to solve the material problems of a deeply troubled class through principles of self-organization and mutual aid. In October of 1934, Mattick began his main organizational work by starting to publish *International Council Correspondence.* By the end of 1937, 29 issues of the periodical had been published, and in February of 1938 it changed its name to *Living Marxism*, the name it bore until the fall of 1941, after which it was known as *New Essays* from the fall of 1942 to the winter of 1943. In these journals and the hundreds of publications that followed

(his bibliography contains more than six hundred essays, books, reviews, and articles), Mattick developed his conception of council communism and delved more deeply into Marxist thought, becoming one of the leading Marx experts in the United States. In the latter part of his life, which overlapped with the advent of new movements between the 1960s and 1970s, his perspective garnered a great deal of attention and he gave a number of lectures on both sides of the ocean. He remained a steadfast exponent of council communism until the end of his life, supporting the autonomy of workers and the principle of economic self-organization, a position he shared with well-known intellectuals such as Pannekoek, Korsch, Rubel, Gorter, and Rühle (all of whom were non-dogmatic Marxists linked to Rosa Luxemburg's teachings in some way). He was also an intense critic of the social-democratic side of the labor movement inspired by the 'Red Pope' Karl Kautsky as well as the Bolshevik current organized by the 'best' of Kautsky's disciples, Lenin himself (Ragona 2014).

The main focus of Mattick's Marxism is the critique of political economy, that is, the scientific analysis of capitalism. He granted new attention to the theory of value and the absolute centrality of production, the sphere in which living labor produces the new value for which capital in all its forms yearns. Mattick adhered to the well-known Marxian theory of the 'tendency of the rate of profit to fall', perceiving it as the ultimate reason for the recurrent crises plaguing the capitalist system: "And since total capital, like any particular capital, changes its organic composition in the course of accumulation – constant capital increases more rapidly than variable capital – the rate of profit, which must be commensurate with total capital but is generated only by the variable part, must fall" (Mattick 1969: 14). Crises can also represent an opportunity, however, in that they make room for processes of reorganization, clearing out smaller capitals from the market and disciplining and transforming the workforce – although clearly not 'abolishing' it outright, as argued by some post-workerist fantasies in later periods. If the ordinary state of the capitalist economy is crisis, it is equally true that, in historical reality, there have always been counter-tendencies such as technological developments, wars, and imperialism working to prevent it from collapsing. Ultimately, however, the main lifeline of capitalism is the state, in the form of the social state (the one dominating central economies during the so-called 'glorious '30s') or 'real socialism'. Mattick holds up the image of the 'mixed economy' to denounce the fact that the apparently bipolar world is actually homogeneous and uniform in that it is dominated everywhere by a form of capitalism kept alive by public institutions. This state of affairs cannot last forever, he argues, and there are two ways we might move beyond it – through either an overbearing and aggressive form of capitalism or unprecedented forms of communism based on councils.

According to Mattick, the way forward must begin from the 'counter-history'

of communism, the experiences of struggle that have been mainly relegated to in-between spaces – crushed as they were by social democracy and its subsidiaries – but which nevertheless enjoyed significant moments of affirmation. He does not dodge the question of what we might call the institutional structure of future society: "We therefore raise as the immediate slogan of working-class power: the workers bring all social functions under their direct control; they appoint all functionaries and recall them. The workers take the social production under their own management" (Mattick 1935: 18). He locates the principle for regulating the relationship between production and distribution in a new, different way in a text by a Dutch collective associated with the council movement – the Group of International Communists. Mattick defines their *Basic Principles of Communist Production and Distribution*, published in 1930, as "the first attempt by the Western European Councils to deal with the problem of building socialism on the basis of Councils" (Mattick 1974: 17). Indeed, this vision involves a new unit of measure destined to replace value and therefore all instances of wage labor, whether performed for a private individual or the state – a unit known as 'socially necessary labor time'. While Mattick acknowledges that one cannot truly speculate about the state of the economy following the revolution, he clarifies that it is nevertheless possible to start thinking about the "measures and instruments required to affirm the specific social conditions we want to obtain, in this case conditions that are to be considered communist" (Mattick 1974: 18). Using the unit of measurement suggested by the Dutch communists, workers would be granted rights over what they produce proportional to the time they spend working, calculated not individually but on the basis of the average amount of time needed to produce something. Mattick does appreciate the Dutch councilor participants' insistence on negating the underlying need for an apparatus of technicians and administrators in charge of setting criteria for the distribution of goods, a function to be fulfilled instead by producers independently managing distribution for themselves. However, he warns that it is not sufficient to put producers in a direct relationship with products – the priority is production, not distribution, and in reality it is the former that must be subjected to the conscious control of workers. The logical consequence of this point is that institutions in charge of supervising will be unavoidable in a communist society, just as in any other kind of society. Mattick does not demand an answer to the question of how to prevent these institutions from taking on a life of their own and, in so doing, undermining the power and self-determination of the direct producers and Councils (the beating heart of this new socialism). However, what he writes about the Dutch proposal can be applied to his analysis – it is not a program drawn up once and for all, but rather an attempt, among the few and therefore noteworthy, to address the problem of a communist economy and society.

