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The Accidental Topology of Digital Culture: *How the Network Becomes Viral*

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Introduction: ***The Essence, the Event and the Accident***

> It is well known that the Internet itself, perhaps the centrepiece of techno-boosterism today, emerged from the military's attempts to develop secure means of communication amongst its members.
>
> —— Robins and Webster, *Times of The Technoculture* 150

> In the United States, the Pentagon, the very originator of the Internet, is even talking in terms of a "revolution in the military" along with a "war of knowledge", which might supersede the war of movement in the same way as the latter had superseded the war of siege… This will be the great accident of the future, the one that comes after the succession of accidents that was specific to the industrial age (as ships, trains, planes or nuclear power plants were invented, shipwrecks, derailments, plane crashes and the meltdown at Chernobyl were invented at the same time too...)
>
> —— Paul Virilio "Speed and Information: Cyberspace Alarm!"

In the 1990s a number of authors argued that the essential qualities of digital network culture were to be found in the militarised objectives of the cold war (Robins and Webster; Wise). Many pointed to the central role of DARPA (the US Defence Department Advanced Research Projects Agency) in the early design of a distributed model of communication intended to withstand military attack and claimed it fashioned the ideological identity of the Internet. A few of these authors went on to describe how network culture itself is characterised by a dystopian, panoptic expression of militarised, cybernetic power; a culture symptomatic of the victorious spread of post-cold war capitalist sovereignty (Robins & Webster 111-130; Virilio). However, by the end of the decade, researchers working in the field of complex network theory discovered that the Internet's topology had mutated into something quite different from what had been predicted by this particular analysis of capitalist network power. They found that the hypothetical *robustness* of the network, which purportedly emerged from its highly redundant distribution and random connectivity, is actually countered by increasing network *vulnerability*. In fact, researchers working in this field went on to argue that it is an enduring myth of Internet history that its topology was ever designed to simply survive a nuclear attack (Barabási 144; Buchanan 78-82). Their opinion on this matter is very well supported by the testimony of the often-cited engineer attributed with the design itself. In a recent interview, Paul Baran argues that "roadblocks" set up by the telecoms monopoly AT&T prevented his work for RAND on distributed networks from being fully integrated into the ARPANET project (Brand). According to Baran these obstacles arose from the failure of communication engineers to fully adapt to a new paradigm in technology. Subsequently,

the implementation of packet switching into the fabric of the ARPANET project went ahead free of Baran's full set of proposals, including a stipulation of a highly redundant and robust topological design similar to a fishnet (see figure 1).

Figure 1 *Baran's feasibility study for RAND determined that a distributed network was the most redundantly connected topology and as such a robust defence against targeted attack. "The enemy could destroy 50, 60, 70 percent of the targets or more and it would still work" (Baran interviewed by Brand).*

In effect, rather than being the outcome of an essential military design, the dynamic growth of the Internet arguably reveals a haphazard *becoming* involving unanticipated future *events* and *accidents*. These include Baran's misplaced plans and feasibility studies; obstructions caused by the failed relations between agencies such as the telephone monopoly, the military and its allies in research and development. But topological change has also occurred in conjunction with an open-ended technosocial involution, which exhibits spontaneous and emergent properties. In other words, the network has coevolved as much by way of the event and accident as it has by intentional design. Yet, arguably, the nature of these digital events and accidents is not best captured by the "generalised kind of accident," which Virilio situates as the cataclysmic *accident of all accidents* – aka Virilio's doom laden Information Bomb that outshines even Chernobyl (*Speed and Information*). On the contrary, vulnerability brings into play anomalies such as unexpected glitches or often-unwanted digital by-products and junk (viruses, worms and spam). These are not necessarily substantial accidents, but instead unsubstantial by-products of a largely *unessential* network milieu.

