SITUATING CREATIVITY: DEVELOPING A NON-CARTESIAN APPROACH TO THE CREATIVE PROCESS

A Dissertation
Submitted to
the Temple University Graduate Board

In Partial Fulfillment
of the Requirements for the Degree
Ph.D. in Philosophy

by Eric Fleming
Diploma Date: May 2013

Examining Committee Members:
Miriam Solomon, Dissertation Advisor, Department of Philosophy
Philip Alperson, Department of Philosophy
Joseph Margolis, Department of Philosophy
John Carvalho, External Reader, Department of Philosophy, Villanova University

ABSTRACT

In this dissertation I argue that creativity should be understood as a situated and distributed process. As I develop my approach to understanding creativity over the course of this dissertation, three core claims emerge: 1) that the creative powers of particular agents are constituted within the concrete circumstances (both social and material) in which they are situated, 2) that the creative process itself unfolds across networks of associating actors, and 3) that these networks of associating actors include nonhumans of diverse sorts as active participants in the creative process. Understanding the creative process in this way distinguishes my approach from the ways in which creativity has traditionally been understood, which I argue are marked by a deep Cartesianism. This Cartesianism manifests itself in the way that creativity is predominantly studied and conceived of as a cognitive process that occurs within the minds of individuals. Because creativity is seen to occur within the minds of individuals, and because these minds are seen to function autonomously of their context, there is a resulting lack of attention to how the creative process is shaped by and extended out into the material and social environment. Furthermore, because creativity is understood to be solely a manifestation of human agency and human intentions, the active role of nonhumans in the creative process has not been taking into account. Drawing upon literature within feminist epistemology, cognitive science, science and technology studies, disability theory, and situated action theory, I argue that to better understand creativity, we must consider the creative process as it occurs within particular social and material environments, as it is

distributed across diverse networks of actors, and as it is shaped in essential ways by

nonhuman actors. It is only by considering creativity in its context, out in the world and

in the interactions between things, that we can get an adequate understanding of the

creative process.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

CHAPTER 1
HOW CREATIVITY IS UNDERSTOOD TODAY, BEGINNING WITH A SKETCH
OF AN ALTERNATIVE PERSPECTIVE

What do we understand by the term "creativity"? What are the limits of the word's extension? Speaking broadly, the term creativity refers to the process by which something new or novel, something that previously did not exist, is brought into existence. Further, to count as being creative this novel thing must also be seen as having value. A more novel and valuable product is typically understood to result from a process that is more creative than a process which generated a product that is comparatively less valuable and less novel. This coincidence of novelty and value as characteristic of creativity will be found in most contemporary attempts to define creativity.

However, we mean more than simply the occurrence of the coincidence of novelty and value when we say that something is creative. We also have beliefs about what sorts of entities are capable of engaging in creative activity, and of what aspects of those entities the creative capacity resides in. More precisely, we are inclined to see the human individual as that entity that is creative and, furthermore, to see creativity as a strictly mental phenomenon. That is to say, creativity is understood to happen within the minds of individuals. That which is external to the individual mind is perhaps a resource, tool, or stage for creative action, but its role in the creative process is essentially passive. The creative process may act upon the external world, but the external world itself is not creative. As such, we say of an interesting musical performance that the musician is creative, but not his or her instrument. Of an important scientific discovery we say that the scientists are creative, but not their tools or the institutions within which these scientists work. Of the innovative novel, we say that the novelist is creative, but not the

language within and out of which the text is composed, the traditions or genres within which the text is embedded, the tools with which the text was composed, or the social and material environments within which the act of composition was situated. If we want to study creativity, we should thus take as the focus of our research the minds of individuals and then determine and study what sorts of mental processes or dispositions are the most conducive to creative accomplishment.

But what if this way of understanding creativity actually obscures what creativity really is? What if this individualistic and purely mental conception of creativity causes us to misconceive the creative process? What if creativity is not, in fact, even an exclusively human process and can not be understood solely with reference to human actors? In posing these questions to the conventional way of understanding creativity, which defines and delimits both popular and academic theories of creativity, I aim to reconceptualize creativity and provide an alternative approach to the study of the creative process.

1.1 - Preliminary Statement of My Approach

So that the goals and intentions that will guide the next couple hundred pages will be clear, so that what exactly I want to claim about creativity is explicit from the very start, I want to state now what, at the end of this dissertation, I will conclude about the nature of creativity. My approach to the creative process ultimately focuses upon actors and the associations that form between actors. By the term "actor" I denote, to quote Bruno Latour, "entities that do things."[1] Let me now produce a list of entities that do

---

[1] See Bruno Latour, "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts," in *Shaping Technology/Building Society,* ed. Wiebe E. Bijker and John Law (Cambridge: The MIT Press, 1992), 241. As will become clear, my own approach is

things: neutrinos, Bank of America, quasars, nuclear reactors, electric guitars, electric eels, the proletariat and the bourgeoisie, Karl Marx, CERN, Lake Vostok, the Great Red Spot, *Raiders of the Lost Ark*, ants, and ant colonies. These are all actors; they all do things. Perhaps the most unusual features of this list of actors is that it includes various nonhumans, including entities that many of us would consider inanimate (a quasar) or abstract (the proletariat). Though calling these things "actors" might seem somewhat perverse to common sense, such perversity is valuable because it encourages us to see these various nonhuman entities as not simply, at best, passive objects of human action, which is what common sense holds them to be, but as active participants in structuring the world that they inhabit with us, which is what they really are. The point is that these entities do things, they affect the world around them and the course of its development. As such, a theory of creativity that hopes to be adequate to its task needs to take this nonhuman activity into account.

Following Latour, I consider actors to be the effects, not just the causes, of their activities in the world, and thus my understanding of actors is essentially performative. However we must be careful to avoid understanding performativity in an individualistic fashion, and in so doing rendering actors and their activities as autonomous and independent; conceiving of performativity in this manner would cause us to mistakenly consider the actions of individual actors' as the sole source of their own existence. Actors not only enact themselves, they are also acted upon and through by other actors, they act upon other actors, and they act in coordination with a multitude of other actors; in fact all

heavily indebted to Latour and actor-network theory, as well as theorists with whom I detect an affinity like Donna Haraway, Andrew Pickering, and Karen Barad. This influence should become evident over the next few pages.

actions, approached in the manner that I am proposing, reveal not one actor coming into definition but a swarm of entangled and intermingled actors. Given this, we should conceive of this collective activity as constituting a dense web of interactions.[2] It is in the matrix of this distributed and decentered activity, which originates from and is mastered by no particular actor, that particular actors form and become individuated.

In light of this account of actors and their activities, the nature of the associations that form between actors should be clear: associations are things done, they are performed or enacted, they produce a change or effect in the associated actors; associations do something to the actors that are associated. As such we can not say that two actors are associated with one another if these actors do not affect one another. A notion of association that does not entail some kind of change or effect in the associated actors is an empty and entirely abstract notion of association. Thus associations, as I will employ the term here, are enacted and undergone by actors. Associations may be maintained, modified, renegotiated, reinforced, diminished, or extinguished, but the key point is that associations are things that actors do.

Understood in these terms, creativity designates the process by which novel capacities for acting upon and within the world, which is to say new ways of associating, come into being; a work of literature, an invention, or a scientific theory can be said to be creative to the extent that they *do*, in their own particular ways of *doing*, something different, something new, something novel. This novel *doing* is the core of the creative process. However, what an actor is capable of doing is not a property that inheres in the

---

[2] Or rather, to invoke a word coined by Karen Barad, "intra-actions." Her work, and this concept, will be considered later. See Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham: Duke University Press, 2007).

individual actor; what an actor is capable of doing emerges out of its specific manner of being situated in the world, the particular associations that it maintains with other actors. To develop this point, consider the wide range of actors with which I associate and, in so doing, transform my capacities for acting upon the world. For example, in association with my laptop I exhibit capacities for engaging with my world that I do not, without such an association, possess: I can e-mail a friend, look up journal articles concerning a topic I am studying, compare reviews of local restaurants, and keep track of the latest news about Curiosity, the Mars rover. In forming an association with a bicycle I become capable of new modes of locomotion. In forming these sorts of associations, with computers, with bicycles, with whatever, I become a sort of hybrid actor, and in so doing I exhibit capacities for engaging with and acting upon my world, for associating with it, that I did not previously manifest. What we should note, however, is that the number of associations that any actor enacts is only a small number of the associations that are available to it, that are possible, and as these actors explore and make new associations, they generate sometimes novel hybrids or configurations of actors with transformed and sometimes novel capacities for acting. For example, the assemblage constituted by a musician, guitar, and mixing board is today a rather unremarkable entity. When we look at the musical practice of Toshimaru Nakamura, however, we find a modification of this assemblage in which the guitar has been removed and the mixing board's output is fed back into the mixing board itself. This assemblage of Nakamura and no-input mixing board is a rather novel thing, but what should be noted is that we are not simply dealing with a new combination of already existing actors, but an actor that exhibits rather novel musical possibilities that, in enacting these possibilities, participates in the creative

transformation of its musical situation and the sorts of activities that are possible within it. That is to say this no-input mixing board is not just a novelty, an orphaned object without a context within which it, and what it does, would make sense; it also exists and participates in the formation of a particular space of musical performance, in this case free improvisation, with a particular and evolving set of practices. Nakamura and his no-input mixing board not only enact previously unrealized possibilities of musical practice, they also participate in a redefinition of what is possible; they generate new musical possibilities.

To clarify, the sorts of possibilities that exist for any given actor should be thought concretely, in terms of the particular situations within which that actor is embedded. As such, though perhaps in some abstract sense it is possible that I could become a Viking warrior or an alchemist, concretely speaking these possibilities are not really possibilities for me because the world that I inhabit, the situation that defines me and my activities, prevents me from becoming these things. I can not form the sorts of associations that would enable me to be these things. One of the questions that should concern us, with regards to creativity, is how these situations that structure, constitute, and guide our activity can change such that certain existing possibilities disappear and new possibilities emerge. The answer to this question, I believe, we are required to study how actors interact with one another; how actors interact and form new configurations of actors, new actors, and new settings or situations; how actors act in ways to remake the situations within which they are situated and in so doing redefine their capacities.

To make sense of the inextricable embeddedness of the creative process in concrete material and social worlds, I want to conceive of creativity as a situated and distributed process. To clarify exactly it means to say that creativity is situated, consider Philip Robbins and Murat Aydede's analysis of the concept of situated cognition. The concept of situated cognition holds that, "first, cognition depends not just on the brain but also on the body (the embodiment thesis). Second, the cognitive activity routinely exploits structure in the natural and social environment (the embedding thesis). Third, the boundaries of cognition extend beyond the boundaries of individual organisms (the extension thesis)."[3] Simply stated, a cognitive process can be said to be situated if the cognitive process relies upon the cognitive agent's mode of embodiment, if the cognitive process is parasitic upon its environment, and/or if the cognitive process itself extends beyond the boundaries of the organism. Creative cognitive processes are similarly situated, and in subsequent chapters I will explore this point in more detail, but right now it is more important to note that my use of the term situated, like how I understand creativity, is not strictly cognitive. In other words, the creative process is situated even in its non-cognitive aspects, which involve the creative material interactions between things in the world that do not necessarily involve the production and manipulation of knowledge, and we can understand what this means in terms parallel to how Robbins and Aydede explicate the notion of situated cognition. When I say that the creative process is situated, this means first that we should consider the actor in its physicality and how this physicality shapes the creative process; second that the creative process does not simply

---

[3] Philip Robbins and Murat Aydede, "A Short Primer on Situated Cognition," in *The Cambridge Handbook of Situated Cognition*, ed. Philip Robbins and Murat Aydede (New York: Cambridge University Press, 2009), 3.

reside in the bodies of particular actors, but also depends upon the associations that the actor has formed with other actors and its environment; and finally that the creative process may not bounded by the physical limits of any particular actor, but rather extends out into the environment.

In this dissertation, I want to consider situated and distributed ways of understanding and analyzing creativity to be complimentary. The situated approach focuses upon the creative process of a particular actor as embodied, embedded, and extended. The distributed analysis, however, takes the focus off of the particular actor and considers the creative process as it is distributed across a network of associated actors. We should approach these networks of associated actors without, at least in the initial stages of analysis, giving privileged to any particular actor or actors as playing a determining or more central role in the creative process. Thus, asked to, for example, give an account of the creative process that resulted in the theories of special and general relativity, I would not, as is customary, turn my investigation upon Einstein as if he was solely responsible for this creative accomplishment, as if he was the sole actor in this creative process; rather I would seek to determine the multitude of diverse actors across which this creative process was distributed, how these actors associated with and in turn constituted each other, and ultimately how this ensemble acted in such a way as to transform the field of physics and bring into existence a novel type of scientific practice.

My approach to the nature of creativity, as sketched out above, raises questions concerning the limits of the term's use. To clarify: the domain of artistic practice is seen as archetypal of creativity, and calling innovation within artistic practice "creative" seems

natural to us. However I want to claim that creativity is present in all domains of human practice, even the most mundane. Creativity, I claim, can be found in scientific and technological practice and is evident in how we manage the affairs of our day-to-day existences. That we can find creativity in science and technology is not, however, a controversial claim. Also not terribly controversial is the claim that creativity is present even in the mundane tasks that define daily existence; psychologists of creativity have made such everyday creativity an object of study.[4]

There are, however, two things about the breadth of how I will employ the term creativity that are perhaps more controversial. The first concerns domain specificity. Specifically, what I am proposing is a general theory of creativity, one that aspires to make sense of the creative process as it occurs within and across diverse forms of human practice; my approach to creativity should thus be applicable to creativity in painting, literature, sports, the invention of new technologies, the formulation of scientific theories, etc. For the generality of my approach to be plausible, the creative processes that occur within these various domains must be, in some fundamental way, the same sort of process; there should not be a form of creativity that is unique to the practice of composing literature and, as such, utterly alien to the creative processes found in the sciences. The entirely reasonable worry, however, is that the apparent similarities between different domains of creative practice may only be superficial or erroneously imposed by a theory which seeks unity where there is none; upon closer investigation these different domains of creative activity may reveal fundamentally different types of creative processes, which no one theory can properly theorize. To such worries I answer

---

[4] See Ruth Richards, ed., *Everyday Creativity and New Views of Human Nature* (Washington D.C.: American Psychological Association, 2007).

that not only does my approach not erase the crucial differences between different types of creative practice, but that my approach is better attuned to such differences than the conventional theories of creativity to which I aim to provide an alternative. All my approach specifies is that creativity necessarily occurs within, and concerns the activity of, ensembles of associated actors; the settings that these actors constituted and occupy, the particular practices that these actors participate in, the number and nature of the actors, the manner in which these actors associate, etc, must all be determined with reference to the specific creative process under analysis. Different creative processes, for example, might involve the participation of rather different sorts of actors enacting very different sorts of associations. As such, though my intent is to propose a general theory of creativity, it is one that I hope is adequate to making sense of diverse forms of creative processes without erasing their differences and diversity.