## Raniero Panzieri (1921–1964): the socialist use of technology

It is interesting to note that some of the most important issues in the work of Kollontai (in Russia) and Mattick (in the United States) also appear in a specific yet comparable form in the work of the Italian political thinker and militant Raniero Panzieri who, despite his short life, was able to sow innovative ideas for a socialism of the future that would be both democratic and anti-capitalist. Panzieri was born in Rome in 1921 and died in Turin in 1964. He was deeply committed to and engaged in the labor and socialist movement, dedicating to it considerable organizational efforts and all of his creative intelligence (Ferraris 2011).

Post-war Italy was a country on its knees, and in this context Panzieri worked with the Italian Socialist Party, concentrating first on its activities of cultural organization and later its Sicilian federation. This brought him into contact with peasant struggles for land redistribution in the early 1950s, a battle the large landowners met with extreme force up to and including mafia violence. At the same time, Panzieri also participated in the political struggle at the national level and ended up holding key positions in the party. In 1956, he condemned the Soviet invasion of Hungary even while refusing to accept that Stalinism represented communism. He was convinced that the world labor movement's crisis could only be solved by rejecting the idea of the party as a guide and by the workers' movement regaining its proper autonomy through the creation of new forms of direct democracy (echoing Gramsci's ideas in *Ordine Nuovo*). It was to this end, at once theoretical and organizational, that he devoted the last years of his life. In this period he lived in Turin, which at the time was Italy's Fordist city par excellence, and he gave up all his positions in the leading organs of the Socialist Party because they had proven too attached to the old order to embrace the experimental new ideas Panzieri was exploring. Even while reaffirming his criticism of traditional leftist organizations, he sought until the end to mend the rift between these organizations and the new workers' movement that was taking form, although he ended up being progressively marginalized (Mancini 1977).

In the hometown of FIAT, he started the famous *Quaderni rossi*, a project that appeared iconoclastic and disruptive in relation to the larger European scene but which was also characterized by deep internal tensions. The journal explored the question of direct democracy in depth on the basis of the historical initiative of the Councils, as well as an analysis of neo-capitalism conducted through both inquiry and 'co-research', that is, militant research carried out in the field. Rejecting the avant-garde conception of the relationship with the masses, this methodological approach allowed activists to reformulate the theory-praxis nexus as relations between equals (Panzieri 1982: 181). An invaluable legacy for all projects seeking to transform society, this innovative method grew out of changes in the composition of the working class itself that called for an objective examination of reality,

freed from ideological frameworks.

Panzieri's take on Marxian analysis led him to the steadfast conviction that "the capitalist use of machines is not, so to speak, a simple distortion of or deviation from an 'objective' form of development that is in itself rational; rather, it determines technological development" (Panzieri 1961: 5–6). Seeing as how technology carries with it the mark of capital, its development cannot be considered the ultimate phase of capitalism, the antechamber of socialism, as most left parties claim. On the contrary, "The new 'technical bases' progressively attained in production provide capitalism with new possibilities for the consolidation of its power". Indeed, capitalism is a dynamic system capable of reacting to the contradictions it itself produces; its only constant and the precondition of its survival is "the (tendential) growth of the power of capital over labor power" (Panzieri 1964: 287). The task of class, therefore, is to construct an alternative rationality:

