

AN ABSTRACT OF THE THESIS OF

Chris Villemarette for the degree of Master of Arts in English presented on September 13, 2006.

Title: The Control, Resistance, and Evolution of Digital Artifacts: A Materialist Study of Internet Culture

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Jon Lewis

My goal is to demonstrate that a coevolutionary relationship exists between decentralized networks over which digital media are used and the control mechanisms placed on those networks and digital media. The resisting digital media and the control mechanisms placed on them push each other toward further decentralization. The aspects of a network that are externally controlled tend to decentralize to evade capture, and the control mechanisms tend to also use decentralized strategies so that they may better control decentralized networks. Using the interdisciplinary terminology of Gilles Deleuze and Felix Guattari, and other critical theorists, I investigate the movements of files on computer networks. By analyzing examples of digital artifacts that were distributed in a decentralized way in response to pressure placed on them by intellectual property enforcing institutions, I show that digital artifacts can respond to selection pressures in a way similar to evolution. I also examine the decentralized control strategies that attempt to regulate the spread of digital artifacts that contain elements that have been marked as intellectual property. I conclude that control and resistance do push each other toward decentralization.

The Control, Resistance, and Evolution of Digital Artifacts:  
A Materialist Study of Internet Culture

by

Chris Villemarette

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Chris Villemarette, Author

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## **Chapter One – Introduction**

The Internet has drastically changed the way that music, movies, texts, and images are used. A person can download a digital copy of an entire television show. That person could then feasibly use video editing software to cut up clips from the show, add their own soundtrack, and save a copy of their edited work. The person could then put that video online for others to download, on a file sharing network or a video sharing website. Finally, those who have downloaded the remixed video can also edit or otherwise alter the video and release it again. This is only one limited example of the possible uses of the Internet, as a variety of digital files are constantly being copied, edited, and circulated. Such practices have become a routine part of Internet culture, despite sometimes being in conflict with intellectual property law. These practices often have no central organizer, instead being decentralized and self-organizing, much like the Internet itself. However, some institutions insist on putting restrictions on the use of digital media.

Digital media, such as those shared on the Internet, have a tendency to resist the restrictions placed on them by adapting. In turn, the control mechanisms also adapt to better control the use of digital media. The adaptation of computer technology, whether for the purposes of resistance and evasion or capture and control, usually entails decentralization. My goal is to demonstrate that a coevolutionary relationship exists between decentralized networks over which digital media are used and the control mechanisms placed on those networks and digital media. The resisting digital media and the control mechanisms placed on them push certain aspects of each other toward further decentralization. The aspects of a network that are targeted by the

strategies of control tend to decentralize to evade capture, and the control mechanisms in response tend to also use decentralized strategies so that they may better control decentralized networks. I will show that networks and the controls placed on them have a variety of aspects that can be pushed toward decentralization. That entails examining cases in which digital artifacts came into conflict with control strategies. I also analyze the systems of management that have been imposed on digital media by institutions such as the Recording Industry Association of America and the Motion Picture Association of America. I will show how such institutions have failed to fully control the use of such media, and also how control systems have moved from centralized strategies to more successful decentralized strategies.

The theoretical foundation that inspired me to study networks of digital media comes from a group of contemporary researchers who are working in the area of new materialism under the influence of the wildly interdisciplinary philosophy of Gilles Deleuze and Felix Guattari. Their book called *A Thousand Plateaus* has been highly influential in making the study of the material flows of networks an important topic for critical theory. This new research is focused on the mixture of decentralized, self-organizing networks and their opposite, hierarchical, centralized institutions. For example, Manuel DeLanda has explored self-organization and stratification in the realms of architecture, geology, biology, and linguistics. John Bonta and Mark Protevi have done similar work in the area of human geography. Michael Hardt and Antonio Negri have combined Marxist analysis with the work of Deleuze and Guattari to understand the role of capitalism in the organization of power. Alexander Galloway

has researched decentralized control in computer networks. My work applies the same concepts of exploring the complex relationships of material networks to digital media on the Internet. I will be using specific terminology that has been developed by Deleuze and Guattari for describing the power relations of networks. I will be blending their terminology with terms from other critical theorists, as well as evolutionary biologists. Deleuze and Guattari themselves used terms from biology and other sciences to describe their materialist philosophy. I will use many of the concepts from *A Thousand Plateaus* concerning decentralization, self-organization, and adaptation. The terminology that Deleuze and Guattari use is intended to describe the movements of materials through networks, and the changing shapes of those networks. Michel Foucault, as an influence on Deleuze and Guattari, will be important for studying the power relations of networks and the control of populations. Foucault, Deleuze, and Guattari were interested in analyzing the institutions of society that regulate behavior, such as schools, prisons, barracks, factories, etc., as well as behaviors that resist or deviate from the regulations prescribed by those who manage the behavior of others.

Foucault, Deleuze, Guattari, and the collection of researchers influenced by them are not the only relevant theorists to my investigation. Additionally, Guy Debord and Gil Wolman's Situationist theory will be useful for discussing file modification, because it deals with turning media to purposes other than that which it was designed. Also, I will use ideas from theorists of memetics such as Richard Dawkins and Robert Aunger to set up the discussion of coevolution because of Dawkins' and Aunger's

application of Darwinian evolutionary theory to fields outside of biology. What ties all of these theorists together is their commitment to a materialist approach to solving problems. Because I share this viewpoint, I focus on the material aspects of digital artifacts. While I affirm the importance of reading digital artifacts as texts, I am more interested in tracing the movements of artifacts. Much like one might trace the distribution of a printed book to determine who was reading it and where, I will trace the replication of digital artifacts to determine the effects of control mechanisms. Importance is placed on the points at which the artifacts, and therefore the ideas contained, are physically reproduced. The content of digital artifacts will be described when relevant, but mostly I will note the strategies that artifacts use to resist control and the strategies that control systems use to respond to resistance.

After laying out a theoretical framework for analyzing the strategies of control and resistance exhibited by digital media and interested institutions, I will analyze specific examples. I start with file sharing, which is more accurately described as the copying or replication of files. In that discussion, I will focus on one specific file sharing program, BitTorrent, because of its ability to create networks without centers across which files are copied. Then, from copying, I move on to another use of files: modification. I analyze examples of files that have been modified and the restrictive reactions from copyright holders. In each situation, I describe the behavior of various kinds of digital artifacts, including peer-to-peer file sharing applications and media files. In each case, I show how digital artifacts populate networks through replication. I also show how digital artifacts are easily broken down into parts, reassembled, and

otherwise modified before again replicating and spreading across networks. While manipulation and replication involve human action as a cause at the local level, decentralized networks lack a central command. Rather, these networks populated by digital artifacts are self-organizing. In each example that I discuss, I identify a centralized media institution or a peer-to-peer network influencing the strategies of the other. Peer-to-peer file sharing networks, as a genre of software, are forced to adapt or die by the actions of the RIAA and MPAA. Illegal remixes are forced to adopt strategies that allow them to live in networks despite demands from copyright holders, or else they would cease to exist. The examples of artifacts that I describe in this work constitute only a fraction of the heterogeneous multiplicity of digital artifacts that proliferate on the Internet. The study of Internet culture provides researchers with the opportunity to take on the perspective of the cultural materials themselves and to affirm their importance.

## **Chapter Two – Digital Artifacts and Networks**

The goal of this chapter is to demonstrate that concepts such as self-organization and Darwinian evolution can be applied to other systems, such as computer networks. It also establishes the case that all use of the Internet constitutes file sharing in some form. I will be referencing the work of various researchers who are connected by their materialist view of the world. Each of them sees some level of unplanned organization taking place in the networks through which materials flow and change. My argument is that digital artifacts, because their use requires for them to be

copied, bear a resemblance to the evolution of life itself, which consists of genes that physically copy themselves without planned direction.

This work concerns itself with the *digital artifacts* that populate *networks*. Digital artifacts include all pieces of information that are copied from one computer to another in computer networks. Networks, in the most general sense, consist of points and lines. The points can be called *nodes*, and the lines connecting the nodes can be called *links*, because they tie nodes together. In computer networks, computers are nodes, and the links allow information to flow from one node to another. I will be discussing computer networks and the human social networks that populate them, but it is important to remember throughout this work that many different kinds of networks exist. Networks come in all shapes and sizes. For example, the human circulatory system differs from a rain forest ecosystem, but both involve the flow of materials from one place to another. The circulatory system involves the flow of blood cells and a variety of other materials. Ecosystems involve the complex, interconnected flows of water, nutrients, and the genes that organize water and nutrients into life. Networks describe both *relations* between and *flows* of materials. I use such a general term, “material,” to emphasize the versatility of the concept of networks, because, ultimately, all relationships and flows can be described by networks.

Relations between things usually involve the flow of materials. Biological reproduction involves the flow of genetic material, which forms organisms that are genetically related to their predecessors. The “family tree” of a given organism

describes relations and flows. A family tree network is not metaphorical, then, but based on material—in this case, genetic material. The networks I am examining in this work are material also. Networks of computers store and exchange digital artifacts in the form of electronic patterns, and the social networks that computer networks engender also consist of material bodies, that is, human beings. The overlap of social networks and computer networks can be referred to collectively as socio-technological networks. The information that humans exchange on computer networks can be generally called digital artifacts. The questions that this work will deal with involve the ways in which the reproduction of digital artifacts is organized on networks. The shape of a network tends to determine the flows and relations of digital artifacts.

While networks vary in shape and size, two basic shapes are helpful for describing them: centralized and decentralized. Centralized networks, as one might expect, are called so because they have a center. In a centralized network, the nodes connected to the center are subordinated to the center. In other words, the nodes are dependent on the center for command. Power radiates from the center of the network outward to the nodes in the periphery. Decentralized networks, on the other hand, have no center, and therefore, have no central command. Power is distributed in decentralized networks. Because decentralized networks are not organized by a center, they can be said to be *self-organizing*.

One can generalize, for example, that the human circulatory system is centralized and a rain forest ecosystem is decentralized. The circulatory system has the

heart at its center. A rain forest ecosystem, on the other hand, has no single controlling factor; changes in any one part can affect other parts of the network. Materially speaking, though, networks are usually hybrids rather than being purely centralized or decentralized. Different parts of the same network can be moving in different directions (toward centralization and away from decentralization, or vice versa). As I said before, my main concern in throughout this work is that of computer networks. The Internet has features of both centralization and decentralization. The Internet is, in many ways, a self-organizing communication network. In other ways, it is hierarchical and planned.

