Towards an anarchist cybernetics

Stafford Beer, self-organisation and radical social movements

Thomas Swann

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abstract

In the early 1960s, a number of anarchist writers showed an interest in cybernetics, in which they saw the tools for better articulating radical forms of self-organisation. Discussions on the connections between anarchism and cybernetics did not advance very far, however, and by the 1970s the topic seems to have fallen off the anarchist radar. With an increase in interest in cybernetics over the last few years, this paper picks up where these debates left off and highlights some key points of contact between cybernetics and anarchism that have the potential to advance radical accounts of self-organisation. Based on a theoretical appraisal of the core texts and arguments in the debate around anarchism and cybernetics, the paper shows that the way in which hierarchy is formulated in cybernetic thought has a crucial impact on anarchist theory and practice and aids both academic approaches to social movements and, importantly, anarchist and radical left praxis. In addition, it provides a response to the critique of cybernetics in critical management studies that stands as a barrier to taking cybernetics seriously as a contribution to radical understandings of organisation.

Introduction

In this paper, I attempt to rehabilitate cybernetics, in some form, as a tradition that has the potential to enrich our understandings of radical or alternative forms of organisation. In doing so, I argue for an anarchist cybernetics: a reading of Stafford Beer's organisational cybernetics that lends itself to forms of organisation that aim to limit if not completely reject centralised, top-down command and control in favour of participatory and democratic practices.

Cybernetics has experienced something of a resurgence in recent years with a number of popular science books (Kline, 2015; Medina, 2011; Pickering, 2010) having been followed by a small but significant amount of interest in the subject within academia and beyond. While some of this work is highly critical (e.g., Tiqqun, 2001; Morozov, 2014), there are also more balanced engagements (Collister, 2014; Crnkić, 2013; Duda, 2013; Galloway, 2014). In critical management studies (CMS), cybernetics has not enjoyed much attention. In *Organization*, a leading journal in the field, discussions of cybernetics are few and far between (e.g., Baeker, 2006; Checkland, 1994; Galliers, Mingers and Jackson, 1997). In *ephemera*, cybernetics has received serious consideration in only one paper (Collister, 2014) and very brief mention in a number of others (e.g., de Geus, 2014; Hoofd, 2010). In addition to addressing this lacuna in CMS, this paper aims to contribute to the growing body of work in CMS on radical social movements (e.g. Feigenbaum et al., 2013; Kokkinidis, 2015; Parker et al., 2007; Parker et al., 2014; Sutherland et al., 2014) as well as anarchist organisation more specifically (e.g. Land, 2007; Parker, 2011; Reedy, 2002; see also the recent *ephemera* special issue: *ephemera*, 2014).

On the face of it, anarchism and cybernetics, as I characterise them here, might seem like opposites, at least in terms of their respective accounts of organisation. Anarchists, on the one hand, have championed non-hierarchical and anti-authoritarian forms of organisation that are built on liberation and autonomy. Cybernetics, on the other, in CMS and elsewhere, has been critiqued for being a functionalist and technocratic approach to organisation, offering the kind of blueprints and top-down planning that anarchists and other radicals frequently reject. Contrary to this apparent conflict, I suggest in this paper that a reappraisal of one particular strand of

cybernetic thought – the strand most closely associated with UK-based cyberneticians, Stafford Beer chief among them – can in fact enrich an anarchist account of organisation. Through a theoretical appraisal of cybernetics, I aim to show that the ways in which Beer and others have thought about self-organisation, autonomy and hierarchy might provide the foundations for a nuanced descriptive *and* normative theory of how people can organise in ways that maximise collective and individual autonomy. In short, I want to answer the question, 'What can cybernetics teach us about how anarchists can and do organise?'. In doing so, I intend to propose an 'anarchist cybernetics' as a new way of thinking about anarchist organisation.

To this end, this paper will attempt three tasks. Firstly, I begin with overviews of both anarchism and Stafford Beer's organisational cybernetics, focusing on his Viable System Model. Secondly, I turn to how cybernetics was taken up by several anarchists in the 1960s and 1970s. Thirdly, in order to advance a theoretical development of this meeting of anarchist political theory and the understanding of control and organisation found in cybernetics, I introduce and discuss the notion of functional hierarchy. In line with this third task, I then attempt to rearticulate Beer's Viable System Model as a way of understanding anarchist organisation. Cybernetics, I argue, has the potential to add crucial nuance to anarchist accounts of organisation and, more generally, to show how social movement organisation can be understood in ways that go beyond often simplistic descriptions of ideal situations of democratic deliberation and decision making. In concluding, I respond to the functionalism critique of cybernetics.

Anarchism

Anarchism has often been associated with chaos and disorder, and so to take anarchism as the starting point for a discussion of organisation may to some seem odd. The depiction of the bomb-throwing anarchist assassin and provocateur left in the public imagination by works of literature such as Joseph Conrad's *The Secret Agent* lingers to this day, and 'anarchist' is often used across the political spectrum to dismiss an opponent's views and actions as nonsensical, immature and, worse yet, a dangerous threat to any and all forms of social organisation. The anarchist tradition, contrary to these dramatic caricatures, is fundamentally concerned with order and with effective organisation. One of the earliest proponents of anarchism as a political position, Pierre-Joseph Proudhon argued that 'society finds its highest perfection in the union of order with anarchy' (1840: n.p.). As Ruth Kinna puts it, 'anarchism is a doctrine that aims at the liberation of peoples from political domination and economic exploitation by the encouragement of direct or non-governmental action' (2005: 1). Anarchism shares with traditions such as socialism and communism the view that people should be free to enjoy the fruits of their labour without exploitation by capitalists and other land and property owners and that they should have the political freedom to associate in whatever ways they please and to explore individual autonomy to the greatest extent allowed by the need for collective organisation. This drive towards collective and individual liberation has seen anarchists over the last almost two centuries resist in various ways, among others, capitalism, the state, organised religion, monarchy, patriarchy, racism and colonialism, homophobia and, more recently, environmental destruction and exploitation of animals.

As Kinna notes, however, one of the things that distinguishes many anarchists from others aligned with socialist and communist traditions is the commitment to direct, non-governmental

political action in both enacting this resistance and prefiguring alternative forms of life. Direct action is often conflated with violence, and while many anarchists accept violence as a necessary tactic at certain moments, direct action is certainly not reducible to it. Benjamin Franks writes that direct action 'refers to practical prefigurative activity carried out by subjugated groups in order to lessen or vanquish their own oppression' (2006: 115; see also 2003). Direct action, crucially, involves not petitioning others in order to oppose oppression or exploitation, be those others actors such as governments or political parties or indeed the oppressors and exploiters themselves, but instead taking the steps deemed necessary to solve the problem directly.

