

MANUFACTURING IMAGINARIES: NEO-NAZIS, MEN'S RIGHTS ACTIVISTS AND 3D PRINTING

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This article addresses the intersection between additive manufacture, the political imaginary, and Italian radical thought. While a suitable Venn diagram that illustrates the connections between these areas might initially appear to require a fair bit of twisting and turning, I believe that such a diagram is possible, and that it illuminates the political values that are, or could be, important for the political changes made possible by 3D printing. Such a method will expose what outcomes are conceived as possible by 3D printing within the political imagination of dissident groups. The political imaginary of some white supremacists and anti-feminists is one that sees civic space as polluted with misguided liberalism, with a potential resolution to be found in the new technologies related to additive manufacture. Italian radical thought includes a number of methodologies for conceptualising of relationships between domestic and civic spaces, as well as significant and enthusiastic work connecting contemporary events to immediate or short-term political developments. Through the device of the 'social factory', Italian radical thought greatly helps us to understand the connections between work and home insofar as they address the changes in life and labour that have arisen over the last forty years. The investigation of 3D printing and right-wing politics that I undertake in this article demonstrates new uses of Italian Marxist thought, providing challenges to the concept of the factory society, as well as reporting on the unexpected projections for 3D printing in political uses by far-right groups.

by Robbie Fordyce

"[I]f it can be imagined, it can be made, as our Race has proven time after time."

User 'mark777', Stormfront.org

INTRODUCTION

This article addresses the intersection between additive manufacture, the political imaginary, and Italian radical thought. While a suitable Venn diagram that illustrates the connections between these areas might initially appear to require a fair bit of twisting and turning, I believe that such a diagram is possible, and that it illuminates the political values that are, or could be, important for the political changes made possible by 3D printing. Such a method will expose what outcomes are conceived as possible by 3D printing within the political imagination of dissident groups. The political imaginary of some white supremacists and anti-feminists is one that sees civic space as polluted with misguided liberalism, with a potential resolution to be found in the new technologies related to additive manufacture. Italian radical thought includes a number of methodologies for conceptualising of relationships between domestic and civic spaces, as well as significant and enthusiastic work connecting contemporary events to immediate or short-term political developments. Through the device of the 'social factory', Italian radical thought greatly helps us to understand the connections between work and home insofar as they address the changes in life and labour that have arisen over the last forty years. The investigation of 3D printing and right-wing politics that I undertake in this article demonstrates new uses of Italian Marxist thought, providing challenges to the concept of the factory society, as well as reporting on the unexpected projections for 3D printing in political uses by far-right groups.

The flattening-out of distinctions between work and home has been implicit in the technology of the home computer. Yet the colonisation of the house by the factory is made far more explicit in the fact that the development of 3D printing has begun to include process of manufacturing within the home on a wider scale than previous hobbyist activities. Locating a manufacturing process within the security of the home grants a form of production that is somewhat free from the regulation applied to commercial manufacture. This freedom in turn allows for varying degrees of social panic over what, exactly, people are doing with this technology. I wish to chart some of these imaginings, and tie them to political projects that would aim to either engage in revolution or reform, or else prevent such revolutions or reforms coming to pass. To me, the political imaginary that surrounds 3D printing should be addressed, beginning with the contemporary liberal democracies of North America and Europe, and also within Oceania, from where I write. Beyond that, the political concerns of anti-feminist and white supremacist communities provide intricate and distasteful illustrations of disruptive political imaginaries.

This article takes the disruptive position of additive manufacture as a given fact, and moves to expand upon the facility that 3D printing may have in future disruptions, particularly in terms of the effects that it has within politicised communities. This material has been discussed at

length in terms of peer-to-peer production writ large; Yochai Benkler has already mapped out precisely this function in terms of the productive practices of anarchist groups, in terms of the political freedoms offered by peer mutualism (Benkler 2013). The importance of Benkler's observations lies in the way in which production systems operate outside of their relationships with different types of structuring systems, whether that be between state and market, church and union, or otherwise. For this article, the communities of interest are the white nationalist group 'Stormfront' and the men's rights group 'A Voice for Men', as well as a number of smaller satellite groups. These groups were chosen for a number of reasons: their interest in machining and weapons manufacturing, their focus on problems of political economics, and also for the reason that they are not the 'usual suspects' for Italian radical thought, in that they are neither neoliberal nor Marxist in their politics. By examining these groups, we can see what future some political groups see in 3D printing, and, by understanding these different political imaginaries, we can project different investments and tensions surrounding the technology. The way in which 3D printing will be disruptive may well be in terms of how it influences governance and political action more than what outputs are literally produced by 3D printers. The theorists mobilised — Agamben, Tronti, Hage, Boltanski and Chiapello — provide the critical energy to unpack the way in which manufacturing enters the home, and the projections of domesticated manufacturing onto future cities. Tronti merges with Agamben to describe the tensions between the home, the city, and the factory, which then adds to Hage, Boltanski and Chiapello's functional application of future imaginaries to map out how political groups act on these tensions to further their goals.

METHODOLOGY

The research methodology developed over two stages. Originally the methodology drew from Dhiraj Murthy's concept of 'covert digital ethnography' (Murthy 2008), and John Postill and Sarah Pink's embodied virtual ethnography (Postill and Pink 2012). Work by Maurizio Teli, Francesco Pisani and David Hakken (2007) further informed this approach, by conceptualising the idea of a 'cyberethnography.' Such work does a lot for framing approaches to assessing online collectives without engaging in reductionist approaches.

As the research developed, however, the ethnographic approach framing the initial foray proved to be less effective than expected, primarily due to the fact that open access to many of the surveyed forums mitigated the need for interviews or covert approaches. The research progressed by making use of observational techniques drawn from the work of a number of scholars who provided alternatives to strictly ethnographic work, and developed into a primarily archival approach to the data. Gabriella Coleman (2010) provides insight to possible approaches, particularly given that the object of research was one for which 'logic is organized significantly around, although not necessarily determined by, selected properties of digital media' defined by Coleman as a type 'digital vernacular' grouping (Coleman p. 488). Coleman argues that these groups in particular offer particular interpretative challenges to traditional ethnographic and empirical analysis, for which analytical scrutiny may be able to overcome problems related to anonymity and informality. Coleman's category is adept in defining an approach that is useful for research into the use of 3D printing by pre-existing groups. In this context, Christine Hine (2011) provides a set of ethical concerns for unobtrusive data collection and analysis within the context of online forums. While Hine shares a number of valuable insights into the conceptual issues related to online data collection, the most important issue for my research was that the data was collected without exposing users, or breaching the privacy of the group —these are ethical issues that should still be respected. In the case of this research, all reported materials come from publicly accessible portions of each site, and all users presented pseudonyms that have been retained. Where private user information was discovered, this material has been excised from the research data. For many of the sites surveilled, a strong emphasis on political advocacy was present, meaning that much of the data was clearly intended for public dissemination. The original process of ethnographic research was discarded, as the ethnographic requirements of immersion and investment were not forthcoming, as the fairly specific search areas in each case proved to lack the levels of communication necessary for a strong ethnographic approach. Research continued in a predominantly archival mode, with a periodic element, as described below.