What are the relations and flows of computer networks, specifically, the Internet? What aspects of the Internet are centralizing and decentralizing, and what are the causes of such movements? As for the question of “what flows on the Internet,” the answer is digital artifacts. That the kinds of artifacts flowing on the Internet are digital is important because, as in our example of biological reproduction, when digital artifacts flow, what is actually happening is that a copy is being made.

### **File sharing: The Replication and Distribution of Digital Artifacts**

The term *file sharing* is used often to refer to the exchange of music and movies over networks, even though something as innocuous as email is an example of file sharing. If one examines the replication of a file, the data copies itself many times, with human action as a catalyst. In the case of an email, the text is entered from person's fingers into the keyboard and is initially stored in the computer's random

access memory (also known as RAM). RAM acts as a short-term memory storage through which information constantly circulates. The user, by sending the email, copies the information from the RAM to a central server that has been designated to deliver email. The server stores the copy on its hard drive, a more permanent storage medium. The file, once in the email server's hard drive, is copied and stored in two locations: the sender's "sent mail" folder and the recipient's "inbox." When the recipient checks his or her inbox, the server sends a copy of the email to his or her computer's RAM. Each time thereafter, when the sender or recipient accesses his or her sent mail folder or inbox, a copy is again made. However, such copies are temporary, because the RAM only deals with information on a short-term basis. In the case of an email, the user can easily copy the text from an email into a word processor and save the text in a file on his or her computer's hard drive, if he or she wants a backup copy. The ability for the user to save files permanently on hard drives allows for people to acquire large libraries of media archives, including text, audio, and video files.

Most of the file sharing networks I will examine here can be described as decentralized, or to add another interchangeable term, *peer-to-peer* networks. Peer-to-peer networks have no central planning in their organization. Therefore, they are self-organizing networks. Some file sharing programs enable centralized networks, in which the files are copied to a central server, as in the case with email. However, increasingly, file sharing refers to files exchanged directly from one computer to another. Such activity is referred to as peer-to-peer file sharing. This trend can be

called decentralization, because it has moved the burden of replication and storage from centralized servers to distributed nodes in a network that connect on an ad hoc basis. These nodes are not literally directly connected, as would be the case in a local area network, in which the two computers would be connected by a central hub or router—devices that serve as centers for small networks. Rather, in a peer-to-peer connection over the Internet, each computer running a given file sharing program connects over a wide area network to other computers running the same program. Despite trends in decentralization, however, file sharing networks generally have some aspects that remain centralized. For example, Napster, a file sharing network popular in the late 1990s, used centralized servers to store lists of files that users had on their hard drives available for download by other users. In this way, to find files, the user would enter a search term which would be compared to a list stored on a server. The actual replication of files, however, still happened over connections between the nodes of the network—the computers running the program and the humans initializing the replication of files.

When file sharing programs give users access to each other's media files, the resulting meshwork of relations and flows forms a decentralized, self-organizing network, because no one user directs the flow of files. Any user has the ability to cause a file to replicate from another's media library to her or his own, with a variety of file sharing programs, each of which form networks of connection between both computers and people, none of which commands or plans the network on a global level. Therefore, predicting the details of file replication remains difficult, because

they are not planned in advance. Because peer-to-peer networks on which all files replicate are unpredictable complex systems, the files themselves can be seen as a form of *nonorganic life*. The reproduction of files can be described with a family tree in the same way that genetic family trees show the relationships between biological relatives. Networks can describe flows of materials and the relations those flows entail, such as media files replicating on computer networks; however, networks can also describe the relations and flows of power, discipline, and control that are applied to decentralized computer/human networks by centralized institutions.

### **Strategies of Control: Digital Rights Management as a Form of Biopower**

One major influence on Internet culture is the control that institutions such as the Recording Industry Association of America and the Motion Picture Association of America attempt to foist on file sharing networks. This particular type of control is generally referred to as *digital rights management* or *DRM*. The goal of DRM schemes is to control the replication of digital media files, which include music, movies, and television shows. While DRM is intended to prevent copyright infringement, it is often applied indiscriminately, so as to affect entire file sharing networks. Such control attempts to manage the replication of digital files into a predictable set of practices. However, with control comes resistance, which is often the result of complex causes and is therefore, unpredictable for the practical purposes of management. An analogy I find appropriate is that of antibiotics and antibiotic-resistant bacteria. When antibiotics are applied to a population of bacteria, the strongest bacteria live to reproduce, and

over generations of reproduction, the population becomes resistant to the antibiotic. Therefore, I view resistance as a property of life, and that includes nonorganic life. The view carries over to digital artifacts, because they replicate when they are transferred from one computer to another. But, now that I have identified a problem worth exploring – the interaction between peer-to-peer file sharing networks and the centralized institutions that apply DRM to prevent peer-to-peer file sharing – I now need a framework for exploring that problem.

The terminology of French poststructuralist philosophers, specifically Michel Foucault, Gilles Deleuze, and Félix Guattari, is useful for describing such self-organizing systems, as well as the factors that attempt to control such systems and make them predictable. French philosopher Michel Foucault's conception of power is important in poststructuralist thought, and is also relevant when examining networks. In “The Subject and Power,” Foucault writes:

Let us come back to the definition of the exercise of power as a way in which certain actions may structure the field of other possible actions. What, therefore, would be proper to a relationship of power is that it be a mode of action upon actions. That is to say, power relations are rooted deep in the social nexus, not reconstituted “above” society as a supplementary structure whose radical effacement one could perhaps dream of.<sup>1</sup>

Power can be said to be a property of networks because networks contain “actions [that] may structure the field of other possible actions” within a given network.<sup>2</sup> In this way, power produces the possible relations and flows of a network. The poststructuralist approach to power provides a way to view social and political relations as networks through which power flows. Power, then, is present in any social

network, and can be distributed throughout that network according to the shape of the network. Foucault also provides another useful term: resistance. Foucault contrasts power with resistance:

I would like to suggest another way to go further toward a new economy of power relations, a way which is more empirical, more directly related to our present situation, and which implies more relations between theory and practice. It consists of taking the forms of resistance against different forms of power as a starting point. To use another metaphor, it consists of using this resistance as a chemical catalyst so as to bring to light power relations, locate their position, and find out their point of application and the methods used. Rather than analyzing power from the point of view of its internal rationality, it consists of analyzing power relations through the antagonism of strategies.<sup>3</sup>

For Foucault then, the examination of the “economy of power relations,” should begin with resistance. Later in this work, when I am specifically focusing on file sharing networks, those file sharing networks will be seen as sites of resistance in contrast to controlling institutions. I will be “analyzing power relations through the antagonism of strategies,”<sup>4</sup> the strategies being moves toward decentralization, in the case of file sharing networks, and moves toward centralization, in the case of institutions like the RIAA and MPAA. Although, I should note that moves toward decentralization can also be a strategy of control, to which resistance would have to find new strategies, and I will provide examples of that later. Earlier, however, I used the term resistance in reference to biological adaptation in the case of antibiotic-resistant bacteria. While Foucault does not necessarily directly tie the concept of resistance to evolution, he does connect the concepts of power and resistance to life itself. Foucault argued that power increasingly focuses itself on the control of populations through the production and reproduction of life. He named this concept “biopower.”<sup>5</sup>

Biopower refers to the control of populations and by extension, production and reproduction within those populations. Power is exerted over life, controlling its movements and activities – “structur[ing] the field of...possible actions.”<sup>6</sup> However, resistance to control is possible, and perhaps even unavoidable. As Gilles Deleuze, another French philosopher and colleague of Foucault, said in his book entitled *Foucault*, “Life becomes resistance to power when power takes life as its object. [...] When power becomes bio-power[,], resistance becomes the power of life, a vital power that cannot be confined to species, environment or the paths of a particular diagram. Is not the force that comes from outside a certain idea of Life, a certain vitalism, in which Foucault’s thought culminates?”<sup>7</sup> Deleuze’s words here work well with the antibiotic-resistant bacteria example – when humans focus their efforts on managing the reproduction of a population of bacteria, the bacterial colony’s ability to adapt becomes its strategy of resistance, and the control mechanism ultimately fails because it cannot predict how the bacteria will change.

Biopower as a concept is relevant to my study in that it closely resembles the concept of digital rights management. Instead of biological life being at stake, control over the production and reproduction of digital artifacts is what centralized media institutions are after. Media institutions, such as the RIAA and MPAA are different than institutions such as schools, hospitals, factories, and barracks. Through media institutions pass not the majority of people, but rather only the people who produce artifacts for and with the corporations that belong to the media institutions. What also pass through these institutions are the artifacts themselves, which, with legal

documentation, become intellectual property. But, as I pointed out, intellectual property accounts for only a fraction of the set of digital artifacts. How can one know at any given time the number of artifacts created outside of the intellectual property system? But the similarity lies in that media institutions control the movements and reproduction of digital artifacts, in the same way that human institutions control the movements and reproduction of human bodies.

Resistance, in this view, becomes the replication of files over networks, which cannot be contained, such as in the case of file sharing. Because digital artifacts reproduce without any loss in quality (unlike their analog counterparts such as magnetic tape and floppy disks), the companies that control the production of copyrighted artifacts wish to only allow the reproduction of the artifacts to which they claim ownership. They downplay even the existence of artifacts outside of the bounds in which they can exercise digital rights management. In this way, DRM closely resembles Foucault's concept of biopower. The "life" in this case, however, is the nonorganic life of networks over which digital artifacts flow. The programs that create these networks are intelligently designed by programmers, but the networks themselves have no central planning. Therefore, the decentralized shape of such networks structures the ways in which control can be applied to them, which in turn influences how new file sharing programs will be developed. Although the networks and the artifacts that populate them are nonorganic, they still feature what can be called the creativity of life, or the unpredictability of complex systems.