Importantly, recent maps presented by complex network research demonstrate how the evolution of the Internet and the World Wide Web has led to a topological milieu in which future events and accidents are not simply determined by past identities, but instead emerge fractal-like from heterogeneous and morphogenetic processes (Faloutsos et al; Barabási). In fact, the role of events and accidents in transformational processes is starkly drawn into focus by Massumi's example of the generation of a fractal pattern, which initially works on the principle of self-similarity (*A User's Guide to Capitalism and Schizophrenia*). Each transformation, for example of a snowflake, operates on symmetrical levels of repetition (an ideal event). However, if future events or accidents are introduced they will cause the pattern to deviate. In this sense, we can understand network accidentality as instability in a complex system, or a thing on the verge of change. [1] Certainly, the transformation of digital networks has produced a very different topology to the fishnet design anticipated in Baran's work for RAND in the early 1960s. In its place, researchers have found a far-from-random topology that exhibits a decentralised, clustered and highly vulnerable pattern of complex connectivity (see figure 2).

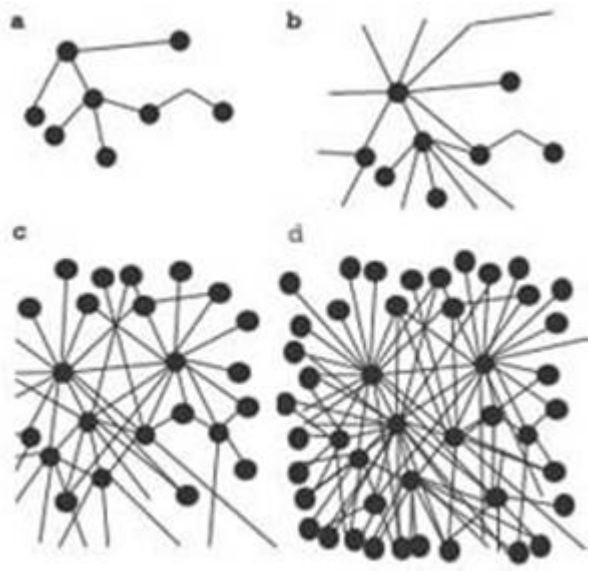

Figure 2. *The nodes of a network are not given - they grow (Barabási). Starting with a smaller number of nodes (a) and developing links over time (b & c) older nodes in the network become vulnerable hubs or clusters (d). This means that targeted viral attacks can spread from a hub to infect the entire network.*

In light of these new maps of the dynamic evolution of the network this article argues that we can better grasp the composition of what appears to be an increasingly accidental topology, and thus enhance our understanding of what constitutes digital network culture. In fact, contrary to those authors who have pointed to the cold war origins of the Internet (a manifestation of network power) as an *essential* property that seemingly structures network identity, this article explores the role of the *unessential* in the open-ended evolution of network culture. By doing so, the author sets out to challenge the causality afforded to essences by considering the role of unforeseen emergent properties and the mode in which the action of future *events* and *accidents* can inversely impact upon the unity of network identity. The article initially situates vulnerability as an unforeseen emergent property, which destabilises the assumed robust unity of digital networks. It argues that these topological properties are actualised in the symbiotic interactions between capitalist network power and a complex and collective social multiplicity – a collectivity Hardt and Negri have termed the *multitude*, which is a social concept discussed further in the next section. For now though it is enough to say that these interactions are part of a process in which the heterogeneous material and expressive component parts of a technosocial assemblage relate to the whole network, and sequentially, how the network then relates back to the component parts, producing new territories and capacities. Therefore, importantly, as well as the planned events involved in the process of change, there are the subsequent accidents and deviations, which over time can also interface with the assemblage - decoding, deterritorializing and transforming its topology in novel ways, both in terms of enabling and limiting affects. In fact, it is the emergent topological properties and subsequent events that seemingly trigger the anomalous future events and deviations of network culture, such as viral contagion and spam pollution. Consequently, events and accidents are as much a part of the network as the ideal events of its militarised history.

The article follows a methodological tradition set out by those who have drawn on the concepts of Deleuze and Guattari to explain the capacities of the digital topology (Burnett). However, it is argued here that it is simply not enough to describe the network as rhizomatic in terms of it being a freely democratic model of communication opposed to the authoritarianism of the book and other forms of mass media. While it is nonetheless true that in rhizomatic mode the network is devoid of a sole commander-in-chief, and consequently its evolution does not emerge from well-defined centres, in a further mode its lines of flight are arguably constrained to both the discursive forces of control and a nondiscursive mode we might term a *collective coherence*. In the first mode, the planned robustness of the network has been fundamental to the

deterritorialisation of capitalist production, and the subsequent shift of work practices from the assembly lines of the factory to the virtual "social factory" (Terranova 73-75). In this way, capital has grossly extended the boundaries of machinic enslavement by incorporating free labour into the construction of networks. Yet, in this further mode, network power is transformed by its symbiotic interaction with a social multiplicity. As figure 2 illustrates, one outcome of this interaction is topological clustering, which leads to a vulnerability in the network that escapes direct methods of control, forcing capital to respond to unexpected topological events.