Research was conducted over a six-week period from early October 2013 until mid November 2013, from the pre-selected community sites of Stormfront, A Voice for Men, and the Reddit.com subforum for men's rights. These groups were chosen on the basis of their generally anti-progressive positions, and their existing interest in technology. The research process was observational in nature, driven primarily by website-based searches on the topics of '3D printing', '3D print', '3D printer', 'additive manufacture', 'Liberator', and 'Defense Distributed'. Due to the slow pace of discussion in some forums, the websites were returned to every two weeks, and new material was harvested at these points. Substantial discussion on the Stormfront website restarted in February 2014, and so this material was reviewed periodically over a two month period. New website profiles were constructed in order to have full-access to sites, although no posts or comments were made, and the profiles discarded after use.

Stormfront was chosen as a site for investigation due to its international reach, and my personal engagements with anti-fascist forums in the past. Despite this, Stormfront has already been the site of significant research for many other authors. Stormfront has acted as something of a haven for those espousing racist ideologies, ranging from those in the American Midwest through to Danish neo-Nazis (De Koster and Houtman 2008). Research by Val Burris, Emery Smith, and Ann Straham point to Stormfront's high degree-centrality amongst white supremacist, neo-Nazi, and skinhead organisations (Burris et al. 2000); which is to say that Stormfront is a common reference point for many racist groups. This does, however, bring up the problem of the idea of a 'community'—and whether a forum with such a large and disparate userbase can be referred to as such. While she refuses to assign a legitimate status of 'community' to Stormfront, Lorraine Bowman-Grieve (2009) does describe Stormfront as a 'virtual community', as do De Koster and Houtman, which is a form of 'anchor' for many individuals who share a common interest to develop temporary communities along highly restricted lines. What makes a virtual community, for Bowman-Grieve, is not a reliance on sharing a particular space for long stretches of time, but rather sharing a common space for a set purpose, be it a support group or a hate group. The issue here is that members are 'likeminded' in their approach. A Voice for Men and the Reddit.com Men's Rights subforum are relatively young, compared to Stormfront. Extant research on these sites is limited as a result. These groups also share a 'likeminded' attitude to their agendas, and share many resources and links across these two sites, with a subgroupings appearing in spaces such as Reddit Gonewild (see van der Nagel 2013) and the Antifeminist. The mixed arrangement of sites was decided upon in order to chart a spectrum of agendas, which were hypothesised to contain a degree of overlap. While there are some similarities between white supremacist groups and Men's Rights Activists, the research discovered intriguing differences. The fact remains that all comments and materials found were vague and non-specific, and were instead indicative of ideological positions, rather than a coherent approach to one political orthodoxy

or another. Comments and commenters are illustrative of the various political imaginaries of the communities they belong to, rather explicitly framing a holistic political approach.

3D PRINTING AND ADDITIVE MANUFACTURE

'3D printing' is a term that reappears across a number of discourses, each with their own imagined political future. Let me first identify the fact that the concepts of 3D printing and additive manufacture remain separate within this article. While the terms are largely interchangeable in most academic settings, there is a need to differentiate between social and industrial terminology. The first concept, 'additive manufacture', is a term that has the most use within industry and academic discussions. Additive manufacture is the functional operation of technologies that progressively add layers of material on top of one another in order to generate complex shapes, on the basis of a 3D model generated on a computer (see, for instance, Gibson et al. 2010). The material can be any of a range of things, such as wood, ceramics, chocolate, and so on, but tends to be specialised plastics. The machining may involve a degree of lathing or chemical finishing during or after the production process to complete the object, but is largely a productive, additive, process. The other concept, '3D printing', however, is of a different nature. 3D printing is primarily a populist uptake of the function of additive manufacturing into something else. Even enthusiastic and tech crossover sites, such as 3Ders.org, make use of the term, and it has appeared as a form of shorthand within the news media. As such, it is more connected to fanciful use of additive manufacture, not necessarily based in the real potential of the technology. The term has accumulated a number of conceptual associations in public discussion: the capacity to produce guns, human simulacra, toothbrushes, new skulls and arterial valves, cars, and so on. This would be an expected deployment of the term within public discourse; however, it is important to note that the public imagination contains strands that imagine a far greater capacity for the technology than is probably currently practical. In short, 3D printing is the social use of an industrial technique.

The political imaginary that I refer to is described by Ghassan Hage (2012) as a projection into the future of a possible response to the present. While the political imaginary can be individual, it tends to be a product of collective thought. When radicalised, the political imaginary springs to life with perceived enemies, the evaluation of which is exempt from any particular evidence or fact, and most importantly, it is "not just a conception of the world but an investment in it" (Hage 2012 p. 291). Boltanski and Chiapello (2005) describe the presence of a 'projective city': a catchall term for types of imagined future society that colours contemporary behaviour, primarily of workers within capitalism. The projective city is not one city or another, but an idea of a utopia thrust forward into the future—both a project for now, and projected polis. This concept of an imaginary future society identifies the importance of a form of vulgar economic intervention as a central element of political activism. For the actors dreaming of a projective city, making use of economic processes and objects is central to encouraging or preventing this future state from manifesting. It is within Hage's framework of the political imaginary, and Boltanski and Chiapello's projective city, that I analyse the discussions online, in order to unpack future expectations of 3D printing by the far right. Ideas of the future tended to be inconsistent within the groups that I studied. Different people had different ideas of what was possible, and how such possibilities might come to pass. Because of this, each individual merely contributed to a 'spirit' of a political imaginary, with different concerns as to what 3D printing can do and how it might affect their attainment of the projected city.

On the basis of the difference between the current and future role of domestic printers, we can see that there is something different about the social ideas of 3D printing, separate from the ideas of additive manufacturing. Perhaps these ideas are drawn from the replicators of Star Trek and other science fiction, or perhaps they are ideas unconstrained by any previous reference. In either case, 3D printing is a concept that imagines a capacity for computerised production of materials that sits in excess to what additive manufacturing reasonably achieves, and imbues such an imaginary object with a wide range of potential economic or social outcomes. 3D printing is a concept of production, but one that is not meaningfully limited by current technological or economic thresholds; it is thus not a manufacturing concept: it is a social concept, connected to social concerns. We can begin to think about how these different, socially coded, ideas of 3D printing play out in the context of far right political groups. It is on this distinction between the social and the industrial uses that surround new modes of post-Fordist production that we can begin to chart out a form of political imaginary that bases itself in 3D printing. The disruptive component that this paper addresses is how 3D printing is employed in the construction of a political future for the communities mentioned above. This paper will stake out how 3D printing operates in some of the political utopias imagined by anti-feminist or racist communities, as well as showing how such technologies figure into the reformist or revolutionary agendas of these groups. I lead this article to its key findings through assessing two key discourses that fixate on potentials that seem to reside in the idea of 3D printing.