Closely tied to direct action is the notion of prefiguration, something only relatively recently coined but a core element of anarchist politics at least as far back as the nineteenth-century anarchist Mikhail Bakunin. Prefiguration as a central plank of direct action means that the means used in resisting oppression and exploitation should reflect and be constitutive of the ends desired (Maeckelbergh, 2009; van de Sande, 2013; Yates, 2014). For anarchists, then, real freedom cannot be issued by a dominating authority but can only be realised through direct action by those who free themselves. It is for these reasons that anarchism is often described as an anti-authoritarian political tradition committed to non-hierarchical organisation, in so far as hierarchies subjugated the many at the bottom of the typical organisational pyramid to the few at the top. One of the ways anarchism has been articulated most over the past two or three decades is through a focus on direct and participatory democratic decision making, often with reference to consensus decision making as a model that provides an alternative to both top-down authoritarian domination and the perceived limitations of representative forms of democracy (Maeckelbergh, 2009; 2012; Seeds for Change, 2013). Important to this contemporary strand of anarchist thought is the notion of networked organisation. Franks (2006), for example, identifies the network or federation approach to organisation as one of those that is most in tune with the autonomy and self-organisation at the heart of the anarchist movement as it has developed in recent years (see also, e.g. Gordon, 2008: 14-17; Graham, 2011; Ward, 1973: 51-52).

Anarchism has received increasing interest among academics in recent years, largely as a result of its more central position in left-wing social movements following the collapse of the Soviet Union (Gordon, 2008; Wilson, 2014). To cite just one relevant example, this very journal published a special issue on anarchism and critical management studies in 2014 (*ephemera*, 2014), which included authors from a range of fields including political theory, economics, philosophy, geography and media and communication studies as well as management and organisation studies.

Organisational cybernetics

The word 'cybernetics' has its etymological origins in the Ancient Greek word κυβερνήτης and refers to the art of steering or governing. In the period immediately following the Second World War, Norbert Wiener, credited as the father of cybernetics, defined it as 'the scientific study of control and communication in the animal and the machine' (1961 [1948]: 11). Wiener's work in fact began during the war, working on automated anti-aircraft guns, but after the end of the war he declared himself an anti-militarist and refused funding for military-focused research (Wiener, 1947; see Mirowski, 2002 for an overview of the origins of cybernetics during the war). Cybernetics was intended as an interdisciplinary approach to how systems (organisms, machines,

animals and, later, social forms of organisation) use feedback to self-organise and self-regulate (Mead, 1968). Here, I want to focus on one specific strand of cybernetics that developed out of the initial engagement with feedback, self-organisation and control in the 1940s. While cybernetics research shot off in myriad directions, eventually being eclipsed in the hard sciences by information theory (Kline, 2015), the avenue I want to turn to here is the one that is perhaps most relevant when discussing organisation and, as I will show, radical and anarchist approaches to organisation.[1]

Of importance here is the work of Stafford Beer (and more broadly the British tradition of cybernetics (Pickering, 2010)) and how he developed Wiener's cybernetics into the realm of social organisation. Beer began his work with cybernetics as a management consultant after the Second World War and went on to work on a number of projects that took his account of cybernetics outside of the corporate realm in which it started. In the early 1960s he worked in Salvador Allende's Chile on Project Cybersyn, the attempt by the socialist government to link production and distribution in the country using an electronic network (see Medina, 2011 for a full history of this episode). It was a system that, as many have suggested (e.g. Espejo, 2014), prefigured the internet in the way it aimed at laying down information pathways throughout the country that would allow for real-time coordination of the economy. Crucial to Beer's cybernetics was the claim that there are certain core principles that can be applied in understanding the organisational dynamics of self-organising systems, regardless of what those systems are. This allowed him to take the practical application of cybernetics beyond electronics, mechanics and biology and into the realm of social organisation.

For the strand of cybernetics I want to discuss here, organisation is understood as a set of lines of communication arranged in a network. Beer describes the organisation of a system in the following way:

> The connectiveness of the system can now be introduced into this picture by drawing lines between the dots [...] In this way, we come to look upon a system as a kind of network. [...] [t]he lines depicting the network of our system are in fact its *communications*. (1967: 10-11, italics in original)

This is echoed, for instance, by John Duda, who writes of Wiener's cybernetic programme that 'the very definition of a system lies in the communicative links between its component parts' (2012: 78). So when we think about organisation in the context of cybernetics, we are thinking about a network of nodes linked in multiple ways by lines of communication.[2] Here we can see a foreshadowing of some of connections between anarchism and cybernetics explored in detail below: both are built upon a networked account of organisation. This is of course a very broad definition of organisation that can apply to any form of sociality and indeed to any form of

[1] The history of cybernetics is intricately interwoven with the history of the Cold War and many of the developments in the field emerged as a result of competition and suspicion between the US and the Soviet Union. Funding for cybernetics in the US after the initial burst of interest in the 1940s came as a direct result of Soviet investment in the field and fears of the Soviet Union overtaking the West in key areas of scientific development. Some of the financial support for cybernetics in the 1950s was even provided by the CIA and has been linked to the mind-control project MKUltra (Kline, 2015: 185-90; Umpleby, 2005). For more in-depth histories of cybernetics, see Hayles, 1999; Kline, 2015; Mirowski, 2002. On Soviet Cybernetics, see Dyer-Witheford, 2013 and Francis Spufford's 2010 novel *Red plenty*.

[2] This of course brings cybernetics into a close relationship with systems theory (see e.g. Checkland, 1994).

system, from organic to mechanical, from electronic to social. While this apparent reductionism may seem like stepping onto uncomfortable territory, it is this that has allowed cyberneticians such as Beer to develop a holistic understanding of effective organisation. I do not intend to argue this point here, but for Beer and others, the insights gained from cybernetics apply to any and all forms of system or organisation. The subsequent discussion of cybernetics and the specific elements of Beer's concept of effective organisation, therefore, should be seen as grounded in this general account of organisation as a network of nodes in communication with one another.

There are three core concepts behind cybernetics that are most relevant when discussing organisational cybernetics and its relevance for anarchism: complexity, autonomy and control. As Wiener's definition of cybernetics and the understanding of organisation at the centre of cybernetics suggests, communication is also a vitally important concept, but for the sake of space it is the control element that will occupy a more prominent position in this paper (on cybernetics and communication, see Swann and Husted, 2017).

Complexity is defined in line with the variety of possible states of a system[3] and its environment[4] and the changes that take place in this system-environment coupling. The foundational principle of cybernetics is that for a system (an organism, a machine, an organisation) to remain stable, the system has to be able to change its state to match changes in the environment. This is referred to as Ashby's Law, after cybernetician Ross Ashby (1956), or the Law of Requisite Variety. Successful organisation, according to organisational cybernetics, is about using the information from feedback loops to alter behaviour so that the variety in the system matches the variety in the environment. Scholars of cybernetics Angela Espinosa, Roger Harnden and Jon Walker describe complexity as the process whereby 'the internal dynamics of the organisation and the external niche change in a never-ending dance' (2008: 640). Systems and organisations exist in complex worlds and must be flexible in responding to that complexity. The way they do so is by embracing autonomy.