There are, nevertheless, other significant Deleuzeguattarian concepts that can help us to understand how the network has become viral. As such, the article introduces assemblage theory [2] as a way to consider how these events emerge in what is termed a *machinic universe* or *ecology of machines*: a conceptual spatiotemporality that arguably better explains the accidentalness of the network, as well as the transformation of the aforementioned panoptic tendencies of cybernetic power.

Conceptualising the Digital Accident: *From the Panopticon to Assemblages of Control*

The topological maps produced by complex network research demonstrate how an inherent robustness still exists in the digital architecture (Faloutsos et al; Barabási). It is not as redundant as a distributed network, but the fractal interconnection of disproportionately linked hubs certainly outperforms a centralised topology (Baran). Along these lines, network power is not only resistant to random attack, but arguably remains a very effective adjunct to the goals of flexible, globalised capitalist production. By dispersing the labourer into a networked factory located in the global outsourcing of call centres and the tendency towards remote working practices, capital has successfully weakened worker bargaining power and increased the mobility of market forces, while at the same time centralising managerial control (Hardt and Negri, *Empire* 294-300). In addition, network power retains traces of the panoptic qualities located in the 1990s. For example, the digital topology enables the efficient diffusion of transactional surveillance software, such as cookies, bots and data-mining programs, which are ideal for the management of the productive and reproductive flows of info-capital. Yet, this mutational panopticon is no longer simply an *all seeing eye*, but has become a complex sensory information network that extends its mode of control profoundly into the social field. By way of this extension, its topology is becoming increasingly organised around the intensive flows generated by the collective actions of its users. In other words, network connectivity becomes highly sensitised and responsive to the interaction it has with a social multiplicity. Indeed, as the maps produced by the Faloutsos brothers and Barabási clearly show, this interaction also leads to the formation of vulnerable clusters or hubs that ensure that the distribution of network power functions in a highly unstable environment, and subsequently becomes open to digital anomalies and targeted attacks from disruptive information flows like viruses, worms, spam pollution and technical glitches.

Along similar lines, Barabási, a complex network theorist, has hypothesised that these highly susceptible clusters come about because of a process of what he terms *preferential attachment* (152-153). Simply put, this involves the haphazard interactions users have with a network emerging as a collective and coherent pattern. Following his extensive mapping of the World Wide Web, Barabási hypothesises that collective design (at the application level) may come about because human designers (and automated systems) tend to link to more established nodes in the topology. In other words, a *collective choice* is made to connect to nodes that are older or have more favourable ecological conditions. For example, popular and well-established sites like *Google*, *Amazon* and *Wikipedia* become hubs. Similarly, he suggests that the clustering of Internet nodes arises because of attachment to preferred routers that offer more bandwidth. However, it is important to note that the concept of attachment is complex in nature. Unlike the Web, the connectivity of the Internet (the physical infrastructure) is more likely to be *distance-dependent*. This is a twofold constraining factor. Firstly, the economic cost of laying cable is considerably

more than the creation of a HTML hyperlink, and secondly, routers will almost certainly populate areas where the social demand makes it economically viable for their existence. Significantly, networks are not simply composed of technological nodes and circuits, but also incorporate the actors of the socioeconomic field into their machinic functioning. In fact, the outcome of preferential attachment is that network growth tends to be skewed (scale-free) rather than equally distributed - approximately 20% of nodes have 80% of the links (Barabási 65-78).