### **Deleuzeoguattarian Neomaterialism**

The work of poststructuralists Gilles Deleuze and Félix Guattari could be described as a continuation of Foucault's analysis of power relations. While Foucault's work can be described as interdisciplinary, Deleuze and Guattari take power analysis a step farther by articulating a theory that combines political and social philosophy with the branches of science interested in unpredictable, nonlinear, complex systems. Deleuze and Guattari commit themselves to a view of the world that is radically materialist, yet is able to locate processes once thought to be only present in living beings in the realm of non-living beings. Contemporary poststructuralist political theorists Michael Hardt and Antonio Negri, authors of *Empire*, an interdisciplinary work of political philosophy which they describe as heavily influenced by “Marx's *Capital* and Deleuze and Guattari's *A Thousand Plateaus*,”<sup>8</sup> write, “By contrast [with Foucault], Deleuze and Guattari present us with a properly poststructuralist understanding of biopower that renews materialist thought and grounds itself solidly in the question of the production of social being.”<sup>9</sup> This is because Deleuze and Guattari see life itself as a self-organizing process by which materials come to have organization on their own, without form being imposed on them. Manuel DeLanda has explored Deleuze and Guattari's conceptualization of life in his body of work. Unlike Hardt and Negri, DeLanda rejects most of Marxist theory and instead relies on materialist histories such as Fernand Braudel's *Capitalism and Civilization: 15th-18th Century*.

DeLanda describes the work of Deleuze and Guattari as “neomaterialism”<sup>10</sup> in his essay “Deleuze and the Genesis of Form,” which serves as a useful term for tying together the emerging genre of theoretical work that applies Deleuze and Guattari’s concepts to examinations of decentralized and nonhierarchical organizations of matter and energy. We get the term “nonorganic life,” which has already be used in this work to describe digital artifacts, from in DeLanda’s essay of the title, “Nonorganic Life.” In the essay, he gives examples of self-organization in areas outside of biology, such as geology and atmospheric science. He emphasizes that to apply this to social formations, that is, to create a “geological ethics,”<sup>11</sup> we must follow the flows of matter and energy in social formations. He is concerned with self-organization as a process that occurs in nature and culture, thereby collapsing the distinction between the two. He uses entrainment as an example of a self-organizing process involving social-biological networks as well as other kinds of material formations. The importance of entrainment is that it is observed in not just in biological life, but also in nonorganic material systems. He gives a definition and examples of entrainment as follows,

The phenomenon of entrainment – the spontaneous phase synchronization of different oscillating entities – is common in nature. One well-known example is the slime mold amoeba: in normal circumstances, a group of these amoebas will behave as unrelated individuals, but when the level of environmental nutrients reaches a critically low value, they assemble themselves in to a coherent colony with differentiated “organs.”<sup>12</sup>

Other examples of entrainment include the self-organization of the chirping of crickets, the flashing of fireflies, the ovulation cycles of human females, and the oscillation of sound waves generated by synthesizers. In all of these cases, no

command center directs the action or imposes order from above. And, entrainment is only one example of self-organization. As I have stated, the self-organization that I am most concerned with in this work is that of socio-technological networks and the digital artifacts that replicate without being directed by a hierarchical human organization, but instead by decentralized, ad hoc human organizations coupled with computer networks taking advantage of flexible protocols.

Alexander Galloway, another Deleuze-Guattarian materialist, refers to the form of power in complex systems as “protocol,” a term describing the prescribed, yet flexible, standards of interaction between computers on the Internet, which he explores in his book *Protocol: How Control Exists After Decentralization*.<sup>13</sup> One such crucial concept is that of the rhizome, which Galloway equates with distributed networks, and which I will use to describe the various networks involved in file sharing.<sup>14</sup> While his work focuses on the protocols that enable the existence of centerless computer networks, I have chosen to research the content of those networks. The networks and their content, however, both exhibit the life-like processes that are the subject of research in new materialism.

Mark Bonta and John Protevi, in *Deleuze and Geophilosophy*, explore the connections between Deleuze and Guattari's thought and complexity theory. Complexity theory is the study of the behavior of material systems. They explain, “Researchers in complexity theory investigate the way certain material systems in the inorganic, organic, and social registers attain both higher levels of internal complexity and a 'focus' of systematic behaviour without having to rely on external organizing

agents.”<sup>15</sup> The concept of the network can be applied in a variety of situations – ecosystems, circulatory systems, ant colonies...,etc. Similarly, the related concept of complex adaptive systems can be applied to different situations, as Bonta and Protevi point out in their study of Deleuze and Guattari's “geophilosophy.”<sup>16</sup> Complex systems, which can be described as networks without centers, can include human social networks and peer-to-peer computer networks, as they do not have a central designer and are not entirely predictable. One important assumption of Deleuze and Guattari that makes this generalized application of network theory and complexity theory possible is that they do not see humans as being separate from each other or the world around them. Like the concept of the network, in which connections are made, human life involves many connections, including, among other things, connections with technology and other humans. Therefore, the human individual is not the central focus of study. In the example of antibiotic resistant bacteria, the humans, the chemicals, the bacteria, and other flows of materials all play a crucial role in the adaptation of the bacteria and the techniques used by humans to control the reproduction of those bacteria. However, even organic life is not held up as central in the work of Deleuze and Guattari. *Nonorganic life* is also of importance to a fully materialist geophilosophy, or what DeLanda has called neomaterialism.

Deleuze and Guattari's work can be read as a criticism of the notion that order must be imposed from above or from a central agency. The view that without centralized control, matter would remain disorganized is referred to as “hylomorphism.” Bonta and Protevi define hylomorphism as, “the doctrine that the

order displayed by material systems is due to the form projected in advance of production by an external productive agent, a form which organizes what would supposedly otherwise be chaotic or passive matter.”<sup>17</sup> Interestingly, one can find a similar view in the rhetoric arguing against file sharing. Time Warner chairman and CEO Richard Parsons has been quoted as saying of peer-to-peer file sharing:

This is a very profound moment historically. This isn't about a bunch of kids stealing music. It's about an assault on everything that constitutes the cultural expression of our society. If we fail to protect and preserve our intellectual property system, the culture will atrophy. And corporations won't be the only ones hurt. Artists will have no incentive to create. Worst-case scenario: The country will end up in a sort of cultural Dark Ages.<sup>18</sup>

The argument declares that without central planning, in the form of a hierarchical intellectual property system, culture itself will fail to organize itself and cultural production will come to an end. In Foucauldian terms, if the field of possible actions, including triggering the replication of a media file, is not rendered predictable by only being allowed in accordance with the intellectual property system, then “the culture will atrophy.”<sup>19</sup> However, we can take an opposing viewpoint that argues that human culture and the production of artifacts are intimately interconnected and capable of carrying on without central planning. One such area of thought, called “memetics,” seeks to argue just that by using concepts from Darwinian evolution in contexts other than genetic reproduction.

## **Memetics: An Application of Universal Darwinism**

Robert Aunger, in his book *The Electric Meme*, describes a materialist view of cultural transmission influenced by Darwinian evolutionary theory. While perhaps not directly influenced by Deleuze and Guattari or materialist poststructuralism, Aunger has an understanding of the complex interactions between humans and their artifacts. Equally importantly, Aunger conceives of information as material, and therefore, he is not making a metaphorical connection between evolution and culture, but is careful to always render material explanations for cultural evolution.

The term “memetics” was coined by evolutionary theorist Richard Dawkins in his book *The Selfish Gene*. Memetics approaches cultural analysis from the standpoint of evolution, and speculates that units of culture, what memeticists refer to as “memes,” copy themselves from one person to another through communication and other artifacts. In this view, nearly anything that is transmitted from one brain to another is a meme—everything from the songs of birds to “knock, knock” jokes. The importance of memetics to my own work is that it provides a framework to study the digital artifacts that replicate on the Internet with the help of human intervention.

To examine the evolution of Internet culture, it is helpful to employ the concept of “Universal Darwinism” – the idea that evolutionary theory has a scope not limited to biology. Such an outlook is based on the idea of replication. The idea is that anything that replicates can exhibit some form of evolution. Memetics, the evolutionary approach to culture and information, provides the beginning of a useful framework for studying Internet culture. Digital artifacts are of particular interest,

because, despite the Internet being often described as a “virtual world,” it is primarily *material*. Files in a computer network replicate every time they are used or transmitted. This replication can be seen as a nonorganic life process.

Aunger cites Richard Dawkins as coining the term “Universal Darwinism” to describe the idea that evolutionary theory can be applied to fields other than biology – a kind of interdisciplinary evolutionism.<sup>20</sup> Dawkins accomplishes this expansion of evolutionary theory by focusing on “replicators” – an abstraction that can be used to describe a variety of different objects in different milieus.<sup>21</sup> Aunger defines four characteristics of replicators:

- *Causation*: The source must be causally involved in the production of the copy
- *Similarity*: The copy must be like its source in relevant respects.
- *Information transfer*: The process that generates the copy must obtain the information that makes the copy similar to its source from that same source, and
- *Duplication*: During the process, one entity must give rise to two (or more)<sup>22</sup>

While Aunger separately defines memes, signals, and artifacts as all having a role in cultural reproduction, memes being neuronal states inside the brain, signals being behaviors caused by those memes, and artifacts being objects caused by those behaviors,<sup>23</sup> I will be focusing on artifacts.

The relationship between memes and artifacts, according to Aunger, is like the relationship between genotypes and phenotypes – the genotype being the genetic information and the phenotype being the expression of that information in an organism. Dawkins proposed the idea of an “extended phenotype,” which would include expressions of an organism such as behaviors and modifications of the

organism's environment. Auger writes, "we might say the idea (a new meme?) is the genotype and the activity of the individual in making the artifact is the phenotype, while the secondary consequence – the *extended* phenotype, if you will – is the artifact itself. [...] [A]rtifacts *are* the focus of selection pressures. [...] [W]hat evolves is the idea behind the artifact."<sup>24</sup> Auger goes on to describe artifacts in a few different ways, including artifacts as "interactors," "signal templates," "communicative artifacts," and finally artifacts as "replicators."<sup>25</sup> In his explanation of these concepts, he does talk about media storage ("...books, magnetic tape, and DVDs")<sup>26</sup> and computer technology, but he does not give much attention to computer files as artifacts. He uses computer viruses as an example, "able to duplicate themselves in electronic forms of memory, and thus constitut[ing] an instance of an artifactual replicator."<sup>27</sup>

Computer files can only be transferred by replication. When one sends an email, one sends a copy of the text, not the original text. When one downloads a song from a peer-to-peer file sharing service, the person hosting that file does not lose his or her copy; rather, the receiver triggers the replication of that file. Having made this claim, I should use Auger's own criteria for what defines a replicator. The example of a person downloading a media file via a file sharing program certainly fits three of the requirements: similarity, information transfer, and duplication. The only question, then, concerns the first characteristic, that of causation. Earlier Auger cites Dawkins on the question of whether or not a piece of paper with important information on it is a replicator, "Dawkins himself considers this case and concludes that the piece of paper – or more precisely, the information printed on it – *is* a replicator. So replicators can

be artifactual in nature, not just biological.”<sup>28</sup> In other words, the causation doesn’t necessarily have to be “direct” or “proximate;” rather, a person can be the intermediary cause – “the person punching the copier button,”<sup>29</sup> or the person pushing the button to send an email or download a file.