More controversial, however, is that my use of the word "creativity" will not be restricted to the domain of human practice. Any process from which emerge novel actors or assemblages of actors, with novel capacities for action and affect, counts as creative. As such certain natural processes, for example speciation, may exhibit creativity, and in an absolutely non-metaphorical sense. There are a few reasons why, given my approach, this non-anthropocentric view of creativity is unavoidable. One reason is that, though most theories of creativity understand the creative product to be a novel idea, I want to instead claim that what counts as a creative product should not be restricted in this manner. For example, a technological invention is not a mere idea, but a thing in the world; for that matter, so is a poem or a work of philosophy. A second reason to not restrict creativity to human practice is that it is unclear what exactly defines the boundary

of human practice, what demarcates it from nonhuman activities or practices. Making a delineation between human practice and nonhuman activity is further complicated when we consider the extent to which human practices are entangled, facilitated, and shaped by nonhuman actors; these human practices, we find, are not purely human; are in fact hybrid practices involving the participation of diverse actors. This is true not only of some human practices, but all human practice, and we should not assume that in these practices the human actors are necessarily the principal or most salient powers. Finally, when we ask ourselves what, in principle, constitutes human practice as human practice and thus separates it from the sorts of activities nonhumans engage in, it is usually concluded that this distinguishing thing must be something like consciousness, mind, intentionality, etc. Even if we hold such answers to be satisfactory, we can still ask ourselves what these processes add to human practice, and thus human forms of creativity, that makes such practices fundamentally different from those in which humans, and their cognitive activities, are absent. If creativity is simply this associative process that I have sketched out above, I don't see how consciousness changes the nature of this process in any fundamental or essential way. Consciousness may allow for new and unique types of associations, new and unique ways of acting upon and engaging with the world, but we should not uncritically privilege such mental processes as constitutive or essential to the creative process, or see these mental processes as necessarily distinct from or autonomous of the world within which such processes are embedded. The distinction between human creativity and nonhuman creativity seems fuzzy, the insistence upon such a distinction seems questionable, and as such I will treat human and

nonhuman creativity as continuous with one another and in no essential way different from one another.

1.2 - Assessment of Contemporary Research on Creativity

Following Margaret Boden, we can distinguish between three dominant ways in which creativity is understood: romantic theories of creativity, inspirational theories of creativity, and psychological theories of creativity. Romantic and inspirational theories of creativity hold that creativity is not susceptible to scientific analysis; creativity is, according to such theories, fundamentally mysterious, inexplicable, and resistant to any form of analysis that might make the creative process an object of knowledge.[5] Inspirational theories of creativity, such as one finds in Plato, hold that creativity has a divine source, and that ultimately the human being is not the agent responsible for the creative accomplishment. The poet, for example, is not the true source of their poem; the true author of the poem is whatever divine power acted through the poet and inspired them, and the workings and methods of this divine power are not susceptible to scientific investigation. Romantic theories of creativity, however, hold "that creativity – while not divine – is at least exceptional. Creative artists (and scientists) are said to be people gifted with a specific talent which others lack: insight or intuition."[6] Like inspirational theories, romantic theories of creativity also tend to conceive of the workings of the creative process as fundamentally mysterious, as incapable of being made an object of knowledge. While not exactly in vogue in the sciences, inspirational and in particular romantic

---

[5] Margaret Boden, *The Creative Mind: Myths and Mechanisms* (London: Routledge, 1990), 14.
[6] Ibid.

theories of creativity are still present and influential. Notable representatives of this romantic approach to creativity in the 20th century include Sigmund Freud and Antonin Artuad. For Freud, creativity is a manifestation of the obscure workings of the unconscious.[7] This is true for Artaud as well, who valorizes the creative power of the irrational and unknowable parts of the mind to produce works of art that have the capacity to deliver revolutionary shocks to the order of society.[8] Romantic theories of creativity enjoy significant popularity in the wider culture as well, where exceptional creative ability is often correlated with eccentric personalities and lifestyles. Consider our cultural reverence for drug-addled rock stars with brief and troubled lives like Jimi Hendrix, Sid Vicious, Kurt Cobain, and Mark Linkous; the creativity of these artists is often seen as inextricably and inexplicably linked to the drugs and lifestyles that destroyed them. Consider also the movie *A Beautiful Mind*, wherein John Forbes Nash, Jr.'s creative capacity is depicted as interwoven with, and as beyond his control as, his madness.

An important point of divergence between romantic and the psychological theories of creativity, to which we will soon turn, is the concept of genius. Kant's discussion of genius in *Critique of Judgment* is crucial to the modern understanding of the concept. Kant writes that "genius is a talent for producing something for which no determinate rule can be given, not a predisposition consisting of a skill for something that can be learned and following some rule or other; hence the foremost property of genius

---

[7]Sigmund Freud, "The Moses of Michelangelo," in *On Creativity and the Unconscious: The Psychology of Art, Literature, Love and Religion*, ed. Benjamin Nelson (New York: Harper Perennial, 2009), 11-40.

[8] Antonin Artaud, "The Theater and The Plague," in *The Theater and Its Double*, trans. Mary Caroline Richards (New York: Grove Press, 1994), 15-32.

must be originality."[9] Two things are immediately apparent. The first is that for Kant, genius is the opposite of imitation; products of genius are, above everything else, original and unique.[10] The second is that one can neither learn to be a genius nor give an account of the functioning of genius. Kant makes this absolutely explicit when he writes that "genius itself cannot describe or indicate scientifically how it brings about its product, and it is rather as nature that it gives the rule."[11] The notion of genius that Kant articulated proved to be very important, and we can detect its influence in the work of subsequent writers, such as Schopenhauer, Goethe, and Nietzsche; in fact, the concept of genius proved to be enormously popular, as we find the notion being invoked again and again in diverse artistic and intellectual movements of the 19th and 20th centuries. Interestingly, whereas Kant saw genius as pertaining only to the domain of artistic practice, and having no role to play in the development of scientific or technical knowledge, today we attribute genius to people who display extraordinary creativity, no matter what the domain of their creative activity might be.[12] Einstein, for example, has become for us emblematic of the concept of genius.

Researchers with a more scientific bent are usually, and understandably, reluctant to invoke the concept of genius because of the manner in which the notion of genius places the workings of the creative process off limits from rational and scientific investigation. Furthermore, the idea that geniuses exhibit unique and exceptional talents opens up between the genius and the rest of us non-geniuses an unbridgeable gulf. Rather

---

[9] Immanuel Kant, *Critique of Judgment*, trans. Werner Pluhar (Indianapolis: Hackett Pub. Co, 1987), 307.
[10] Ibid., 308.
[11] Ibid.
[12] Ibid., 309.

than conceive of highly creative accomplishments as a sign of genius, genius being a mysterious and special talent that is unique to the genius and which is furthermore unsusceptible to scientific analysis, psychological approaches to creativity tend to consider such creative accomplishments to be the result of processes which are in no fundamental way different from those that operate within the minds of less exceptional people engaged in less exceptional creative practices. For example, some researchers argue that highly creative people are simply those that have acquired a significant, and perhaps difficult to obtain, degree of knowledge about their field, and this depth of knowledge is a constitutive element of their creativity, thus accounting for the rarity of highly creative people without appealing to any mysterious or exceptional creative processes; rather, in highly creative people we simply find normal cognitive faculties operating in an exceptional manner.[13] Further, psychological theories of creativity treat creativity as fully explicable in scientific terms. Thus to explain the creative process that yielded a work like *Ulysses* you do not need to invoke any processes or skills that are not present in works of literature that are less well-regarded or seen as less revolutionary. What accounts for the differences between different degrees of creative accomplishment may not be very mysterious at all. For example, a common answer in the psychological literature is that creativity is simply the result of hard and dedicated worker, and as such

---

[13] Robert Weisberg, a cognitive psychologist, is a prominent proponent of this knowledge-based approach to creativity. See Robert Weisberg, "Creativity and Knowledge: A Challenge to Theories," in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 226-50.

accomplishments that we take to be evidence of genius are really just the products of long and hard work, of intense dedication.[14]

My own approach to creativity is not formulated as a response to or reaction against inspirational or romantic theories of creativity; rather, my concern is the psychological theories of creativity that are predominant in academic discourse on creativity. In this dissertation I intend to reject some of the fundamental assumptions of mainstream research on creativity and present an alternative way of conceiving of the creative process. I do this not to argue that creativity is mysterious and unknowable, not to present a revamped romanticist or inspirationalist theory, but rather to offer a new, and hopefully better, way to make the creative process intelligible. A brief consideration of how creativity is understood within mainstream psychology will, as such, help me situate my own theory.

Though selecting a moment when creativity first became a serious topic of psychological research may be somewhat arbitrary, the psychological literature makes frequent reference to J. P. Guilford's 1950 APA Presidential Address as a starting point.[15] In this speech, Guilford claimed that the topic of creativity had received insufficient

---

[14] See, for example, Michael Howe, *Genius Explained* (Cambridge University Press, 2001) and Robert Weisberg, *Creativity: Genius and Other Myths* (W H Freeman and Co, 1986).

[15] See, for example, Robert J. Sternberg and Todd I. Lubart, "The Concept of Creativity: Prospects and Paradigms" in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 3. Guilford's address is also mentioned as an important event in the modern study of creativity by Howard E. Gruber and Doris B. Wallace in "The Case Study Method and Evolving Systems Approach for Understanding Creative People at Work" and Jonathan A. Plucker and Joseph S. Renzulli in "Psychometric Approaches to the Study of Human Creativity," both of which are collected in the Sternberg volume cited above.

attention by psychologists, and that more research should begin to focus on it. Following

Guilford's address, the first and most prominent approaches to creativity in psychology

were psychometric. The psychometric approach to creativity studies and measures

creative ability through the use of tests. Though creativity itself may not be directly

testable, psychological correlates to creativity such as certain personality traits,

dispositions, or thinking styles can be specified and tested. Divergent thinking, for

example, which is the capacity to generate many different answers or solutions to a

problem or question, is a thinking style commonly associated with creativity in the

psychometric literature.   However, though the psychometric approach to creativity

has been predominant, it is not the only approach within psychology. Other approaches to

studying creativity include the experimental, biographical, biometric, and historiometric

approaches.[16] Though these approaches may diverge from one another in significant

ways, what is true of all of these approaches is that the focus of research is the

psychological processes and properties of individuals. For example, though the

psychometric approach attempts to identify enduring psychological traits that account for

creativity and the experimental approach tends to focus more narrowly upon specific

cognitive processes associated with creative activity, the object of study of both

approaches is, nearly universally, the individual human agent. If the situation or setting of

creative activity is studied, it is usually not taken seriously as anything more than an

---

[16] Jonathan A. Plucker and Joseph S. Renzulli, "Psychometric Approaches to the Study of Human Creativity," in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 37.

influence upon or context of creative activity. Similarly, group creativity has only recently become a subject of psychological research.[17]

As an example of this tendency among psychologists to conceive of creativity primarily in terms of individual human agents, consider the creative cognition approach to creativity, which exemplifies both the demystified approach to creativity characteristic of psychological approaches to creativity and the individualistic form that this demystification takes. Of the cognitive processes responsible for creative cognition, Ward, Smith, and Finke write that "far from being unusual, these generative cognitive processes are commonplace and normative. They are part of the normative operating characteristics of ordinary minds."[18] In other words, the cognitive processes responsible for creativity are not unique to creative cognition; they are also not mysterious; these cognitive processes are present also in normal, everyday, cognition. An example of such a cognitive process is analogical transfer. According to Robert Weisberg, in analogical transfer "information from a previous situation is transferred to a new one that is analogous to the old; the new situation is similar in structure to the old one."[19] The similarity of structure between these two situations allows for the situation which is known to be used as an analogy for understanding that which is not known. Thus analogical transfer might be helpful for certain types of problem solving; the creative solution to a particular problem might involve the use of knowledge from another domain

[17] R. Keith Sawyer, *Group Creativity: Music, Theater, Collaboration* (Mahwah, New Jersey: Lawrence Erlbaum Associates, 2003). Sawyer is probably the most notable contemporary psychologist who studies group creativity.

[18] T.B. Ward, S.M. Smith, and R.A. Finke, "Creative Cognition," in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 190.

[19] Robert Weisberg, "Case Studies of Creative Thinking: Reproducing versus Restructuring in the Real World," in *The Creative Cognition Approach*, ed. Steven M Smith, Thomas B. Ward, and Ronald A. Finke (Cambridge: MIT Press, 1995), 62.

that, in some way or another, is similarly structured. One of the examples that Weisberg

provides is that of Bohr's model of the atom and our understanding of the solar system:

the known structure of the solar system provided the analogy by which the problem

concerning the unknown structure of the atom might be solved. What we should note is

that cognition, as it is conceived of by cognitive psychologists, is understood to be

essentially independent of the environment inhabited by the cognitive agent. The

environment may provide the inputs which the cognitive agent then processes, but the

cognitive process is not understood to be situated in this environment nor is it distributed

across the environment; that is to say, the creative process, which is essentially cognitive,

is understood to be essentially independent of its environment.

Though he is not technically a psychologist, Arthur Koestler's influential theory

of bisociation also renders the creative process in a similar, individualist manner.

Koestler's claim is that we mostly perceive and understand our world through one or

another theoretical perspective, which Koestler calls "matrices of thought."[20] Each of

these matrices of thought are governed by their own particular logics, and each give us a

certain sort of perspective on the world. However, these perspectives become habitual

and limiting; something seen from one perspective might appear differently, or not

appear at all, from another. The act of bisociation is what allows us to break out of these

familiar perspectives and think creatively. Koestler writes that "the bisociative act

connects previously unconnected matrices of experience."[21] In being associated, these

two distinct perspectives, or elements of these perspectives, become blended to form a

new thing, a new and perhaps highly novel perspective or idea. Bisociation is, as such,

---

[20] Arthur Koestler, *The Act of Creation* (London: Arkana, 1989), 38.
[21] Ibid., 45.

creative process. But what is the role of the world, within which the human agent is embedded and constantly engaged, in the process of bisociation? Seemingly there is not one, as Koestler seems to see bisociation as occurring solely within the minds of individuals. But what if worldviews and perspectives are not just psychological in nature, but are embedded and embodied in the world, in artifacts and practices? If this is the case, then it might be possible to account for bisociation not simply via the blending of perspectives within individual minds, but also the blending and intermingling of objects and practices. This seems plausible, but because of Koestler's narrow focus upon individual psychologies, this question and the possibilities it harbors are never addressed.

My point is, in essence, that though there are a variety of approaches to creativity within the discipline of psychology, these divergences all occur within a philosophical horizon defined by Cartesian ideology. But what, exactly, does this mean? First, it means that creativity is understood in essentially individualistic terms; the object of analysis, when studying creativity, is the individual human agent. The reasons for conceiving of creativity in this way seem obvious and justified: when we try to identify what entities exhibit creativity, common sense indicates that the correct answer is the individual human being. Groups or societies are only creative to the extent that the individuals that comprise them are. Furthermore, not only is the individual the creative agent, but it is creative independent of, and often in resistance to, its social context. This is the conventional view. Approaches to creativity that move beyond this characteristic narrow focus upon creative individuals and study the creativity of groups or collectives, in such a way that the these groups are understood to possess creative capacities or processes in

their own right that are not reducible in a linear way to the creativity of its component parts, are rare.[22]

The second thing that is meant by saying that psychological theories of creativity exhibit Cartesianism is that these theories construe the relation between mind and world in an essentially dualistic manner; specifically Cartesian dualism, the specific relation between mind and world that is associated with Descartes. The relation between mind and world argued for by Descartes can perhaps be characterized as a non-relation: the mind and the world are ontologically distinct, and though they may interact in some mysterious way, each obey very different laws and possess very different properties.[23] The mind, Descartes argues, is a free and rational thinking substance whereas the external world is the domain of deterministic extended substances. The behaviors of one of these substances can not be explained in the terms appropriate to the other; the mind must be explained in its own terms, not in terms of the activities of material substances.

It might seem strange to claim that modern psychology exhibits symptoms of Cartesianism. That is to say, is it not the goal of psychology to explain the mind in a way that is compatible with our understanding of the natural world and by means of a scientific methodology? It is true that much of modern psychology can be interpreted as an attempt to overcome Cartesianism, to articulate a materialistic theory of the mind. Nevertheless, we must also take note of how deeply this dualistic perspective has insinuated itself into how we understand and experience the world and how Cartesianism reasserts itself in unlikely places, including, in this case, psychology. True, a psychologist

---

[22] Again, see the work of R. Keith Sawyer.
[23] René Descartes, "Meditations on First Philosophy," in *The Philosophical Writings of Descartes: Volume II*, trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch, (Cambridge University Press, 1985), 59-62.

may not appeal to any sort of ontological distinction that separates thinking and extended substances, but nevertheless most psychological research seems to assume that the mind and its operations can be understood independently of the world in which it is embedded.