Nevertheless, this is a digital divide that is not reducible to one or two ideological voices or structural regularities. On the contrary, this undemocratic milieu does not simply emerge from the constraints imposed upon it by the hegemonic forces of capital, but instead coevolves within the coherent hum of nondiscursive collectivity. In other words, it becomes open to a technosocial multiplicity of unpredictable events rather than structure. It is therefore a mixture of controlled events (stability) and an uncontrollable accumulation of deviating future events and accidents (instability) that enable and limit the free action of the network, and subsequently reduce the explanatory power of a distinct model (including the rhizome) to describe the network experience as a whole. Instead, the interaction between network power and the electronically connected social multiplicity tends to make the network a territorialised and deterritorialised spatial composition; it is both arborescent and rhizomatic; striated and smooth; state machine and nomad. What is important here is that as a description of the social we also avoid the macro-functionalist tendencies of sociology and all of its references to the unity of the social as analogous to an organism. Networks are different. Control, in this sense, contends with the social emergence of acentred multitudes (Terranova 115). This multitude, according to Hardt and Negri, is unlike "the people" or "the population" which are often reduced to identities or unities. Equally, the multitude is not the same as the "crowd," "the masses" or "the mob" that can appear to be "incoherent, anarchic and indifferent." In contrast, the multitude is "an internally different, multiple social subject whose constitution and action is not based on identity or unity (or, much less, indifference) but on what it has in common." Hardt and Negri argue that capital endeavours to imprison the flesh of the multitude into the body of global processes of capitalist production, but this imprisonment tends to lead to the development of a "productive figure" that can "move through network power and come out the other side, to express itself autonomously and rule itself" (*Multitude* 99-102).

There have been efforts made to *tap into* this volatile relation between the digital expression of network power and the multitude. Described by Terranova as a potential mode of *soft control*, the "wildest" expressions of self-organising network computation (genetic algorithms) attempt to "hack the multitude … at its most fluid and least stratified" (130). However, Terranova's notion of network culture equally emerges from an unstable expansion of nodes and links involving a vast layering of network machines, connected by continuous technosocial negotiations over the incompatibility of protocols (59). It is perhaps the instability produced by the "interconnectedness of the whole [network] space" (153) that pushes the network to a bifurcation point, after which it becomes a perfect medium for both the circulation of *friction-free* capitalism and an array of non-capitalistic and disruptive flows organised around the nomadic practices of pirate enclaves and virus exchanges. Conceivably, this emergence further constitutes a new networked militancy; an "agent of biopolitical production and resistance against Empire" (Hardt and Negri, *Empire* 411). This is what has been described elsewhere as a potent autonomous zone, a pirate utopia evidently "at war with all governments" (Bey 402). It is, of course, important to remain cautious of the power attributed to such groups and clearly position their role in the discourse of fear and panic drummed up by the antivirus industry (Parikka "Digital Monsters, Binary Aliens"), but viral vulnerability is, without doubt, an increasing reality of network culture.

Let us now move on to consider the application of assemblage theory as a way of understanding the role of events and accidents in the topological interaction between network power and the multitude. To begin with, we need to look at two significant concepts. Firstly, *concrete machines* or

assemblages. In his analysis of Foucault's *Discipline and Punish*, Deleuze describes the prison, the school and the factory as concrete assemblages (37). These are panoptic mechanisms, techniques, and functionalities. But it is important to note that this does not reduce the panoptic concept to a single machinic architecture. On the contrary, it is a machine function; it disciplines, it educates, and it leads to the production of more machines. But Foucault's *concrete* is integrated with the docile bodies of the prisoners, the pupils and the factory workers. By way of comparison, we may consider that the concrete assemblage of the digital network, which is often regarded as a functioning composite of technical machines, also acts in relation to a significantly broader concept of network architecture and content-output functionality. In this way, it is fabricated from various coders, codes, human and non-human nodes of exchange, links, routers and a fuzzy distinction between flexible centres and the margins of the network itself.

Understood as a machine, the concrete assemblage of the network must also have a finalising function: through a generative phylum of code production, it brings together more machines. However, this is not a function of a singular mechanism of production. It must be remembered that machines are always related to other machines in the production and reproduction process (Deleuze and Guattari, *AntiOedipus* 36). They are an assemblage of material and expressive components engaged in social, cultural, political and technologically driven interactions. In other words, a multitude (including producers and consumers, net-slaves and net-pirates, virus writers and antivirus communities) *comes together* within the circuitry and information flow of the network milieu in order to produce. This is something like the diagrammatic relation that leads to the production of the docile bodies of Bentham's prison, as they become part of the architectural design and function of a power machine, forming a biopolitical concrete assemblage of domination in relation to the cells and the central tower of observation. And it is therefore, arguably, this process of *coming together,* or the *actualisation* of a concrete assemblage, that best defines the network.

