Manufacturing household governance: additive manufacture and the social factory

"if 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 social theory. 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 certain 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 social theory includes a number of methodologies for conceptualising certain types 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 social theory 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 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 certain types of politicised community. Already 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 social theory, in that they are neither neoliberal nor Marxist in their politics.

The research 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). As Postill and Pink note, the process of embodiment in digital ethnography can be taxing to the researcher. In their case, this related to the furious pace of browsing causing strain on Postill's body (Postill and Pink, 2012: 128). In my case, the research was difficult due to my repeated encounter with highly objectionable positions regarding the nature of ethnicity and gender. This was, obviously, to be expected, due to the topic of research, but the commitment to research nonetheless required that I refrain from commenting. 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 'Defence 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.

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 PLA or ABS 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. 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.

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 certain potentials that seem to reside in the idea of 3D-printing.

3D printing and disruption

3D printing is disruptive whether or not the feared societal changes associated with it ever materialise. 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 certain 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: 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. The distributable nature of STL files is the basis on which intellectual property rights are challenged at a scale of societies, rather than individuals. One of the most disruptive elements of 3D printing may be in the fact that it is not sufficiently defined within existing intellectual property law. 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, 2014:101). 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, 2010: 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 social theory

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 and Steven Wright 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: 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. The rapid war-time industrialisation of Italy was followed by the implementation of a pattern of post-industrial economics. This economic pattern was mirrored with a repressive state function, the direct precursor to Berlusconi, which chose to pacify the working populations with bullets and jail cells. These operations of the state were bolstered by the remnants of the CIA's infamous anti-Communist 'Operation Gladio'. Italy's political situation has been, for many decades, a dangerous and complex affair.

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: 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. His tensions with the *autonomia* and other actors, such as Antonio Negri, worsened during the period leading up to the government crackdown referred to as the *Anni di Piombo*, at which point the Italian state's frustrations resolved in the imprisonment or exile of many of his peers. Tronti has had many publications since his emergence as a theorist in the 1960s, and many of the key ideas have been definitive for the various Italian Marxist movements over this period. Key practices, 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 the Italian condition. 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. 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 in his idea of Empire – an idea of a factory society so large as to encompass the globe.

It is both theoretically and politically important not to confuse the work of the factory society with the work of reproductive labour. While they overlap in places, these are distinct concepts, with different investments in how labour is extracted from workers. To equate one with the other is to undermine both. Where reproductive labour focuses on the way in which the domestic sphere produces the conditions such that workers may return to the factory each day, the factory society examines the way in which social environments give rise to the development of information and culture. 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. The factory, as Michael Hardt famously notes, became a laboratory (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 which comprise 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, and its focus on the prohibition of particular uses of additive manufacture towards supposedly anti-social practices. P2P presents an unknown factor for many discussions surrounding the sharing and distribution of manufacturing. 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: 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-Bicchierai, 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.

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 which is used by the designers of one of the 3D printable guns. In an interview, Defence 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 that people who are already the primary subject of discourses of 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; all these point to the evidence that, whatever problems there may be with the technology of the gun itself, there remains little that seems to be capable of keeping the technology under the control of the state. Domestic additive manufacturing will do little to change this fact. This has not prevented the technology from mobilising a substantial concern over its potential effects. This has, also, not prevented this imaginary future from being mobilised in changes to legislation. The libertarian organisation Defence 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: Defence 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 Defence 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 certain types of items, then we'll be awash with fascistic organisations, terrorists, and sexual perversion.

Stormfront

A white supremacist utopia, which would be founded through 3D printing, has been discussed extensively on the white supremacist website, Stormfront, since February 2012. 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). 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 Defence Distributed. Certain 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 largely predictable discussions about Zionist conspiracies and hidden political messages ('ThracianSword', 2013). There is an unsurprising obsession with the pedigree of the inventors noting 'white genious [sic?] at work' ('Istavan', 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). Instead it is the economic disturbances of 3D printing that is the focus of white supremacist 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 ('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 (theantifeminist, 2013). 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 variation on the liberal democratic fear, in that it fears not specific outputs from the additive manufacturing process, but rather the development of society as a whole under the 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 a crypto-libertarian ideology that believes in a capacity for political change through encryption devices that enable 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 transmissions systems allow for their redistribution between homes. We can see these agendas arising from the start. 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 (Defence 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 equally real. White supremacists believe that possibly the economy will develop into the condition that white workers may be able to work far less; 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 certain 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. We can follow Chantal Mouffe's work, and conceive of the political dimension as constituted by differences between groups – differences that cannot and should not be reduced (Mouffe, 2013). Furthermore, Mouffe notes that material outcomes of collective practices are capable of producing order, but that this order is always limited, fragile and contested. This order often expresses itself in the form of state, reconciling those parties that vie for the control of the nation. This order is fundamental to Mouffe's position, but also provides a way of understanding that political organisations may operate outside the bounds of statist control, and indeed may be more effective when they do so.

This concept of multiple collectives constituting new organisations of political activity can be applied to Agamben's discussions of the home. 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.