With the large number of mouse clicks and button pushing that initiate file replication on a daily basis, a complex socio-technological network of interactions results in a centerless ecosystem of files populating the Internet. While any innocuous file replication is technically an example of file sharing, the use of the term "file sharing" refers to a specific kind of replication in which computers connect to each other to share their media libraries, either in portions or in their entirety. Therefore, the term file sharing has a connotation of having to do with illegal activities, usually in reference to the intellectual property system and infringement of copyright. In the next chapter I will explore peer-to-peer file sharing networks and the strategies by which they adapt to pressure from large, centralized media institutions.

The relationship between file sharing networks and centralized media institutions, specifically the Recording Industry Association of America and the Motion Picture Association of America, has been described as an “arms race.”<sup>30</sup> To continue with the evolutionary perspective, this relationship is called “coevolution,” which can take the form of an arms race or mutual cooperation; however, the distinction between arms races and mutual cooperation is not always clear.<sup>31</sup> The situation remains complex, as Robert Aunger points out, “Taken together, genes plus memes plus artifacts create a life-form of increased complexity, similar to symbiotic

relationships in the biological realm such as lichen (the combination of a fungus with algae). Human culture is a phenomenon that emerges from the interactions between humans, memes, and their constructions.”<sup>32</sup> However, the model that Auger describes does not place enough emphasis on the conflicts of human culture and the strategies involved in power relations. For such an analysis, we must return to Deleuze and Guattari.

Peer-to-peer networks bear a resemblance to the concept of the rhizome, which comes from Deleuze and Guattari's *A Thousand Plateaus: Capitalism and Schizophrenia*. A rhizome, in nature, is a networked root system, like a ginger root, that grows horizontally, as opposed to the vertical structure of a tree. The concept, like many of Deleuze and Guattari's concepts in *A Thousand Plateaus*, is meant to be applied to a variety of situations. Decentralized, self-organizing networks can be described as rhizomes. The rhizome is contrasted with centralized, hierarchical structures. They write:

To these centered systems, the authors contrast acentered systems, finite networks of automata in which communication runs from any neighbor to any other, the stems or channels do not preexist, and all individuals are interchangeable, defined only by their state at a given moment – such that the local operations are coordinated and the final, global result synchronized without a central agency.<sup>33</sup>

Rhizomes include the peer-to-peer file sharing networks, through which people share music, movies, and software with each other. The concept of the rhizome is important because rhizomes lack central authority and planning, much like evolution itself. What makes the concept of rhizome so useful, however, is that it can be used to describe material systems that are organic, but also self-organizing social systems and

nonorganic systems. Therefore, one can apply the concept of the rhizome to many different kinds of systems that continue to function without “central agency.”<sup>34</sup> Our first example of systems without central agency is the networks created by the file sharing program BitTorrent. BitTorrent, as a flexible protocol, allows for rhizome like connections between computers to bloom into existence.

### **Chapter Three –**

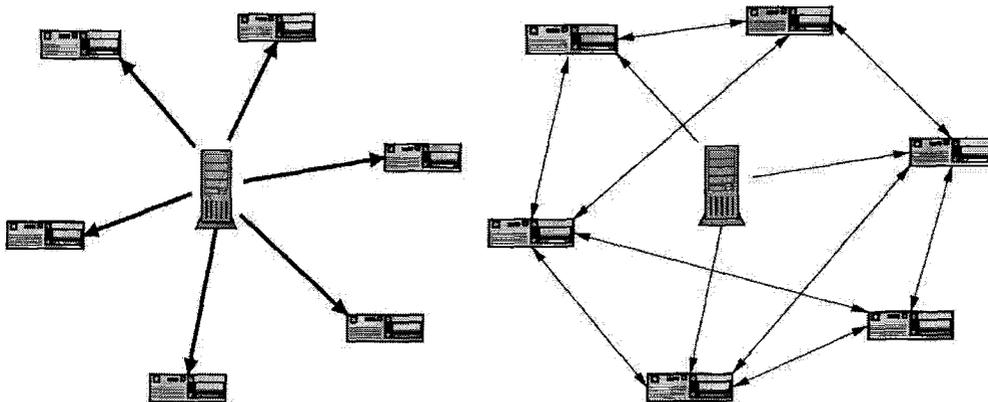
#### **Peer-to-Peer File Sharing Networks: An Examination of BitTorrent**

The purpose of this chapter is to describe the file sharing program BitTorrent. I have chosen to focus on BitTorrent because it is an example of the decentralization of file sharing in response to pressure placed on other file sharing programs.

BitTorrent is also relevant because the small networks created by it, called swarms, feature a kind of selection process by which they grow in size or die out. Because BitTorrent swarms make up approximately a third of all Internet traffic, they can be described with a term taken from Deleuze and Guattari’s *A Thousand Plateaus*, smooth space. I will define smooth space and show that some of the control mechanisms used against BitTorrent follow a model of smooth space’s opposite, striated space. I will also provide an example of a decentralized control mechanism, Peer Impact. Peer Impact is a decentralized response to the failure of centralized attempts at controlling BitTorrent, because Peer Impact uses BitTorrent networks to distribute files, but only those within the intellectual property system. Furthermore,

Peer Impact uses the decentralized social networks that form around decentralized file sharing networks to promote products within the intellectual property system.

The creation of the file sharing program BitTorrent is a watershed moment in the history of file sharing, because BitTorrent decentralized many of the aspects of file sharing that were previously centralized. For one, with older file sharing networks, such as Napster, users connected to central servers. BitTorrent, however, allows users to connect directly to each other, without a server. The evolutionary niche that BitTorrent fills was created because of the Napster network being shut down by pressure from the RIAA. In other words, BitTorrent decentralized certain aspects of the networks it creates, because the shape of the Napster network was vulnerable to attack. While aspects of file sharing have become decentralized, other aspects remain centralized. In any given situation in which one is looking at centralization and decentralization, certain aspects can be centralized while others are decentralized. BitTorrent, specifically, decentralized the connection of peers to each other, but other aspects remained centralized. A simple explanation of how exactly BitTorrent is used may be helpful.



*Fig. 1: Client-Server File Transfer Fig. 2: Distributed File Transfer as in BitTorrent  
A Centralized Network<sup>35</sup> A Decentralized Network, or, Rhizome<sup>36</sup>*

BitTorrent is a file sharing protocol. A protocol is an agreed upon standard of actions by which any two computers who recognize the standard may interact. BitTorrent is unique in that it allows for users to share outgoing bandwidth, the amount of data that can be sent to another user at a given time. Because BitTorrent breaks files into small fragments, a user immediately begins sharing pieces received with other users. This structure subverts the broadcast model of bandwidth distribution that is the industry standard—users typically get much more incoming bandwidth than outgoing bandwidth from their Internet service providers. The first time one uses BitTorrent, one simply downloads a small file that quickly installs the software on one's computer. Next, to use BitTorrent, one must first find a torrent—the file that is identified by having the extension “.torrent”. The “.torrent” files are small files that add one's computer to the “swarm” of other people who are downloading and uploading the same file. The links to these “.torrent” files are hosted on servers, called “trackers,” that allow the user to search for music, movies, and more.

Such centralized trackers have been the focus of legal pressures from the MPAA, despite the fact that trackers only host the small “.torrent” files and not the actual copyrighted material. The pressure from the MPAA is an example of centralized control. The MPAA has successfully shut down many trackers, and in May, 2005, one such round of legal action targeted sites that trade television shows.<sup>37</sup> As trackers shut down, more seem to appear in their wake. At current, one need only

to enter the name of a particular movie, music album, or television show with the word “torrent” into Google search to find links to “.torrent” files. Furthermore, programmers have discovered new ways of decentralizing the tracking aspect of BitTorrent. Because BitTorrent takes advantage of the rhizome shape, it evades capture by the hierarchical, central planners of culture, such as the Recording Industry Association of America and the Motion Picture Association of America.

File sharing networks are particularly interesting, because they allow for the replication of digital artifacts, but they themselves are artifacts. The programs that allow users to connect to a file sharing network are artifacts. Furthermore, the networks themselves are artifacts, although networks are created by all of their users rather than by designers, because they are centerless. The artifacts that people share on file sharing networks, when transferred, create exact copies of themselves; therefore, digital artifacts do not necessarily change or mutate simply by being copied. However, in the case of BitTorrent, a particular media file can undergo a kind of selection process. If we take a movie as our example, the popularity of that movie among the file sharers determines how long that movie is available for sharing. If the movie is unpopular, then fewer people will join in the group of those sharing of that movie, that group being called a *swarm*. Eventually, everyone will leave a swarm if the movie is unpopular. If the movie is popular, however, the swarm will continue to grow in size as more people join in the file sharing creating a snowball effect. Although no swarm is permanent, their lifespans depend on the popularity of the file being shared. The swarm effect can be seen as a weakness of BitTorrent, but it is only a weakness if no

other file sharing programs exist, which is not the case. Therefore, BitTorrent is better suited for some situations, such as distributing files that many people need or want, and other programs may be better suited for others situations. This is because file sharing programs themselves are artifacts that evolve to meet the needs of a particular situation. Often, the evolution of file sharing programs involves a decentralization of a particular aspect of the network in response to power and control.