3D PRINTING AND DISRUPTION

3D printing is disruptive whether or not societal changes that have been associated with it ever materialise (see Rimmer 2012 for copyright related issues, Heemsbergen 2014 for environmental concerns). This is because these fears themselves have already mobilised political and legal changes within several jurisdictions where manufacturing is available within households. Irrespective of whether additive manufacture becomes a significant focus for intellectual property challenges in the same way as BitTorrent protocols, there are still legislative and economic challenges being brought into play. The need to regulate, finance, or protect uses of additive manufacture is already testing older legislation, just as the same processes produce new markets. Matthew Rimmer expresses the tensions that have arisen around additive manufacture in his submission to the Australian Law Reform Commission, *Copyright and the Digital Economy: 3D printing*, noting that: '3D Printing is the latest in a long line of disruptive technologies [...] which have challenged intellectual property laws, policies, practices, and norms.' (Rimmer 2012, p. 6). What Rimmer's comment notes is that while 3D printing presents challenges to legal and economic frameworks, it is also not unique in this fact. Other technologies, as seemingly mundane as the 'cassette recorder,' are a part of a lineage of instability. Rimmer includes the 'peer to peer network' in his list of disruptive technologies, but I would add to this that such a network is a key contingency for the disruptive qualities of 3D printing. STL, or 'STereoLithography,' files are the standard for many 3D printers. The data size of these files is trivial to current computer networks, with the 'Liberator' pistol (noted in detail below) clocking in at just under 6MB. The distributable nature of STL files is a significant barrier to regulation, in that STL files have no inbuilt Digital Rights Management systems, and that 3D printers are capable of producing dangerous materials. One of the most disruptive elements of 3D printing may be in the fact that it is

not sufficiently dealt with in existing intellectual property law (see Daly 2014 for further examples). As Simon Bradshaw et al. write in the context of the United Kingdom, the 'personal use of 3D printing technology does not infringe the majority of IP rights' (Bradshaw et al. 2010). In a contrasting position, James Meese notes that the role of the intellectual property rights control may never come to pass in some situations. Meese notes that the US Supreme Court ruled that videocassette recording should be relieved from obligation to intellectual property rights, primarily due to a potential for use in non-infringing cases far outweighed the damage of infringement (Meese 2014, p. 101). The most disruptive element of 3D printing may well be how new law is constructed to deal with the perceived challenges that it poses.

Social changes certainly have the facility to expand beyond the legal frame. Luke Heemsbergen corroborates many of the above points regarding intellectual property concerns, but notes that additive manufacturing's efficiency paradoxically provides significant potential for excess and waste (Heemsbergen 2014). In terms of concerns around the changes in peer production, Matt Ratto and Robert Ree note that additive manufacture paves the way for peer production to move from the digital to the physical, changing the nature of networked production. One of the problematic understandings of 3D printing and associated digital media is the belief that it constitutes a specific economic 'sector', as opposed to being 'integrated in highly specific ways into a wide array of production practices' (Ratto and Ree, 201 p. 2). During an interview-based qualitative project into social attitudes to 3D printing, the authors summarise the following observations from their participants about the 'futurism' of additive manufacture:

'[T]he changes that may occur are not just technical but equally social and economic in nature [...] It is interesting to note that, at least among participants in the emergence of 3D printing, this insight has become almost mundane.' (Ratto and Ree, 2012)

Ratto and Ree pose a curious point: that the social changes brought about by 3D printing are socially expected. The expectation of a potential economic and social disruption has ironically become commonplace.

THE TERMS OF ITALIAN RADICAL THOUGHT

For this article, I wish to join two elements of Italian scholarship that are not normally seen together: the thought of Giorgio Agamben and Mario Tronti. The two thinkers come from reasonably different traditions within Italian academic thought. Tronti was an important figure within the *operaismo* movement, which itself led to the *autonomia* and post-autonomist movements of the 70s and the 90s. Nick Dyer-Witheford (1999) and Steven Wright (2002) both chart the atmosphere from which Agamben and Tronti developed. Tronti's thoughts were forged within the repressive state operations of Italy's post-war era, and his ideas, along with those of many others, were formed from a fervent re-reading of Marx. Agamben, on the other hand, cultivated his thought within the literary scene, among author Italo Calvino, filmmaker Pier Paolo Pasolini and others (De la Durantaye 2009, p. 8). Rather than drawing on Marx, Agamben draws on Heidegger, Walter Benjamin, and Simone Weil. While Tronti and Agamben had somewhat different training in philosophy and theory, they were both born of the same Italy, with the same problems of social development.

Agamben's response to this situation was to produce a series of books and articles dedicated to a theoretically complex assessment of the relationship between subject and state over the centuries. As Nicholas Heron notes, this task is primarily directed at undermining Foucault's historicity of governmentality, sovereignty, discipline, and biopolitics, and showing that the function of all these forms of power have existed for many centuries (Heron 2011). This developed into the unpacking of modern and classical conceptions of the operations of sovereignty and government, paying special attention to legal exceptionalism and the historical figure of the outlaw. Agamben's contribution to this paper is his work on economy, which sits nestled between Foucault's biopolitics and the history of Christian theology. The economy, for Agamben, holds a role as a key tool for the ordering of societies and peoples. Agamben's critique of economic governance is primarily charted within the book *The Kingdom and the Glory*, yet this concept has strands within practically every single one of his other texts. Readers of this work of Agamben's should not be confused by the summary on the rear of the book; the thesis of this work is not that the economy has a religious or theological origin, but rather to examine the role that economics has when understood from an eschatological position. The essence of this project is to understand how, precisely, the seemingly apolitical arrangement of objects in the world is intentionally drawn into the development and resolution of specifically political outcomes by political actors. Agamben observes the influence of Aristotelian conceptions on the domestic space within the Christian church. These principles are adopted as a conceptual apparatus for understanding Christ's divine administration of the economy of the world as eventually meeting the conditions for the arrival of the Rapture. As Heron notes, Agamben's approach is one that marks the medieval eschatological approach onto the modern economy. The contest over the governance of the economy is thus a divine governance of the telos of all peoples (Heron 2011 p. 162). With this in mind, we can see that the way in which different political groups produce their telos also determines the politics that they hope to contest within economic spaces.

Agamben's approach in *The Kingdom and the Glory* is far removed from many current concerns of social theory, but its application in contemporary assessments operates to draw attention to otherwise unnoticed things. This approach is a critique of the economy that allows for the identification of otherwise unrevealed secular eschatologies. Such eschatological readings allow us insight into how different communities understand changes to the economy and their consequences. In this frame of analysis, the economy is thus the site of contestation, but is not contested over simply for gains in power, but for determining the proper ending of the history either in a utopia or a dystopia. This relates strictly to the changes in domestic additive manufacture, in terms of how political actors understand the way that 3D printing provides a new economic arrangement, and in turn, changes what political outcomes can be organised or need to be prevented. This creates one goal for the analysis in this article — to ask what new imaginary political situations have arisen by virtue of 3D printing, in terms of their explicit or implicit goals.