This Cartesian focus upon individual minds, the processes and qualities of which are understood to exist largely independently of their world, is, as I noted, evident in the psychological research on creativity. From this Cartesian perspective, when one wants to explain creativity, all one needs to explain is the creative process as it occurs in an individual mind, which is in turn conceived of as an effect of the brain alone and explanatorily independent of the material world and its social environment. I want to call such theories of creativity Cartesian theories of creativity, and it is these theories that my own approach is developed in opposition to.

I am not, however, the first person to criticize psychology for its overly individualistic approach to creativity. Psychologists too have criticized the excessive individualism of much of the research done on creativity and have attempted to articulate theories that take into account the larger social and environmental contexts within which creativity happens. Simonton's historiometric approach, Amabile's work within social psychology, and Csikszentmihalyi's systems perspective are all significant attempts to formulate a non-individualistic approach to studying creativity. All of these attempts, on my view, fail to adequately develop a real alternative to the predominant Cartesian approaches.

Of the above mentioned approaches, it is Simonton's historiometric approach that, in my view, most thoroughly fails to provide a viable alternative to the Cartesianism of

mainstream psychological approaches to creativity. The historiometric approach attempts

to determine the general laws that pertain to creative accomplishment via the application

of statistical analysis to the historical record, in particular through the analysis of

important creative individuals. The historiometric approach is essentially quantitative; for

example, this approach allows the researcher to determine the average age of peak

creative activity for poets, and to compare this to the peak years of philosophers.[24]

Through the historiometric approach the researcher is able to determine the existence of

correlations between creative accomplishment and factors such as birth order, trauma,

and family background as well as cultural, social, economic, and political factors. For

example, there seems to be a correlation between economic growth and the degree of

creative accomplishment within a society.[25] As such, the historiometric approach

surpasses the narrow focus upon individual human agents by attempting to study the

correlation between creative accomplishment and factors which transcend individual

existence. However, how exactly these extra-individual factors might actually affect

creative activity are not determinable via the historiometric approach; in fact, it seems

that Simonton considers these factors to be no more than context, meaning that the social

dimension may influence or constrain the creative process in various ways, but it is not

directly a part of the creative process. Furthermore, the true mechanism of creativity, as

Simonton understands it, is understood in terms derived from evolutionary theory:

variation and then selection. On Simonton's account, the generation of novelty is an

unconscious process wherein ideas undergo random alteration; this process is often

---

[24] Dean Keith Simonton, "Creativity from A Historiometric Perspective," in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 117-8.
[25] Ibid., 125.

gradual in nature and largely beyond the control of the individual. Simonton even goes so far as to claim that "the real creative genius has no real control over the emergence of ideas."[26] The novelty produced by this unconscious process then undergoes a selection process as the novel idea rises to conscious awareness and is subjected to rational analysis by the creative agent and evaluation by the community to which this new idea is addressed. However, to the extent that the social situation only plays a role during the selection phase, the social situation does not itself participate in the production of novelty; it simply selects for it. The process by which novelty is generated remains, and operates mysteriously, within the depths of the unconscious mind. Because Simonton understands the process by which novelty is produced to occur solely within the minds of individuals, it is to this extent just another manifestation of Cartesianism.

To better results than Simonton, social psychologists have also attempted to understand creativity in ways that go beyond the individualistic focus of Cartesian theories of creativity. When social psychologists attempt to study creativity, they do not study isolated individuals, they study people as they are affected by their social circumstances. The goal is to determine how these social circumstances affect creative activity. Teresa Amabile's research is an important early example of the social psychological study of creativity.[27] In answer to the question of how the social affects creativity, one of the primary conclusions of her early work was that people who are intrinsically motivated tend to be more creative than people who are extrinsically

---

[26] Dean Keith Simonton, *Origins of Genius: Darwinian Perspectives on Creativity* (Oxford University Press, 1999), 71.

[27] Teresa Amabile, *Creativity in Context* (Boulder, Colorado: Westview Press, 1996).

motivated.[28] That is to say, when someone is self-motivated to engage in a particular task or activity their work will be more creative than the work of someone who has extrinsic factors determining and motivating their work. For example, a painter working on a project of their own choosing is more likely to be creative than someone who is working on commission, and whose work is constrained by external determinations regarding content, style, or whatever.

Regarding this conclusion that extrinsic factors are detrimental to creativity, with the complementary point that intrinsic factors encourage creativity, it is interesting to note two things. First, the role of the social seems to be rather narrowly conceptualized, seemingly reduced to the role of affecting motivation. Secondly, when social factors enter in as determining motivation, the research concludes that the social has a negative effect upon the creative process. In other words, to the extent that the social enters in as an extrinsic, motivating factor, the creativity of an individual decreases. If one wants to promote creativity in people, or at least in children as children were Amabile's test subjects, Amabile claims that what one should be doing is encouraging autonomy and "respecting each child's individuality."[29] As such, even in this very important work on the social psychology of creativity, we can see how difficult it is to overcome this individualist tendency to conceive of creativity in anything but individualist terms; these individuals are creative to the extent that they feel autonomous, self-motivated, and unconstrained by social pressure and once the social context starts to manifest itself as an extrinsic pressure on the creative process, the creative process is spoiled.

---

[28] Ibid., 107.
[29] Ibid., 261.

It should be noted, however, that more recent research by Amabile and other social psychologists has developed a more complex understanding of intrinsic and extrinsic motivation. For example, researchers no longer consider extrinsic motivation to have a solely negative effect upon creativity.[30] Furthermore, environmental factors beyond those that determine motivation have increasingly become an object of research by social psychologists.[31] For example, researchers have found environmental scanning can contribute positively to the creative process.[32] To this desire to articulate a deeper and more complex understanding of the relationship of the social and material environment to creativity, what I hope to contribute is a way of thinking about the environment that conceives of it as more than a mere influence upon the creative process, but as an active element of the creative process itself.

Another important attempt to formulate an alternative to the predominant individualist theories of creativity can be found in the systems perspective. Mihaly Csikszentmihalyi is the major representative of this approach. On his view creativity is a "systemic rather than an individual phenomenon."[33] To account for the systemic nature of creativity, Csikszentmihalyi considers the creative process as it occurs across three interacting components: the individual agent who generates a novel idea, the domain of knowledge in relation to which that novel idea is generated, and the field of experts that

---

[30] Ibid., 112-27. See also Mary Ann Collins and Teresa Amabile, "Motivation and Creativity," in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 297-312.

[31] Ibid., 203-40.

[32] Ibid., 228.

[33] Mihaly Csikszentmihalyi, *Creativity: Flow and the Psychology of Discovery and Invention*, (New York: Harper Perennial, 1996), 23.

evaluates the idea.[34] As we can see, the environment accounts for apparently two-thirds

of the system that generates creative phenomena. For example, though individual painters

are the actors that generate particular artworks, these artworks are modifications of or

responses to already existing knowledge and information; this already existing body of

cultural knowledge is the domain. The work of these painters is in turn evaluated by a

community of critics to assess its value; this is the social dimension of the creative

process, what Csikszentmihalyi calls the field, and it determines whether or not particular

works of art can become part of the domain. As such, the creative process proceeds like

this: the domain is the body of information that the creative individual draws upon and

modifies; this modified information is then evaluated by the field, and if the field finds

this transformation valuable it is accepted as a part of the domain; this in turn results in

the transformation of the domain itself. The crucial point is this: for Csikszentmihalyi it is

the very act of evaluation by the field that makes a novel product creative or not. On the

paintings of van Gogh, for example, Csikszentmihalyi writes that "a hundred years ago

those canvases were just the hallucinatory original works of a sociopathic recluse. They

became creative only after a number of other artists, critics, and collectors interpreted

them in terms of new aesthetic criteria and transformed them from substandard efforts

into masterworks."[35] That is to say, a work of art or a new scientific theory is not creative

until it has been accepted by the field and incorporated into the domain.

However, though Csikszentmihalyi claims that his approach allows us to

understand creativity as a process that unfolds across a system comprised of domain,

[34] Mihaly Csikszentmihalyi, "Implications of a Systems Perspective for the Study of Creativity" in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 314-6.
[35] Ibid., 321

individual, and field, the systems perspective is ultimately not a successful alternative to the conventional Cartesian theories of creativity. For instance, it is not clear how, as Csikzentmihalyi claims, the evaluation of a novel idea by the field actually acts to constitute, not just evaluate, that particular idea as being creative. Recall again Csikzentmihalyi's assertion that van Gogh was not creative until his works had been evaluated as such by the field. This is a very interesting claim, as it implies that van Gogh's work was not intrinsically creative, but only creative because it was evaluated as having value, and, given different circumstances, it could conceivably have been evaluated as not being valuable and consequently not being creative. But how does this work? How does the act of evaluation by the filed actual constitute something novel as creative? Csikszentmihalyi never develops an adequate account of how the process of evaluation actually makes an idea creative. When Csikszentmihalyi claims that "creativity is not the product of single individuals, but of social systems making judgments about individuals' products" he needs to be able to say how this judgment turns an idea that is just eccentric and novel into one that is legitimately creative.[36]

A second point which illustrates Csikszentmihalyi's failure to transcend the Cartesianism implicit in much psychological thinking concerns how he treats the domain of creative activity. Regarding the domain, which is the body of knowledge or information in relation to which one is creative, Csikszentmihalyi claims that "to be creative, a person has to internalize the entire system that makes creativity possible."[37] But what does it mean to internalize a domain in its entirety? That one contains within

---

[36] Ibid., 314.
[37] Mihaly Csikszentmihalyi, *Creativity: Flow and the Psychology of Discovery and Invention*, 51.

oneself, in duplicate, all of the knowledge, skills, and ways of seeing which populate a

given domain? Or is one just required to internalize the most salient and central

information which defines the domain? The vagueness of what it means to internalize an

entire domain of knowledge aside, the real problem is this: in conceiving of the relation

between the creative individual and domain in terms of internalization, Csikszentmihalyi

obscures the real dynamics that pertain between individuals and the domains within

which they work. A domain does not exist abstractly, as a body of disembodied

information; rather, the knowledge, information, and ways of perceiving that constitute a

domain are embedded in the characteristic objects and practices of that domain. This

knowledge is accessed through active engagement with these objects and within these

practices.

To develop this point, consider the distinction Andy Clark makes between

baseline knowledge and meta knowledge. Baseline knowledge is knowledge that has

been internalized. If someone asks me to name the most important of Lautreamont's

writings, I can reply, without consulting any encyclopedias or anything, that it is

Maldoror; I can do this because I have internalized this knowledge. However, there are

other things about which we have meta knowledge, which is "knowledge about how to

acquire or exploit information."[38] For example, a boat navigator might not know his or

her precise location, but they have the skills needed to access and acquire this

information with ease through certain types of environmental interactions. As such, meta

knowledge concerns knowing how to access information, not knowing the information

itself. Because meta knowledge allows us to readily access the knowledge that we need

---

[38] Andy Clark, *Natural Born Cyborgs* (New York : Oxford University Press, 2003), 67.

when we need it, this eliminates the necessity to internalize that information to which meta knowledge gives us access. But perhaps the information made accessible by meta knowledge does not really count as part of the domain? After all, a lot of this information is trivial, mere facts the knowing of which would not normally be seen as relevant to proficiency within a domain. However this criticism misses the point, which is that the acquisition of meta knowledge is often one of the most important factors that determines whether or not someone is proficient in a domain. That is to say, a lot of what counts for proficiency is not necessarily the information that one has internalized; just as important are the skills that allow one to access the desired information, which resides in artifacts and certain forms of interaction with the environment, when that information is needed.

Simply stated, the concept of internalization fails to capture what occurs when an individual becomes proficient within a domain of knowledge. Furthermore, Csikszentmihalyi's emphasis upon internalization is Cartesian because he holds that for knowledge to count as knowledge, it must reside in the subject. True, some knowledge may in fact become internalized, but a lot of knowledge is not internalized; instead, this knowledge is embodied and embedded in particular environments, objects, or practices and requires certain skills and knowhow, or meta knowledge, to access. The way in which this embodied and embedded knowledge is deployed and transformed in creative activity will require, as we shall see, a more dynamic and context sensitive approach than Csikszentmihalyi's internalist theory of knowledge allows.

Finally, though Csikszentmihalyi claims that creativity must be understood in terms of systems, the source of novelty on his view is still the individual human agent. The domain of knowledge is, on Csikszentmihalyi's account, a passive body of

knowledge. The field simply evaluates whether or not a novel idea is in fact valuable and therefore creative. The creative individual, however, is the sole source of novelty in this system; creative individuals are the ones the alter and transform the knowledge of the domain and then submit the products of their work to the field to be evaluated. To this extent Csikszentmihalyi's systems perspective on creativity retains the creative individual as the focus of its analysis, and as such, it is unclear to what extent, if at all, Csikszentmihalyi actually transcends the Cartesianism of mainstream research on creativity.

The examples of Simonton, Amabile, and Csikszentmihalyi suggest the difficulty of formulating a non-Cartesian theory of creativity. In spite of their best efforts to conceive of creativity in relation to a wider social and material environment, in their accounts the human individual, and in particular the human mind, always asserts itself as the locus of creative activity. It is perhaps reasonable to conclude that this repeated failure to formulate a non-Cartesian theory of creativity is evidence of the fact that creativity is really and truly a property of individuals. My contention, however, is that an inadequate attention to the embeddedness of human beings in particular material and social environments will inevitably result in a misapprehension of the creative process. As such, we need to be more determined in our attempts to think beyond the horizons of Cartesianism if we are to acquire a better understanding of creativity.

1.3 - Definitions of Creativity

Before I conclude this introduction, it may be useful to consider how creativity is defined in the psychological literature on creativity. Sternberg and Lubart, in their introduction to the *Handbook of Creativity*, offer a definition that is representative of how most researchers today define creativity, namely that "creativity is the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)."[39] One will find exactly this definition of creativity, with various synonyms sometimes standing in for "novel" and "appropriate," repeatedly in the literature on creativity.[40] As such, this definition deserves closer attention.

1.3.1 - Appropriateness

When appropriateness is posited as an essential criterion of creativity, what is meant is that a creative accomplishment provides a solution to a certain problem, meets the standards of whatever community it is addressed to, or is evaluated as valuable by the relevant experts; the key point is that there is some established situation to which the novel creative product adapts and conforms. According to such definitions, creativity is not about unfettered novelty because creativity must always respond and conform to the existing state of things. If the problem is to get a spaceship from Earth to Alpha Centauri,

---

[39] Robert Sternberg and Todd Lubart, "The Concept of Creativity: Prospects and Paradigms," 3.

[40] For a few examples of this predominating way of defining creativity, see Teresa Amabile, *Creativity in Context*, 35; Margaret Boden, *The Creative Mind: Myths and Mechanisms*, 1; R. Keith Sawyer, *Explaining Creativity: The Science of Human Innovation* (Oxford University Press, 2006), 27-8; and Emma Policastro and Howard Gardner, "From Case Studies to Robust Generalizations: An Approach to the Study of Creativity" in *The Handbook of Creativity*, ed. Robert Sternberg (Cambridge University Press, 1999), 214.

then the appropriate solution to this problem must in fact get a spaceship from Earth to Alpha Centauri. If you write a poem, for that poem to count as a creative it must meet some of the standards of the community of poets and poetry critics, the poetry community, to whom that poem is addressed. If you think you have developed a novel theory that accounts for the nature of dark matter, your theory must be acceptable to other scientists in the field for it to also count as creative.