Autonomy is considered a necessary feature of any system in order that it can respond flexibly to changes. For Beer, a system or organisation that can do this can be described as 'viable': it can continue to pursue its goals while participating in this dance with complexity (Beer, 1994 [1981]: 50). An organisation which is run in a rigidly centralised manner would be too sluggish to be able to respond to change (*ibid.*,: 103; see also Leonard, 2013: 17). As Beer writes,

> [i]t is clear that large areas of any organisation will and should be autonomous. If every aspect of business, every smallest decision, had to be thought about consciously at the senior management level then obviously the firm would grind to a halt. (1967: 219-220)

Allowing the parts to operate with some level of autonomy increases the potential variety in the organisation's operations, making it easier for it to match the variety in the environment. The different parts of any system must, therefore, have some level of autonomy from the rest of the system and be able to respond to change as they see fit.

While the context of much of Beer's work on organisational cybernetics is in hierarchically-organised companies, the notion of control he utilises has little in common with accounts based

[3] In line with the definition of organisation relevant to cybernetics, Beer characterises systems as 'anything that consists of parts connected together' (1967: 9).

[4] Importantly, the distinction between a system and its environment in cybernetics is only from the perspective of a certain observer and is not objective (see Cilliers, 2001; Espinosa et al., 2008: 639-640).

on command and control structures, orders and top-down decision-making. Beer is keen to note, for example, that despite pyramidal organisational charts, organisations that remain stable, successfully cope with change and are able to pursue goals do so because their actual operations depart radically from their stated organisational structure. If an organisation were to follow the chain of command set out in its organisational chart – with a leadership at the top and various levels of authority and responsibility arranged downwards as far as those at the bottom who have no authority and are required to follow orders passed down the chain – the response to change at the bottom, where the organisation actually operates in its environment, would be incredibly slow. Those at the bottom would need to pass information about the change in the environment up to the next level and so on until the leadership at the top made a decision and passed that decision down again through each level. By that point, Beer argues, the response would be irrelevant as the situation would have changed again. In avoiding this, the parts of the organisation in contact with the environment in fact embody a degree of autonomy in so far as they can respond to change as they see fit within set limits. They need to be able to do this for the organisation to remain stable in the face of change (1967: 80-83).

Control, on this understanding, is used as a technical notion that refers to the processes at work in systems that regulate the operations of those systems, through autonomous action. It is not about compulsion or being directed through domination. Control refers to the way in which the parts of an organisation operate autonomously in response to change. It is in this sense, then, that systems and organisations can be said to be self-organising: they control themselves through an arrangement between autonomous parts.

Cybernetician Allenna Leonard puts it well:

> A cybernetic understanding is not that control that is backed up by coercion […] It is the control of a skier going down a hill, of balancing this way and that. Or it is the control of a helmsman steering a ship. The one thing that people do not realize about [cybernetics] is that the control is in each function, not top-down […] That makes cybernetics more of a science of balancing than a science of control. (2013: 16-17)

Similarly, Espinosa et al. write that organisational cybernetics

> helps us […] to create more effective organisation by engaging the energy and intelligence of local constituents in the overall endeavour. The experience of maximum local autonomy is […] one of the logical requirements for ensuring effective organisation. (2008: 642)

In applying these insights to the practical task of organisation, Beer developed a particular model for understanding how organisation works according to cybernetics: the Viable System Model.

The Viable System Model

The account of Beer's Viable System Model (VSM) I present here is based primarily on how he describes the model in *Brain of the firm* (1994 [1981]).[5] The VSM is divided into five levels or systems (see Figure 1 below).

Figure 1: The Viable System Model, showing three System One units (A, B, C) and their interaction with their local niches and one another (1A, 1B, 1C), their coordination under System Two and the strategic alignment of the whole organisation or system at Systems Three, Four (in relation to the whole environment) and Five. The arrows represent flows of information between parts of the model. The dotted lines indicate the two broad sections of the model. (Based on Beer's depiction of the VSM in *Brain of the firm* (1994 [1981]: 128).)

System One

The System One units of the model represent the operational parts of an organisation. The System One units operate on specific tasks within the external environment and have the autonomy to respond to changes in their environmental niches as they see fit.

System Two

The second level is a framework within which System One units communicate with one another and coordinate their activities. As Beer writes, System Two 'exists to provide a local interaction between Systems One of all of the subsidiaries' (1994 [1981]: 165). This affords a minimal level of coordination between System One units but does not provide organisational goals. They 'hunt about aimlessly' (*ibid.*: 129) and as yet there is no purpose or overarching goal to their operation.