Tronti, compared to Agamben, has a far more pragmatic engagement in the politics of production. A document that more firmly explains Tronti's history within the Italian worker's movements is his nostalgic publication 'Our Operaismo', wherein he details the passions and regrets that mobilised his theory and his practice. Key techniques, such as the 'worker's perspective' and the 'strategy of refusal', which I have written about elsewhere (Fordyce and van Ryn 2014) have continued as influential within the strands of thought that have emerged from Tronti's work. The 'factory society' or 'social factory' is a key development from Tronti's thought. The factory society is the assessment of the way in which capitalism leads large networks of people to provide the cultural or informational basis of production without being paid. The

goal is to examine the relationship that social life has with capitalist production, and the core of the idea is that the stochastic encounters that we experience as social beings in the world feed into the labour that we perform in the workplace. Our social lives become the means of production for the production of commodities, if not through our own work, then certainly through another's.

The Italian Marxists, of which Tronti is one, deeply feared the prospect that the social relations of the industrial sector would escape the factory walls and colonise the rest of the city (Dyer-Witheford 1999). The entirety of society, they claimed, would become over-mechanised and relations that were once bonded by a being-in-common would be lost. What was once a civil society would become what they called 'the social factory'. Their fear was not only well founded, but essentially came to pass — traditionally independent social institutions, such as the university, eventually took on many qualities of striation, hierarchy, and quantitative performance-based assessments that were used to regulate workers on the factory floors.

The factory society is an attempt to account for the observed increase in cultural labour, largely aligning with Marx's prediction of the increasingly organic ratio in the composition of capital. Tronti specifies this in terms of its social effects: 'When the factory seizes the whole of society—all of social production is turned into industrial production—the specific traits of the factory are lost within the generic traits of society. When the whole of society is reduced to the factory, the factory—as such—appears to disappear' (Tronti 1962).

While Tronti has not yet used the term 'factory society', it is this piece that frames the concept for later authors. Negri in particular has taken up the idea of the factory society with Michael Hardt (2000) in his idea of Empire — an idea of a factory society so large as to encompass the globe. The factory was an important site for the members of *operaismo* and *autonomia*, in that it is both the space of oppressive bosses, as well as a laboratory for experimenting with resistance and new forms of organisation. The conditions of the factory were hostile enough for workers that resistance movements developed and, as Michael Hardt notes, the factory became a laboratory for testing new social formations (Hardt 1996). The factory society is thus repressive in that it subordinates all of society towards commodity production, but in this same move, it makes the whole of society capable of resistance to capital.

The relevance of the factory society to 3D printing is the way in which the factory society focuses on the immaterial components of commodity production. The redistributable nature of the STL files comprising the schematics for all 3D printed items, combined with the domestic sphere now capable of a form of post-industrial capitalism has two effects. Firstly, new economic divisions have the potential to arise between those who can make use of a network of productive digital assets, and those who cannot; secondly, the way in which the factory society conducts and facilitates resistance begins to change. When the factory society of Tronti encounters the paradigm of economic governance of Agamben, a picture emerges of a society driven by the effects of a combined subordination and contestation of the terms of economic development not towards some idea of the 'good of the nation', but rather the way in which the combined actions of individual households is enmeshed with drive towards particular teleologies.

The factory society of Tronti and the economic theology of Agamben add nuance to the introduction of 3D printing into the domestic sphere. 3D printing is not the first time the household has been transformed by the introduction of digital means of production into the home. In *Cyber-Marx*, Nick Dyer-Witheford discusses the potential for a Marxist uptake of the home computer as a chance for a revolutionary, rather than reformist, economy, but notes that the emergence of home computing came at the same time as the end of 'actually-existing socialism'. Marxist terms were used to interpret these changes — 'materialism', 'liberation' and 'revolution', but the revolution was technological and social, while political changes would come much further down the line (Dyer-Witheford 1999). As research already shows, the domestic sphere has a complex relationship within the home (Pink 2013; Nansen et al. 2009, 2011). New media technologies already form an economy within domestic spaces in the most literal sense possible: the etymology of economy is *oikonomia*, meaning a well-ordered home.

The social factory is upturned in the context of 3D printing. The concept of the social factory demands that, with or without their knowledge, individuals contribute immaterial knowledge work to the production of material goods. This requires a political economic split between the means of material production — i.e. the factory — and the means of immaterial production — in other words, human brains engaged in thought. The problem for the concept of the social factory is that in the case of 3D printing, the political economic split does not necessarily exist. A person can both be in charge of their creative thoughts, and produce immaterial designs and material objects on the basis of those thoughts. Despite this, the superficial control over the political economic association between the various means of production is complicated by the needs of a printing material that is external to the system. Whether the printer uses metals, plastics, or paper, these materials must be sourced from the marketplace, and must be paid for with money, and thus the fundamental distinction does not disappear. What the social factory exposes in this case, however, is a potential for the development of new material economies that do not communicate through a marketplace, but are still capable of communicating with each other.

THE LIBERAL DEMOCRATIC MODE

Before we can move to the discussion of how the right wing or anti-feminist groups understand the political value of 3D printing, I will first address the largest, most prevalent, and most efficacious of the imagined political futures that we face. This is the liberal democratic political imaginary, which has its focus on the prohibition of particular uses of additive manufacture towards supposedly anti-social practices, a prohibition regulated by a combination of market and state powers. Peer to peer (P2P) presents an unknown factor for many discussions surrounding the sharing and distribution of manufacturing, and allows space for fears about distribution and anti-social agents to develop. The issue is precisely that the most easily regulated elements of society are the factory, the marketplace, and the public sphere. As Michel Bauwens notes, within P2P production, the factory and the marketplace are better understood as epiphenomena to a design and production process that will survive happily without them (Bauwens 2005, pp. 36-38). The fear is, then, that regulation is unable to target peer production, which was already the case, but with peer production moving towards material objects, then the result will be terrifying. The liberal democratic political imaginary is, in fact, the chief observation that formed and guided this paper. The focus of such claims are the popular concern that 3D printing will enable the wide-scale production of guns, and that this will occur outside of situations that are capable of regulation. Plenty of news reports cover precisely this concern, both for the public at large (for instance, Franceschi-Bicchieri 2014; Phillip 2013; Rosenwald 2013), and for the gun manufacturer themselves (Pearce 2013). The liberal democratic fiction seems to be that the lack of

regulation will mean that guns cannot be restricted by the state in a formal manner, that the expenses related to the purchasing of weapons is no longer a factor, and that such a surplus of weapons will undermine the fire superiority that law enforcement has traditionally held. The concern over the production of other weapons (knives and clubs and so on) is largely not raised in print; so too is the discussion about access to ammunition ignored. The liberal democratic mode should be separated from the ideological modes of the 3D printing community, which, as Johan Söderberg (2014) notes, is far more interested in mobilising change through the socially emancipatory powers of new technology, albeit to little or no success. Sara Tocchetti (2012) produces an analysis of MAKE Magazine, the combination of the ideologies of Tim O'Reilly and the more radical arm of the Maker community. In this, Tocchetti notes the expectations of the Maker community are far less interested in the formulation of a precise political agenda, and are far more interested with individualistic and post-human capacities of technology. Between Tocchetti and Söderberg, we can see a distinction between the techno-enthusiasm of the 3D printing community, and the liberal democratic techno-fears of illicit 3D printed outputs.