Though claiming that appropriateness is a feature of creativity seems sensible, a problem with this and similar criteria emerges when we consider accomplishments that are now consider to be highly creative, but that were at first not so positively evaluated. What changed between the initial unreceptive evaluation and its eventual acceptance? How are we to think about this change in relation to creativity? Instances such as these are abundant and should cause us to think more carefully before considering appropriateness as an unproblematic criterion of creativity. Take, for example, Evelyn Fox Keller's reflections on her and Lee Segel's work on slime mold. Keller and Segel were concerned with giving an account of how slime molds make the transition from being more or less independent single cellular organisms to a multicellular organism during the course of their life cycle. Traditional accounts of this process have relied upon the notion of pacemaker cells, which, when they detect certain changes in their environment, start to emit signals that will bring about the transition of the individual slime mold cells in the vicinity into a multicellular organism that exhibits certain structures, such as stalks and fruiting bodies, and which contains cells that have become differentiated from each other. However, though the pacemaker cell was the dominant explanatory model for slime mold transition, there was little evidence to support the

existence of pacemaker cells, and furthermore, there was evidence that suggested that

they in fact might not exist. As an alternative to the theory of the pacemaker cell, Keller

and Segel "examined the spatial stability of a homogenous field of undifferentiated cells

interacting through the production and degradation of, and chemotaxis to, acrasin. [They]

showed that the conditions of instability, for the onset of aggregation, would be met by an

increase of individual cellular production of acrasin and/or chemotactic sensitivity

without prior differentiation."[41] In other words, the production of acrasin by individual

slime mold cells, all of which are identical, in response to a lack of nutrients in the

environment, is enough to initiate the aggregation of the cells into a multicellular slime

mold without the need for a pacemaker cell to initiate and govern the transition. Though

Keller acknowledges that her and Segel's model was still inadequate, due to its use of a

linear model of aggregation, their theory seemed to present an innovative alternative to

the pacemaker hypothesis. However, not only was Keller and Segel's theory not

evaluated as being a significant and creative contribution to biology, the paper in which

they presented their theory was largely ignored.[42] Keller suggests that the reason for the

lack of response to their theory was in part because "of the predisposition to kinds of

explanations that posit a single central governor [and] that such explanations appear both

more natural and conceptually simpler than global interactive accounts."[43] In other

words, because of the commitments of the scientific community at the time, and because

of the sorts of explanations which were considered appropriate, Keller and Segel's

---

[41] Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1995), 151.
[42] Ibid., 154-5.
[43] Ibid., 155.

theory, which in retrospect can be seen to be highly creative, was not seen as an appropriate contribution by the scientific community to which it was addressed.

Keeping in mind that, in time, a field may change its evaluations of what contributions are valuable to it, to what extent can a field's judgments regarding what is and is not creative be taken as definitive? Perhaps we could argue that a field's evaluation of a creative achievement becomes more accurate with the passage of time, and that the truly creative accomplishments will be eventually recognized as such? However, though we may take comfort in this idea that the truly creative accomplishments will, no matter how negative their initial reception might be, eventually be recognized as such, to say that this is inevitable strikes me as Panglossian. There does not seem to be any necessity that that which is appropriate will be seen as such, that that which is valuable will actually be valued; it seems certain that the creative accomplishments of a great many people will never be recognized as such.

Or perhaps we should, like Csikszentmihalyi, claim that nothing is creative until it has been evaluated as such by the relevant authorities; that somehow the act of evaluation and acceptance by a community of experts constitutes a novel idea as creative. The problem with such an approach is that, if one wants to claim that the act of evaluation is constitutive of the creativity of a novel idea, one has to give some sort of account of how this evaluation actually constitutes that which is evaluated as creative. Csikszentmihalyi refuses to do this. To the question of "might something be creative yet not be appreciated as creative?" Csikszentmihalyi replies that "such a question is too metaphysical to be considered part of a scientific approach. If the question is unanswerable in principle, why

ask it?"[44] However, saying that whether or not unrecognized instances of creativity actually exist is an unanswerable question does not itself give one grounds to claim that the act of evaluation is itself constitutive of the creativity of a novel product. Furthermore, we must recognize that fields are not necessarily monolithic or unanimous entities, but are often divided internally by disputes over not only what criteria should be used when evaluating novel contributions, but over the purpose and nature of the field itself. Given a field that does not exhibit consensus or unanimity, how are we then supposed to determine whether or not a particular novel product, about which opinion is divided, is in fat creative? To answer such a question we have to go beyond a strictly psychological account of creativity and begin to consider the social dynamics of these fields.

A further reason to question whether appropriateness is really a defining characteristic of creativity is that the notion of appropriateness inclines us to think of creativity as a process that is fundamentally adaptive to its circumstances, which misses the capacity of creative activity to redefine its circumstances and what is considered appropriate. For example, the films of the Dogme 95 movement were not creative simply because, for all of their novelty, they ultimately conformed to the standards of filmmaking; they were creative because they challenged accepted filmmaking practices and even conventional notions of good taste, and in so doing they challenged, redefined, and transformed our understanding of what is appropriate and valuable. Creativity can also create values. In a sense this criticism of the concept of appropriateness echoes Nietzsche's critique of the evolutionary theory of his day. Nietzsche's criticism focuses

---

[44] Mihaly Csikszentmihalyi, "Implications of a Systems Perspective for the Study of Creativity," 321.

upon the tendency to conceive of evolution exclusively in terms of adaptation, which is a reactive process. That is to say that to the extent that evolution is understood as an adaptive phenomenon, it is understood as reactive to its circumstances, its environment. But Nietzsche thinks that this focus upon adaptation gets the phenomenon of life, and of evolution, all wrong. Life, for Nietzsche, is fundamentally active; it creates form and meaning spontaneously. Thus in suppressing the fundamentally active nature of life, evolutionary thought "forces 'adaptation' into the foreground, which is second-rate activity, just a reactivity, indeed life itself has been defined as an increasingly efficient inner adaptation to external circumstances."[45] Though I do not necessarily agree with Nietzsche's construal of life as essentially active, his critique of the notion of adaptation, to the extent that it is seen as the primary mechanism of evolution, is essentially the same as my criticism of the notion of appropriateness when appropriateness is understood to be a set of criteria to which novel products must conform or adapt to in order to count as creative. In overemphasizing appropriateness, we become unable to adequately understand creative processes that challenge, renegotiate, or generate new notions of appropriateness and value. This double relation of creativity to the appropriate, of both appealing to and transforming it, must be kept in mind as we try to understand creativity.

1.3.2 - Novelty

Novelty is the second reoccurring criteria used to define what counts as creative. But what exactly is novelty? Novelty is a quality of something that is new, but new in a way that is unexpected and surprising. The more a product departs from what is already

---

[45] Friedrich Nietzsche, *On the Genealogy of Morality,* ed. Keith Ansell-Pearson, trans. Carol Diethe (Cambridge University Press, 2007), 52.

exists, from what is expected, the more novel it appears. Like appropriateness, novelty seems like an obvious criterion of creativity, and like appropriateness, I think that we should be concerned about how the notion of novelty may cause us to misunderstand the creative process.

One concern is that in making a distinction between products that are novel and those that are merely variations or modifications of things that already exist, and in furthermore conceiving of novelty as the true mark of creativity, we end up overestimating the degree to which the creative product stands apart from that which precedes it. Furthermore, because the concept of novelty applies to things that we consider to be strikingly new or original, we might be inclined to think that the process that generated this product was similarly striking and remarkable. This is perhaps one explanation for why we tend to consider the creative process to be defined by sudden inspiration and insight; our understanding of the event of inspiration and insight mirrors, in the creative process, the apparent novelty of the creative product.

Regarding novelty as definitive of creativity, I was to suggest two things. First, many creative products are not strikingly original or novel, and that if we attend closely to the world around us, we will find the products of creative activity everywhere. Second, upon closer examination even the creative processes that result in rather novel products are often gradual and rather unremarkable in nature, with no single moment during which the creative product suddenly came together. These points I am making are, it should be noted, quite noncontroversial in the psychological literature. On this point it is helpful to consider Subrata Dasgupta, who, in his book *Creativity in Invention and Design*, conducts a computationalist analysis of Maurice Wilkes' invention of the microprocessor

and concludes that "there is no documentary evidence to indicate the occurrence of a Eureka-like moment" and that even when Wilkes had an experience during which he reported that his "ideas fell into shape," "what the computational mode of description reveals is that it is possible to explain episodes of great insight or Eureka-like events in gradualistic terms."[46] That is to say an investigation of the psychological processes that underlie what appear to be sudden and astonishing creative insights may in fact reveal a prolonged process during which the creative idea was being gradually formulated and developed. Furthermore the psychological processes operative here probably do not differ in any significant way from those which generate less obviously novel creative products.[47]

1.3.3 – An Alternative Conception of Creativity?

In rethinking the creative process, my approach also rethinks the creative product; what defines it as creative. Or rather, according to my approach there is no creative product as such, which is to say a product that bears the property of being creative. The products of a creative process can be said to be creative to the extent that these products form associations with other actors that are creative. Said in another way, the newly generated actor, the result of the creative process, the creative product, is not intrinsically creative; it is what it does that is creative. For example, let us say that, hypothetically, I was going to research and give an account of the creative process that resulted in Herman Melville's novel *Moby Dick*. To give this account I would, again, attempt to determine all

---

[46] Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality* (Cambridge University Press, 1994), 193-4.
[47] Robert Weisberg, "Creativity and Knowledge: A Challenge to Theories," 248.

of the various actors involved in the process of composing the novel, including obviously

Melville, but also the other texts that he consulted when writing *Moby Dick*, the writing

implements, the places he wrote it, the other individuals with whom he and his text

interacted, the traditions and communities to which Melville and *Moby Dick* belonged, as

well as the text of *Moby Dick* itself, which during the compositional process probably

emerged as an actor in its own right, with its own dispositions and ways of affecting the

writing process. Once the various actors that are involved in the creative process have

been determined, we would seek to understand how these actors were situated in relation

to one another and their environment and how this creative process was distributed across

these various actors. This would, hopefully, give us an account of how the text of *Moby*

Dick came to be, how it was created. However, if we wanted to determine whether or not

this text was creative, we would have to look at what it does. Did the text of *Moby Dick*

in some way change the actors and other institutions with which it interacted? Did it

transform literary practice? Or how literature was read? Did it change Melville? And

what is interesting about *Moby Dick* is that it mostly didn't do anything for a long while,

and then it did. It was not until the early 20th century that people began to reevaluate

Moby Dick and to regard it as a worthwhile and interesting work of literature. At this

point *Moby Dick* began to act creatively. However, it is not the case that suddenly people

recognized the previously unrecognized creativity of *Moby Dick*; rather, it was only then

that the text began to form creative associations, that *Moby Dick* began to affect its world

in creative ways. To be clear, unlike Csikszentmihalyi, I am not claiming that the

community of critics, in their reevaluation, bestowed upon *Moby Dick* the property of

being creative. Rather I want to claim that, when *Moby Dick* was rediscovered, the text

emerged into a new situation, a new set of associations, and it is in association with these other actors that the text was able to do things that were creative, and it was in concert with these other actors that what *Moby Dick* did was creative. When one reads *Moby Dick* and finds it to be creative, the book is not the only actor being creative; the reader, and undoubtedly additional and less obvious actors as well, is also an active participant in determining the nature of the creative experience and how this text manifests itself, what it does, as a creative agent. Furthermore, if a work of literature forms creative associations with other actors, this does not mean that all of its associations are necessarily creative. Some of the associations that *Moby Dick* engages in may be creative, but others will not be; for example if it is read by someone who finds it boring or if a copy of the book ends up associating, unread, with other books in a box in a storage unit, these associations would arguably not be creative. The point is that the reason that a particular association is creative can not be explained solely with reference to one of the actors being associated; rather, the creativity of the creative product results from the activity of all of the actors involved. The fact that *Moby Dick* was not originally seen as creative tells us not only about the actor that is Melville's text, but also about the community of actors that received it and the types of associations that they were capable of making.

All of which is to say that if we want to determine whether the product of a particular processes is creative, we must first understand that creativity does not inhere in the product, the new actor, as a property. Rather, creativity should always evaluated specifically, with reference to what that actor is doing in the various associations that it is embedded in. Because there is no limit to the types of associations that an actor may

make, the question of whether or not this actor is creative is also an open-ended one. A poem that is regarded as uninteresting or lacking value may one day find readers that value it and are changed by it; in this new situation, it is suddenly creative. Conversely, an idea which is initially seen to be highly creative may, in time, fall out of favor and cease to be creative. Further, because these actors may travel far from the situations that generated them, we must consider, as part of a novel actor's creative potential, the manner in which it is elaborated, reinterpreted, and remade as it travels from one network, one set of associations, to another. What that actor meant and did, ultimately what that actor was, in the situation that generated it may have little to do with what that actor means and does, what that actor is, in the situation in which it begins to be creative.

This alternative conception of creativity, both of the creative process and the creative product, will be developed over the next few chapters. What I have written now is only a preliminary statement intended to give the reader a sense of where this project is going and what I intend to claim about creativity. My hope is that what I have said about creativity in the preceding pages will be seen as a reasonable consequence of attempting to situate the creative process in concrete material and social worlds and of conceiving of creativity non-anthropocentrically, as a process actively engaged in by and distributed across an assortment of diverse actors, both human and nonhuman. It is also my hope that this alternative conception of creativity will tell use more about the creative process, make it more intelligible, than the Cartesian theories that currently predominate.

Chapter 2 of this dissertation will focus upon the work of Margaret Boden and Subrata Dasgupta, two cognitive scientists that have developed valuable approaches to

studying creativity. My purpose in examining their thought will be to present a fuller account of what I denote by the term "Cartesian theory of creativity." Chapter 3, wherein I begin articulating the details of my alternative approach, will focus upon the socially situated nature of creativity; specifically how problem finding itself is a socially situated phenomenon. Feminist standpoint theory, and in particular the writings of Donna Haraway, will assist me in articulating this point. Chapter 4 turns to the topic of embodied interaction within material situations as an aspect of the creative process. The writings of Hans Joas and Lucy Suchman will be consulted to develop the notion of situated action and its creative potential, and the writings of various disability theorists will then be utilized to subject this notion of situated action to a useful, and hopefully creative, critique. Chapter 5 will attempt to broaden, in a nonanthropocentric way, our notion of creativity such that nonhumans are seen as active participants in the creative process. Actor-network theory, in particular the writings of Bruno Latour, as well as Donna Haraway, Andrew Pickering, and Karen Barad will be the thinkers that guide me in this chapter, and ultimately the thinkers that will most define my approach to the creative process. Finally, chapter 6 will attempt to conclude this project by drawing together the various threads of my argument and articulating an approach to understanding and studying of creativity that conceives of the creative process as essentially situated and distributed in assemblages formed out of the associations made between diverse types of actors.

CHAPTER 2
ON THE CARTESIANISM THAT IS PREDOMINANT IN COGNITIVE SCIENCE
THEORIES OF CREATIVITY

To get a better sense of how exactly Cartesian theories of creativity conceive of

the creative process, in this chapter I will analyze how creativity is conceived of by two

cognitive scientists. I want to focus on theories of creativity within cognitive science as it

is a field of research that, at least traditionally, is deeply marked by a Cartesian way of

approaching the human mind. Consider what Robert A. Wilson identifies as the

cognitive science gesture, which renders cognition in such a way that "cognition [is]

computational (and computation was individualistic), or cognitive processing [is]

mechanistic (and such mechanisms were individualistic)."[1] That is to say, cognitive

science conceives of the mechanisms or computations of thought as a property of an

individual; they occur within the boundary of the individual. This Cartesianism can also

be found in representationalism, which is one of the core tenets of cognitive science:

representationalism "holds that we interact with the world perceptually and behaviorally

through internal mental representations of how the world is (as the effects of perceiving)

or how the world should be (as instructions to act)."[2] Representationalism holds that our

experience of the world is thoroughly mediated by representations, and these

representations exist within the individual. What is external to the individual is simply

that which is represented, but as external it plays no active role in the actual cognitive

process of forming and processing representations. Cognitive science is Cartesian

because it conceives of cognition as a strictly internal and individual process. Elided in

---

[1] Robert A. Wilson, *Boundaries of the Mind: The Individual in the Fragile Sciences* (Cambridge University Press, 2004), 144.
[2] Ibid, 145.

such a conception of cognition is the inextricably embodied and embedded nature of human cognition. In the following pages I hope to reveal the Cartesianism characteristic of cognitive science as it manifests itself in how cognitive scientists think about creativity. In particular, I will look at the research of Margaret Boden and Subrata Dasgupta.