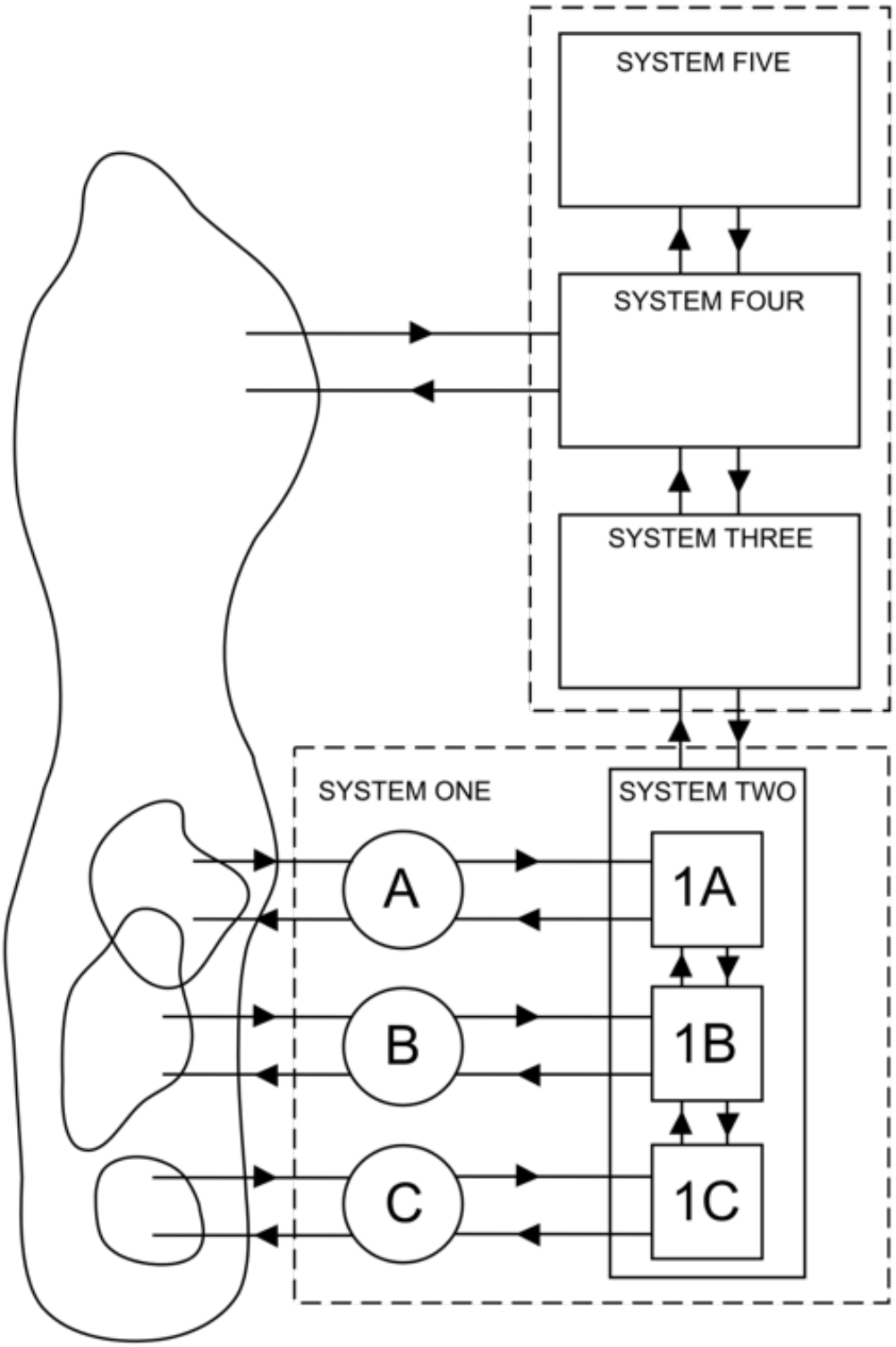
System Three

In addition to the five sub-systems, Beer divides the VSM into two broader sections. From the perspective of a System One unit, this works such that the first, lower part of the system or organisation 'has to do with recognizing that there are other autonomous divisions than my own' while the second, higher part of the system or organisation 'has to do with recognizing that my own autonomous division is part of a corporation' (*ibid.*: 229). System Three is the first level of that second or higher part of the VSM: it regulates the operations of System One units not in line with each other but in line with the goals of the system or organisation of which they are part.

System Four

The fourth level is where the immediate strategy of the system or organisation is developed. It involves those activities that take in information from System Three about how the lower, autonomous System One units are operating as well as information from the environment about changes and fluctuations and how the system or organisation responds to and affects these. In

[5] For supplementary accounts, see Beer, 1994 [1979], 1985, 1989; Espejo and Harnden, 1989; Espinosa et al., 2004; 2008; Leonard, 1994; Medina, 2011: 34-39; Pickering, 2010: 240-256; Walker, 2006.


SYSTEM FIVE
SYSTEM FOUR
SYSTEM THREE
SYSTEM ONE
SYSTEM TWO
A
B
C
1A
1B
1C

addition, it is involved in transmitting information between System Three and the planning and longer-range strategic thinking and decision-making at System Five.

System Five

At the top of the VSM is System Five. This level Beer describes as the 'senior management': 'The direction of the enterprise, with its concentration on where we are going rather than where we have come from, with its foresight that is to say, is the thinking part of the whole organisation' (*ibid.*, 201). This is a rather unfair characterisation as every level of the system or organisation is thinking, but what Beer means is that looking at the system or organisation as a whole, System Five is the part that deals with the long-term planning for the system or organisation.

While a lot more can be said about the VSM, including how it relates to the kind of actual organisations Beer was working with when he developed it, I must leave this discussion for another time. The important thing to grasp from this brief overview is the role the different sub-systems of the VSM play and how they relate to one another. This is of perhaps a level of abstraction many are uncomfortable with, but I will return to a concrete example of what this means in practice below.

It should be noted that the way this operates as a model is different from the notion of a blueprint. Organisation theory in general and Critical Management Studies in particular has shown a scepticism towards blueprints as plans of how organisations ought to be structured, with these plans being applied from above. The VSM, however, is not intended to operate as a blueprint in this way. Beer described the VSM as a 'diagnostic tool' (1994 [1981]: 155) and cybernetician Roger Harnden has similarly discussed its use as a 'hermeneutic enabler' (1989). The point of the VSM is, therefore, not to prescribe organisational structures or practices but to provide the tools those involved in organising can use to better understand the processes in which they are participating. The VSM, rather than outlining the exact structure of a viable organisation is intended to highlight the necessary functions and lines of communication that any organisation, however it is in fact structured, will need to have. In this sense, it is intended as a heuristic of sorts that can assist people in thinking through and responding to questions of organisational structure rather than as a blueprint they ought to follow.

Another point worth covering before moving on is the distinction between description and normativity in Beer's VSM. Beer's account of effective organisation is intended as a descriptive one, in which the functions and lines of communication are defined and made apparent. The normativity of any actually-existing organisational form, according to Beer, comes not from a cybernetic understanding of the functionality of a viable system but from the operation of the organisation itself. Beer notes, for example, that the normative planning and goal-setting happens at sub-system five (1994 [1979]: 354). This is not something built into the VSM as a model but something mapped as a function that will occur in a real-world example of organisation. What the VSM does, through describing effective organisation, is allow those determining the normativity of a particular organisation to assess where different functions should be located and how lines of communication should be developed.

With these brief overviews, both of anarchism and Beer's cybernetics and his VSM, in place, I want to now build on these descriptive openings in order to advance the argument that there is something about self-organisation that cybernetics can tell us that can enrich anarchist accounts

of organisation. First, I want to cover the existing engagements with cybernetics by anarchist writers.

Anarchism and cybernetics

In 1963, the journal *Anarchy* published two papers discussing the relevance of cybernetics for anarchism.[6] The first of these, by neurophysiologist Grey Walter (1963), focuses on human physiology and early robotics and only briefly touches on political organisation. Crucially, however, Walter notes (1963: 89) that examinations of how the brain is organised reveal that 'we find no boss in the brain, no oligarchic ganglion or glandular Big Brother.' He goes on to say:

> Within our heads, our lives depend on equality of opportunity, on specialisation with versatility, on free communication and just restraint, a freedom without interference. Here too local minorities can and do control their own means of production and expression in free and equal intercourse with their neighbours. If we must identify biological and political systems our own brains would seem to illustrate the capacity and limitations of an anarcho-syndicalist community. (Walter, 1963: 89)

This is an instructive passage that is strikingly similar and equally evocative to one from Beer on the form of control at work in cybernetics:

> There is no ultimate ganglion in the brain that tells the nervous system what to do. There is no thermostat anywhere in the body with a marker set at the temperature 98.4°F. And the *Book of Proverbs* reminds us that 'the locusts have no king, and yet they go about in bands'. In short, democratic systems regulate and organise themselves without benefit of dictat or ukase. They do not have hierarchies of command. (2009 [1975]: 25)

While neither Beer not Walter were anarchists *per se*,[7] they both show leanings towards anarchist accounts of self-organisation that draw on the central tenets of cybernetics. The second *Anarchy* paper, written by John D. McEwan (1987 [1963]), goes into greater depth on the relationship between cybernetics and anarchism and is far more explicit in this regard. The starting point for understanding the connection between anarchism and cybernetics is the concept of self-organisation:

> The basic premise of the governmentalist – namely, that any society must incorporate some mechanism for overall control – is certainly true, if we use 'control' in the

[6] While there has been some minimal discussion of anarchism and decentralised organisation in the literature on and connected to cybernetics e.g. that of Angela Espinosa et al. (2008), Maurice Yolles (2003), Ana Paula Baltazar (2007) and, to a limited extent, Humberto Maturana and Francisco Varela (1980), this work does not identify or elaborate on the connections between cybernetics and anarchism that I want to discuss here.