> The working-class struggle thus presents itself as the necessity of global opposition to the capitalist plan, where the fundamental factor is awareness – let us call it dialectical awareness – of the unity of the 'technical' and 'despotic' moments in the present organization of production. The relationship of revolutionary action to technological 'rationality' is to 'comprehend' it, but not in order to acknowledge and exalt it, rather in order to subject it to a new use: to the socialist use of machines. (Panzieri 1961: 14)

The task of the proletariat's political organization – an issue Panzieri was already exploring back in the 1950s – consists of bringing instances of struggle back together as a unified project aimed at rupturing the false objectivity of economic development and replacing it with worker control (Panzieri 1957: 197–199). Moreover, such control must be exercised not only at the level of individual companies, but also by ensuring reciprocal coordination among the various units of production and incorporating local organs of democratic representation in the process of planning production. Panzieri clarifies:

> Far from it being possible to present it as a 'surrogate' for the conquest of political power, workers' control would thus constitute a phase of maximum pressure on capitalist power (as a threat explicitly directed at the roots of the system). Hence, workers' control must be seen as a preparation for situations of 'dual power', in connection with a total political conquest of power. (Panzieri 1961: 23)

The insight underlying this plan stems from an analysis aimed at showing how,

unlike competitive capitalism, monopoly capitalism must also seize political power in order to maintain its economic tyranny over society – this power begins as the iron-fisted domination of individual productive units but extends to also include dominion over the state (Libertini and Panzieri 1958: 113). Panzieri writes:

> [...] the factory tends to pervade, to permeate the entire arena of civil society [...] the factory *disappears* as a specific moment. The same type of process that dominates the factory, characteristic of the productive moment, tends to impose itself on *society as a whole* and thus the characteristic features of the factory - the particular type of subordination of living labor-force to capital, etc. – tend to pervade *all levels* of society (Panzieri 1976: 40).

There is only one way in which the proletariat can oppose the pervasiveness of capital in its monopolistic phase and resist its neo-totalitarianism: by taking a leading role in the very heart of production. Indeed, this is the core of Panzieri's plan. It is in building economic democracy here and now, instead of putting its faith in a palingenetic conquering of political power, that the working class lays the foundations of the socialist society of the future, grounded on self-organization. Ultimately, the transformation of existing social relations (which in his eyes is an eventuality, not a historical necessity) depends not on technical development but on the subjective element of "worker insubordination" (Panzieri 1961: 7).

The ideas developed by Panzieri, the most innovative theoretician of Italian workerism, were revisited and radicalized a few years after his death by groups belonging to the revolutionary left, in particular the Turin-based group Lotta continua (Bobbio 1988). By putting into practice the idea of 'socializing' struggles (i.e. extending them from the factory to larger society, and from the working class to other social strata), Lotta continua adopted Panzieri's faith in direct democracy as both the instrument and purpose of anti-authoritarian socialism.

## Alain Bihr (1950–): a new socialist strategy after 1989

The era of large-scale protest that erupted in the mid-1960s, first in the United States and then in Europe, and which was led by a new generation of workers, students, women, the leading figures of decolonization, *et cetera*, seemed to radically question the stability of capitalism. Indeed it was certainly not a flash in the pan, and the world after '68' seems undeniably different than before. Yet neither has capitalism collapsed; rather, it faced the economic, political and social crisis of the 1970s and came out the other side stronger than before, everywhere, and intent on imposing a new order, disturbingly reminiscent of Friedrich A. von Hayek's vision

of "[making] the capitalist world immune to the interventions of democratic politics" (Streeck 2013: 239).

After having been targeted by revolutionary groups, the post-war compromise between capital and labor that had been in effect since 1945, particularly in the heart of 'developed' Europe, was disavowed once and for all – but by capital, which in so doing was able to neutralize the economic, social, and political role of the working classes by implementing restrictive economic policies and carrying out a massive reorganization of production (Streeck 2013: 23). At the same time, 'real socialism' collapsed.