2.1 – Margaret Boden

Early in *The Creative Mind*, Boden draws a distinction between two types of creativity; that which is P-creative and that which is H-creative. The term P-creative, or psychologically creative, "concerns ideas (whether in science, needlework, music, painting, literature . . .) that are surprising, or perhaps even fundamentally novel, with respect to *the individual mind* which had the idea."[3] On the other hand H-creative, or historically creative, "applies to ideas that are novel with respect to the whole of human history."[4] The essential distinction Boden is drawing is that, if an idea is P-creative, it is an idea that is new and original with respect to the individual mind which conceives of it, however, for an idea to be H-creative, it must not only be P-creative, it must also an idea that no one has had before in human history.

Although examples of H-creativity are generally held in more esteem in our culture, because they are seen as instances of creativity at its most exemplary, Boden's position is that if one wants to study creativity, what one should study is P-creativity.

---

[3] Margaret Boden, *The Creative Mind: Myths and Mechanism* (London: Routledge, 2004), 43.
[44] Ibid.

There are a few reasons for this. One is that, given the incompleteness of the historical record, H-creativity can only be provisionally determined.[5] A given innovation may appear to be H-creative, but in fact be predated by an earlier, though forgotten, instance. Furthermore, there are many social factors at work which may elevate certain creative figures and turn them into creative heroes, while other innovators become forgotten.[6] Joyce, Eliot, Pound, Faulkner, Woolf, Proust, Beckett, and Stein are all recognized as central figures within the canon of modernist literature, their contributions to literature are held to be H-creative. However, the prominence of these writers has come at the expense of other, perhaps equally innovative writers, such as Jean Toomer and David Jones, who are comparatively little known. The reasons why some writers are canonized and others are not can not be understood solely in terms of the differences in creative or literary quality of the work produced by each writer. Luck may play a role in whether or not a given creative accomplishment is recognized, as well as the social connections that are made by the author. For these reasons, Boden concludes that "there can be no psychological explanation of H-creativity *as such*. Indeed, there can be no systematic explanation of it at all."[7] In other words, because we can not give a psychological account of H-creativity, because the factors that determine H-creativity are social and historical, Boden holds that we can not give a systematic account of H-creativity.

However, in addition to the fact that it is difficult to determine what actually is H-creative, Boden argues that there is another and more important reason to focus on P-creativity. This reason is that H-creativity results from psychological processes which are

---

[5] Ibid., 45.
[6] Ibid., 45-6.
[7] Ibid., 45.

no different than those that give rise to things which are P-creative. The only thing which distinguishes H-creativity from P-creativity is the historically unprecedented nature of an H-creative innovation, but there is no essential difference, according to Boden, in the creative processes themselves. On this view, H-creativity is only a particular type of P-creativity, one that generates a novel product which no other P-creative process has previously generated. Because of this, if one wants to study creativity, one need not attend only to those innovations that are historically unprecedented, for the psychological processes, and thus the creative processes, which underpin H-creativity and P-creativity are identical.

Boden identifies three forms of P-creativity, which is just to say three forms of creativity. The first, and the last that I shall discuss, is combinatorial creativity, which results from the combination of familiar, existing ideas into new, unfamiliar ideas. The second is exploratory creativity, which is creative because, within an already established conceptual space, it discovers previously unknown concepts or possibilities. The third form of creativity is transformative, so-called because it transforms the dimensions and structure of a conceptual space.

As is indicated above, both exploratory and transformative creativity occur in relation to conceptual spaces, or what Boden calls "maps of the mind": "The maps of the mind, which are themselves in the mind, are generative systems that guide thought and action into some paths but not others."[8] Mathematical laws, for example, define a space within which certain mathematical moves or operations are possible and others are not. Similarly, when writing a short story, the compositional process occurs within a

---

[8] Ibid., 59.

conceptual space, composed of explicit and tacit rules, which encourage certain techniques and decisions and prohibit others. These constraints, these laws, rules, and principles, define the structure of a conceptual space. They also specify the possible ways in which that space can be navigated.

The first way in which a conceptual space can be a source of creativity is through its exploration. The rules that define a conceptual space can be seen, according to Boden, as a generative system which determines all of the possibilities of that space. To show how such generative systems can be a source of creativity, Boden cites Chomsky's discussion of the creativity of language as an example of this: the English language is governed by a generative system of grammatical rules which open up a space of linguistic expression.[9] Within this space there are seemingly endless possibilities for the composition of new sentences. The discovery of previously unnoticed possibilities within a space defined by a preexisting set of constraints is what is meant by exploratory creativity. For example, this sentence you are now reading is, presumably, a first-time novelty, which is to say that it has never been written before; it has resulted from an exploration of the possibilities opened up by the preexisting rules of the English language. Nevertheless, examples of novelties such as this are not exactly surprising or interesting. However, some explorations of generative systems, those which depart from the most well traversed paths, can yield more surprising results. Thomas Bernhard's ranting, monological, single paragraph novels fit well within the possibility-space of 20th century fiction, but because of their extremity, because of how far they stray from

---

[9] See Margaret Boden, *The Creative Mind: Myths and Mechanism* 49 and "What is Creativity?," in *Dimensions of Creativity*, ed. Margaret Boden (Cambridge: MIT Press, 1994), 77-8.

ordinary novelistic expression, they are quite distinctive, and occupy a position which is quite unique in literary history. Such creative accomplishments may be unexpected and surprising, but they are nevertheless already possible within the conceptual space they inhabit; they are intelligible as consequences of the generative systems which govern them.

Boden also argues that some generative systems may be more conducive to creativity than others. For example, we might suggest that literary or poetic forms of expression perhaps stem from different sorts of generative systems than everyday language, and that these generative systems tend to produce richer, more complicated, more creative types of language use. The centrality of rhyme, meter, and attention to the formal qualities of language use to literary expression all serve to produce a different and more complex sort of linguistic space than that which defines a conversation. However, Boden never exactly specifies what makes one conceptual space interesting or rich and another comparatively uninteresting and flat.[10] Is it the sheer complexity and heterogeneity of the rules that govern the generative system? Is the rigidness or openness of the generative system to change a factor we need to consider? In order to understand the relationship between generative systems and creativity, these questions need to be pursued more thoroughly.

Nevertheless, perhaps because exploratory creativity only yields new yet nevertheless predetermined possibilities of a generative system but never brings new possibilities into being, Boden questions whether or not the exploration of possibilities within a conceptual space is in fact creative. For example, she writes that, regarding

---

[10] Margaret Boden, *The Creative Mind: Myths and Mechanism*, 59 & 61.

Chomsky's notion of languages as governed by generative systems, "his stress on the fecundity of language was correct . . . . But the word 'creative' was questionable. It expressed the fact that people come up with new sentences when they *explore* the possibilities of English grammar. But it said nothing about *moving outside* those grammatical rules."[11] Here Boden is explicitly questioning, even doubting, the creative potential that the mere exploration of conceptual spaces offers. However, even if exploratory creativity is not itself creative, it may be a precursor to a more legitimate type of creative activity: "exploration is the start of non-combinatorial creativity. Indeed, if the style of thought is an interesting one . . . then even just exploring it will lead to many novelties, and may reasonably be regarded as 'creative.'"[12] Boden is claiming that exploration can at least lead to creativity activity for "nothing is more natural than the progression from exploring a given style of thinking to transforming it."[13] As we explore and learn about a certain conceptual space, we begin to see the ways in which we may change it. But what exploration in itself uncovers is not necessarily creative. This claim makes a certain amount of sense, because, for example, most of the unique sentences which we will utter in our lives are also completely unremarkable. Only those expressions which markedly diverge from what we are accustomed to will register as being creative, and such divergences are often accomplished by rewriting the rules which govern the act of composition itself.[14] For example, because the practice of writing

---

[11] Ibid., 49.
[12] Ibid., 58.
[13] Ibid.
[14] This does not mean that all creative sentences break the normal rules of sentence construction or style. The possibilities of sentence construction that result from the conventional rules of sentence construction are vast and interesting enough to allow for the creation of significantly creative literary works. What is simply meant is that one

poetry often encourages rethinking and remaking the rules of linguistic expression, poetry is a good place to find examples of transformative creativity. In transformational creativity, the very conceptual space is restructured through the alteration of the rules which generate it. If the exploration of a conceptual space can unearth that which is unexpected but inherently possible given the rules which govern the conceptual space, then the transformation of a conceptual space can bring into being that which was previously impossible. This marks the distinction between generative first-time novelty and radical creativity.[15]

Boden illustrates the transformative form of creativity in terms of western classical music: "This music is based on the generative system known as total harmony. From its origins to the end of the nineteenth century, the harmonic dimensions of this space were continually tweaked to open the possibilities (the rooms) implicit in it from the start. Finally, a major transformation generated the deeply unfamiliar (yet closely related) space of atonality."[16] In this example, we have the generative system of total harmony which may be explored in various ways. However, eventually this system became depleted of noteworthy moves that can be made within it and become boring and uncreative. To reinvigorate the creative potential of the generative system, a small change was made to one of the parameters of the system. Boden cites the periodic redefinition of the role and nature of the home key in Western classical music as an example of this. Such changes open up new musical possibilities to be explored, but since these changes occur at a level not deeply embedded in the generative system, the new spaces opened up

avenue for the construction of novel literary works may involve a departure from the accepted rules of composition.
[15] Margaret Boden, "What is Creativity?" 78.
[16] Margaret Boden, *The Creative Mind: Myths and Mechanism*, 80-1.

are relatively small compared to the changes made by someone like Schoenberg. Schoenberg dropped the constraint of the home key altogether and brought into being a radically different conceptual space: atonal music. This change in conceptual space was deep and radical because it was not a simple tweaking of the parameters of the generative system, but an elimination of a rule fundamental to the generative system itself. The sort of music that was possible after this transformation was surprisingly different from that that came before. However, this does not mean that Schoenberg created a form of musical expression freer of constraint than traditional music. Instead, the sort of music that Schoenberg made possible operated in relation to a significantly altered set of constraints than traditional music.

Popular music, with its often labyrinthine networks of genres, subgenres, and subsubgenres, offers many examples of how constraints are tweaked, added, or dropped to form new spaces of musical expression. Shoegaze is a genre of pop music defined by the use of effects pedals and other techniques to give the guitars a droning, noisy, and indistinct quality. Doom metal is defined by a deceleration of the usually fast tempos associated with metal, and funeral and drone metal in take this decelerated tempo to an extreme. Electronic dance music swarms with subgenres that splinter, fuse, and mutate seemingly as fast as they exhaust themselves, and though these subgenres may be distinguished from one other by conventions and distinctions that the outsider may find arcane, even absurdly fine-tuned, fans and artists within the genre take these distinctions seriously, and find the exploration and modifications of such constraints to be a source of much creativity. To take another, quite different example, consider Aristotle's analysis of the genre of Ancient Greek tragedy, which originally had only one actor on stage.

Aeschylus added the second, and Sophocles added a third.[17] Such redefinitions of the tragic genre can be seen as highly creative because they allowed for the composition of markedly different types of tragedies than had previously been possible.

Against the popular understanding of constraints, which tends to conceive of them solely as limitations on what is possible and as such inimical to creativity, constraints function in Boden's account to produce the very conceptual spaces within which creative activity occurs. The conceptual space is born out of these constraints, and there is no creativity without constraints. The Oulipo writers understand constraints in precisely this way, and in many of their writings they explicitly emphasize the importance of constraints to creativity and, more importantly, they employed various sorts of constraints to assist them in their writing. Perhaps the most famous example of this is Georges Perecs novel *La Disparition*, translated into English as *A Void*, which is a lipogram written without the letter "e."

In addition to the positive relation of constraints to creativity, it is also important to recognize that on Boden's account, new conceptual spaces are always constitutionally related to earlier conceptual spaces. Conceptual spaces are never generated *ex nihilo*. Atonal music as we know it only makes sense and is only possible in relation to the tonally centered music that preceded it. Even something as revolutionary as a Kuhnian paradigm shift, for example the transition from classical mechanics to relativity theory, does not represent a simple substitution of one epistemological framework with a second, unrelated framework. A paradigm shift is best conceived of as a radical redefinition of

---

[17] Aristotle, "Poetics," in *The Complete Works of Aristotle: The Revised Oxford Translation*, Vol. 2, edited by Jonathan Barnes, (Princeton University Press, 1984), 1449a10-32.

the conceptual space of physics, but a redefinition nonetheless, and thus the theory of

relativity, as significant a departure as it is from traditional scientific approaches, still

grows out of classical mechanics as well as the study of non-Euclidean geometry, from

which relativity theory derived some of its new constraints.

      The third form of creativity that Boden discusses is combinatorial creativity. This

notion of creativity is not dissimilar to Koestler's notion of bisociation: combinatorial

creativity is a product of the combination of previously unrelated concepts or domains of

knowledge. Boden's conception of combinatorial creativity is differentiated from

Koestler's, however, because cognitive science, Boden claims, has finally given us a

mechanism by which combinatorial creativity may be explained: connectionist

networks.[18]

      Connectionism attempts to explain cognitive phenomena in terms of networks and

their patterns of activation, which are simplified models of how the neurons in the brain

are thought to operate. It is an approach to cognition that was developed in explicit

opposition to classical cognitive science, which was more explicitly modeled upon

computationalist symbol manipulation. To better understand the connectionist approach,

let us consider an example of how a connectionist network might model object

recognition.[19] Consider a simple connectionist network, made up of nodes and

connections between nodes, and these nodes and their connections are furthermore

grouped into three categories: input, hidden, and output. Each node within the input

---

[18] Margaret Boden, *The Creative Mind: Myths and Mechanism* (London: Routledge, 2004), 34-5 & 125-46.

[19] Though this is my example, I owe my capacity to write it to a thorough reading of William Bechtel and Adele Abrahamsen's *Connectionism and the Mind: Parallel Processing, Dynamics, and Evolution in Networks* (Oxford: Wiley-Blackwell, 2002).

section of the network is responsive to a single phenomenon, perhaps a certain color, intensity of light, or shape, and when it is presented with that stimuli, it activates and sends a signal into the hidden network that in turn activates nodes within the hidden layer of the connectionist network. If I subject the network to a certain set of stimuli, let us say red, round, and noisy, the connectionist network will begin to associate these stimuli with each other by strengthening the connections between the nodes in the hidden network that activate in response to these different phenomena. This linked pattern of activation is how a connectionist network models something like recognition. With repeated exposure, I may be able to input the sound alone and the connectionist network will infer from that single stimulus the noisy red ball that it has been trained to identify, and its output will be that identification: "I hear that noisy red ball."

One of the benefits of a connectionist approach is that it may be able to give us insight into the mechanisms that underlie combinatorial creativity. Boden writes: "two ideas could blend in the memory to give a third . . . . We can suggest a psychological mechanism to overlay one pattern over another without losing either; and to produce a new pattern to which both old ones (among others) contribute."[20] In other words, if we want to understand how two different ideas can be combined or blended into a third novel idea, connectionism can represent the mechanisms of this process in terms of a network with a novel pattern of activation that was achieved through the blending together of two other activation patterns which become associated with one another.