[7] Walter did come from an anarchist family that included his father Karl who attended the Anarchist Congress in Amsterdam in 1907, his son Nicholas who was a leading figure in the anarchist movement in the UK in the 1960s and his granddaughter Natasha who is a prominent feminist writer and activist. Involvement in radical politics seems to have skipped a generation when it came to Grey Walter, although the passage quoted shows that he certainly retained some anarchist sympathies.

> sense of 'maintain a large number of critical variables within limits of toleration'. […] The error of the governmentalist is to think that 'incorporate some mechanism for control' is always equivalent to 'include a fixed isolatable control unit to which the rest, i.e. the majority, of the system is subservient'. This may be an adequate interpretation in the case of a model railway system, but not for a human society. The alternative model is complex, and changing in its search for stability in the face of unpredictable disturbances. (*ibid.*: 57)

Crucially, McEwan addresses self-organisation in much the same way as it was utilised in the work of Beer. Crucial to this is how the technical notion of control as self-organisation links up with the political notion of self-organisation. As John Duda puts it, moving the notion from the technical understanding of early cyberneticians to the social or political notion used by Beer, self-organisation can be understood 'as radical democracy and horizontal self-determination' (2013: 57). McEwan compares his account of cybernetic social self-organisation to a passage from anarchist Peter Kropotkin that speaks of an anarchist society 'which looks for harmony in an ever-changing and fugitive equilibrium between a multitude of varied forces' (quoted in McEwan, 1987 [1963]: 52). Cybernetics and an anarchist vision of society both recognise the complexity and variety that is central to organisations and their environments. Furthermore, both focus on the importance of a constantly shifting harmony achieved through autonomous self-organisation. As Kinna writes of cybernetics (2005: 68), '[i]n contrast to government control mechanisms, self-organizing systems were controlled from within the organism and could respond to their ever-changing diversity.'

This initial affinity between anarchism and organisational cybernetics is made all the stronger when one takes a closer look at how Kropotkin characterises centralised, top-down forms of government as being not only politically and morally objectionable but also ineffectual in dealing with complexity and variety: 'in all production there arise daily thousands of difficulties which no government can solve or foresee' (1927: 76-77). Kropotkin argues that 'production and exchange represented an undertaking so complicated that the plans of the state socialists, which lead inevitably to a party directorship, would prove to be absolutely ineffective as soon as they were applied to life.' As an alternative to centralised attempts at responding to variety, Kropotkin proposes that the workers themselves administer production in an autonomous manner. Political scientist Marius de Geus, who has also highlighted the parallels between Kropotkin's anarchism and what he refers to as 'bio-cybernetics', writes:

> [Kropotkin's] vision of an anarchist society strongly resembles relatively modern bio-cybernetic organizational theories and systems of 'self-regulating' modules. In society there exist basic units (individuals, associations, communes, etc.) which have to possess autonomy, and which can co-operate and federate on a voluntary basis with the other units. (2014: 869)

Colin Ward, one of the foremost anarchist writers in the latter half of the twentieth century and editor of *Anarchy*, notes (1966: n.p.) that '[c]ybernetic theory with its emphasis on self-organising systems, and speculation about the ultimate social effects of automation, leads in a similar revolutionary direction' as anarchism. Ward argues that anarchists as early as Pierre-Joseph Proudhon understood that complexity is central to autonomy (1974: 44). Indeed, Ward writes that

> [h]armony results not from unity but from complexity [...] Anarchy is a function, not of society's simplicity and lack of social organisation, but of its complexity and multiplicity of social organisations.[8] (*ibid.*: 50)

He goes on to claim that '[c]ybernetics, the science of control and communication systems, throws valuable light on the anarchist conception of complex self-organising systems' (*ibid.*).

Unfortunately, this seems to be about as far as the connection between organisational cybernetics and anarchism went.[9] Based primarily on Beer's work it may well be possible to pick up where Ward, McEwan and others left off and show how cybernetics can play a role in an understanding of anarchist organisation. Doing so, I want to argue, will address key gaps in the literature on both anarchism and, in turn, Beer's cybernetics. On anarchism, there needs to be more of an attempt at articulating the detailed dynamics of anarchist organisational forms. On cybernetics, more can be done to elaborate on the radical implications of Beer's work. In responding to the research question set out in the introduction to this paper ('What can cybernetics teach us about how anarchists can and do organise?'), I focus below on the third task of this paper, on how Beer's strand of cybernetics leads us to rethink how anarchists might frame hierarchy in organising and what an anarchism VSM might look like. Through examining these two areas in detail, I hope to be able to begin to explore precisely how engaging with cybernetics from an anarchist perspective might be fruitful and what might be gained in doing so.

Functional hierarchy

What seems to be holding back a productive relationship between anarchism and organisational cybernetics is the hierarchy involved in Beer's VSM. While System One operating units do enjoy a level of autonomous decision-making, and indeed this is essential to responding to complexity, any decisions must be made within the parameters set by Systems Three-Five where the planning and regulation of the whole organisation is of concern. The VSM remains, in how it is presented, a centralised affair, even if that centralisation is of a limited scope. As Beer writes,

> some part of any viable system does what it likes. But of course the autonomous part of the system remains part of the system, and to do that it must take notice of the central regulatory model. To that extent, then, it does what it is told. (1974: 71)

Autonomy for Beer and cybernetics is not based on a 'fanatical love of liberty' (Bakunin, 1972 [1871]: 261) but on the practical needs of self-organising systems: it is an 'effective freedom' (Beer, 1975 [1973]).

For anarchists, hierarchy is a target in so far as it acts to structure and reinforce domination and coercive control. Despite this apparent clash with anarchist principles, the way hierarchy appears in organisational cybernetics should not be seen as necessarily antithetical to the way anarchists view organisation. As McEwan writes (1987 [1963]: 44), 'the usage [of the term "hierarchy"] is a technical one and does not coincide with the use of the term in anarchist criticisms of

[8] Echoing this, Murray Bookchin, while not drawing on cybernetics, writes of ecological stability that it 'is a function not of simplicity and homogeneity but of complexity and variety' (1982: 24). Bookchin uses the term 'cybernetics' but does so to refer to high-technology rather than processes of self-organisation (1985).

[9] See Duda (2013) for a discussion of two other brief and minimal engagements with cybernetics by anarchist writers Paul Goodman and Sam Dolgoff.

political organisation'. To show why this is the case, a distinction needs to be made between two forms of hierarchy: *anatomical hierarchy* and *functional hierarchy*. Like many important ideas, it is small, simple and elegant, and yet it makes a big difference when it comes to an anarchist cybernetic understanding of organisation.