This brings us to our second concept: the *abstract machine.* This is a map or diagram installed inside the various concrete assemblages. In this way, an abstract machine - a diagram of the *matter-function* or material functionality of the network in this instance - assembles together functions and materials, which are incorporated (installed) into the various concrete assemblages. Of course, not all concrete assemblages relate to an exact diagram. Some act as meeting places, points of exchange in a circuit, but all have a history of diagrammatic change (Deleuze 23-44). In other words, unlike static representational maps, these are maps of intensity. Indeed, this diagrammatic change is observed in the haphazard augmentation of Internet history described above. This is a history that is, after all, not constrained by unchanging events. Abstract machines are diagrams that *coordinate* the actualisation and functionality of concrete assemblages, but significantly they will never guarantee precisely how an assemblage will come together; events, accidents and multiplicities will always produce deviations. Guattari describes how the relation between abstract machine and concrete assemblage "functions as an interface between actualised registers of discursivity and non-discursive Universes of virtuality"(*Chaosmosis* 27). In other words, how the most deterritorialised aspects of the diagrammatic relation (including the accident) *takes control* of the most territorialised strata.

The panopticon is an example of a diagram that produces such an interface. It brings together the component parts of a disciplinary machine that exists in the functions of prisons, schools, factories etc. Likewise, the network brings together (assembles) functions such as information flow, interaction, association, attachment, as well as the widening dispersal of machinic enslavement. Yet, significantly, like prisons, schools and factories, the network does not always behave in a predetermined mode. There are the anomalous overflows of production: the future events and accidents. There are the viruses, the worms and the security hacks, just as there are the prison riots, the school truancies and the actions of industrial saboteurs and Luddites. As Guattari argues, machinic "functional identity" is never entirely guaranteed, "the wear and tear, accident,

death and resurrection of a machine … are part of its destiny" (41). Continuous breakdown of the concrete machine will "demand a renewal of its material components." Indeed, these breakdowns are often the outcome of accidents that tend to draw upon the collective energy of the components of a machinic assemblage – sapping its power. For example, computer viruses are very good at harnessing the collective processing power of a network. In this way, the new field of digital epidemiology has revealed how one infected node can repeatedly spread a virus to many clusters without having to reach an epidemic threshold (Pastor-Satorras & Vespignani). In practical terms this means that the net-slaves and net-managers (both human and robot) have to take part in a constant process of maintenance, conservation and repair. That is installing security patches until viral breaches have been thwarted, downloading viral signature updates for antivirus software, filtering endless flows of spam and generally reconfiguring machinic components so as to avoid programs that divert the machinic expression of their host machines. However, it must be said that these reactive antivirus programs and cranky spam filters have had minimal impact on the exponential increase in anomalous clutter and superfluous viral messages. Network identity is, it seems, wide open to the instability caused by the multiple flow of these viral events and accidents.

There are of course those who have tried to understand the identity of the viral digital networks by recourse to metaphor, signification and resemblance (Lupton; Flanagan; Cubitt; Sim). But these humanist perspectives do little more than reproduce the biologically inspired analogies that the antivirus industry uses to effectively scare net-slaves into buying costly hygiene products (Sampson "A Virus in Info-Space"). The use of the analogy with viral disease reveals interesting relations running between the various diagrams of biological, technological, cultural and marketing viruses. Yet the often-conservative approach to technology encountered in cultural studies tends to focus on what is understood as the increasing autonomy of the technical machine to the detriment of the human spirit - a dialectical struggle between Self and Other. Arguably, these authors underestimate the ongoing process of the machinic enslavement of a social multiplicity, which has more to do with extending production and profit deeper into the social field than it does with human expulsion. Indeed, Guattari makes a useful distinction between the humanised processes of signification, in which meaningful codes and metaphors derive directly from the human's working relation to technical machines, and the basis of *machinic thought*, in which the abstract machine is a diagram that also contains *asignifying* expressions – equations, plans, diagrammatic capabilities (36-37), and we might add, future events and accidents. In the former mode, humans tend to consider themselves somehow outside of the machine, but in this latter sense, everything is within the machinic ecology. Therefore, we are not so concerned with the foregrounding of dialectical ideas or derived human experience (surface effects) as much as we are with the *real* process of movement from *maps of intensity* to a concretised matter-function.