Solid Concepts has successfully produced a titanium alloy semi-automatic pistol, which effectively replicates an M1911 handgun (Solid Concepts 2013). A trial gun passed its testing stage relatively successfully, and reportedly has fired fifty rounds without jamming. It is, however, not able to be produced on regular household printers. It requires an industrial-grade machine, and access to titanium substrate. The weapons by Solid Concepts have been much less a part of the discussion around legislation, perhaps partly due to the fact that it is not a domestic product, but a traditional commodity produced through relatively novel means.

We can see that the liberal democratic political imaginary focuses on the economics of manufacture. The control over the manufacture of goods is important in order to retain the state's monopoly over violence, as the concern is less over the fact of manufacture than it is over what is manufactured. This has two components to it; the first is the escape from the regulatory space of the national marketplace, into the domestic sphere. This escape allows people to act within the nation, but without the purview of the state, generating and distributing materials from their home computers without entering into direct regulatory oversight. The second concern for the liberal democratic approach is the networked aspect; the redistributable nature of STL files means that groups can operate in collusion with each other, generating the tools and devices for criminal activity. The computer networks that link these spaces allow for peers to distribute materials independent of state control. These two components define the unusual aspects of 3D printing. Like any new technology, the unique capacities and tensions that they embody produce new demands on legislation. This has led to the condition whereby technologies are seen as a replacement for the state, or else the means for its removal.

Indeed it is precisely this anti-governance rhetoric that is used by the designers of one of the 3D printable guns. In an interview, Defense Distributed spokesman, Cody Wilson made use of a familiar refrain: 'Digital manufacture of guns is here. Wither the State' (Farivar 2013). This tension between the liberal democratic and the libertarian agendas on 3D printed weapons provokes an observation in terms of economic theology. The eschatology for the liberal democratic political imaginary is, in fact, to desire for no change at all. Regulation is deployed in order to prevent the introduction of new devices. It is geared as much towards the reproduction of normal situations that the primary disruptive quality of 3D printing is that it has been instrumental in modifying law and regulation in order to mute the changes brought by new technologies.

Access to weapons, as it stands, has never been a problem for those who wish to use them on others. The repeated condemnation of belligerent parties as 'insane' or 'criminal' within the press indicates those people who are already the primary targets for weapon control are the very same people that seem to have little problem with access in the first place. The paramilitaries that emerge during national revolutions, national and international criminal syndicates, gun rights movements and school shootings; that these events are possible at all points the fact that the state does not have adequate control of supply for light weapons. This has not prevented the idea of 3D printed guns from mobilising a substantial concern over its potential effects. This has, also, not prevented this imaginary future of widespread household production of weapons from being mobilised in changes to legislation.

The libertarian organisation Defense Distributed and the 3D printer corporation Solid Concepts have already demonstrated that the manufacture of ballistic weapons through additive manufacture is currently possible. Currently, state control has been exerted over the corporate websites of these companies: Defense Distributed has had to comply with existing federal legislation regarding weapons trafficking, and has had to remove the STL files that are used in the production of the Liberator gun (Greenberg 2013). This event has, nonetheless, led to the point where the files are hosted on many thousands of computers world-wide. The 'Liberator' gun, as designed by Defense Distributed, is freely available through many torrent trackers. This is a weapon that can be produced by domestic 3D printers, requiring only the addition of a firing plate for the gun to work. A combination of libertarian and anti-gun control mindsets has meant that the STL files are now effectively hosted on a cloud of computers controlled by activists who seek to continue to make the files freely available over BitTorrent protocol.

Utopian visions of an earth awash with 3D printing focus on additive manufacture as combining well with existing encryption systems to develop radical economies outside of the current regulatory capabilities. Conversely, dystopian visions tend to believe that the same encryption systems combined with a lack of scarcity for dangerous items, then we'll be awash with fascistic organisations, terrorists, and sexual perversion.

STORMFRONT

The prospect of a white supremacist utopia, which would be founded through 3D printing, has been discussed extensively on the white supremacist website, Stormfront, since February 2012. This community has taken to the concept of 3D printed guns with great enthusiasm, with substantial discussion on the production of the M1911 handgun by Solid Concepts, and some community members have reposted the STL files for the Liberator gun by Defense Distributed. Members of the community have drawn parallels between the one-shot plastic guns, and one-shot guns delivered to the French resistance during WW2, leading to discussions about Zionist conspiracies and hidden political messages, indicating that the Liberator is opposed to white supremacy: 'The gun pictured with Shumer was called the Liberator. Like the Liberator one shot gun delivered to resistance fighters by America in Axis occupied lands. It was meant for a resistance fighter to shoot a Nazi

to take his rifle.' ('ThracianSword' 2013). There is an obsession with the pedigree of the inventors noting 'white genious [sic] at work' ('Istvan' 2013), and an aesthetic preference for metal sintering printers ('Ruger410' 2013). Stormfront members have an enthusiasm for printing car parts, and there is also an expectation that eventually industrial manufacturing will involve a handful of white working class men operating factories, while all other people languish in squalor, a condition which is arguably already the case. The utopian aspect of these discussions leads to a belief that the 'Aryan race' will be able to coordinate a large-scale printing of guns and conduct a global coup of current supposedly communist leaders, such as Barack Obama.

The white supremacist political imaginary seems to have two stages to it, bearing in mind that the community is not exactly unified in their expectations about additive manufacture. One is of the mass production of weaponry. The faith in metals over plastics has led some of the Stormfront members to hypothesize over the effectiveness of the Solid Concepts M1911 allowing the white community to potentially organise the arming of multiple militias towards a tactical coup of the centres of power throughout their various home nations. Despite the focus on metalwork, weapons, and machinery, this is surprisingly a less popular position. The general expectation of a future 'race war' is one that is largely not contingent on access to guns ('Kaiser Corax' 2013). Indeed, the expectation is that the capacity to print weaponry will benefit their opposition more:

[T]he government is not capable of protecting us, if the population was all white and armed this wouldnt even be an issue, there just afraid some dumb black to can't afford a pistol is going to print one and shoot a 9 year old in the face for disrespecting him buy stuff in his shoes or something ('Paladin Steel' 2013).

Instead it is the economic disturbances printing that are the focus of white supremacist 3D printing politics.