To conclude, exploratory, transformational, and combinatorial creativity form the core of Boden's analysis of creativity. These are all, in essence, cognitive processes that

---

[20] Margaret Boden, *The Creative Mind: Myths and Mechanism* (London: Routledge, 2004), 143.

generate novelty. Combinatorial creativity results from the combination of already existing ideas into new ideas. Exploratory creativity finds previously unexplored possibilities within an already established conceptual space. Transformational creativity indicates the restructuring of a conceptual space by altering the rules or constraints which define it, therefore bringing into being previously impossible conceptual moves.

2.2 – Subrata Dasgupta

Like Boden, Subrata Dasgupta is a cognitive scientist who has done significant work on creativity, but unlike Boden, whose theory attempts to be applicable to all domains of creative activity, Dasgupta is concerned almost exclusively with technological creativity. Furthermore, like Boden his focus is on individual creativity, yet Dasgupta does not outright ignore the possibility of group creativity. Nevertheless, though group creativity may in fact be a real phenomena, Dasgupta claims that "it would be imprudent to suggest categorically that there are fundamental differences between group and individual creativity."[21]

Dasgupta's approach to creativity operates at the knowledge level and it is computationalist in nature. To understand what Dasgupta means when he claims that creativity is a knowledge level process, consider the following quotation: "generally speaking, an invention in technology or a discovery in science, a literary product, or a work of art can entail one or many ideations. Whatever may be the case, if we ask what happens in ideation, the answer is, *nothing more than a knowledge level process*!."[22] That

---

[21] Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality* (Cambridge University Press, 1994), 13.
[22] Subrata Dasgupta, *Technology and Creativity* (Oxford University Press, 1996), 183.

is to say, Dasgupta's approach is a knowledge level theory of creativity because the focus

of his analysis is on ideation. By ideation Dasgupta means "momentous cognitive events"

such as a scientific discoveries, technological inventions, or artistic innovations.[23] By

knowledge level process, Dasgupta means a process in which "cognition is described or

explained in terms of goals, actions, knowledge, and intendedly rational behavior."[24]

Thus, for Dasgupta, creativity is primarily a cognitive process concerned with the

creation of new ideas, and it is a rational, goal oriented process which occurs in relation

to a body of knowledge. An example of this might be an invention of a new literary style,

where the goal is a new mode of expression, and the achievement is developed in relation

to body of knowledge constituted by literary texts. It is plausible that even a highly anti-

rationalistic literary genre such as surrealism was conceived of through a rational process.

For example, if the goal is to express or privilege the irrational, and if dreams and free

associative thought are held to be irrational in nature, then the documentation of one's

own dreams and automatic writing techniques present themselves as reasonable ways to

attain this goal.

     Dasgupta's use of the term "rational" should be considered a bit more closely

here. Though Dasgupta does claim that creativity is a rational process, he realizes that the

creative solutions to technological problems that are ultimately arrived at are not always

the optimal solutions, and thus he appeals to Herbert Simon's concept of bounded

rationality. The theory of bounded rationality takes seriously the "constraints on the

cognitive and information-processing capabilities of the agent. Consequently, there are

---

[23] Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality* (Cambridge University Press, 1994), 88.
[24] Ibid, 55.

limits to the extent to which an agent can arrive at a correct decision."[25] Of interest with

regards to my own desire to understand creativity as situated, "the crux of the concept [of

bounded rationality] is that in a decision-making situation, there are two components, the

decision-making agent and the environment in which the decisions are being made."[26]

That is to say, though Dasgupta claims that the creative process is a rational process, it is

not rational in any absolute sense, for the environment within which a rational process

actually happens imposes limits upon the decision making process that might cause one

to select a less than perfect solution to a given problem.

  The importance of goals for Dasgupta also deserves further comment, as the

process by which goals become redefined and generate sub-goals is a core feature of

Dasgupta's analysis of the creative process. Dasgupta writes that "creative processes are

purposive, goal-directed, or teleological in nature"[27] where by teleological he means "that

such process are governed by identification of ends and the determination of means to

achieve such ends."[28] Furthermore, these goals can be broken down into or generate sub-

goals.[29] If my goal is to write a short story that expresses what it means to be a distracted

adult in the early 21st century, I may decide that instant messaging, text messaging, and

social network websites encapsulate these themes in a particularly meaningful way, and

thus successfully emulating and portraying these communications technologies become

sub-goals of my writing process. In attempting to achieve a particular goal, the creative

process may result in the positing of a whole series of sub-goals that, in determining more

---

[25] Ibid, 49.
[26] Ibid.
[27] Ibid, 191.
[28] Ibid.
[29] Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality* (Cambridge University Press, 1994), 192.

precisely the nature of my task, refine and redefine the nature the creative

accomplishment.

To reiterate, Dasgupta holds creativity to be in essence an ideational process

which is rational, goal-directed, and knowledge-rich in nature. Dasgupta calls this the

knowledge-level hypothesis of ideation (KLHI), which he formulates as follows :

> Let ψ be a scientific or technological goal for which π is a solution
> produced by an agent by way of a cognitive process. Furthermore, let π be
> novel or original in the psychological or historical sense. Then the process
> constructed by the agent can be specified by or explained in terms of a
> knowledge-level process with ψ as input and π as output.[30]

On this formulation, a creative process is a process for which the input is a given goal,

and the output is a solution. This output is achieved by rational means and in relation to

an existing body of knowledge.

In his book *Creativity in Invention and Design*, Dasgupta gives an account of

Maurice Wilkes' invention of microprogramming, a consideration of which will allow us

to get a deeper understanding of how Dasgupta understands the creative process.

Dasgupta conceives of the creative process that generated the output, or creative

accomplishment, of microprogramming as "a structured set of symbol-transforming

actions [that] appeals to a corpus of knowledge the tokens of which are in part postulated

to exist at the time [of the relevant creative accomplishment]."[31] Furthermore, as we

noted earlier, this process is "purposive, goal-directed, or teleological in nature."[32] Now

---

[30] Subrata Dasgupta, *Technology and Creativity* (New York: Oxford University Press, 1996), 102.
[31] Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality* (Cambridge University Press, 1994), 189.
[32] Ibid, 191.

let's look more closely at the elements of how the creative process, and in particular the invention of microprogramming, is rendered in terms of Dasgupta's approach.

First we have the knowledge body, which is "an integrated and organized collection of facts, theories, rules, exemplars, models, beliefs, metaphysical commitments, and values pertaining to a particular subject matter or domain."[33] The individual elements within the knowledge body are knowledge tokens. These knowledge tokens may be either personal or public, and the knowledge body may change over time.[34] Furthermore, this knowledge body can be represented as a conceptual network, with the links between the knowledge tokens representing relations of instance, property, components. For example, the EDSAC (Electronic Delay Storage Automatic Calculator) is an instance of a digital computer, which has as a component EDSAC Memory, which is in turn an instance of bit-serial ultrasonic memory, which has the properties of being simple and regular.[35]. Furthermore, there are also rule links, which "express general explanatory relations between the propositions signified by the links that they connect."[36] For example, the desired solution to Wilke's problem is a control unit that is reliable and maintainable *because* it is simple and regular in design.

Given a particular knowledge body, the problem is how a goal might be transformed into a creative solution. With regards Wilkes' invention of microprogramming, his goal was to design a control unit that was easy to maintain and repair (This is his primary goal, which Dasgupta designates as G0), which means that it must be simple and regular in structure (Thus G0 generates a sub-goal, which Dasgupta

---

[33] Ibid, 17.
[34] Ibid.
[35] Ibid, 72.
[36] Ibid, 74.

represents as G1).[37] Furthermore, there existed in Wilkes' knowledge body the

knowledge tokens F4 and F5, namely that the order interpreter of the EDSAC was

implemented as a diode matrix (F4) and that the control unit of the MIT Whirlwind was

implemented as a diode matrix respectively (F5). Given that diode matrixes are simple

and regular in structure, the inference is then to design a control unit that is implemented

as a diode matrix. In other words, given a body of knowledge containing knowledge

tokens about control units, diode matrices, design principles (such as the preference for

simplicity in design), etc, if the goal is to design a control unit "possessing a simple,

repetitive, and regular structure," and it is inferred that a control unit that is implemented

as a diode matrix would be simple, repetitive, and have a regular structure, then through

abduction we have the new goal of designing a control unit implemented as a diode

matrix.[38] Though we can not review the whole of Dasgupta's analysis, which becomes

terribly complex, ultimately, through a branching network of logically derived goals and

sub-goals and a proliferation of knowledge tokens, he shows how Wilkes may have

arrived at the notion of microcomputing.

We have an input (the original goal), a series of steps that can be formally

represented, and then an output (the creative product, which is a novel idea). However,

though Dasgupta presents us with a model of human creativity as a computationalist or

symbol manipulating process, he is careful to point out that this does not necessarily

imply that the mind and the creative processes it engages in are truly computational.[39]

The computationalist model of the creative process is simply metaphorical, and to the

---

[37] Ibid, 110.
[38] Ibid, 115.
[39] Ibid, 39.

extent that it is only a metaphor, it only functions as a "scaffolding" with which to reach a

correct conclusion and then be abandoned.[40] In other words "the real power of such

computation-based architectures of the creative mind lies in that they provide a

metaphorical framework for understanding creativity," but they are not to be taken as an

explanation for the actual mechanisms of creativity.[41] However, though the computer

serves as merely a metaphor for understanding the mind, it is a metaphor that Dasgupta

believes is particularly well suited to studying cognition, and creative cognition more

particularly, for "the discipline of computer science appears to possess the appropriate

armory of language, notation, and conceptual tools for describing and explaining such

symbolic processes – including how ideas may, in fact, combine."[42]

There are two features of Dasgupta's computationalist model of creativity that I

would like to note as I conclude my summary of his approach. The first is the gradualistic

nature of the creative process as he conceives of it. We encountered Dasgupta's claim

that creativity is a gradualistic process in the previous chapter, but now we are in a

positing to understand how exactly he understands creativity to be gradualistic. In

essence, creativity is gradualistic because "large insights are composed of a possibly

intricate but describable network of small steps. Acts of creation by humans, like those of

nature, are incremental or gradualistic."[43] Thus, to take again the example of Maurice

Wilkes' invention of microprogramming, there was no moment of inspiration wherein the

notion of microprogramming suddenly and appeared in Wilkes' mind. Rather, according

---

[40] Ibid, 30.
[41] Subrata Dasgupta, "Shedding Computational Light on Human Creativity ,"
Perspectives on Science, 16.2 (2008): 129.
[42] Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality* (Cambridge University Press, 1994), 36.
[43] Ibid, 208.

to Dasgupta's formalized account of Wilkes' invention, the creative process can be broken down into a whole array of sub-goals and insights that collectively resulted, step by step, in the invention of microprogramming. The experience of the convergence of these various insights might be reported to feel something like a sudden flash of inspiration, but the process that generates the creative accomplishment is best seen in gradualistic terms, as a complicated cognitive process which unfolds over a long duration.[44]

A second interesting feature of Dasgupta's analysis is his emphasis on the historical contingency of particular creative processes. Though Dasgupta is interested in articulating a general theory of technological creativity, for his theory to be properly applied it must be thoroughly and carefully grounded in the details of the historical context within which the particular creative achievement being studied emerged. This emphasis upon historical context is reflected in Dasgupta's attention to the specific knowledge body that Wilkes inhabited when he invented microprocessing and in his appeal to the notion of bounded rationality. Furthermore, when giving an account of a creative accomplishment and of the process that generated it, we must also acknowledge that a knowledge body

> is a dynamic, shifting entity. We may also, thus, assume that the strength
> of a link in a network can *vary over time*. Connections that are strong
> today may become, through disuse, weak tomorrow and then, because of
> shifts in attention, strengthen once more the day after.[45]

This attention to the details and evolution of the actual knowledge bodies within which particular creative processes are embedded ensures that the accounts of these processes

---

[44] Ibid, 194.
[45] Subrata Dasgupta, *Technology and Creativity* (New York: Oxford University Press, 1996), 46.

are not just well grounded theoretically, but are also attentive to the particular circumstances, the actual knowledge bodies, within which these creative process occurred.

2.3 – The Limitations of Boden and Dasgupta's Approaches

What the theories of Boden and Dasgupta share is a failure to take the situatedness of creativity seriously. For both of these thinkers the focus of their analysis, and the presumed locus of creative activity, is the mind of individual. Boden, for example, explicitly identifies personal creativity as the proper object of analysis when studying creativity. As we saw, there are at least two reasons for this specification. The first is that, according to Boden, it is the psychological processes of individuals that constitute creativity activity. The second is that instances of historical creativity need not, and perhaps should not, be of particular interest to someone who is studying creativity, first because determining instances of historical creativity is a difficult and contentious matter, and secondly because there are no psychological processes that are operative in instances of historical creativity that are not also operative in instances of everyday psychological creativity. However, though I think that Boden is correct to point out that there are no psychological mechanisms unique to instances of historical creativity, I would suggest that there are non-psychological factors, such as social processes, that may be essential to articulating an understanding of H-creativity and why certain instances of H-creativity occured within particular social and historical situations and not others. Taking into account the social locations of H-creative accomplishments may allow us to study them systematically in ways that a merely psychological approach will not. That is

to say, with the aid of anthropological, historical, and sociological resources, we can make the study of historical creativity systematic. Furthermore, if as I will later argue psychological processes are deeply intertwined with and constituted by social processes, then this social dimension must be articulated and understood in order to properly understand the very psychological processes, and any creative processes that they may participate in, that the Cartesian psychologist tries to study as phenomena autonomous of their material and social situations. For example, in the next chapter I will show how feminist standpoint theory enables us to understand how positions of social marginality and disempowerment allow the people who occupy those positions to pose creative problems, and solutions, that are difficult, if not sometimes nearly impossible, to detect and articulate from more privileged social locations. The creativity of standpoint, however, can not be understood solely in psychological terms; it has to be understood in terms of the interaction of the psychological and the social. In pursuing the effect of such extra-psychological processes on the creative process I believe that we will discover that the creative process is not relegated to the mind of the individual but rather unfolds in concrete material and social settings. Thus whereas for Boden the exploration and transformation of conceptual spaces occurs within the mind of the individual, I want to consider the extent to which conceptual transformations are affected by social and material situations.

Though Dasgupta takes more interest in the historical, and therefore extra-individual, specifics of the creative process, this does not distinguish his approach from Boden's in any significant way. That is to say, the historical dimension of Dasgupta's analysis is merely a matter of trying to specify what knowledge tokens were available to

be processed by the cognitive machinery of the individual, and then to specify what cognitive operations where plausible at certain stages of the creative process. The knowledge body simply exists as something in relation to which the individual performs specific cognitive operations, but the nature of these cognitive processes are not affected in any essential way by that knowledge body. However when I claim that the creative process is situated, I am not simply claiming that the process occurs in relation to a particular body of knowledge, but furthermore that the very nature of the creative process itself is in part a consequence of and constituted by the situation in which it is embedded. Thus we should not assume that the creative process of composing works of literature is historically and culturally invariant, with only the knowledge body being contingent, for the act of literary composition is situated in diverse networks of other writers, readers, schools of writing, institutions, writing technologies, etc., and these all shape the creative processes in deep and particular ways beyond simply determining what knowledge tokens get inserted into the cognitive machinery of the creative process. Dasgupta treats historical context as an external influence on the creative process; I want to consider the historical context, or more precisely the diverse actors, practices, and processes that constitute a particular historical moment, as intrinsic elements of the creative process.

Given Boden and Dasgupta's treatments of creativity as a cognitive process that occurs within the psychologies of individuals, I want to claim that the theories of creativity that both thinkers develop are examples of Cartesian theories of creativity. Now it should be understood that neither Boden nor Dasgupta appeal to any sort of distinction between thinking and material substances, a distinction that is a fundamental characteristic of Cartesian dualism. In fact, they would surely admit that the creative

cognitive phenomena they analyze are ultimately reducible to physical phenomena. Nevertheless their theories are fundamentally Cartesian in nature because they give no serious consideration to the embodied and materially and socially embedded nature of cognition. Within cognitive science, cognition has traditionally been understood to be fundamentally a matter of symbol manipulation, and symbol manipulation is understood to be a process performed by the organ of the brain alone, the Cartesian bias resulting in the brain being seen as functioning in a way that can be understood independently of the body of which that brain is a part and the material and social environment with which that body interacts. What follows from this is that when cognitive science attempts to give an account of the creative process, the role of the body and its material and social environment are not adequately attended to.