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. Solutions to household problems can be distributed through communications networks to other households, but so too can other more fundamental changes be communicated in the same way. 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.

Works cited:

3Ders.org (2014) accessed 6 May 2014 [http://www.3ders.org/]

Agamben, Giorgio (2011) *The Kingdom and the Glory*. Stanford University Press: Stanford, CA.

Bauwens, Michel (2005) *Peer to Peer and Human Evolution*. PDF file. Accessed 11 May, 2014. Retrieved from: [http://62.210.98.10/IMG/P2PandHumanEvolV2.pdf]

Benkler, Yochai (2013) "Practical anarchism peer mutualism, market power, and the fallible state". *Politics & Society 41* (2): 213-251.

Dara, Ashley (2013) "3D Printing Umbilical Cord Clamps in Haiti" Makezine 18 October 2013, accessed 12 May 2013. [http://makezine.com/2013/10/18/3d-printing-umbilical-cord-clamps-in-haiti/]

Defence Distributed Homepage (2013) accessed 12 November 2013 [http://defdist.org/]

De Koster, Willem, and Dick Houtman (2008) "'Stormfront Is Like a Second Home to Me': On Virtual Community Formation by Right-Wing Extremists." *Information, Communication & Society* 11 (8):1153-1175.

De la Durantaye, Leland (2009) *Giorgio Agamben: A Critical Introduction*. Stanford University Press: Stanford California.

Doctorow, Cory (2013) "3D printed guns are going to create big legal precedents" *The Guardian Online* 13 May 2013, accessed 6 May 2014 [http://www.theguardian.com/technology/2013/may/13/3d-printed-guns]

Dyer-Witheford, Nick (1999) *Cyber-Marx*. University of Illinois Press: Urbana and Chicago.

Farivar, Cyrus (2013) "Thought 3D-printed guns had to be made of plastic? Think again" *ArsTechnica* 8 November 2013, accessed 8 November 2013 [http://arstechnica.com/business/2013/11/thought-3d-printed-guns-had-to-be-made-of-plastic-think-again/]

Fordyce, Robbie and Luke van Ryn (2014) "Ethical commodities as exodus and refusal" *ephemera 14* (1): 33-55.

Franceschi-Bicchierai, Lorenzo (2014) "Man Arrested in Japan for Owning 3D-Printed Guns" *Mashable.com* 8 May 2014, accessed 12 May 2014 [http://mashable.com/2014/05/08/japan-3d-guns-arrest/]

Gibson, I., G. Goenka, R. Narasimhan, N. & Bhat, N. (2010). "Design Rules for Additive Manufacture". In *Proceedings of the Twenty First Annual International Solid Freeform Fabrication Symposium*.

Greenberg, Andy (2013) "State Department Demands Takedown Of 3D-Printable Gun Files For Possible Export Control Violations" *Forbes Online* 9 May 2013, accessed 12 November 2013. [http://www.forbes.com/sites/andygreenberg/2013/05/09/state-department-demands-takedown-of-3d-printable-gun-for-possible-export-control-violation/]

Hardt, Michael (1996) "Laboratory Italy", in: Paolo Virno & Michael Hardt (Eds.) *Radical Thought in Italy: A Potential Politics*. University of Minnesota Press Minneapolis. 1-10.

Hardt, Michael and Antonio Negri (2000) *Empire*. Harvard University Press: Cambridge, MA.

Heron, Nicholas (2011) "The Ungovernable" *Angelaki: Journal of the Theoretical Humanities 16*(2): 159-174

'Istavan' *Stormfront.org* "3d printing saves life !" 26 May 2013, accessed 8 November 2013. [http://www.stormfront.org/forum/t969390/]

Heemsbgergen, Luke (2014) "What price our fascination with cheaper 3D printing?" *Phys.org* 20 January 2014, accessed 4 May 2014 [http://phys.org/news/2014-01-price-fascination-cheaper-3d.html]

'Kaiser Corax' "Re: In the year 2055" 27 May 2013, accessed 26 October 2013 [http://www.stormfront.org/forum/t969549/]

Labadie, Theodore (2010) "Living in the Dark Age" *A Voice for Men.* 21 December 2010, accessed 8 November 2013 [http://www.avoiceformen.com/mens-rights/living-in-the-dark-age/]

'mark777' *Stormfront.org* "3d printing saves life !" 28 May 2013, accessed 8 November 2013. [http://www.stormfront.org/forum/t969390-2/]

'MaunaLoona' (2013) *Reddit.com -- Men's Rights subreddit* "The Looming SexBot Threat" 16 January 2013, accessed 8 November 2013 [http://www.reddit.com/r/MensRights/comments/16p0jr/the_looming_sexbot_threat/]

Meese, James (2014) *Networked subjects: exploring the author, user and pirate through a relationalist lens.* Ph.D. thesis. Swinburne University of Technology.