How can we trace a path between the walls, both real and symbolic, that crumbled in the three years of 1989–1991? This is the question posed by Alain Bihr, a keen interpreter of the crisis of the 1970s (Bihr 1991) with an original socialist and democratic perspective focused on self-determination. Born in Strasbourg in 1950 and having worked as a high school philosophy teacher, Bihr earned his doctorate in Sociology in 1990 from the Paris VII University and then entered the ranks of the University, first as a researcher and later, from 2002 onward, as a professor. His interests range from research on social inequality to investigations of the far right, the decline of the nation-state, and the history of capitalism. He was among the first to draw the attention of 'Marxists' to the environmental component of the crisis and did so by casting doubt on a cornerstone of 20th century social-communist theories, productivism, in which socialist production, faced with the intrinsically destructive character of capitalism, will instead need to focus on needs and replace the principle of profit maximization with the maximization of social efficiency. This is not an abstract statement, however, and it requires the new labor movement to address the question of what should be produced and how. Such a task requires an effort to decentralize the productive apparatuses, rejecting gigantism wherever possible to ensure direct control over production. In short, Bihr invites us to create a parallel economy alongside the official one, to immediately begin building a "network of alternative enterprises" led by workers as "self-managed democracies", refusing to permanently delegate power and promoting a "rotation of tasks, overcoming the division between command and framing functions, and execution functions" (Bihr 1991: 173). The idea is to make a beginning, that is, to stage a practical and 'experimentalist' attempt to escape from capitalism.

Bihr's 'strategy' is based on the conviction that the myth of revolution as cataclysmic must be set aside. In contrast, change "is necessarily a large-scale endeavor", one that must begin by exploiting the possibilities that can be concretely identified here and now: "This can become reality if an articulated system of counter-powers is implemented in society" (Bihr 1991: 188). After all, turning the world socialist is not a necessary process, and the organized subjectivity of human beings who know how to read and interpret reality and act accordingly is

the only thing that *might* open the door to a different history of humanity. This is the logical context framing Bihr's insistence on "counter-powers", the central pillar of his entire theoretical construction and the force through which a re-energized workers' movement might seek to wrest control over society away from the state. Bihr's idea is that a network of counter-powers is woven into the heart of society, promoting the 'self-management of struggles' and the spread of 'alternative logics', that is, large or small projects that are completely different from those imposed by capital or the state – a true 'counter-society'. This vision transcends any opposition between reformist vs. revolutionary practices because counter-powers address both immediate questions and problems and longer-term or 'historical' objectives. Nor is it the goal of these powers to seize the state's levers of dominion; rather, they seek to replace the state, that is, to replace the monopoly of social power by one or more ruling classes with "a power deriving from the self-activity of the masses, who re-appropriate the guiding, organization and control of social practice" and learn to "do without the state" (Bihr 1991: 193).

A perspective of this sort requires organization, and it cannot be embodied by a traditional political party that has historically operated to generate forms of alienating militancy and to exacerbate centralism. Instead, it entails conceptualizing organizations in which the transmission of power takes place from the bottom up – the base organizations should enjoy maximum 'tactical' autonomy and, through direct democracy, everyone should be guaranteed the chance to contribute to strategic decisions. Central agencies would continue to exist, but they would consist of delegates with a mandate that can be revoked at any time. In terms of ethics, the life of the labor movement's new organizations "should become an ongoing demonstration of the possibility of a different society" (Bihr 1991: 197).

These "roads to renewal" clearly presuppose that the proletariat be empowered and yet, as Bihr specifies, while the proletariat is the subject on which the burden of exploitation weighs most heavily, it is not the only class victimized by capitalism. The task is thus to envision a re-energized anti-capitalist and socialist movement that is multi-faceted in its articulation – one that does not reject the role of avant-gardes but does prevent them from forming a 'high command', that is, an untouchable elite presented as infallible and given charge of leading the masses to revolution: "If the avant-garde is located *in* the movement, therefore, it is the movement's exploratory head, its furthest most point; if the high command instead stands *outside* the movement, it tries to guide the movement according to a strategy or plan of struggle developed from the outside" (Bihr 1991: 207).

In Bihr's work, socialism emerges from its 'classical' phase of class, intellectuals, unions, the party, and conquest of the state to enter (what is for now) a shadowy phase of experimentalism, pluralism, and critique of the traditional conception of revolution. A phase that, in the absence of better definitions, we are forced

to define as 'post-classical'. In this context, socialism becomes *also* a way of life and declares itself *also* as an attitude towards life, which does not refuse the political dimension of traditional socialism, but strengthens it. All those elements, which Bihr saw in advance, seem to be typical of the anti-capitalist movements at the beginning of the 21st century.