To get a better understanding of why the Cartesian theories of creativity of Boden and Dasgupta are problematic, let us consider how Dasgupta in particular conceives of knowledge bodies. In describing a knowledge body, Dasgupta's primary task is to determine what knowledge tokens are present and their relation to one another. The way in which Dasgupta renders a knowledge body and its transformations is highly abstract, with no consideration given of the concrete circumstances that these knowledge bodies inhabit. These knowledge bodies, as rendered by Dasgupta, are merely disembodied systems of information. Though Boden never goes into such detail regarding the constitutive elements of her maps of the mind, it seems clear that if she were to do so, her presentation would be similarly abstract. However, my concern is that such an abstract analysis might elide some important details of how knowledge exists in the world, and that these details are important to understanding the creative process. For example,

though the knowledge tokens of how to play a musical instrument, how a musical instrument works, and the history of that musical instrument might all be abstractly represented as tokens inhabiting a knowledge body, this is done at the expense of ignoring certain significant features of how these knowledge tokens actually operate. For example, the knowledge of how to play a musical instrument is an embodied skill that does not necessarily depend upon us being able to explicitly represent this knowledge to ourselves. Correspondingly, how this tacit knowledge presents itself to us, as well as our capacity to perform it, make it explicit, and change it, will differ in important ways from our knowledge of the technical details of the instrument's construction and history, which are understood in a more explicit manner. Beyond the distinction between knowledge that is tacit, and often embodied, and knowledge that is explicit, there is also the question of how exactly this knowledge exists in the world. Does it solely exist in the minds of experts? Does it exist and perhaps languish in an archive? An expert system? How is it represented? In an obscure technical language? A diagram? In the design of an artifact? Is this knowledge dogma and rigidly defended from doubt, or is it open to debate? Is it common knowledge? Or is it known only to a few experts? It this knowledge just assumed, is it background knowledge, or is it explicit? The various modes in which knowledge exists in the world are not irrelevant to a discussion of how this knowledge body participates in the creative process. The fact that knowledge does not just inhabit individual minds, but also material and social environments may be relevant to our understanding of the creative process, and understanding knowledge as materially and socially embodied may present us with a very different understanding of a particular

creative process than an approach that is concerned only with the abstract relations and dynamics of a set of knowledge tokens.

The charge of Cartesianism can also be leveled against the significant alternative to traditional computationalism within the cognitive sciences; that is to say, against connectionism, which is the theoretical basis on which Boden attempts to give an account of conceptual blending. The Cartesianism of connectionism is most easily seen in how connectionism conceives of the relationship between the cognitive agent and its environment: inputs and outputs. Inputs and outputs delineate the boundary between the mind, represented by the connectionist network, and the environment. Cognition occurs within the neural network, and this process is independent of the environment. The environment is simply an input. Such a representation of human cognition is Cartesian because the functioning of individual neural networks, and thus individual human minds, is conceived of as functionally independent of whatever is going on in the environment. You do not need to, for example, explain the social system in which the individual neural network is embedded to give an explanation of that neural network operates. All of that is outside the network, and the cognitive process is in the network.

2.4 – Alternative Approaches Within Cognitive Science

Though Cartesianism has long been a chief characteristic of cognitive science, and as such any theory of creativity that the field might devise, since the 90s there has been the emergence and growth of various alternatives to this dualistic approach within the field of cognitive science itself. Drawing inspiration from a diversity of sources, including the theory of externalism, dynamical systems theory, J.J Gibson's ecological

theory of perception, and the writings of Martin Heidegger Maurice Merleau-Ponty, Lev

Vygotsky, Gregory Bateson,[46] and others, some of the most important alternatives have

emerged under the names of distributed cognition, embodied cognition, enactivism, and

situated cognition. Because of the messy and multiple ways that have emerged for

classifying these various researchers and approaches, these terms do not necessarily

denote entirely separate approaches and some researchers could be classified as

belonging to two or more of these approaches. Roughly stated: distributed cognition

considers cognitive processes as, at least in some instances, distributed across networks

of cognitive agents and their material environment;[47] situated cognition argues that

cognition can not be understood without reference to the particular social and material

environments with which an individual cognitive agent interacts and within which it, and

its knowledge, is embedded.;[48] embodied cognition holds that cognitive processes are

determined and constituted by the human body and its capacities;[49] and finally enactive

approaches argue that cognition is a product of an organism's interactions with its

---

[46] For example, see Mark Rowlands, *Externalism: Putting Mind and World Back Together Again (*Montreal: McGill-Queen's University Press, 2003); James J Gibson, *The Ecological Approach to Visual Perception* (Hillsdale, New Jersey: Psychology Press, 1986); Martin Heidegger, *Being and Time,* trans. John Macquarrie and Edward Robinson (Oxford: Blackwell, 1962); Maurice Merleau-Ponty, *Phenomenology of Perception*, trans. Donald Landes (Oxford: Routledge, 2012); Lev Vygotsky, *Thought and Language*, ed. Alex Kozulin, trans. Eugenia Hanfmann and Gertrude Vakar (Cambridge: MIT Press, 1986); Lev Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*, ed. Michael Cole et al (Cambridge: Harvard University Press, 1978); and Gregory Bateson, *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology* (University of Chicago Press, 2000).
[47] Edwin Hutchins, *Cognition in the Wild* (Cambridge: MIT Press, 1995).
[48] Andy Clark, *Being There: Putting Brain, Body, and World Together Again* (Cambridge: MIT Press, 1998), and Andy Clark, *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence* (Oxford University Press, 2003).
[49] S. L. Hurley, *Consciousness in Action* (Cambridge: Harvard University Press, 1998) and Alva Noë, *Action in Perception* (Cambridge: MIT Press, 2004).

environment.[50] Taken together, these various approaches allow us to conceive of cognition as something that embodied human beings do, or enact, in relation to their material and social environments; more interestingly, the boundaries of the cognitive agent become blurry as the cognitive process begins to enroll artifacts and objects as part of its process and we might find that, instead of dealing with individual cognitive agents, we are confronted with extended cognitive systems that encompass many agents and their material environment.

However, though we presently have interesting alternatives to the Cartesianism of computationalist and connectionist cognitive science, as of yet these non-Cartesian approaches have not been directed, at least in any significant way, towards developing non-Cartesian theories of creativity. Furthermore, doing so is not really the focus of my present project. Instead of explicitly extending the work of cognitive scientists such as Edwin Hutchins, Andy Clark, Susan Hurley, Shaun Gallagher, and Alva Noë to construct an alternative cognitive science theory of creativity, these thinkers will instead serve as a mostly background inspiration to me as my own attempt to develop a theory of creativity turns explicitly towards feminist standpoint theory, theories of situated action, disability theory, and actor-network theory (and aligned approaches within STS). The promise that contemporary cognitive science holds for articulating alternatives to the predominant Cartesian theories of creativity, to help us see creativity as embodied, enacted, embedded, and distributed, will have to be either deferred to any future writing projects I might

---

[50] Shaun Gallagher, *How the Body Shapes the Mind* (Oxford: Clarendon Press, 2005); Raymond Gibbs, *Embodiment and Cognitive Science* (Cambridge University Press, 2006); Rolf Pfeifer and Josh Bongard, *How the Body Shapes the Way We Think: a New View of Intelligence* (Cambridge: MIT Press, 2007).

undertake or to other cognitive scientists who may become dissatisfied with what

cognitive science has thus far been able to tell us about the creative process.

CHAPTER 3
THE CREATIVITY OF PROBLEM FINDING AND ITS SOCIAL SITUATEDNESS

3.1 – Problem Construction

Creativity is often conceived of in terms of problem solving. Conceived of as such, creativity is the achievement of a solution to a problem. Though I do not believe that it is possible to reduce all creative processes to types of problem solving, problem solving is nevertheless an important type of creative activity. The theory of genetics was a solution to the problem of how organisms pass traits on to their offspring, and how variation and differentiation emerge in populations of organisms. The modernist literary technique of stream of consciousness narration is the solution to the problem of capturing, in a text, the movement and processes of the mind at work. The space elevator is a proposed solution to the problem of transporting humans and other objects from the surface of the Earth to outer space. All of these can be seen as instances of creative problem solving.

In this chapter, however, what I want to look at is not the creative process of problem solving, but rather how we become aware of a problem in the first place, the process of finding, becoming attuned to, or constructing problems. There are at least two reasons that this process deserves our attention. The first is that I intend to show that the process of becoming aware of a problem is itself a creative accomplishment. The second is that, in considering how the process by which we become aware of a problem as a problem occurs in relation to specific social circumstances, we can acquire some important insights into the situatedness of the creative process.

One of the implications of saying that our sense of what is and is not problematic is socially situated is that subjects occupying different positions within society may experience different things as problematic, and what one person experiences as a problem will not necessarily be considered problematic by someone differently situated. The social contingency of what is and is not considered problematic, of what is and is not considered to be a problem, can be appreciated if we draw a distinction between our mere awareness that something is a problem and our experience of a problem as problematic and our understanding of what makes it problematic. To better understand this point let us consider the following example: one of the most troubling problems in contemporary physics is dark matter and dark energy, which although currently not directly detectable, are inferred to exist from how they interact with the parts of the universe that we can detect and study. What makes the supposed existence of dark matter and dark energy even more troubling however is that dark matter and dark energy are thought to constitute the vast majority of the universe. Now I am aware that the hypothesized existence of both dark matter and dark energy is a problem for contemporary physics, and that a solution to these problems is being actively sought by many physicists, but nevertheless these issues are not, for me, a problem. In other words, I do not experience these issues as problematic. However, the reason that I do not experience the existence of dark matter or dark energy as problematic is not because I have a solution to the problem. Rather, I do not have an understanding of the theories and observations in relation to which the existence of dark matter and dark energy could appear as problematic. Perhaps more importantly, I do not participate in the community and practices that would constitute me as a subject from whom these problems would be experienced as problems. What I want

to suggest here is that problems do not merely exist in relation to bodies of knowledge, but also emerge out of the institutions and practices within which these knowledge bodies are situated, transmitted, and transformed. We begin to experience problems as problems not simply through internalizing bodies of knowledge, but also, in many cases, learning how to inhabit the institutions and practices in relation to which these problems are actual problems. As such, I may be aware that the existence of dark matter and dark energy are significant problems in contemporary physics, but I am unable to experience them as problems. This failure results both from a lack of knowledge on my part, but also from my not being situated within the institutions and practices within which this knowledge is embedded.

One of the implications of this is that the emergence and elaboration of problems can be conceived of as a situated creative process. From a certain location and a certain perspective, certain problems manifest themselves and others do not and a particular problem may manifest itself differently to differently situated subjects. We can also give an account of why these particular ways of being situated in the world produce these particular attunements to or constructions of what is and is not problematic. In order to get a clearer understanding of the situated emergence of problems, and why this emergence is creative, I want to turn to feminist standpoint theory.

3.2 – Feminist Standpoint Theory

Feminist standpoint theory argues that people who occupy different positions within society, particularly socially marginal positions, may come to understand the world from a different perspective that may give them an epistemic advantage. More

specifically, feminist standpoint theorists argue that woman have an epistemic advantage over men in many domains of knowledge production. Miriam Solomon argues that in the writings of various feminist standpoint theorist it is possible to draw out and articulate a theory of creativity this is attentive to the particular social and material locations of the creative agents.[1] Following her, I want to look in particular at how feminist standpoint entails an attunement to and capacity to construct particular sorts of problems that those without standpoint will not be attentive to, and how this different attunement to the problematic is itself a creative accomplishment.

The emergence of feminist standpoint theory, as articulated by Dorothy Smith, Nancy Hartsock, and Sandra Harding among others,[2] was influenced by similar arguments within Marxist theory, which claim that the working class has the capacity to form a better understanding of the workings of capitalism than those who own the means of production.[3] Feminist standpoint theorists took up this insight and argued that, in a patriarchal society dominated by male interests, women are in a better position to produce true knowledge of society than men. For example, sociology as practiced by men has traditionally ignored the sexual division of labor and the types of labor that have traditionally been practiced by women, which include domestic labor and child rearing,

---

[1] Miriam Solomon, "Standpoint and Creativity," *Hypatia* Volume 24.4 (Fall 2009): 226.
[2] See Dorothy Smith's "Women's Perspective as a Radical Critique of Sociology," Nancy Hartsock's "The Feminist Standpoint: Developing the Grounds for a Specifically Feminist Historical Materialism," and Sandra Harding's "Rethinking Standpoint Epistemology: What is 'Strong Objectivity?,'" all collected in *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, ed. Sandra Harding (New York: Routledge, 2004).
[3] See Frederic Jameson, "*History and Class Consciousness* as an 'Unfinished Project,'" in *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, ed. Sandra Harding (New York: Routledge, 2004), 143-51 and György Lukács, *History and Class Consciousness: Studies in Marxist Dialectics* (Cambridge: MIT Press, 1971).

and this exclusion has occurred at the expense of producing accurate knowledge of society. However, because women are enculturated to attend to or be concerned with these practices, the sociological work produced by women with standpoint will be more attentive to the absence of these practices in the knowledge produced by their discipline and be in a position to correct for that absence, thus generating knowledge about society that, feminist standpoint theorists argue, is more complete.

To repeat, while the absence of women's labor from traditional sociology is not perceived by male sociologists, women sociologists with standpoint are in a position to perceive this absence as a problem and produce sociological work which corrects and accounts for its absence. Through recognition of the problematic absence of women's labor from sociological theory, feminist sociologists acquire a new, more critical and engaged, perspective upon their discipline, a different research agenda with an additional set of problems, and perhaps even new theories and methodologies. With an eye turned toward the problematic absence of crucial social phenomena, the feminist sociologist has a different orientation within the discipline of sociology than her male colleagues. It is in this different orientation within the discipline, and the sorts of questions that it opens up, that we find the creative capacity of feminist standpoint.

Though the value of standpoint is perhaps most easily discernable in examples drawn from fields like sociology, its importance is not limited to sociology, or even, as we will see, the human sciences. To allow us to appreciate the broader value of feminist standpoint, let us now examine more closely the relation between the woman with standpoint and her discipline as articulated by Patricia Hill Collins and her concept of the outsider within. Collins develops her notion of the outsider within through her analysis of

the standpoint of black women, which will be different from those of either white women or of black men. The reasons for this are the particular social and material realities experienced by black women. For example, black women have traditionally been accepted into white households as domestic servants, often becoming "honorary members of their white 'families,'" but this welcoming into the family is never total or complete.[4] They are thus, even as they participate in the private lives of these white families, still outsiders, never completely becoming a part of these white families and resistant to the values and beliefs, to the worldview, of white society. They are outsiders within.