### **BitTorrent as an Example of Smooth Space**

BitTorrent has been shown to comprise third of all Internet traffic, which is what makes it so interesting.<sup>38</sup> That large portion of the Internet that BitTorrent comprises has the shape of Deleuze and Guattari's smooth space. Smooth space is defined as the space outside of central control—the complex and unpredictable, like the growth of the rhizome. Smooth space's opposite is striated space. Striated space is the gridded, partitioned space of the city—of civilization itself. Striated space is predictable and controllable. The RIAA and MPAA are institutions that use the centralized, hierarchical model. They have the shape of striated space—their products being hierarchically ordered and organized into an easily manageable shape. The two spaces attempt to capture each other in a coevolutionary process. Deleuze and Guattari describe striated and smooth space like the difference between the games chess and Go:

[I]n chess, it is a question of arranging a closed space for oneself, thus of going from one point to another, of occupying the maximum number of squares with the minimum number of pieces. In Go, it is a question of arraying oneself in an

open space, of holding space, of maintaining the possibility of springing up at any point: the movement is not from one point to another, but becomes perpetual, without aim or destination, without departure or arrival. The 'smooth' space of Go, as against the 'striated' space of chess.<sup>39</sup>

Deleuze and Guattari emphasize that “we must remind ourselves that the two spaces in fact exist only in mixture: smooth space is constantly being translated, transversed into a striated space; striated space is constantly being reversed, returned to a smooth space.”<sup>40</sup> A third kind of space, called holey space, can be described as the intermediary between smooth and striated space. Bonta and Protevi compare cyberspace to holey space, “Cyberspace and forest space may also be seen as holey spaces rather than as smooth spaces in that they provide protective cover for 'underground' operations.”<sup>41</sup> I would argue that that characterization does not necessarily apply in the case of BitTorrent. BitTorrent can best be described as smooth space. BitTorrent, for one thing, is not a space for protective cover. In fact, one of the potential problems with BitTorrent is that it does not protect anonymity; therefore, holey space may not be the best way to describe it. BitTorrent is a smooth space because it allows media files to flow. BitTorrent decentralizes the flow of media files that are bound up by the striated space of the intellectual property system.

Much more can be said about smooth space and striated space. The Internet in general could be described as a mixture of the three spaces – smooth, striated, and holey. As we have seen so far, the concepts can be applied to situations as various as the difference between nomads and urban dwellers to the difference between classic board games. Deleuze and Guattari meant for the concepts to be widely applicable in the context of their study of *Capitalism and Schizophrenia*. The relationship they

stress between striated and smooth spaces and capitalism revolves around “the distinction between striated capital and smooth capital, and the way in which the former gives rise to the latter...”<sup>42</sup> The same seems to apply to the intellectual property system and the smooth networks through which digital artifacts flow. Media institutions striate the space in which digital artifacts can replicate through intellectual property. All artifacts produced under the umbrella of major media institutions are considered the intellectual property of corporations. The media institutions then need only to promote the idea that intellectual property is not only the vast majority of artifacts produced, but also that the vast majority of artifacts are the result of the organization of their production carried out by the media institutions. In other words, the media institutions promote their own hylomorphism, in which they give form to culture itself through the production of artifacts in the intellectual property system. By denying the creativity of smooth space, the outside of the intellectual property system, media institutions portray themselves as the generators of cultural production. In addition, through striation, the movements of digital artifacts are rendered predictable by the media institutions.

However, the striated methods give way to the appropriation of smooth space – in this case, the rhizomorphic social networks and peer-to-peer file sharing networks – for distribution of digital artifacts in the intellectual property system. In the smooth model of intellectual property dominating decentralized networks, the burden of promotion is relegated to social networks. The more that customers are encouraged to

take on an active role in marketing artifacts within the intellectual property system, the more predictable the actions of humans and digital artifacts will be.

### **Centralized and Decentralized Control of Peer-to-Peer Networks**

The replication of music and movie files over the peer-to-peer networks has attracted the attention of organizations such as the Recording Industry Association of America and the Motion Picture Association of America. These organizations have sought to end the replication of music and movie files over peer-to-peer networks. Their tactics can basically be divided into two categories: centralized and decentralized. Centralized tactics are those that attack centralized parts of the file sharing networks. Such tactics create a coevolutionary situation in which centralized aspects of file sharing becomes more decentralized as they are attacked. Napster, an older file sharing program, differed from BitTorrent in the way that it allowed peers to find files. On Napster, a user searched from a centralized database of all peers' files. This left Napster open to pressure from the RIAA and MPAA. Eventually, Napster shut down, later to be bought and used as a for-pay subscription music download service. Because of one aspect of Napster that was centralized, the RIAA and MPAA successfully applied direct control on it. Napster has since become a legal file sharing service, which is an example of how power can change its strategy from one of centralization to decentralization.

Instead of centralized control, the acquisition of file sharing networks is an example of decentralized control, as in the case of Napster. Because such digital

artifacts spread over material networks, examining the power structure of those networks might demonstrate that heterarchy and decentralization are characteristics of resistance. However, such neat divisions do not always hold up, as centralized power attempts to decentralize to keep up with resistance. Decentralized control differs from centralized control in that it leaves the peer-to-peer aspect in tact while limiting the content that reproduces over the network.

Subscription services, such as Peer Impact, use peer-to-peer technology and social networks to sell and promote copyrighted music (which is a fraction of the total of all music). In this way, they allow the predictable replication of digital artifacts. The Peer Impact FAQ page describes its service as, “a new online digital content distribution network that provides legal, peer-to-peer file sharing services for its members. [...] Peer Impact™ is the first authorized, peer-to-peer embraced by the major record labels.”<sup>43</sup>

One interesting aspect of Peer Impact's decentralized control is “Active Distribution,” “Active Distribution™ is just what it sounds like; members spreading the word about artists, playlists, video games, other content, etc. and exposing other members to their favorite content. We call these active distributors “NoiseMakers™.”<sup>44</sup> What is interesting about “Active Distribution” is that it appropriates the social networks that form around peer-to-peer file sharing networks. Peer Impact, then, limits the content that social networks can exchange to those under the intellectual property system. Peer Impact is an example of the beginning of a trend of capturing social networks and making them predictable without changing their

shape. All of the “legal, peer-to-peer file sharing”<sup>45</sup> services will in some way control what is reproduced, thereby limiting the full potential of peer-to-peer networks.

File sharing networks and the protocols that allow them to function are but one kind of digital artifact that change over time. As we will see in the next chapter, any digital artifact can be manipulated by human hands with a computer. As with file sharing, such manipulation is a commonplace activity that is built into the technology. Anyone can edit a piece of text. Audio, video, and images can also be edited and recontextualized. Because all digital artifacts are “partial” in this way, once again, they often come into conflict with the intellectual property system.

#### **Chapter Four – Illegal Art: Remixing Digital Artifacts**

The previous chapter concerned itself with file sharing networks, which are self-organizing digital artifacts. This chapter deals with digital artifacts themselves, their relations and flows, and especially the way in which they can be manipulated and remixed with computer software (which, incidentally, is also exchanged on file sharing networks). One specific kind of artifact that results from mixture is the *illegal artifact*. The illegal artifact is so because it uses source materials that have been designated as intellectual property. But before describing illegal artifacts further, we should go into more detail about how files are mixed.

Files are copied from one computer to many others in file sharing networks, with the aid of a human clicking a mouse to begin the copying process. The process is, of course, much more complex. The person may become interested in acquiring a

particular file for particular reasons and then uses search tools to find that file. Once a file is acquired, for example, a piece of music encoded in mp3 format, what does the user do with such a digital artifact? He or she can listen to it in an mp3 player, but he or she can also do more.

For example, a computer user can open the file in an audio editing program and cut pieces of the music, loop them, rearrange them, combine them with pieces from other pieces of music. This is known as the art of remixing. In the process of remixing, the remixer, having had their lifetime up to that point to take in the influences of his or her surroundings, makes connections between different pieces of music, putting them into a new situation, thereby making something that is new, but based on the previous work of others, adapting it to their own tastes. One could argue that all new culture and ideas are adaptations of previous work, whether properly cited or not. This is because of the way influences and tastes flow through networks from person to person in the form of conversations, text, and other artifacts that carry information – whether explicitly as in the case of a recipe, or implicitly as in the case of an already constructed artifact, when a person interprets its use by examining the object or the use of that object by another person.

But, artifacts are often used in ways not intended by their designer. The use of an artifact can change. Similarly, a group of artifacts, such as two mp3 audio files, can be edited, thereby creating a new audio file that could not be predicted. Twenty different people could be asked to remix a song, and the original songwriter would not be able to accurately describe ahead of time how each remix would be arranged. The

issue is further complicated by the intellectual property system. When a person or corporation owns the right for a piece of music to be copied (which includes the production of derivative works), and when a person without those rights remixes a work without permission, a conflict emerges. In this way, the production and distribution of artifacts is captured by established institutions such as the RIAA and MPAA, but that capture is always being eluded by file sharers, remixers, and other copyright infringers. The media institutions' ultimate goal is to have the replication and alteration of their artifacts to be carried out only in predictable and controllable situations. However, the use of artifacts is always turned in unpredictable directions, because humans (as brains, individuals, groups, families, organizations, institutions, societies....etc.) are complex systems.

The strategies by which artifacts are turned from their designed purpose can be described in a few ways. For Deleuze and Guattari, no artifact can be said to have a designer, or even designers. In the second paragraph of *A Thousand Plateaus* they write: "A book has neither object nor subject; it is made of variously formed matters, and very different dates and speeds. To attribute the book to a subject is to overlook this working of matters, and the exteriority of their relations. It is to fabricate a beneficent God to explain geological movements."<sup>46</sup> Although they describe books, they mean for the concept to be widely applicable; one can safely say that, at the least, they mean for the concept to be applied to human artifacts. That is to say, there is no intelligent design for them, even for books, which can be easily extended to file sharing programs and other digital artifacts. Their intention is not to prevent creative

people from taking credit for their work, but rather to not give preferential treatment to human creativity over the immanent creativity of self-organizing life (organic and nonorganic). In this way, all creativity is valued, including that of human activity, but also that ability of projects like file sharing programs and remixing to take on a life of their own, in that they strategically respond to the actions of media institutions.