Functional hierarchy has its roots in Gordon Pask's work on cybernetics. Pask writes of the social organisation of the firm:

> (I)magine a busy executive (who acts as an overall controller in the hierarchy) disturbed by *m* callers. Each hour, to achieve stability and get on with his work, he engages a receptionist (who acts as a sub controller) […] The receptionist […] is able to perform the selective operation of prevaricating with callers so that, for example, the one who is welcome each hour is accepted […] In a very real sense, which gives substance to the idea of a 'level', the interaction of sub controllers takes place in an object language (talking about callers), whilst the overall controller has a metalanguage (talking about receptionists). There can, of course, be any number of levels. (1968 [1961]: 61)

While this is framed within a typically-hierarchical organisational structure with an executive and a receptionist, the point Pask is getting at is that the hierarchy is also one of levels of language: the highest level in the hierarchy involves a metalanguage that is used to talk about lower levels, which too have a language to talk about levels lower than them. Although this is clearly a hierarchy such that a level thrice removed from the top, for example, would have difficulty communicating directly with the top and vice versa given the difference in languages, Pask is very clear that this describes a logical hierarchy of orders, not one that is necessarily rooted in a physical or structural hierarchy (*ibid.*: 63). Beer argues similarly and goes so far as to describe hierarchy in systems and organisations as 'a fiction, which may or may not be reified as an organisation or structure' (1975: 130). The hierarchy Pask and other cyberneticians describe is one of higher and lower orders such that decisions, actions, events, meanings, etc. at lower levels are dependent on frameworks set by higher levels. It is a way of understanding different functions within a system or organisation and is not synonymous with any kind of actual structure. Of course, functions may (and often do) operate within a structure, but crucially they can be separated from structure in terms of the roles they play in organisation.

Pask describes the implications of this account of hierarchy for self-organisation:

> each member must have the possibility, however small, of inverting the structure without leaving his niche to do so. I do not mean 'the office boy can rise to be manager'. I mean, 'in some unspecified conditions the office boy can take the managerial decisions'. (1968 [1961]: 111)

Key here is the distinction between the *manager* as a position or office and *managerial decisions* as something anyone in the organisation can in theory take should the situation demand it. Within an organisation, then, two hierarchies operate: an *anatomical* one of positions (office boy, receptionist, manager, executive) and a *functional* one of roles or logical orders (office boy tasks and decisions, receptionist tasks and decisions, managerial tasks and decisions, executive tasks and decisions). The two kinds of hierarchy are quite distinct from a cybernetic perspective.

Anatomical hierarchy refers to what is traditionally understood as hierarchy in political or social organisation; i.e., multiple levels with a chain of command such that each level is subordinate to the levels above it and where the top level has overall control over decision making in the organisation. Functional hierarchy, however, applies to an organisation where 'there are two or more levels of information structure operating in the system' (McEwan, 1987 [1963]: 44). Functional hierarchy involves distinct orders of decision making such that higher order decisions are decisions about lower order decisions. As McEwan writes (*ibid.*), phrasing this in terms of a cybernetic understanding of an organisation operating in an environment, 'some parts may deal directly with the environment, while other parts relate to activity of these first parts.'

Beer is similarly dismissive of the necessity of a hierarchical or centralised structure to how an organisation operates. In the section on the VSM above, I mentioned that Beer divides the model into two parts: one relating to the autonomous operation of Systems One and Two and the other relating to the strategic and regulatory functions of Systems Three, Four and Five. He express his distaste for referring to these two parts as 'junior management' and 'senior management' respectively because of the notion of hierarchy and command this connotes (1979: 130). He rejects the notion that the hierarchy in the VSM is 'equivalent to the political supposition that there must be policy bosses'. Instead, the hierarchical relationship between the parts of the VSM 'is a *logical* relationship, whatever social form it is given' (*ibid.*, italics in original). What Beer means by 'logical' here is that the hierarchy of the VSM is a conceptual prop rather than a concrete, structural aspect of any existing organisations. McEwan makes this same point by distinguishing between two broad organisational functions: (a) 'the complex of actual production tasks'; and (b) 'the task of solving the problem of how the group should be organised to perform these first level tasks, and how information about them should be dealt with by the group' (1987 [1963]: 47). The crucial point to grasp in developing an anarchist cybernetics, and what marks it out as not only subscribing to a functional or logical hierarchy but to an explicit rejection or limiting of anatomical or structural hierarchy, is this: the different levels in the functional hierarchy all potentially involve the very same individual participants.

The radical and potentially non- or less-hierarchical organisational form (less hierarchical, that is, than traditional forms of political organisation like political parties and trade unions), that is common to anarchist politics may adhere to a functional form of hierarchy such that certain decisions are considered to be higher or lower order than others while there are no bodies or individuals that are structurally higher or lower than others. As these are functions or roles as opposed to positions, by switching role depending on the activity at hand, individuals can perform functionally hierarchical tasks while avoiding the institutionalisation of an anatomical hierarchy. This is the concrete promise of anarchist cybernetics and suggests how an understanding of anarchist organisation can be enhanced through an engagement with organisational cybernetics and Beer's VSM.

An anarchist Viable System Model

It ought now to be possible to begin sketching an anarchist Viable System Model. The picture I want to present briefly here is drawn from accounts of the organisational structure of the Occupy camps that took place in public squares across the world in 2011, most notably in New York's Zuccotti Park. Of course, each Occupy camp was different and the extent to which any of them

reflected anarchist principles is debatable (e.g. Gibson, 2013; Graeber, 2011; Hammond, 2015). The intention here, however, is not to argue that the Occupy camps were examples of anarchist cybernetic organisation but instead to take inspiration from some of their practices in describing a potential anarchist VSM. In doing so, the account here is informed by descriptions of Occupy by authors such as David Graeber (2011; 2013), Marianne Maeckelbergh (2012; 2014) and Mark Bray (2013) as well as by movement participants (e.g., Khatib, et al., 2012). Importantly, the way Occupy is described here is not intended to suggest that it was a perfect example of well-functioning radical left organisation. There are important critiques of various aspects of the practices involved in the Occupy movement (as the authors cited above discuss) and what is included here is meant as a framework or vocabulary for thinking about radical left and anarchist organisation and not a comment on the actually-existing Occupy camps.

Neither is the proposal of an anarchist VSM below to be considered as a blueprint for anarchist organisation, something anarchists and other radicals have been frequently opposed to (e.g. Wilson, 2014: 36-42). As noted above, Beer's original VSM itself was not intended as a blueprint but as a heuristic device aimed at helping people work through problems of organisational structure. The anarchist VSM, in so far as it aims to outline some necessary functions and lines of communication of radically participatory and democratic organisation, is similarly meant to help guide an understanding of anarchist organisation without prescribing the precise structure in question. How anarchist organisations look in reality differs greatly from case to case and the anarchist VSM does not suggest they all ought to look identical but rather that they all ought to include certain functions and lines of communication, however these may be realised in practice. The comments below about Occupy, therefore, should be taken with this in mind, not as prescriptions but as examples of how an anarchist VSM could be used to think about organisational structure.