The second stage of the political imaginary is of an economic system where a few white workers retain specialised control over the factories of the world, allowing the rest of the whites to recline in luxury, while the indolent masses of other races are left to wallow in their filth:

We'll have 3D printers in 20-30 years that will be able to construct entire buildings without a team of Tradesmen. Jobs in the military will be replaced by Robots with organic Brains. The same application can be done with Firefighters. Evolve the technology at the top. Devolve the supporting population. See how long it takes for the whole mess to collapse. ('Riemann' 2013).

Such an economic model is attached to both capitalist and socialist visions of white nationals within Stormfront's community, a quirk that seems to elide the differences between both systems.

Expectations about the economy from the white supremacists seem to ignore the existing political economics of factory control and ownership, and the way in which gigantic fields of predominantly non-white people have been abused by historical patterns of labour controlled by colonial powers. Furthermore, as noted already by De Koster and Houtman, the national support for white supremacists is in inverse proportion to their online presence (De Koster and Houtman 2008). The more vehement and enthusiastic national groups in Stormfront are the least likely to be supported in secular life.

ONLINE ANTI-FEMINIST GROUPS

Anti-feminist and men's rights groups (it is worth identifying that these are not wholly self-identical political positions) also seem to be somewhat invested in 3D printing, but to less of an extent than white supremacists. Dedicated discussion is lacking, and instead communities seem to prefer to simply posting limited editorials of news articles on sites such as *A Voice For Men* and *The Antifeminist*. In particular *A Voice for Men* has the most explicitly political concept of 3D printing — it will simply allow for the supposed matriarchal society to simply impose itself further by allowing female knowledge economy workers to reproduce the current conditions with greater efficiency (Labadie 2013). The men's rights community on the Reddit online social forum has a few elements that equate 3D printing with the capacity to print sex dolls in the appearance of their choosing (MaunaLoona 2013; MRAFront 2013). This aspect becomes insidious in other situations — *The Antifeminist* in particular has discussions about the potential for 3D printing for in-home development of sex dolls modelled on children, indicating that producing child size sex dolls involve an ethical dimension, where the alternative is surely that paedophilia will be more rampant: 'The maladaptive female chimpanzee brain strikes again. Femihags at Jezebel [...] evidently would prefer a real child to be abused than the 'paedophile's' inclinations be safely spent inside a doll.' (theantifeminist 2013). Furthermore, the site indicates that they wish to be able to make dolls in the image of specific people, particularly in terms of how they project future developments to proceed:

In the next few years, 3d printers will be able to match the faces and bodies of sex dolls to that of celebrities, pornstars, or even a girl of your choosing (so long as you have a 3d scan or a number of 2d photos at different angles). In another decade or two, such dolls will be able to be printed out at home using desktop 3d printers, with an infinite variety of designs downloadable from the internet. Indeed, you will eventually be able to print out a realistic sex doll in the form of any female, living or dead, who has a photo of herself online or that you possess. Combine the above with telepresence and the possibilities are endless.

Yet these same discussions contain an opposing fear that the printing of sex toys will further emasculate men, as women are able to customise their own sex toys, allowing them to eliminate the 'need' for men in the bedroom.

The anti-feminist perspective is far less uniform than the white supremacist position, and is thus far less coherent. Rather than having two distinct stages to their political imaginary, the anti-feminist groups see primarily a single coherent trajectory for 3D printing, and many others that are far less coherent. The primary trajectory relates to an undermining of the vision of masculinity that ties men to manual industrial labour. This eschatology is tied to a generally pessimistic outlook in the future, in contrast to the largely optimistic viewpoints of the white supremacists and manufacturing. 3D printing is set to replace the effectiveness of men in the factory space, as the innate frailty of women is overcome through high technology and computerisation. Men are thus supposedly going to be less necessary in the long run, leading to their redundancy and obsolescence in the workplace, to be consigned to the household as domestic househusbands. This viewpoint sees the role of male labour as solely tied to a form of labour that, according to Michael Hardt and Antonio Negri, is no longer hegemonic with regards to

production (Hardt and Negri 2000), but nonetheless is one that creates fears within the anti-feminist community. This is a fear not specific to outputs from the additive manufacturing process, but rather a fear of the development of society as a whole where there will be a further entrenchment of women's governance of men. 3D printing upsets the natural and gendered divisions of labour, and unbalances men's ability to govern themselves and their families. 3D printing is a blight on society, not in part, but as a whole system.

CONCLUSION

Both the white supremacist and anti-feminist groups tie into an ideology that believes in a capacity for political change where 3D printing enables users to avoid public regulation. The manufacture of goods in the home, for the home, is certainly capable of existing outside of regulation, and encrypted transmission systems allow for their redistribution between homes. We can see these agendas arising from the start, connecting to the issues that Söderberg (2014) and Tocchetti (2012) see as already existing to the ideologies of 3D printing communities. The developers of the Liberator pistol have a strict libertarian political perspective, and they repeat aggressive anti-State rhetoric in their production blog and elsewhere (Defense Distributed 2014). The visions of the future that these groups discuss generate a bleak field for liberal-democratic perspectives. The regulation of 3D printed guns is mainly focused on the post-production weaponry more than on their manufacture, and, as Cory Doctorow states, the use of a gun is far more significant than the terms of its construction (Doctorow 2013). While the potential for failure of a weapon produced through additive manufacture is higher than a professionally machined device, the bullets are effective enough to be dangerous. Despite this, the two groups have departures, mainly in terms of what the economic future will hold, with specific niche attitudes colouring the preferences of each group. White supremacists believe that possibly the economy will develop into the condition that white workers may be able to work far less, while other members of the community are highly pro-labour, and worry that 3D printing will disenfranchise white workers. Anti-feminist positions identify the post-industrialisation as a sort of 'becoming-woman' of the economy, as traditionally masculine labour begins to disappear, and this is treated as a part of a matriarchal coup of the global economy.

3D printing makes possible some forms of production that were not possible before — the manufacturing of objects in the home using materials that previously required technical knowledge or heavy and expensive industrial equipment. What this means is that there is a political capacity to the communal use of 3D printing. That is to say that immaterial design and material production can operate to resolve individual problems through collective practices.

This concept of multiple collectives constituting new organisations of political activity can be applied to Agamben's discussions of the home. As mentioned, Agamben makes use of Aristotelian thought to understand the home as a site that has a qualitatively different arrangement order to the city in which it is located. In the process of the members of a household cohabiting, the individual members both structure and are structured by a unique economic arrangement that emerges from their interactions; however, individual households are excluded from the space of politics. Whatever form they take, homes are capable of developing material solutions to household problems, yet this is not, strictly speaking, a political event. The inclusion of Tronti's social factory contests this role. The house is no longer a separate economic domain, hermetically sealed from the operations of the *polis*, but takes on a role as a staging ground for new economic action based in material production. In this sense, connected households express new economic arrangements that produce systems of economic governance without the marketplace.