Unlicensed remixes, like peer-to-peer file sharing networks, are outside of the prediction-control apparatus. Remixing, in itself, does not discriminate between sanctioned and non-sanctioned remixing, just as file sharing networks do not discriminate between those artifacts in the intellectual property system and those outside of that system. Remixing makes connections between different sources to form new assemblages. This brings us back to the concept of networks as collections of flows and relations. A remix is the result of pieces of artifacts flowing into each other. The result of such flows is an artifact that descends from its various source materials, which themselves were assembled from various parts – a finger plucking a guitar string making sound flow through a cable, out of an amplifier, into a microphone, to a mixing board and onto a reel of magnetic tape, years later to be digitized and cut into pieces with audio editing software. The distinction between partial and whole artifacts no longer exists. The flows of artifacts do not follow a predetermined path, much like the flows of peer-to-peer file sharing networks. However, institutions based on intellectual property, such as those in the movie and music industries, desire a model in which such flows *are* predetermined, controllable, and predictable. But before examining the conflict between the institutions of intellectual property and digital

artifact remixers, we should further explore the question “Of what is an artifact made?”

In their discussion of the rhizome, Deleuze and Guattari recall their collaboration in writing the first volume of *Capitalism and Schizophrenia*, called *Anti-Oedipus*. In this discussion, they describe of what a book is made. Among other things, they say that a book is a "little machine,"<sup>47</sup> referencing their thesis in *Anti-Oedipus* that literally "[e]verything is a machine,"<sup>48</sup> and "continuous flows and partial objects that are by nature fragmentary and fragmented."<sup>49</sup> They also say that a book is an "assemblage" and a "multiplicity,"<sup>50</sup> "made of variously formed matters, and very different dates and speeds."<sup>51</sup> This view of what a book is, which is an ontological claim that extends to more than just books, but also to "[e]verything,"<sup>52</sup> is extremely helpful in describing artifacts other than books, and especially digital artifacts because of the ease with which they can be taken apart, manipulated, and made into new artifacts. Although, Deleuze and Guattari meant for machines to include parts of human beings, entire human beings, parts of social networks, entire social networks, and so on. Therefore, a person's hand is a machine, that manipulates a mouse (another machine) that manipulates an artifact (also, a machine), causing it to replicate on a computer network, which is also a machine made of machines, and so on. In this way, they are able to forgo the distinction between humans and their technology. They do not privilege the human, or even biological life, which is why we are able to call digital artifacts nonorganic life.

### **Deterritorialization and Reterritorialization: Remixing as Marking Territory**

We have already established that digital artifacts are little machines, partial objects, and nonorganic life, “made of variously formed matters.”<sup>53</sup> These notions lend to the idea that digital artifacts can be easily remixed with audio and video editing software to form new artifacts. I would like to draw another concept from *A Thousand Plateaus* to further describe the act of remixing – that of marking territory. Territory is a crucial concept in *A Thousand Plateaus*. As we saw earlier with the concepts of smooth and striated space, Deleuze and Guattari are interested in describing spatial power relations, likely under the influence of Foucault's work. *A Thousand Plateaus* is a work of capture of territory and escape from territory, marking territory and remarking territory, not only in the literal sense as with a battlefield or a file sharing network, but also in terms of “aparallel evolution,”<sup>54</sup> a form of coevolution in a given ecosystem, between machines through a process they call deterritorialization and reterritorialization. We will see later that they apply these concepts to art itself, which will be useful for examining the conflict between remixed art and the intellectual property system that has marked certain remixes as illegal because their source material has been marked as intellectual property.

Deleuze and Guattari refer to the relationship of aparallel evolution as involving two complementary concepts: deterritorialization and reterritorialization.

They use the example of the wasp and the orchid to explain:

How could movements of deterritorialization and processes of reterritorialization not be relative, always connected, caught up in one another? The orchid deterritorializes by forming an image, a tracing of a wasp; but the wasp reterritorializes on that image. The wasp is nevertheless deterritorialized,

becoming a piece in the orchid's reproductive apparatus. But it reterritorializes the orchid by transporting its pollen. Wasp and orchid, as heterogeneous elements, form a rhizome. [...] ...a becoming-wasp of the orchid and a becoming-orchid of the wasp. Each of these becomings brings about the deterritorialization of one term and the reterritorialization of the other; the two becomings interlink and form relays in a circulation of intensities pushing the deterritorialization ever further.<sup>55</sup>

But they also apply the concept to the book and the world, and thereby, all art and artifacts. They clarify that such deterritorialization and reterritorialization has to do with marking by which artifacts make rhizomes with other little machines in a process of constant becoming.<sup>56</sup> Deleuze and Guattari ask,

Can this becoming, this emergence, be called Art? That would make the territory a result of art. The artist: the first person to set out a boundary stone, or to make a mark. Property, collective or individual, is derived from that even when it is in the service of war and oppression. Property is fundamentally artistic because art is fundamentally poster, placard. [...] No sooner do I like a color that I make it my standard or placard. [...] Artists are stagemakers, even when they tear up their own posters. Of course from this standpoint art is not the privilege of human beings. Messiaen is right in saying that many birds are not only virtuosos but artists, above all in their territorial songs [...].<sup>57</sup>

Once again, Deleuze and Guattari make one of their concepts applicable to realms outside of human life. But, more importantly, the concept of art as the marking of territory is especially relevant in the case of illegal art. Illegal art is designated so because its source material has been marked as intellectual property. The remixing artist makes a mark on territory that has already been marked, thereby deterritorializing that art, using art and property in a way unintended by the one who marked the territory in the first place. The case of artistic deterritorializations and reterritorializations seems to be involving *relative* deterritorialization, as in the case with the wasp and the orchid. In other words, the marking upon each others territory is

a coevolutionary process. I would now like to apply the concept of remixing as deterritorialization to another theoretical conception of illegal art: the *détournement*, and its complementary concept, *recuperation*.

### **Détournement and Recuperation**

I would like to investigate illegal art with the concept of *détournement*, especially as it is described in Guy Debord and Gil Wolman's 1956 article "A User's Guide to *Détournement*." Debord and Wolman were members of the Situationist International, a group concerned with abolishing the distinction between art, revolution, and everyday life that is often credited as an inspiration to the May 1968 insurrections in France. In the essay, they write,

Any elements, no matter where they are taken from, can be used to make new combinations. The discoveries of modern poetry regarding the analogical structure of images demonstrate that when two objects are brought together, no matter how far apart their original contexts may be, a relationship is always formed. Restricting oneself to a personal arrangement of words is mere convention. The mutual interference of two worlds of feeling, or the bringing together of two independent expressions, supersedes the original elements and produces a synthetic organization of greater efficacy. Anything can be used.

It goes without saying that one is not limited to correcting a work or to integrating diverse fragments of out-of-date works into a new one; one can also alter the meaning of those fragments in any appropriate way, leaving the imbeciles to their slavish reference to "citations."

Such parodistic methods have often been used to obtain comical effects. But such humor is the result of contradictions within a condition whose existence is taken for granted. Since the world of literature seems to us almost as distant as the Stone Age, such contradictions don't make us laugh. It is therefore necessary to conceive of a parodic-serious stage where the accumulation of detoured elements, far from aiming to arouse indignation or laughter by alluding to some original work, will express our indifference toward a meaningless and forgotten original, and concern itself with rendering a certain

sublimity.<sup>58</sup>

Situationists' writings far precede Internet culture, and détournement may only refer to a specific kind of remixing, however, some aspects of the concept are applicable to works that proliferate on the Internet. Debord and Wolman describe détournement as "propaganda," showing "indifference toward a meaningless and forgotten original" as opposed to "obtain[ing] comical effects."<sup>59</sup> However, having considered their attitude toward "slavish reference to 'citations,'" what has become important in light of digital rights management schemes is not necessarily whether or not the content of remixed art is propaganda or comical, but instead the disregard for distinguishing between intellectual property that is owned and that which is in the public domain. What the Situationists effectively advocated was the free flow of artifacts without any restriction, be that a traceable reference to source material, or legal obstacles to prevent mixture between artifacts. If détournement is a marking of territory, they sought to capture striated territory and replace it with smooth territory by marking on any available artifacts. In this way, culture would always be a space of unpredictable difference, in which the marking of territory would be a continual process. However, the Situationists had a complementary concept to détournement, which they referred to as *recuperation*. Recuperation is similar to détournement in that it marks upon cultural artifacts, but in doing so, brings them back into the intellectual property system. To draw on an example from the first chapter, if peer-to-peer file sharing is a détournement of the Internet, in other words, if peer-to-peer file sharing turns the Internet to a new purpose that was not intended by the original, designers, then peer-

to-peer-for-pay services like Peer Impact recuperate the smooth space created by peer-to-peer technology and turn it back to the purpose of promoting and distributing cultural artifacts marked as intellectual property. How this applies to coevolution is that *détournement* and recuperation can be seen as relative strategies, in the same way as deterritorialization and reterritorialization are relative to each other in the example of the wasp and the orchid. They are relative in that they both involve the marking of territory, the difference being that *détournement* and deterritorialization mark on territory that is striated, whereas recuperation and reterritorialization mark on territory that is smooth – either by striation or by appropriating the smooth space. In either case of striation of smooth space or appropriation of smooth space, the artifacts in question are limited in their ability to be copied or mixed due to their mark designating them as property.

I would like to submit examples of digital artifacts that remix copyrighted audio and/or video in a way reminiscent of *détournement*. The first example is “The Grey Album,” a mixture of cut up music from The Beatles’ “White Album” and rapper Jay-Z’s “Black Album.” The second example is a series of *G.I. Joe* cartoons that were remixed and redubbed with new audio tracks. That example is especially relevant because of how the clips have been appropriated into advertisements, which I consider an example of decentralized control. The final example will be the website YTMND.com, which is relevant because it features a proliferation of remixed artifacts. While some aspects of these examples are closer to *détournement* than others, I propose that in the age of digital replication, what is most important about

these works is that they incorporate material from the intellectual property system.

Although my focus is on the how the artifacts were created and shared, rather than their content, I will examine content to an extent, because *détournement* refers to not only how the artifact was created, but also to its potentially subversive content.