Starting with the System One operational units, then, those parts of the organisation that are tasked with the tactical work of the organisation, these can be seen in the various formal and informal working groups and caucuses as well as in individual activists. These were involved in the day-to-day running of the camps (cleaning, cooking, etc.) as well as planning protests and demonstrations, liaising with the press, organising the camps' own media and many other jobs. These were voluntary organisations and individual activists could be members of different groups. Following the logic of Beer's VSM, System Two would focus on the coordination between these different working groups and would include informal communication (activists chatting over lunch) or more formal communications (in regular working group coordination meetings). System Two is not a structural part of the organisation of the camp but is a function of coordination between System One groups and activists.

As discussed above, the VSM is divided into two sections: the lower part that deals with autonomous coordination and the higher part that deals with framing this autonomous action within the whole organisation. For the anarchist VSM, the higher section would be reflected in the general assemblies that took place regularly in the Occupy camps. System Three involves members of the organisation reflecting on the activities of the working groups in relation to the overall strategy of the organisation. Members of the working groups consider their activities and adjust them if necessary in line with the decided-upon goals of the organisation. Crucially, for an anarchist cybernetics, all activists can, potentially, be involved in the general assemblies and so in these System Three discussions. The same individuals step out of their functional role as working group members and individual activists and into that of reflecting on their practice

within the autonomous groups. System Four involves the same individuals again, and also in the general assemblies, reflecting on their activities and those of the organisation as a whole in relation to events in the outside world. Adjustments to both tactics and strategy can be made in light of changes in the environment of which individual groups might not be aware but of which those present at the general assemblies can collectively inform each other.[10]

The final level of the account of Occupy I'm presenting here is that which is concerned with the strategy and overall goals of the organisation. This is again a level of discussion and decision-making that is, or should be, open to all in the organisation. It is where decisions are made about the objectives and priorities of the organisation and is ultimately what limits the autonomy of the working groups; but again, this is not a limitation coming from a distinct group of leaders but is something that is agreed upon democratically by all members of the organisation (in practice through consensus or high-threshold majority vote).

As discussed above, the essential distinction in the anarchist form of VSM here is that there is a hierarchy in terms of function or logic but not in terms of structure and it is not a hierarchy that issues commands from one group to another group. Rather, decisions are made democratically by all members of the organisation. Limits are imposed on their autonomy but these are limits that are agreed upon together. By making these crucial distinctions and by delving into the detail of how self-organisation operates according to Beer's cybernetics, I have suggested here that we can better understand precisely how anarchist organisation might be better characterised. For anarchism, a prefigurative commitment to radical, participatory democracy is a key element of how organisation should work. Through cybernetics, and the at-first-sight-contradictory concept of functional hierarchy, I have tried to show how such a form of organisation, built around the necessity of participatory democratic control and the demand for autonomy can be thought through in detail.[11]

As with the general discussion of Beer's VSM, it is important here to consider the extent to which the anarchist VSM is descriptive and the extent to which it is normative. While Beer's VSM, as I noted above, is intended as a purely descriptive heuristic tool, with the normativity coming from those using it, in the anarchist VSM the normativity is more central to the model itself. This is because instead of the anarchist VSM being proposed as a general account of the functions and lines of communication in any system, it is specifically aimed at explaining the functions and lines of communication in cases of anarchist organisation. As indicated throughout this paper, this means that the model presupposes a normative commitment to resisting all forms of domination and exploitation and to a radically participatory form of democratic deci-

[10] There was, importantly, discussion in Occupy Wall Street around implementing an additional body, a spokescouncil, that would allow for better coordination between working groups. This would not alter the description of the anarchist VSM in any fundamental way, but would point towards System Three and Four functions being performed in the spokescouncil meetings with delegates from lower order clusters rather than in general assemblies. I leave a more detailed discussion of this change to a future paper.

[11] An interesting and potentially important contribution to this account of control might be made by turning to the work of Niklas Luhmann. Luhmann (2012; 2013) objects to the possibility of external steering or control of systems found in some classic approaches to cybernetics, notwithstanding the focus in cybernetics on self-organisation and self-steering. Luhmann argues that direct, top-down steering is impossible given the complexity of the world. While unpacking the possible implications of Luhmann's work for this anarchist reading of cybernetics is beyond the scope of this paper, the way I have characterised self-organisation here and the notion of anarchist cybernetics more generally may benefit from future examination of Luhmann's position on steering and indeed on systems and organisation overall.

sion making. This key difference between Beer's VSM and the anarchist VSM, therefore, comes down to the normative running side-by-side with the descriptive in the model. Rather than focussing purely on effective organisation (the descriptive element of the VSM) and leaving the ethical and political commitments (the normative) to those using the model, the anarchist VSM involves both effective organisation and ethical and political commitment as central drivers of the model.

This meeting of anarchism and cybernetics is perhaps presented as being somewhat neater than a complete overview, more complete than I have been able to provide here, of the tradition of cybernetics might suggest. While, as I have highlighted, there are several points of contact where the understanding organisational cybernetics provides can help advance anarchist accounts of organisation, it should be noted that this is undoubtedly a partial reading of cybernetics and does not take into account the full range of complexity present in the field. It is perhaps no surprise that, with the potential exception of Walter, none of the cyberneticians discussed here were drawn to the participatory democratic practices of anarchism during their lifetimes. True, many were involved one way or another in radical experiments in art, robotics and computing (see Pickering, 2010), but on the whole their politics did not, explicitly at least, stretch beyond a social democracy infused at times with counter-cultural extravagance and spiritualism. At times, the politics of cybernetics spun in quite the opposite direction. Friedrich Hayek, for example, showed an interest in cybernetics in the 1950s and 60s (e.g. Hayek, 2013) and while he never developed this in his work, the notions of complexity and self-organising systems (self-organising through competition rather than cooperation) did influence his account of the free market as a tool for allowing order to emerge from chaos (Cooper, 2011; see also Gilbert, 2005). However, rather than show a direct correlation between all elements of the cybernetics tradition, or indeed even all elements of Beer's work, my aim here has been to point towards some specific insights into self-organisation found in cybernetics that, when elaborated in a certain way, with an attention to limiting authoritarian, top-down control, can be fruitfully brought into conversation with anarchist political theory and practice. Before concluding, I want to turn to a potential critique of this approach to understanding anarchist organisation that potentially calls into question the very foundations of the relationship between cybernetics and anarchism.