Mouffe, Chantal (2013) *Agonistics: Thinking the World Politically.* Verso: London

'MRAFront' *Reddit.com -- Men's Rights subreddit* "Metropolitan Museum of Art: Displaying jailbaits in 3D? Male Sexuality and Muses" 2 August 2013, accessed 8 November 2013 [http://www.reddit.com/r/MensRights/comments/xjqop/metropolitan_museum_of_art_displaying_jail baits/] (NB: This reference page itself has links to objectionable content)

Murthy, Dhiraj (2008) "Digital Ethnography: An Examination of the Use of New Technologies for Social Research" *Sociology 42* (5): 837-855

Nansen, Bjorn, Michael Arnold, Martin R. Gibbs and Hilary Davis (2009) "Domestic orchestration: Rhythms in the mediated home" *Time & Society 18* (2/3): 181-207.

Nansen, Bjorn, Michael Arnold, Martin R. Gibbs and Hilary Davis (2011) "Dwelling with media stuff: latencies and logics of materiality in four Australian homes" *Environment and Planning D 29* (4): 693-715

Pearce, Rohan (2013) "NSW Police issues warning on 3D printed guns" *Techworld* 24 May 2013, accessed 12 May 2014 [http://www.techworld.com.au/article/462774/nsw_police_issues_warning_3d_printed_guns/]

Phillip, Joshua (2013) "Bill Regulating 3D Printed Guns Announced In NYC" *Epoch Times*, 12 June 2013 accessed 12 May 2014 [http://www.theepochtimes.com/n3/105893-bill-regulating-3d-printed-guns-announced-in-nyc/]

Pink, Sarah and Kerstin Mackley (2013) "Saturated and situated: rethinking media in everyday life" *Media, Culture & Society 35* (6): 677-691.

Postill, John, and Sarah Pink (2012) "Social Media Ethnography: the digital researcher in a messy web" *Media International Australia 145*: 123-134.

Ratto, Matt (2011) "Critical Making: Conceptual and Material Studies in Technology and Social Life" *The Information Society 27*: 252-260

Ratto, Matt, and Robert Ree. (2010) *The Materialization of Digital Information and the Digital Economy Knowledge Synthesis Report* 1 December 2010, accessed 5 May 2014 [http://thingtanklab.com/wp-content/uploads/2011/02/SSHRC_DigEcon_DDF.pdf]

Ratto, Matt, and Robert Ree (2012) "Materializing information: 3D printing and social change" *First Monday 17* (7) [http://firstmonday.org/ojs/index.php/fm/article/view/3968/3273]

'Riemann' "Re: Why no jobs in USA!" 14 April 2013, accessed 8 November 2013 [http://www.stormfront.org/forum/t956725-2/]

Rimmer, Matthew (2012) "A Submission to the Australian Law Reform Commission on Copyright and the Digital Economy: IT Pricing". 12 November 2012, accessed 6 May 2014 [http://works.bepress.com/matthew_rimmer/140/]

Rosenwald, Michael (2013) "Printed plastic guns a growing worry for law enforcement" Washington Post 13 November 2013, accessed 12 May 2014 [http://www.washingtonpost.com/local/printed-plastic-guns-a-growing-worry-for-law-enforcement/2013/11/13/211e9f74-4cad-11e3-be6b-d3d28122e6d4_story.html]

'Ruger410' *Stormfront.org* "3D printed gun fun" 8 November 2013, accessed 12 November 2013. [http://www.stormfront.org/forum/t1003965/]

Stiegler, Bernard (2010) *For a new critique of political economy.* Polity, Cambridge.

Solid Concepts (2013) "World's First 3D Printed Metal Gun Manufactured by Solid Concepts" 7 November 2013, accessed 4 May 2014 [http://www.solidconcepts.com/news-releases/worlds-first-3d-printed-metal-gun-manufactured-solid-concepts/]

'theantifeminist' *The Anti-Feminist.Com -- Anti-Feminist Theory of Men's Rights, Male Sexuality, Feminism* "Petition 'Succeeds' in Removing 'Child-Sized' Sex Doll from Chinese Site" 17 November 2013, accessed 20 November, 2013 [http://theantifeminist.com/petition-succeeds-in-removing-child-sized-sex-doll-from-chinese-site/]

'ThracianSword' *Stormfront.org* "Re: 3D Printed Guns Stir Up Governments, Shoot Air Into 3D Printing Bubble" 6 May 2013, accessed 8 November 2013. [http://www.stormfront.org/forum/t965068-2/]

Tronti, Mario (1962) "Factory and Society" in *Operai e capitale.* English translation available via. *Operaismo in English.* Trans. Guio Jacinto. Posted 13 June 2013, accessed 4 December 2013 [http://operaismoinenglish.wordpress.com/2013/06/13/factory-and-society/]

Tronti, Mario (2007) "The Strategy of Refusal", in: Sylvère Lotringer and Christian Marazzi (Eds.) *Autonomia: Post-Political Politics*, Semiotext(e): Cambridge, MA: 28–35.

Tronti, Mario (2012) "Our operaismo" *New Left Review 73*: 118-139.

Wright, Steve (2002) *Storming Heaven.* Pluto Press: London.