Debord and Wolman describe *détournement* as “clashing head-on with all social and legal conventions,”<sup>60</sup> and I would emphasize that what is important in the examples of remixed digital artifacts is the “clashing with [...] legal conventions.” What one must remember, however, when analyzing power relations in the replication of digital artifacts, is not simply whether or not a particular artifact’s replication is legal or illegal, but also whether or not that replication (or prevention of replication) works to centralize and stratify control over replication or to decentralize power by allowing the free flow of artifacts. In each example, I will examine the paths of the artifact’s replication and the consequences of cease and desist letters (if any) on replication. In each case, we will see that the replication of a given artifact cannot be entirely eradicated, and that such flows can be seen as resistance and self-organization in the face of hylomorphic control imposed from above by intellectual property institutions. What remains most important is to investigate the strategies that allow illegal artifacts to replicate, and the strategies by which illegal artifacts are prevented from replicating.

## **Remixing and Decentralization:**

### **DJ Danger Mouse's *The Grey Album* and Grey Tuesday**

On February 24, 2004, over 170 different webmasters changed their color scheme of their websites to feature the color grey and made available a copy of DJ Danger Mouse's *The Grey Album* – a remix featuring music samples from The Beatles' self-titled album (also known as the *White Album*) and vocal samples from rapper Jay-Z's *The Black Album*. Downhill Battle, a non-profit musical activism project that promotes file sharing as civil disobedience organized the event, known as “Grey Tuesday.” This online protest was organized as a response to cease and desist letters delivered to DJ Danger Mouse, whose real name is Brian Burton, from EMI, the company that claims ownership of the copyright for the *White Album*. On the other hand, an a capella version of Jay-Z's *Black Album* had intentionally been released for use by DJs who would want to remix songs from the album. EMI served DJ Danger Mouse with a cease and desist letter, to which he responded by agreeing not to distribute any more copies of the album, which initially only had a small pressing of compact discs. In this way, all reproduction of *The Grey Album* by centralized means (i.e., the production of compact discs as initiated by DJ Danger Mouse) was effectively controlled by a major music publishing corporation.

Looking at DJ Danger Mouse's *The Grey Album* and “Grey Tuesday” as the main case study, we will see the ways in which resistance, control, and coevolution played out in a particular instance of remixing resulting in a piece of illegal art. A

focus on the shape of the networks over which the remixed artifact in question was replicated will give a sense of the interplay between controlling and resistant forces.

My aim is to demonstrate that *The Grey Album*, and other pieces like it, are the result of the flows of material (in this case, digital audio files) that encounter each other in the context of remixing software to make another artifact, different than the original audio files from which it was mixed. Because of the many ways in which media can be recombined, predicting what will be remixed next is a problem of complexity. In a smooth space, in which the flows of data replication and recombination are not blocked or prevented, such remixing would self-organize, similar to the way in which life and genetic reproduction are self-organizing processes. Systems of control, however, such as the intellectual property system, make the assumption that organization must be imposed on matter from above. Therefore, making what is and is not remixed predictable is of utmost importance for imposing control. The intellectual property system makes this possible by controlling the rights to whether or not a given artifact can be combined with another. When artifacts that are not supposed to recombine do so, the first method of control is the *cease and desist letter*. By looking at some cease and desist letters in response to certain pieces of illegal art, we may be able to better understand the view that matter needs to be shaped and organized from above. *The Grey Album* and *Grey Tuesday* provide a well-rounded case study for us to begin with, especially because of the response to the attempted control.

The reproduction of *The Grey Album* on Grey Tuesday decentralized into social and material peer-to-peer networks. Because digital artifacts replicate in an environment, they exhibit similar traits as biological life. But, digital life is dependent on the human-computer networks that use them to communicate and activate their replication. While *The Grey Album* was available on peer-to-peer file sharing networks both before and after February 24, 2004, that day was designated as an official day of protest against the restriction of file replication. The greytuesday.org website claims, “On February 24, 2004 approximately 170 websites hosted a full copy of the Grey Album, in spite of the fact that many of those sites received a cease and desist letter from EMI’s lawyers.”<sup>61</sup> Downhill Battle, “a non-profit organization working to support participatory culture and build a fairer music industry,”<sup>62</sup> is the group that organized the protest, but many of the sites hosting *The Grey Album* were not previously associated with the group and came together in an ad hoc manner. In addition, the site claims that during the day of protest, over one million files were downloaded:

After a survey of the sites that hosted files during Grey Tuesday, and an analysis of filesharing activity on that day, we can confidently report that the Grey Album was the number one album in the US on February 24 by a large margin. Danger Mouse moved more “units“ than Norah Jones and Kanye West, with well over 100,000 copies downloaded. That’s more than 1 million digital tracks.<sup>63</sup>

In this case, the social networks facilitated by the Internet provided the infrastructure for the rhizomorphous distribution of the digital artifacts. Although, in one sense, the protest centralized the list of participating sites at greytuesday.org. In fact, the list of participating sites is still located on the main page of greytuesday.org, although EMI

has taken no legal action other than sending cease and desist letters. The album is also still available for download at [bannedmusic.org](http://bannedmusic.org).

Although some aspects of the file sharing of the protest were centralized, the overall effect was successful in replicating *The Grey Album* over peer-to-peer networks. The computers on which each participating website stored the album functioned as centralized sources of the file, but because they were widespread and agreed to participate in the same action ad hoc, they allowed for widespread distribution, and from each website's place of storage, many other computers downloaded copies of the files.

Having discussed the digital rights management applied to *The Grey Album* in the form of cease and desist letters, and the shape of the networks on which *The Grey Album* flowed on Grey Tuesday, I now turn to the question of coevolution in the case of Grey Tuesday. Did coevolution occur in the example of *The Grey Album*? Did artifacts change due to pressures, digital rights management, and cease and desist letters? The cease and desist letter sent to DJ Danger Mouse *did* lead to his remixed album being widely distributed in the Grey Tuesday activities. What were the other consequences? Did any artifacts undergo changes because of cease and desist letters? The answer seems to be that the cease and desist letters sent to participants in Grey Tuesday had little effect, if any. The album is no longer available on most of the participating websites, but the album *is* available for download on some websites and of course on file sharing networks. While no new artifacts arose in response to pressure, the way in which websites are used was temporarily changed on Grey

Tuesday. Never before had different, previously unrelated websites been used to distribute a piece of “illegal art.” With each website acting as a distribution point, over one million digital artifacts were replicated in the course of one day. In terms of “analyzing power relations through the antagonism of strategies,”<sup>64</sup> cease and desist letters were not effective in the case of Grey Tuesday.

In other cases of “illegal” remixes, cease and desist letters have sometimes been ineffective, and in others, they have changed the way in which certain artifacts replicate. However, digital artifacts, illegal or otherwise, continue to replicate in some way in each case. Now, I will turn my attention to other illegal remixes, many of which have also produced cease and desist letters. The cease and desist letter seems to be preferred tool of those wishing to “limit the field of actions”<sup>65</sup> of manipulators of digital artifacts so as to make them act predictably. Different cases feature different responses to cease and desist letters, from ignoring them, responding to them and continuing, to discontinuing production of such artifacts (although, replication of existing artifacts is difficult to prevent entirely). Once again, in the following examples, we will examine the effectiveness of the strategies used in marking and remarking territory.

### **Deterritorialization and Détournement: Fenslerfilm’s *G.I. Joe* PSAs**

One group of remixes on the Internet is Eric Fensler’s remixed G.I. Joe PSAs, which involve video edited from the G.I. Joe cartoon aired originally during the 1980s and audio from the remixer, Eric Fensler, who has redubbed new dialogue in place of

the original dialogue. I believe they are meant to be satirical. Their non sequitur nature can be attributed to the fact that they use editing to create juxtaposition the original copyrighted G.I. Joe material against absurd, re-dubbed dialogue, often playing on stereotypes. These new G.I. Joe PSAs are, I argue, in the spirit of détournement. By depicting situations in which adults give a life lesson to children, the original PSAs offered situations in which adults were trusted authority figures. In the Eric Fensler PSAs, adults act more like reproducers of the dominant culture, all the while executed with hilarious absurdity. For example, in “PSA 11,” a male G.I. Joe character arrives at a soccer field and instead of offering some basic advice as might be done in the original PSA, the character begins reciting what sound like news reports, saying, “Damage to the base is said to be heavy and the Israeli jets are reported to have made it back to their headquarters,” and “A forty-nine year old unidentified man went berserk last night, opening fire with a 12-gauge shotgun in a crowded downtown restaurant.”

In “PSA 16,” a female G.I. Joe character asks two African American children (speaking in an absurd stereotypical fashion) if they’ve, “see[n] a pink, uh, I wanna say vinyl purse around here somewhere? I’m just dying to get my cigarettes.” From there, the scene disintegrates into dreamlike, hallucinatory surrealism. In other PSAs, the Native American G.I. Joe speaks in his native language rather than English, absurdly portraying Native American stereotypes. In the PSA with the Japanese G.I. Joe character, all of the characters speak Japanese, including the ones who are supposed to be “Americans.” Perhaps the most relevant PSA, however, features the

African American boy from “PSA 16,” and a G.I. Joe character who shouts at him “Hey kid! I’m a computer! Stop all the downloadin’!”

As to whether or not the remixed PSAs are examples of détournement, they bear many similarities to Debord and Wolman's conception of détournement, but it is also questionable whether or not the PSAs meet the criteria of being “the accumulation of detoured elements, far from aiming to arouse indignation or laughter by alluding to some original work, will express our indifference toward a meaningless and forgotten original, and concern itself with rendering a certain sublimity.”<sup>66</sup>

All websites hosting Fensler’s films were sent letters by lawyers for Hasbro, Inc. They write, “These PSAs are portions of G.I. JOE® cartoons that been re-cut and dubbed. The G.I. JOE® cartoons are the copyrighted property of Hasbro. The fake PSAs available on your website are unauthorized derivative works of the G.I. JOE® cartoons.”<sup>67</sup> This is an example of overt control. However, it has not proven effective, as no sites have removed the videos to date except for Fensler's own website. Because the files can replicate so easily, the burden to store the files was able to be decentralized away from Fensler himself. The PSAs, however, have been recuperated, in a sense. Their ability to replicate has been taken away by a certain kind of file type.