Beyond theories of resemblance then, technologies (both old and new) can be understood as designed by both semiotic patterning and diagrams of asignification. For example, let's compare the information network with the canal lock. The lock is a device designed to enable a boat to travel up a canal. On the visible surface, it is an apparent human endeavour to reverse the essence of nature, and supposedly impose human technoculture on the waterway. This is the surface effect of the technical machine; an effect drawn from the most detectable of its essential qualities. However, studying a lock's diagram more closely reveals a less than visible apparatus, which works meticulously to the dynamic overproduction of water flow. In itself this has nothing to do with the semiotic encoding of technoculture, or for that matter, the command or *setting-upon* of natural essences, as Heidegger would have it in his *Question Concerning Technology.* But instead, the lock follows virtual diagrammatic forces that exceed human signification since the flow of water is an intermediate determinant of its function. The lock is therefore a concrete assemblage that functions according to the rules of an asignifying diagram of water flow, as well as the human derived semiotic experience of the machine. Often it is only when accidents occur that we *see* the true power of asignifying forces and the abstract diagram is revealed. For example, this

might follow the technical failure of a weir to control the overflow caused by mechanical error, or even human sabotage leading to a deviation, a loss of identity and potential death. This is a point of technical breakdown admittedly understood by Heidegger (Parikka "Viral Noise"), but more so in terms of the revealing of the machine's essence, rather than an outcome of the becoming of a machinic assemblage as it connects to other universes of potentiality.

Network Power: ***Events, Accidents, Capture and Escape***

> Through an effective feedback loop and short-circuiting of disruptions and interruptions, threats of capitalism are turned into general fears and risks, which in turn are translated into consumer products that aim to control that fear and deliver safety. In our case [the computer virus], this refers to the complex discourses and practices of anti-virus software and digital security policies. The truly responsible user is one who takes care of herself and her loved ones by protection – and, as it happens, an influential part of the protection comes in the form of commodity products. (Parikka "Digital Monsters, Binary Aliens")

There are a few parallels that can be drawn between the accidents of the industrial age and the productive overflows of the post-industrial network. For example, Parikka suggests that computer viruses can be understood as "*accidents*" of a "techno-capitalist culture," those "unwanted bads" that are a by-product of the post-industrial culture of production. Yet, significantly, he argues that capital is learning to cope with its accidents. Parikka describes capital as a machine of *capture* (following Deleuze and Guattari, *A Thousand Plateaus* 424-473). It pulls the anomalous viral flows into its own concrete machinic assemblage, and in doing so, produces a surplus value from the production of antivirus hygiene products. Indeed, we might further argue that the panoptic mode of the state-capital machine has shifted from a mode of surveillance to a mode of capture. In this vein, Hardt and Negri argue that the network no longer simply orders a disciplinary space of production, but in its network mode capital has had to develop a method of control that manages a machinic space of multiple flows (Hardt and Negri, *Empire*). In this way, the overcoded triumph of the global networks of capitalist-state sovereignty conceals a pressing need to *capture* the counter-flows; events and accidents that emerge from the ongoing crisis between capitalism and its interaction with the multitude.

Yet, it is significant to note that the process of capture does not mean that capital has been able to simply absorb and destroy its accidents. Certainly not – the state apparatus of capture depends entirely on the successful incorporation of smooth flows into the service of its machine and its subsequent capability to maintain a good level of service for its capitalist allies. The circuitous welding of smooth flows to rigid centres of state striation has been fundamental to network power. Crucially, capital no longer has a need for modes of opposition, isolation and purification encountered during the cold war period, but instead it "thrives on circuits of movement and mixture" (Hardt and Negri *Empire* 199). The material walls of its prisons, schools and factories are increasingly torn down to allow the deepening dispersal of the inclusionary functioning of intensive network power into the social field. In other words, the disciplinary spaces described by Foucault have extended in all directions of a social assemblage, which accommodates the evolving diagram of control. Nevertheless, not all of its accidents are successfully captured in this way. Indeed, like the prisoner who successfully jumps a security fence, the soldier who goes AWOL or patient who absconds, computer viruses and worms (digital accidents) continue to evade the firewalls and escape the process of capture.