## Conclusion: an experiment in the 21st Century

The four intellectual-militants analyzed above raised questions that current revolutionary groups still have to tackle – the respective roles of the State, the party, and the trade union; managing the economy in a post-capitalistic society; the problematic relation between equality and freedom; and the tensions between representative and direct democracy. Their recipe has been, in short, to make use of self-government and self-organization as antidotes to bureaucratization and authoritarianism.

Yet the world is nowadays undergoing the divorce between capitalism and democracy and between politics and economy (Streeck 2013: 25), while at the same time the very existence of any sort of labor movement is questioned globally in the face of job atomization and automation. Is there still space for utopian imagination?

Whereas in the Western world protest movements come and go as they fail to establish stable anticapitalistic social and political structures, in the region of Rojava, in Syrian Kurdistan, the Movement for a Democratic Society (TEV-DEM) has taken up the challenge issued by the intellectual-militants presented here of building a post-capitalistic society grounded in self-government and social justice and furthermore with a strong commitment to gender equality. As even the *New York Times* eventually recognized, "the Kurds are there not only to fight against the Islamic State, but also to defend a precious experiment in direct democracy" (Ross 2015).

This theoretical and political experiment stems from the strategic about-face the Kurdistan Workers' Party (PKK) made in 2005 following its leader Abdullah Öcalan, who has been held in Turkish prisons since 1999. Based in part on his reading of the US anarchist Murray Bookchin, the Kurdish leader invited the party to give up on building a traditional state and instead to concentrate on the struggle for autonomy and self-defense, in this case through democratizing the areas Kurds inhabit. Öcalan proposes building a new society in the present, a society in which power flows from the bottom up, based on citizen assemblies (councils) and progressively widespread structures in which delegates operate on the basis of an imperative mandate (Öcalan 2011). In short, he has been acting from prison to "become the exponent of a 'state-less democracy' founded on three pillars: the

equality of women, ecology and peace" (Levi Strauss 2016: 63). It is not simply a matter of pursuing gender equality, but of enacting a profound cultural revolution in the name of 'gyneology', the science (and knowledge) of women, which is an unprecedented paradigm aimed at abolishing the patriarchy and violent masculinity permeating the principle of the state. In Rojava, this move to overcome centuries of women's subordination to men can be seen in multiple spheres of community life, starting with the military. As far as institutions are concerned, the People's Council of West Kurdistan is based on a multi-level system in which administrative positions rotate back and forth between women and men. Since 2014, the council system has been accompanied by a more traditional level of government, the Democratic Autonomous Administration, that operates in keeping with the principles of freedom, equality, and social justice established by the "Charter of the Social Contract in Rojava" (YPG 2016). Under today's conditions of war, this text represents a set of prospects for the future. The anti-capitalist character of Rojava's social experiment lies in the cooperative organization of production as well as in the critique of money, which is viewed not as a neutral instrument for mediating trade but as a reification of exploitative and domination-based social relations. In so doing, these community efforts to build an economy based on needs – and environmental balance – within a system of direct democracy might offer the disenchanted observers of post-democratic capitalism a spark of hope for the future.

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# References

*The quotations are mostly translated from the Italian editions of the works.*

Bihr, Alain (1991): *Du "Grand soir" à "l'alternative". Le mouvement ouvrier européen en crise*, Paris, Les éditions ouvrières.

Bobbio, Luigi (1988[1979]): *Storia di Lotta continua*, Milano: Feltrinelli.

Braun, Tina (1998): "Peace profile: Alexandra Kollontai", *Peace Review*, 10:2, 295–300.

Brodsky Farnsworth, Beatrice (1976): "Bolshevism, the Woman Question, and Aleksandra Kollontai", *The American Historical Review*, 81:2, 292–316.

Clements, Barbara Evans (1979): *Bolshevik Feminist. The Life of Alexandra Kollontaj*, Bloomington/London: Indiana University Press.

Ferraris, Pino (2011): "Raniero Panzieri: Per un socialismo della democrazia diretta", P.P. Poggio (ed.), *L'Altronovecento. Comunismo eretico e pensiero critico*, Milano: Jaca Book - Fondazione Micheletti, 381-401.

Holt, Alix (1979): "Introduzione", in Alexandra Kollontai, *Vivere la rivoluzione. Il manifesto femminista che la Rivoluzione di Ottobre non seppe attuare*, Milano: Garzanti, 5-21.