### **Reterritorialization and Recuperation: Heavy.com**

The PSAs have been hosted on a website called heavy.com. Heavy.com’s entire site is made with Macromedia Flash. By using this medium, it accomplishes a few things. First, the links to all of the media files are integrated into an active visual

environment, allowing the advertisements of corporate sponsors to be integrated into the experience and inserted between mouse-clicks toward opening media files. In this way, the PSAs and the advertisements are integrated into a fragmented, yet unified, environment. Second, Macromedia Flash can accrue information about users through “local shared objects.”<sup>68</sup> Third, and perhaps most importantly, one cannot save the .swf Flash files to a hard drive. In other words, the replication of digital artifacts on Heavy.com is limited. When one views, for example, the Fensler G.I. Joe remixes, the files are replicated (as they always must be) to the computer’s random access memory (RAM, which is the computer’s “short term memory”), but as soon as the user is no longer watching a media file, that copy is gone – purged from the RAM. One cannot make a permanent copy. Macromedia Flash has become the file medium used by popular video hosting sites Youtube and Google Video. On youtube.com, anyone can upload video and view video, but they cannot save the file. In one way this strategy is decentralized, because it allows access to the files as long as one is connected to the Internet, but it also restricts the files' replication.

Thus far, we have examined use of a variety of materials composed of copyrighted artifacts: audio clips, video clips, likenesses of celebrities. The final example in this chapter includes all of those elements and more, including text and image. Let us explore the ways in which “YTMNDs” combine digital artifacts, replicate, and evade the capture of legal conventions.

**Strategy of Proliferation: “You're the man now, dog.”(Ytmnd.com)**

The website ytmnd.com perhaps serves best as the last example, simply because of the sheer number of its remixes, as it invites anyone to make a simple, single webpage combining text, a tiled image, and a looped audio clip, referred to as a “YTMND.” These pieces of “art” perhaps best reflect Deleuze and Guattari's notion of artifacts being “assemblages” and “multiplicit[ies],”<sup>69</sup> because they combine many elements and are multiple in number. Currently, over a quarter of a million YTMNDs are hosted on ytmnd.com.<sup>70</sup> The site invites anyone to make a YTMND by filling out a simple form in which one submits an image file, an audio file, and optionally, up to three lines of text.

A YTMND is made up of three elements, and are almost always intended to be humorous. The image is perhaps the most crucial element of a YTMND. The image used in a YTMND is often a static image tiled across the browser window. However, the image can also be centered in the middle of the screen. In addition, the image can be animated, which has led to the creation of more complex YTMNDs. The image is almost always derived from another source, and is often modified in some way as to add to the humor of the piece. In this way, YTMND encourages one to take an image from any source. By using the “Print Screen” button on one's keyboard, one can copy the contents of their screen for use in image editing software. In this way, any image can be used and manipulated to create a YTMND. The audio portion of a YTMND consists of an audio clip that is looped as to repeat itself indefinitely. Sometimes the audio is meant to sync up with an animated image, but it is often simply a background.

The audio clip is also almost always derived from another source. Finally, the text portion of a YTMND, which is optional, consists of up to three lines that are displayed in a font appearing to zoom toward the viewer.

The acronym “YTMND” is derived from the first work of its kind, created by Max Goldberg, which features a tiled image of actor Sean Connery, with the text “YOU'RE THE MAN NOW DOG.COM.” The looped audio comes from the film *Finding Forrester* in which Connery delivers the line “You're the man now, dog.”<sup>71</sup> This YTMND is hosted at [yourethemannowdog.com](http://yourethemannowdog.com), but eventually, Goldberg created [ytmnd.com](http://ytmnd.com) to provide an easy way for people to create and share their own YTMNDs.

One interesting phenomenon concerning YTMNDs is that they often use other YTMNDs as source material. Therefore, one can trace the relations between various YTMNDs that alter the content of one YTMND to generate another. Perhaps YTMNDs are one of the best examples of digital artifacts because of this – their source material can derive from any image, audio, and text, including themselves. Technically, a YTMND is not supposed to violate copyright law (or any law); however, this rule is not enforced. Because YTMNDs are so great in number, they are difficult to moderate, although a moderation system exists. If a YTMND is potentially offensive, it is hosted at [ytmnsfw.com](http://ytmnsfw.com), the acronym NSFW standing for “not safe for work.” Because YTMNDs can be made by anyone, they can feature humor that is offensive, sexist, racist...etc. However, it is often difficult to determine whether or not a YTMND uses offensive content for ironic purposes. Because YTMNDs use source material that may or may not be copyrighted, and because they often display an

“indifference toward a meaningless and forgotten original,”<sup>72</sup> they are a good example of détournement. YTMNDs are often intended to be humorous; however, they do so in a variety of ways. YTMNDs can even be informative, detailing the history of a particular YTMND trend.

What all of the artifacts I have described share in common is that they are made up of materials that come from a variety of sources. Some of those sources are copyrighted and some are not. What will be done with an artifact is not predictable, because anyone can potentially change any artifact and re-release it. Files will continue to change because of human behavior, but because those changes are not directed from a centralized source, those changes cannot be easily controlled. When controls are implemented, however, files will change again to ensure that somehow they are able to reproduce. And when those files change, the control will also change to become better at preventing the unsanctioned reproduction of files.

## **Conclusion**

Digital artifacts, by design, *must* replicate in some way whenever they are used, and permanent copies are made whenever digital artifacts are shared over the Internet. Digital artifacts therefore blur the distinction between production, consumption, and circulation. Much like any other artifacts, their production, consumption, and circulation are subject to centralizing and decentralizing forces. One of the main points that the philosophers in the area of new materialism seem to agree on is that all materials are subject to such forces, which produce networks of flows and

relations. All actual networks, including the socio-technological networks that I have focused on, have both centralized and decentralized characteristics. The shape of a network can even depend on the scope within which one analyzes a particular network. In any case, however, centralizing forces tend to command areas of networks, and decentralizing forces tend to escape command. Command can also occur in decentralized ways, often as a response to decentralizing forces. Command often sees itself as giving form to networks; however, this work's thesis maintains the philosophical viewpoint that networks can exhibit organization without command.

The interaction between self-organizing networks and media institutions results in a series of reactions that can be described as coevolution. In each example, a counterplay exists between the replication (or circulation-production) of artifacts and the strategies to control those artifacts at the point of their replication. The intellectual property institutions regain some predictability and command of the artifacts' behavior with the use of digital rights management and other practices. Digital artifacts interact and change while passing through the computers of many individuals, without one commanding designer. However, centralizing institutions, the RIAA and MPAA being the models used in this work, believe (if we can say that institutions have guiding philosophies as "beliefs") that command is necessary. That is to say, they believe in the philosophy of hylomorphism, which this work has argued against. Of equal importance as these beliefs are the strategies and actions of these institutions who *do* command the production, circulation, and consumption as they constitute a polycentric media artifact industry.

However, while coevolution can involve relative movements and territorial markings, such as *détournement* and recuperation, and deterritorialization and reterritorialization, coevolution can also cause commanding institutions to decentralize, without losing their ability to command. In other words, control can exist without centralization. When this happens, where does strategy for digital artifacts to flow, connect, and mutate in a self-organized way go? In other words, how can self-organization exist with decentralized control?

The answer to the question is perhaps unanswerable, because of the unpredictable nature of evolution. But, we may discover other kinds of movements besides centralization and decentralization, more kinds of coevolutionary strategies other than arms races and cooperation. It would not be unimaginable that a multiplicity of factors, movements, flows all contribute to the way that materials are produced, circulated, and consumed. In our observation of the "behavior" of cultural artifacts, by staying close to their material nature, the way they must be physically reproduced, and the flows of their reproduction, we can better understand the benefits of encouraging a collaboration between human creativity and the self-organizing properties of matter.

Taking the point of view of digital artifacts is not to deny the role of the humans that use them, but rather to give a fuller picture of the role that cultural materials play in the development of human culture, especially in the context of computer networks. However, the materialist point of view is of course not limited to the study of computer networks. Computer networks may reveal that culture is

dependent on physical artifacts, but a research focus based on tracking the flows of matter could potentially offer insight into other areas of study, including literature and culture.

Deleuze and Guattari repeatedly warn us throughout *A Thousand Plateaus* that rhizomes and smooth spaces are not inherently liberatory. However, they tend to favor the unfettered flows and connections of “life” – whether in the context of human subjectivity, biological life, or life as a generalized concept, which would include the nonorganic life of geological formations and digital artifacts. While power organized in the shape of rhizomes and smooth spaces does not automatically allow life to connect and flow without command, we can generally say that they favor self-organization. Therefore, throughout this work, I have given preference to self-organizing networks, as I have adopted the philosophy that matter does not need to have form imposed on it to organize. By extension, the work argues that self-organizing culture is preferable to culture that has a form imposed on it by centralized institutions.

Self-organization could easily be called 'resistance' in Foucauldian terminology as well as in the terminology of microbiology, because resistance is the opposite of discipline and control. In other words, resistance and self-organization happen as contingencies unaccounted for by discipline and control. To recall the example of antibiotic resistant bacteria, if the designers of antibiotics could predict the evolution of bacteria, then they could account for such resistance in the design of drugs. However, resistance, by definition, is unpredictable. To use an example appropriate to

Foucault, a prison can regulate the life of its prisoners, yet prisoners always find ways to evade such regulation and break rules, creating an underground network economy in which contraband is constantly produced and circulated (and consumed in the case of consumable goods).

It is this rhizomorphous, underbelly that exists exterior to command centers that I privilege in this work. In the realms of culture and science, the productive underbelly provides innovations that would otherwise not be allowed to exist. To understand the value of self-organization and resistance in culture is crucial to discussions about intellectual property. Whether one is focused on intellectual property in the genetic realm, as in the case of patenting particular breeds of plant, or in the digital realm, as I have focused on, the same situation applies. In both cases, evolution has allowed materials to organize in complex networks of relations, in which intervention from command centers can have unpredictable consequences.

What stance are we to take then in light of such coevolutionary feedback loops between mechanisms of control and resistance? We can oppose control mechanisms such as digital rights management, even if it does drive technological innovation in a direction that subverts control. But still, a network is only a shape, and therefore even the most effective control can be decentralized. And there may also be other shapes for power relations that we have not yet considered.

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