In this light, we may wish to once again return to the rhizome concept and consider digital accidents as nomadic war machines. To be sure, despite their bellicose name, war machines do not primarily set about a violent course of action against the state machine. On the contrary, because a nomad has no real need for the state, it only truly comes into violent conflict when the state

attempts to put it to work for the *common good* of state functionality and identity. It is the disconnection from its own mutational flow, and the subsequent reconnection to the services of the state machine that defines the war machine's loss of power (Deleuze and Guattari, *A Thousand Plateaus* 230). Therefore, state intervention into a nomadic science, like virus writing, only becomes a confrontation when the counter-machine fails to control its own mutation. There comes a point in this moment of capture in which a nomad science is arguably driven to insurgency. In this way, the early history of computer viruses and worms cannot be compared to the Luddite's clog thrown into the gears of an industrial machine. This is not a history of oppositional militancy after all. On the contrary, the immanent reproduction of the viral event, and its subsequent deviations are best seen in the experiments carried out in the labs of The Xerox Palo Alto Research Centre in 1978, in which scientists lost control of a replicating worm (Shoch and Hupp). This well-documented accident, and others like it, transformed future experimentation into a marginal science, a game, a prank, and over time translated it into a malicious warhead requiring new measures of control.

Before concluding this article, it must be stated that this war machine hypothesis rests entirely upon two contentious lines of argumentation. Firstly, Moulthrop claims that the computer virus is *No War Machine* since it originates from "inside" the logocentric and performative systems of the state machine (1991). A point arguably rendered superfluous, since the diagrams that coordinate the assemblages of the state and the war machine can no longer be considered in terms of a distinctive *inside* or an *outside*. It is *within* open network space that both capitalist production and non-capitalist production occurs. Secondly, and related to this issue of openness, virus writing would need to be considered as a science (marginal or nomadic). This is of course an idea fiercely contested by the discourses surrounding computer security (Sampson "Dr Aycock's Bad Idea"). Yet, the mathematics of the virus is at the very least a nomadic science. There is an apparent historical relation between viral logic and the agonistic liar paradoxes developed in the sciences of the Ancient Greeks (Sampson "Senders, Receivers and Deceivers"). For example, self-referencing liars, such as *this sentence is false*, are viruses that challenge the axiomatic mode of deducing the truth. This is clearly seen in Zeno's paradoxical retelling of the Aristotelian syllogism in which the interaction connecting predicate and premise produces an absurd cyclical conclusion, somewhere in-between true and false. Later on, in the early 1930s, Gödel used a similar trick when he took an axe to the tenets of Hilbert's system of formal logic. Turing's location, in the same decade, of levels of undecidability within the circuits of the logic machine went on to inspire Cohen's doctoral study of computer viruses which states that it is impossible to create a program that will always determine whether another program is a virus (Louw and Duffy 9). As Deleuze and Guattari have argued, mathematics is itself a "monster slang," which once left to its own devices, will go "completely mad" (*A Thousand Plateaus* 24).

Conclusion

What becomes significant to our understanding of network culture is that it is best grasped, following the removal of the essence, in terms of the event, accident and multiplicity. Indeed, despite the essentialist claims, centred on the Internet's inner capacity to robustly withstand a nuclear attack, it seems that the network's interface with the multitude has led to an increasingly vulnerable and anomalous network. In a broader sense, post-Cold War hegemonic power itself has moved from the certainties of an ideological bipolar world to the tactical management of the unstable centres and blurred margins of a vulnerable network space. The virtual networks that crisis-manage the world market have displaced the panoptic machine, once founded upon the assembly lines of disciplinary production. For that reason, and in order to endure, capitalism re-channels the emergent *schizophrenia* of network events and accidents into its own productive cycle, appropriates what it needs, and supposedly discards the rest. As argued above, capitalist actors, like those involved in the security industry, have stylised a discursive *dark side*, a kind of

outside populated by a growing taxonomy of overcoded digital Others, in the shape of viruses, worms, spambots etc. To be sure, by overindulging in analogies from immunology, particularly those surrounding the AIDS virus, Helmreich has argued that computer security rhetoric helps to encode (and commodify) human anxieties (*472-491)*. Following this, as Parikka proposes, some of these accidents are in fact captured by the security industry, who then extract a surplus value from the virus problem.