Responding to the CMS critique of cybernetics

Much of the response to cybernetics in CMS has centred around rejecting it as a functionalist approach to social organisation. Gibson Burrell and Gareth Morgan (1979) define functionalism according to, firstly, a positivist ontological position that views reality as an objective phenomenon that can be accessed directly through detached, scientific observation and, secondly, a commitment to 'social engineering as a basis of social change'. 'It is concerned,' they write, 'with the effective "regulation" and control of social affairs' based on maintaining an equilibrium or status quo (*ibid.*: 25-26). The critique of cybernetics in the CMS literature focuses on the perceived goal of designing organisational structures according to an objectively true model of how organisations achieve stability and meet set aims. As Hugh Willmott argues, cybernetics is as a 'comparatively sophisticated example of knowledge guided by a technical interest in prediction and control' (1997: 323). This critique is raised outside CMS by Werner Ulrich (1981) who, in reflecting on Beer's economic planning work in Chile with Project Cybersyn (Medina, 2011),

highlights the way in which a group of technicians was able to design a communications network that reduced the scope of agency in decision making for workers in factories and managed their activities through commands that came from a centralised control room. 'As an action system', he stresses, 'Cyberstride [the Project Cybersyn computer programme] can impose its autonomy on the allegedly autonomous decision makers' (*ibid.*: 52).[12]

Ulrich goes so far as to describe this approach to knowledge and control as 'managerial fascism' (*ibid.*: 55, following Ivan Illich) and Andrew Pickering writes of how it conjures up 'the spectre of Big Brother' (2010: 31). To the extent that cybernetics can be put to work in an account of anarchist organisation, then, the critique of it as functionalist seems to throw up a serious obstacle. It could well be argued that the anarchist VSM is a prime example of an attempt by someone with (the pretension of) expert knowledge to define a model of organisational structure that should be applied by activists if they want to be successful in achieving their aims.

On the two constituent parts of the CMS critique of cybernetics as functionalist, a response from within cybernetics can be attempted. Rather than being founded on a positivist view of reality and scientific observation, the second-order cybernetics of Beer, Pask and others (see Scott, 2004) has, according to Pickering, more in common with social constructionism and 'a vision of knowledge as *part of* performance rather than as an external control of it' (2000: 25, italics in original). If knowledge is socially constructed and based on subjective interpretation rather than objective observation, and is an active part of doing rather than simply of knowing in a detached way, then the charge of social engineering too has to be reconsidered. Firstly, the knowledge involved in this strand of cybernetics is a knowledge accessible to and held by participants in a certain practice rather than external observers. Secondly, the application of this knowledge is not from the outside and top-down but from within and bottom-up: the participants in a practice apply the knowledge themselves in deciding how to act. This is not to say that that knowledge and the process of performance can never be captured by centralised, top-down structures and processes, but it does reject the assumption that such a centralisation of top-down command is *necessarily* a part of how cybernetics understands organisation. For cybernetician Ernst von Glasersfeld (1991), this 'radical constructivist' approach to cybernetics is less about the top-down control that anarchists are opposed to and more about helping people navigate experiences, practices and relationships.

How then should the anarchist VSM be understood as something applied not by external, detached technicians of social engineering but in a radically democratic and participatory process of socially constructed knowledge used by participants of organisational practices? The key here is to take seriously Beer's description of the VSM as a 'diagnostic tool'. The VSM, as the discussion above pointed out, is not to be considered a blueprint for organisation but should instead be thought of as a guide for identifying important roles, functions and lines of communication. Beer's contention is that however an organisation looks to its members, it will, if it is to be effective in responding to complexity, involve the functions identified in the VSM. Highlighting these functions may allow those inside the organisation to point out where breakdowns in communication or threats to decentralisation, for example, happen and the effect they have on the organisation. The VSM helps explain this and can be used in responding to problems within the organisation, but it does not necessarily dictate how the organisation should be structured. This,

[12] For similar critiques, see Medina (2011: 191-192), Kline (2015: 241), Tiqqun (2010) and The Invisible Committee (2014).

however, raises a further question. If the VSM is not a model of organisational structure, what is specifically anarchist about anarchist cybernetics? Why is it not just an application of cybernetics to anarchist organisation that operates in the same way as its application to any other kind of organisation?

While cybernetics underlines the benefit of decentralisation and functional hierarchy in terms of effectiveness in responding to complexity, something anarchist such as Kropotkin prefigured, anarchism adds to this the political or normative importance of decentralisation. For anarchists, decentralisation is not only praised because of its effectiveness but also, perhaps more importantly, because how it supports the political principle of individual and group autonomy and freedom. Duda (2013: 64) describes the cybernetic approach to anarchism of McEwan as 'a shift away from a moral vision of anarchism, outraged at the scandal of domination' towards a paradigm focussed on the 'superior productivity of anarchist organisational methodology', but I would suggest that it in fact tries to show that anarchism trumps top-down government on both counts, without prioritising one over the other. This crucial element of anarchist cybernetics additionally helps in articulating a non-functionalist approach to cybernetics. While the functionalism critique holds that cybernetics is essentially focused on top-down social engineering, an anarchist cybernetics, with its commitment to decentralisation and self-organisation as radically democratic principles, rejects such an authoritarian imposition. Instead, the insights gained from an application of an anarchist VSM to a particular organisation would be acted on in a democratic and participatory way.

Conclusion

The purpose of this paper has been to propose an anarchist cybernetics, as a way of answering the question, 'What can cybernetics teach us about how anarchists can and do organise?'. Cybernetics, specifically the work of Beer on the Viable Systems Model (VSM), details an approach to organisation that involves concepts of autonomy and self-organisation. For this reason, it was attractive to anarchists in the 1960s and 1970s. These germs of an anarchist engagement with cybernetics were, however, never developed and up until recently there has been little discussion of the connections. A return to these initial anarchist engagements with cybernetics suggests that bringing it into debates around alternative and radical organisation can be fruitful. Critical to such an attempt should be a development of the idea of functional hierarchy, introduced by cyberneticians such as Pask and Beer and made explicit in relation to anarchism by McEwan. The anarchist cybernetics and the alternative version of the VSM presented here are intended as the first steps in doing just that. By articulating the hierarchy in the VSM as a functional hierarchy of roles and tasks, organisational cybernetics has something to offer anarchist theory and practice in terms of a way to better understand the dynamics of non- or less-hierarchical organisation. This contributes to emerging work in anarchist studies that recognises the limits of anarchism (Wilson, 2014) and focusses less on the rejection of hierarchy in all its forms and more on an opposition to domination as a core aspect of anarchist politics (Prichard and Kinna, 2016).

This is not to say that there are not a range of problems that need to be brought into any further conversations around anarchist cybernetics. Some of the central ideas discussed here, such as hierarchy and autonomy, may well be far more complex than their treatment here may suggest (e.g., Böhm et al., 2010; Bookchin, 1995; Freeman, 1972; Wilson, 2014). Work in anarchist

studies and CMS, as well as reflections from social movement participants, that problematises some of the foundational elements of anarchist and radical left organising needs to be addressed. More importantly perhaps, it remains to be seen how anarchist cybernetics might operate in activist contexts. Central to this would need to be an appreciation of intersecting oppressions and exploitations such as those that are constitutive of and target class, race, gender and sexuality, and the resistances to them that were a central part of the Occupy example I drew on here. Overall, however, an engagement between anarchism and cybernetics may have the potential to advance understandings of key aspects of the organisational dynamics of anarchist and radical left social movement organisation, as well as provide a contribution to anarchist and radical social movement praxis.

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