As a final reminder, I wish to emphasise the split that I see between 3D printing and additive manufacturing. Where additive manufacturing is a practiced technology, 3D printing is a social concept: a concept that understands some functions produced within additive manufacturing, but in doing so projects massive potential into such technology. 3D printing technology as used in networked households poses a new economic trajectory that is both utopian and dystopian at the same time. There is potential for material humanitarian aid, such as is already being deployed in Haiti (Dara 2013), just as much as a potential exists for providing the material means for violent crime. We can perhaps understand 3D printing through Bernard Stiegler's reworking of Plato's *pharmakon*, a medicine that had both the power to heal or harm. For Stiegler, a *pharmakon* is a way of alleviating psychic stresses of modern society, but taken in too great a dose, and a society collapses in on itself with its obsessions (Stiegler 2010). We can attempt to review and predict a wide range of thoughts that may guide particular political uses of 3D printing, and governments can generate relevant regulatory systems in order to accommodate for these eventualities. However, the capacity for households to act in concert and generate their own systems of self-regulating governance will be difficult to overcome through simple regulation from the State. The disruptive capacity for 3D printing does not come from the fantasies that surround an imagined potential, and instead come from the way in which new social factories and new forms of economic governance arise from its distribution.

BIOGRAPHY

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BIBLIOGRAPHY

3Ders.org 2014. Available from: <http://www.3ders.org/> [Accessed 6 May 2014]

Agamben, G 2011. *The Kingdom and the Glory*, Stanford University Press: Stanford

- Bauwens, M 2005. *Peer to Peer and Human Evolution*, available from: <http://62.210.98.10/IMG/P2PandHumanEvolV2.pdf>. [Accessed: 11 May 2014]
- Benkler, Y 2013. 'Practical anarchism peer mutualism, market power, and the fallible state', *Politics & Society*, Vol. 41(2), pp 213-251.
- Boltanski, L & Chiapello E 2005. *The New Spirit of Capitalism*, Verso: London.
- Bowman-Grieve Lorraine 2009. 'Exploring "Stormfront": A Virtual Community of the Radical Right', *Studies in Conflict and Terrorism*, Vol. 32(11), pp 989-1007.
- Burris, V, Smith, E and Strahm, A 2000. 'White Supremacist Networks on the Internet', *Sociological Focus*, Vol. 33(2) pp. 215-235.
- Coleman, G 2010. 'Ethnographic Approaches to Digital Media', *Annual Review of Anthropology*, Vol. 39(1), pp 487-505.
- Daly, A 2014. 'Submission to the Legal and Constitutional Affairs References Committee Inquiry', Submission 393, *The ability of Australian law enforcement authorities to eliminate gun-related violence in the community*. Available from: <http://www.aph.gov.au/DocumentStore.ashx?id=83d49fd1-3006-4881-9326-caad079760b8&subId=300761>.
- Dara, A 2013. '3D Printing Umbilical Cord Clamps in Haiti' Makezine 18 October. Available from: <http://makezine.com/2013/10/18/3d-printing-umbilical-cord-clamps-in-haiti/> [Accessed 12 May 2013]
- Defense Distributed Homepage 2013. Available from: <http://defdist.org/> [Accessed 12 November 2013]
- De Koster, W and Houtman D 2008. "Stormfront Is Like a Second Home to Me": On Virtual Community Formation by Right-Wing Extremists, 'Information, Communication & Society 11(8), pp 1153-1175.
- De la Durantaye, L 2009. *Giorgio Agamben: A Critical Introduction*. Stanford University Press: Stanford
- Doctorow, C 2013. '3D printed guns are going to create big legal precedents' *The Guardian Online* 13 May. Available from: <http://www.theguardian.com/technology/2013/may/13/3d-printed-guns> [Accessed 6 May 2014]
- Dyer-Witheford, N 1999. *Cyber-Marx*. University of Illinois Press: Urbana and Chicago.
- Farivar, C 2013. 'Thought 3D-printed guns had to be made of plastic? Think again' *ArsTechnica* 8 November. Available from: <http://arstechnica.com/business/2013/11/thought-3d-printed-guns-had-to-be-made-of-plastic-think-again/> [Accessed 8 November 2013]
- Fordyce, R and van Ryn L 2014. 'Ethical commodities as exodus and refusal' *ephemera*, Vol. 14(1), pp 33-55.
- Franceschi-Bicchieri, L 2014. 'Man Arrested in Japan for Owning 3D-Printed Guns' *Mashable.com* 8 May. Available from: <http://mashable.com/2014/05/08/japan-3d-guns-arrest/> [Accessed 12 May 2014]
- Gibson, I, Goenka, G R. Narasimhan, N. & Bhat, N. 2010. 'Design Rules for Additive Manufacture'. In *Proceedings of the Twenty First Annual International Solid Freeform Fabrication Symposium*.
- Greenberg, A 2013. 'State Department Demands Takedown Of 3D-Printable Gun Files For Possible Export Control Violations', *Forbes Online* 9 May. Available form: <http://www.forbes.com/sites/andygreenberg/2013/05/09/state-department-demands-takedown-of-3d-printable-gun-for-possible-export-control-violation/> [Accessed 12 November 2013]
- Hage, G 2012. 'Critical anthropological thought and the radical political imaginary today' *Critique of Anthropology*, Vol. 32(3,) pp 285-308.
- Hardt, M 1996. 'Laboratory Italy', in Paolo Virno & Michael Hardt (eds.) *Radical Thought in Italy: A Potential Politics*, University of Minnesota Press: Minneapolis, pp 1-10.
- , and Negri A 2000. *Empire*. Harvard University Press: Cambridge
- Heemsbgergen, Luke 2014. 'What price our fascination with cheaper 3D printing?' *Phys.org*, 20 January. Available from: <http://phys.org/news/2014-01-price-fascination-cheaper-3d.html> [Accessed 4 May 2014]
- Heron, N 2011. 'The Ungovernable', *Angelaki: Journal of the Theoretical Humanities*, Vol. 16(2), pp 159-174
- 'Istvan' 2013. '3d printing saves life !', *Stormfront.org*, 26 May. Available from: <http://www.stormfront.org/forum/t969390/> [Accessed 8 November 2013]
- 'Kaiser Corax' 2013. 'Re: In the year 2055', *Stormfront.org*, 27 May. Available from: <http://www.stormfront.org/forum/t969549/> [Accessed 26 October 2013]
- Labadie, T 2010. 'Living in the Dark Age' *A Voice for Men*, 21 December. Available from: <http://www.avoiceformen.com/mens-rights/living-in-the-dark-age/> [Accessed 8 November 2013]
- 'mark777' 2013. '3d printing saves life !', *Stormfront.org*, 28 May. Available from: <http://www.stormfront.org/forum/t969390-2/> [Accessed 8 November 2013]
- 'MaunaLoona' 2013. 'The Looming SexBot Threat', *Reddit.com—Men's Rights subreddit*, 16 January. Available from: http://www.reddit.com/r/MensRights/comments/16p0jr/the_looming_sexbot_threat/ [Accessed 8 November 2013]