However, in the network milieu, the residue of events and accidents is no longer simply rendered outside of an otherwise fully functioning organism. In the sociotechnical milieu of the network, liar codes not only undermine the true and false of binary statements, but they also destabilise the homeostatic immunological system in which self and non-self are supposedly differentiated. The unity of the network, like any other assemblage, can therefore no longer be considered in terms of a "strict reciprocal determination between parts" (DeLanda, *A New Philosophy of Society* 9). On the contrary, the transformation of the network is composed as much by the accident, as it is by the orderly automation of cybernetic feedback loops. In fact, symbiotic interactions produce anomalous emergent properties that in turn relate back to the component parts, producing new territories and topological capacities. Any sense of inner identity or organic unity is a thinly disguised residue effect spread over the surface of a perpetual mode of mutation.

In this sense, this article not only rejects the causality afforded to essences, but also questions the foregrounding of the most important or planned events in favour of the accident and its role in the open-ended evolution of network culture. Moreover, there is arguably no longer a need to consider the crude distinction between the essence and the accident – even as Virilio carefully positions them. [3] As already stated, the accident need not be substantial. Indeed, as Deleuze argues, the divergent actualisation of topological forms "takes place entirely within the unessential" (*Difference and Repetition* 189). Therefore, it is perhaps prudent to eschew altogether the necessities of substance and the relativity of accidents in favour of an exploration of the composition of the unessential. In order to grasp network culture we should engage in a thorough investigation into the nebulous distinction between planned events, repetitious ideal events, future events and accidents. For example, we should look to the lost plans, the emergent nodal clustering, the viruses, the worms, spam pollution, net porn and digital junk – these have all, in various ways, turned out to be significant to our understanding of the becoming of the network. These events are, as such, fuzzy intermediate modes of determinism, caught up in co-causal constraints of a topological space of possibilities. They demonstrate how the material and expressive parts of an assemblage relate to an exteriority rather than the interiorities of organic functionalism and essentialism (DeLanda *A New Philosophy of Society*). In fact, we can take the fractal procession of events and accidents in network culture to be what DeLanda locates as processes of causality "laying between the two extremes of a complete fatalism, based on simple and linear causal relations, and a complete indeterminism" *("*Deleuze and the Open-ended Becoming of the World*")*. It is this machinic process that ensures that the identity of capitalist network power is never absolutely guaranteed.

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Endnotes

[1] In a Deleuzian world, the accident becomes a problem of consistency and the mode in which we might consider how heterogeneities are held together as assemblages without becoming a homogenous totality. See also DeLanda and his development of a theory of intensive processes of becoming focusing on spontaneous, self-organising processes (*Intensive Science and Virtual Philosophy*).

[2] The *machinic assemblage* is a creative response to the question of "what holds things together?" (Deleuze and Guattari, *A Thousand Plateaus* 327). Deleuze and Guattari argue that the easy way to answer this question is to provide a "formalizing, linear, hierarchicalized, centralized, arborescent model." However, they are critical of the tendency of theorists who can be observed "dividing the undivided terrain" and reintroducing "centres at each locus and stage of linkage" (328). In contrast, Deleuze and Guattari's project locates "the problem of consistency" by concerning itself with the mode in which the components of a territorial assemblage hold together, and how different assemblages join together, with each component in passage and relay with one another; marking out the assemblage as a *territory* in which "new relations" (504) between content and expression appear, and then disappear (deterritorialize). See also DeLanda's book *A New Philosophy of Society* in which he describes assemblage theory as involving "relations of exteriority" in contrast to the organic totalities of functional sociology and essentialism, which, he claims, concern themselves with "relations of interiority."

[3] While Virilio argues that substance is both the object and its accidents he manages to retain the dichotomy between the essence and the accident. This is because he inverts the relative and contingent properties of the accident with Aristotle's dominant necessity of the substance (See Lotringer's interview with Virilio in 1983). In contrast, Deleuze's notion of the unessential in *Difference and Repetition* avoids the rescaling of the substance/object binarisms altogether by rejecting essentialism outright.

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