Kollontai, Alexandra (1919): "Women Workers Struggle For Their Rights", *Marxist Internet Archive*, https://www.marxists.org/archive/kollonta/1919/women-workers/index.htm, (accessed 07/02/2018).

Kollontai, Alexandra (1921): "Tesi sulla moralità comunista nell'ambito dei rapporti coniugali", in Alexandra Kollontai, *Vivere la rivoluzione. Il manifesto femminista che la Rivoluzione di Ottobre non seppe attuare*, Milano: Garzanti, 151–158.

Kollontai, Alexandra *(1962): L'opposizione operaia in Russia (1921), edited with an introduction by G. Bianco, A. Galliussi, P.G. Gasparotto, Milano: Azione Comune.*

Kollontai, Alexandra (1973): *Autobiografia di una comunista sessualmente emancipata*, edited by Virginia Visani with a comment by Iring Fetscher, Milano: Palazzi.

Levi Strauss, David (2016): "La speranza del Rojava", Dila Dirik et al (eds.): *Rojava: Una democrazia senza Stato*, Milano: Elèuthera, 61–68.

Löwy, Michael (1988): *Rédemption et utopie. Le judaïsme libertaire en Europe centrale. Une étude d'affinité* élective, Paris, Presses universitaires de France.

Mancini Sandro (1977): *Socialismo e democrazia diretta: Introduzione a Raniero Panzieri*, Bari : Dedalo.

Mattick, Paul (1935): "Workers' Councils and Communist Organization of Economy", *International Council Correspondence*, 1:7, 7–18.

Mattick, Paul (1969): *Marx and Keynes. The Limits of the Mixed Economy*, Boston, Porter Sargent Publisher.

Mattick, Paul (1971): "Introduzione", Henryk Grossmann (ed): *Marx, l'economia politica classica e il problema della dinamica* (1971[1969]), Bari: Laterza.

Mattick, Paul (1974): "Introduzione", *Principi fondamentali di produzione e di distribuzione comunista* (1974[1930]): Milano: Jaca Book, 13–31.

Öcalan, Abdullah (2011): *Democratic Confederalism*, London/Duisburg: Transmedia Publishing Ltd.

Panzieri, Raniero (1957): Appunti per un esame della situazione del movimento operaio, in Id., L'alternativa socialista. Scritti scelti 1944–1956, edited by Stefano Merli, Torino, Einaudi, 183-199.

Panzieri, Raniero and Lucio Libertini (1973[1958]): *Sette tesi sulla questione del controllo operaio*, in Raniero Panzieri : *La crisi del movimento operaio. Scritti interventi lettere, 1956-1960*, edited by Dario Lanzardo and Giovanni Pirelli, Milano: Lampugnani Nigri, 104-117.

Panzieri, Raniero (1976[1961]): *Sull'uso capitalistico delle macchine nel neocapitalismo*, in Raniero Panzieri, *Lotte operaie nello sviluppo capitalistico*, edited by Sandro Mancini, Torino: Einaudi, 3–23.

Panzieri, Raniero (1964): *Plusvalore e pianificazione. Appunti di lettura del Capitale*, in Raniero Panzieri, *Lotte operaie*, 51–85.

Panzieri, Raniero (1982): *La crisi del comunismo* in Raniero Panzieri, *L'alternativa socialista. Scritti scelti 1944-1956*, edited by Stefano Merli, Torino, Einaudi, 179–183.

Porter, Cathy (1980): *Alexandra Kollontai: A Biography*, London: Virago.

Quirico, Monica and Gianfranco Ragona (2018): *Socialismo di frontiera. Autorganizzazione e anticapitalismo*, Torino: Rosenberg & Sellier.

Ragona, Gianfranco (2014): "L'avventura della rivoluzione: Il comunismo dei consigli di Paul Mattick", *Critica Marxista*, 3–4, 65–72.

Ross, Carne (2015): "The Kurd's Democratic Experiment*"*, *New York Times*, 30 September.

Streeck Wolfgang (2013): *Tempo guadagnato. La crisi rinviata del capitalismo democratico*, Milano: Feltrinelli.

YPG (2016) *Charter of the Social Contract in Rojava.* https://ypginternational.black-blogs.org/2016/07/01/charter-of-the-social-contract-in-rojava/ (accessed 2018-10-22).