- Meese, J 2014. 'Networked subjects: exploring the author, user and pirate through a relationalist lens', Ph.D. thesis, Swinburne University of Technology.
- 'MRAFront' 'Metropolitan Museum of Art: Displaying jailbaits in 3D? Male Sexuality and Muses', *Reddit.com—Men's Rights subreddit*, 2 August. Available From: http://www.reddit.com/r/MensRights/comments/xjqop/metropolitan_museum_of_art_displaying_jailbaits/ [accessed (NB: This reference page itself has links to objectionable content)] [Accessed: 8 November 2013]
- Murthy, D 2008. 'Digital Ethnography: An Examination of the Use of New Technologies for Social Research' *Sociology*, Vol. 42(5), pp 837-855
- Nansen, B, Arnold, M Gibbs M R and Davis H 2009. 'Domestic orchestration: Rhythms in the mediated home', *Time & Society*, Vol. 18(2/3), pp 181-207.
- , 2011. 'Dwelling with media stuff: latencies and logics of materiality in four Australian homes', *Environment and Planning D*, Vol. 29(4), pp 693-715
- 'Paladin Steel' 2013. '3d printing saves life !', *Stormfront.org*, 27 May. Available from: <https://www.stormfront.org/forum/t969390/> [Accessed 26 October 2013]
- Pearce, R 2013. 'NSW Police issues warning on 3D printed guns', *Techworld*, 24 May. Available from: http://www.techworld.com.au/article/462774/nsw_police_issues_warning_3d_printed_guns/ [Accessed 12 May 2014]
- Phillip, J 2013. 'Bill Regulating 3D Printed Guns Announced In NYC' *Epoch Times*, 12 June. Available from: <http://www.theepochtimes.com/n3/105893-bill-regulating-3d-printed-guns-announced-in-nyc/> [Accessed 12 May 2014]
- Pink, S and Mackley K 2013. 'Saturated and situated: rethinking media in everyday life', *Media, Culture & Society*, Vol. 35(6), pp 677-691.
- Postill, J and Pink S 2012. 'Social Media Ethnography: the digital researcher in a messy web', *Media International Australia*, Vol. 145, pp 123-134.
- Ratto, M 2011. 'Critical Making: Conceptual and Material Studies in Technology and Social Life', *The Information Society*, Vol. 27, pp 252-260
- , and Robert R. 2010. *The Materialization of Digital Information and the Digital Economy Knowledge Synthesis Report* 1 December. Available from: http://thingtanklab.com/wp-content/uploads/2011/02/SSHRC_DigEcon_DDF.pdf [Accessed 5 May 2014]
- , 2012. 'Materializing information: 3D printing and social change' *First Monday*, Vol. 17(7). Available from: <http://firstmonday.org/ojs/index.php/fm/article/view/3968/3273>
- 'Riemann' 2013. 'Re: Why no jobs in USA!', *stormfront.org*, 14 April. Available from: <http://www.stormfront.org/forum/t956725-2/> [Accessed 8 November 2013]
- Rimmer, M 2012. 'A Submission to the Australian Law Reform Commission on Copyright and the Digital Economy: IT Pricing', 12 November. Available from: http://works.bepress.com/matthew_rimmer/140/ [Accessed 6 May 2014]
- Rosenwald, M 2013. 'Printed plastic guns a growing worry for law enforcement' *Washington Post*, 13 November. Available from: http://www.washingtonpost.com/local/printed-plastic-guns-a-growing-worry-for-law-enforcement/2013/11/13/211e9f74-4cad-11e3-be6b-d3d28122e6d4_story.html [Accessed 12 May 2014]
- 'Ruger410' 2013. *Stormfront.org*, '3D printed gun fun', 8 November 2013. Available from: <http://www.stormfront.org/forum/t1003965> [Accessed 12 November 2013]
- Söderberg, J 2014. 'Reproducing Wealth Without Money, One 3D printer at a Time' *Journal of Peer Production* 4. Available from: <http://peerproduction.net/editsuite/issues/issue-4-value-and-currency/peer-reviewed-articles/reproducing-wealth-without-money/>
- Solid Concepts 2013. 'World's First 3D Printed Metal Gun Manufactured by Solid Concepts', 7 November. Available from: <http://www.solidconcepts.com/news-releases/worlds-first-3d-printed-metal-gun-manufactured-solid-concepts/> [Accessed 4 May 2014]
- Stiegler, B 2010. *For a New Critique of Political Economy*. Polity Press: Cambridge
- Teli, M, Pisanu F and Hakken D 2007. 'The Internet as a Library-of-People: For a Cyberethnography of Online Groups', *Forum: Qualitative Social Research*, Vol. 8(3). Available from: <http://www.qualitative-research.net/index.php/fqs/article/view/283/621/>
- 'theantifeminist' 2013. 'Petition 'Succeeds' in Removing 'Child-Sized' Sex Doll from Chinese Site', *The Anti-Feminist.Com—Anti-Feminist Theory of Men's Rights, Male Sexuality, Feminism*, 17 November. Available from: <http://theantifeminist.com/petition-succeeds-in-removing-child-sized-sex-doll-from-chinese-site/> [Accessed 20 November 2013]
- 'ThracianSword' 'Re: 3D Printed Guns Stir Up Governments, Shoot Air Into 3D Printing Bubble', *Stormfront.org*, 6 May. Available from: <http://www.stormfront.org/forum/t965068-2/> [Accessed 8 November 2013]
- Tocchetti, S 2012. 'DIYbiologists as 'makers' of Personal Biologies: How MAKE Magazine and Maker Faires Contribute in Constituting Biology as a Personal Technology', *Journal of Peer Production* 2. Available from: <http://peerproduction.net/editsuite/issues/issue-2/peer-reviewed-papers/diybiologists-as-makers/>
- Tronti, M 1962. 'Factory and Society" in *Operai e capitale*. English translation available via. *Operaismo in English*. Trans. Guio Jacinto. Posted 13 June 2013. Available from: <http://operaismoenglish.wordpress.com/2013/06/13/factory-and-society/> [Accessed 4 December 2013]

—, 2007. 'The Strategy of Refusal', in: Sylvère Lotringer and Christian Marazzi (eds.) *Autonomia: Post-Political Politics*, Semiotext(e): Cambridge, pp 28–35

—, 2012. 'Our operaismo', *New Left Review*, Vol. 73, pp 118-139.

van der Nagel, E. 2013. 'Faceless Bodies: Negotiating Technological and Cultural Codes on reddit', *Scan: Journal of Media Arts Culture*, 10(2). Available from: <http://scan.net.au/scn/journal/vol10number2/Emily-van-der-Nagel.html>

Wright, S 2002. *Storming Heaven*, Pluto Press: London.

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