For these black women employed as domestic servants, their experience of being outsiders within gives them a unique and valuable perspective on racism. They have a different perspective on racism than the white families who employ them because the existence of racism and the ways in which it manifests itself, while usually invisible to the white employers, is perceived by these black women.[5] But they will also have a different perspective on racism than black men because of their access to the private lives of white families. These women see, from a unique perspective, that white dominance results not from the innate superiority of white people, a myth which is made untenable after participating in the private lives of their white employers, but upon the institution and practices of racism itself.[6] The experience of being an outsider within and the insights which derive from it gives these women the capacity to produce important knowledge about, and unique ways of resisting, racism. Collins argues that this outsider

---

[4] Patricia Hill Collins, "Learning from the Outsider Within: The Sociological Significance of Black Feminist Thought," in *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, ed. Sandra Harding (New York: Routledge, 2004), 103.
[5] Ibid, 118.
[6] Ibid, 103.

within status has been integral to the development of black feminist thought, and that furthermore "sociologists might benefit greatly from serious consideration of the emerging, cross-disciplinary literature that I label Black feminist thought, precisely because, for many Afro-American female intellectuals, 'marginality' has been an excitement to creativity."[7]

Let us now begin to draw out more specifically what gives outsider within status, and the standpoint that may be derived from it, its creative power. Although Collins takes the black woman academic to be paradigmatic of what it means to be an outsider within, she is not arguing that only black women are capable of achieving outsider within status. The question then is this: what defines an outsider within? Given Collins' account, there seem to be two essential characteristics of the outsider within. The first characteristic is that the outsider within gets to know firsthand the contradictions between the worldviews and perspectives of the outsider and insider. Through the process of becoming an insider, the outsider experiences the lack of fit or coherence between their own experiences, and their understanding of these experiences, and the insider perspective that they are in the process of acquiring. The second characteristic is that the differences between the outsider and insider viewpoints index not only different experiences of or ways of being in the world, as might exist between the disciplinary perspectives of an architect and a philosopher for example, or a chemist and a novelist, but also a contradiction born of domination, of unequal social relations. What is at issue is not simply the coming into contact of different and perhaps incommensurable theoretical perspectives within a single individual, but the tension that results from attempting to simultaneously hold socially

---

[7] Ibid., 104.

oppositional viewpoints, an activity that surfaces the usually hidden political and social dimension, the power-laden nature, of knowledge production. What standpoint attunes the knowing subject to are the asymmetrical power relations that both differentiate the group that dominates from the group that is dominated as well as produce the particular perspectives and knowledge practices of these groups. It is the movement of the outsider, coming for a social position characterized by marginalization and exclusion, into a discipline that has traditionally exemplified the point of view of the dominant group, and that has traditionally excluded the outsider, that defines the outsider within.

Being an outsider within thus not only positions one to be more aware of the fact that there are different ways of knowing the world, but also that the dominant group produces knowledge that both issues from and reinforces its social domination. Outsiders within, due to their marginal social positions, are thus better prepared to see and understand how these power asymmetries function in the production of knowledge and then call into question both the knowledge that is produced and the methodologies and institutions that produce it. Furthermore, unlike insiders who more fully identify with the worldview they have been trained to inhabit, "outsiders within are liable to see anomalies."[8] For example, social theories that have been articulated within the institutions that embody the interests of the dominant group will often both miss and be unable to adequately account for certain social practices, for example the unpaid labor of housework that has traditionally been assigned to women. Such practices may be anomalous from the dominant perspective, meaning that these previously unnoticed practices may not be explicable in terms of the familiar theories of the discipline, and as

---

[8] Ibid, 119.

such these anomalies call for alternative theories and the reworking, critique, and perhaps outright rejection of traditional theories. To briefly recall the main theme of this chapter, which is the theme of problem construction, it is in standpoint's capacity to generate anomalies that we can locate both a crucial dimension of the process of problem construction and a significant source of the creativity of standpoint.

One thing that must be made clear is that while all people who occupy marginal social positions may be capable of experiencing a certain splitting of consciousness, due to living in a society that is saturated by the worldview of the dominant group and the simultaneous resistance many marginalized people feel with regards to taking on this worldview as their own, a split consciousness does not necessarily equate to outsider within status. Outsider within status is marked by the movement from a marginal position within society into the core processes that generate, legitimize, and benefit from this marginalization, whether that be the private lives of the elite or the academic institutions which theorize out of this power asymmetry. It is this movement from periphery to core that is characteristic of outsider within status.

Being an outsider within seems to be an essential condition for the achievement of standpoint. However being an outsider within is not necessarily, by itself, enough to constitute standpoint. As Hartsock writes "a feminist standpoint may be present on the basis of the common threads of female experience, but it is neither self-evident or obvious."[9] It is not the raw experience of marginality, or even of being an outsider within, that counts as standpoint. Standpoint is attained through reflecting upon and attempting to understand one's own experience of marginality, as well as struggling

---

[9] Nancy Hartsock, "The Feminist Standpoint: Developing the Grounds for a Specifically Feminist Historical Materialism," 48.

against the various techniques and institutions that produce this marginalization.

Standpoint requires "both analysis and political struggle occurring in a particular

historical space."[10] This is one of the crucial points of standpoint theory: standpoint is not

a given, standpoint is achieved. In other words, achieving standpoint is characterized by

both theoretical and practical engagement with oppression. Standpoint is thus not simply

the product of a particular social position, but also may be understood to be, in a certain

sense, a skill, and one that might be quite difficult to achieve. As Haraway writes, "*how*

to see from below is a problem requiring at least as much skill with bodies and language,

with the mediations of vision, as the 'highest' techno-scientific visualizations."[11] That is

to say, learning how to interpret what one sees from positions subject to social

domination requires as much ingenuity and skill as using a scanning electron microscope

to visualize an atom.

3.3 – Standpoint as Collective

Standpoint, however, should not necessarily be understood as an exclusively

individual achievement. For example Alison Jagger writes that "the standpoint of women

is discovered through a collective process of political and scientific struggle."[12] Or

consider Hilary Rose's claim that that

> feminist methodology seeks to bring together subjective and objective
> ways of knowing the world. It begins with and constantly returns to the

---

[10] Ibid.

[11] Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privileged of Partial Perspective," in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991), 191.

[12] Alison Jagger, "Feminist Politics and Epistemology: The Standpoint of Women," in *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, ed. Sandra Harding (New York: Routledge, 2004), 57.

> subjective shared experience of oppression. It is important to stress shared experience, since the purely personal account of oppression, while casting some brilliant insights, may tell us more about the essentially idiosyncratic character of individual experience than about the general experience of all or even most women.[13]

That is to say, standpoint is not the product or achievement of a single individual, but is the result of collective struggle and collective reflection on and attempts to understand the meaning and causes of one's marginality. Feminist standpoint emerges out of the shared experiences of women and the ways women are constituted as subjects. This collective process of making marginal existence an object of shared knowledge is a precondition for standpoint.

The reticence of Collins and other black feminists to speak of women's experience as such, for the reason that women's experience has conventionally meant white bourgeois women's experience in traditional feminist thought, is important to recall here. Collins point is that the white feminist does not really speak for all women, but, due to her lack of understanding how black women experience oppression and how this oppression is different from that experienced by white women, for, at best, white women only. As such, Collins recommends an intersectional account of oppression, which recognizes the multiple and interlocking forms of oppression, including but not limited to classism, racism, sexism, and heterosexism, that make the experiences of oppression of, for example, a white women different than those of an Asian woman.[14] This point is important, I believe, not because it challenges the need for collective accounts of

---

[13] Hilary Rose, "Hand, Brain, and Heart: A Feminist Epistemology for the Natural Sciences," in *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, ed. Sandra Harding (New York: Routledge, 2004), 76
[14] Patricia Hill Collins, "Learning from the Outsider Within: The Sociological Significance of Black Feminist Thought," 109.

oppression, but rather because it allows us to recognize that standpoints, and the experiences and types of subjectivities upon which they are founded, are not monolithic. A general feminist standpoint may not exist, but I do not think that this fact gives us a good reason to argue against the notion that feminist standpoints are collectively achieved. In fact, the intersectionality of oppression underscores the need for collective knowledge processes because the diverse and dissimilar nature of female oppression in its various forms can only be brought to the surface and theorized through the collective sharing of and reflection upon particular experiences.

3.4 – Standpoint and Problem Construction

What needs to be attended to now is how standpoint attunes subjects with standpoint to problems that those without standpoint will normally not be aware of. Furthermore, I want to claim that this attunement is creative and that the types of problems that standpoint facilitates the detection and construction of are often of a deeper and more fundamental nature than the traditional problems around which disciplines orient themselves. That is to say, standpoint can not only raise questions about what sorts of phenomena are worth studying and what sorts of methods are the most suitable to studying them, but also foundational questions about the nature of knowledge production, and in particular questions concerning the social embeddedness of knowledge and the relation of this knowledge to unequal social relations. But what makes standpoint particularly good at raising and articulating new and interesting problems?

As was noted above, one source of the unique sorts of problems perceived by those with standpoint is the sorts of experiences that they have had. That is to say,

because those with standpoint come from positions within society that are marginal, and because they often work within institutions populated by people from more socially privileged backgrounds, the sorts of experiences that those with standpoint have had will differentiate them from their colleagues in interesting ways. In particular, they may notice how certain practices and experiences that seem of great importance to them may be ignored or distorted within the knowledge produced by the institutions that they inhabit. The absence of attention to the types of experiences and practices that are familiar and significant to those with standpoint will itself appear as problematic to those with standpoint, and if the reasons for this absence are pursued, further problems may begin to articulate themselves: How can the theories and practices of the discipline be adapted to account for these absent phenomena? To what extent will attending to these phenomena require a rethinking of the knowledge that has traditionally been produced by the discipline? Why were such phenomena absent in the first place? What do these absences say about how knowledge is produced and who produces it?

However we should not suppose that the mere experience of marginality alone accounts for how those with standpoint are able to perceive and articulate unique sorts of problems. Consider, for example, Haraway's formulation of standpoint, which focuses not only upon the experiences of those who exist at the margins of power, but also upon how these subjects are constituted as the sorts of subjects that they are. Opposing conventional theories of the subject, which propose a subject that is universal, Haraway argues that in fact subjects are "non-isomorphic."[15] In claiming that subjects are not isomorphic, what Haraway means is that subjects are not all constituted in the same way,

---

[15] Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privileged of Partial Perspective," 192.

that there are different ways of being a subject. But how are we to account for this diversity of subjects? Haraway suggests that particular sorts of subjects emerge through particular ways of being positioned with the world, through the formation of particular sorts of connections. The various processes of subject formation precede the subject and shape its emergence. Different processes of subject formation result not only in subjects with different sorts of experiences, but more importantly in differently constituted subjects, subjects that understand and interpret their world in markedly different ways.

Of particular relevance to my present concerns, Haraway understands the situated subject not as a unified and coherent point of view, but as often, if not always, split, disunified, and multiple. The subject does not look out upon its world from a single, unified point of view, but from many; the subject is possessed of "(at least) double vision."[16] In a way that recalls Nietzsche,[17] the multiplicity of very much interested and motivated perspectives that we find within any particular subject is not an obstacle to objectivity, but a condition for objectivity; the disengaged, disinterested monovision of traditional epistemology is an illusion and it produces illusions, not objective knowledge. The split subject is able to be objective because it is able to register and evaluate how different perspectives, and different positionings, produce different kinds of knowledge; this subject is not just positioned in the world, but critically positioned, and as such it can give an account of and put to analysis its own, and others', knowledge making practices.[18]

---

[16] Ibid, 195.

[17] Friedrich Nietzsche, *On the Genealogy of Morality,* 87.

[18] Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privileged of Partial Perspective" 193.

This split subject that is of such great importance to Haraway is especially evident in subjects with standpoint. To recall Collins' notion of the outsider within, the person with standpoint can perceive the world both from the perspective of someone who is marginalized and from perspectives fashioned by those in power, and this capacity is the result of the split nature of the subject that has undergone subjectification both within social locations of marginality but also within the institutions of knowledge production that reside at the centers of social power. However the goal of the person with standpoint, according to both Collins and Haraway, is not to replace the perspectives and theories generated from the vantage point of social domination with the theories articulated by the oppressed, but to make productive use of this double vision. According to Collins, for the outsider within to strive to achieve a coherent, unified, single perspective would not only entail a choice between either remaining an outsider or assimilating, uncritically and in total, the perspective of the oppressor, but it would also result in the loss of "the creative tension of outsider within status."[19]

The double vision of socially marginal existences, when seriously reflected upon and developed, is a condition for what Sandra Harding has called strong reflexivity. What strong reflexivity entails is that

> the subject of knowledge – the individual and the historically located
> social community whose unexamined beliefs its members are likely to
> hold 'unknowingly,' so to speak – must be considered as part of the object
> of knowledge from the perspective of scientific method. All of the kinds
> of objectivity-maximizing procedures focused on the nature and/or social
> relations that are the direct object of observation and reflection must also
> be focused on the observers and reflectors – scientists and the larger
> society whose assumptions they share. But a maximally critical study of

---

[19] Patricia Hill Collins, "Learning from the Outsider Within: The Sociological Significance of Black Feminist Thought," 122

scientists and their communities can be done only from the perspective of those whose lives have been marginalized by such communities.[20]

What strong reflexivity requires is not only critical reflection upon the methodologies, practices, and theories of one's discipline, but also reflection upon the relation between knowledge production and the social. The examination of how one's social location affects and is affected by the knowledge that one produces is characteristic of the knowledge practices of those with standpoint, and it is what distinguishes their knowledge from the knowledge produced by more traditional researchers. Just as one wants to know what artifacts are introduced into one's observations by the instruments with which one observes, strong reflexivity encourages us to reflect upon the artifacts produced by the social locations of knowledge production. For example, what traces, one might ask, does the ideology of heteronormativity leave in the life sciences?

The split subject conceived of by standpoint theorists like Haraway has the capacity to be attuned to a whole series of problems that would not normally be noticed by those who occupy locations of social dominance. These problems may concern, as has been noted above, how to study types of phenomena that have previously been ignored by one's discipline to critiquing and revising traditional theories in order to accommodate what was previously absent. However, as suggested by the notion of strong reflexivity and the critical positioning of the split subject, the sorts of problems raised by standpoint may be of a more fundamental nature and concern the very practices of knowledge production themselves and how they are socially situated. For example: how is a research agenda shaped by social context and social inequality? How does the style of reasoning

---

[20] Sandra Harding, "Rethinking Standpoint Epistemology: What is 'Strong Objectivity?'" 136.

characteristic of a discipline embody this social domination? How does the knowledge produced by the discipline function to authorize the unequal power relations of society? From the position of standpoint, knowledge production can no longer be conceived of as independent of political struggle; the struggle to achieve standpoint and to produce knowledge that is adequate to the insights of standpoint requires engagement with and resistance to the various ways in which domination is implemented in society and the production of knowledge. Strong reflexivity thus draws out, makes problematic, and requires that we attend to the whole apparatus and context of knowledge production. Standpoint makes the relations between knowledge and power a problem for those who participate in knowledge production.

Taken together, the unique experiences of the marginalized and the particular ways in which those with standpoint are constituted as subjects, defined by split vision, critical positioning, and strong reflexivity, make standpoint particularly well suited for detecting and articulating different and novel sorts of problems. Though the value of standpoint is perhaps easiest to concede in the humanities or scientific disciplines like sociology or history, where the object of study is human activity, standpoint has relevance to what we have come to call the hard sciences as well. For example, on Solomon's reading of Evelyn Fox Keller's study of Barbara McClintock, McClintock is a "critically aware woman in a world of mostly politically unreflective male scientists, [and this critical awareness] gave her the cognitive resources to produce a different kind of biological model: interactive rather than hierarchical."[21] Interpreted in this way,

---

[21] Miriam Solomon, "Standpoint and Creativity," 226. Also see Evelyn Fox Keller, *A Feeling for the Organism: The Life and Work of Barbara McClintock* (New York: W.H. Freeman and Company, 2003).

McClintock's scientific research is exemplary of feminist standpoint. McClintock's standpoint brings to the study of genetics a style of reasoning that is uncharacteristic of the ways of thinking that were typical of the field of genetics, and which gave her an epistemic advantage over her male colleagues. That is to say, the traditional approach was not, for McClintock, self-evident, but rather a problem.

What I have set out to show in this chapter is that problem finding is a socially situated creative process. I attempted to show this through an analysis of feminist standpoint theory, an approach within philosophy of science that claims that women and other marginal groups have an epistemic advantage that derives from their manner of being socially situated. Standpoint theory also allows us to see that problems emerge in relation to certain interests and certain social locations. Subjects inhabiting certain social locations will be able to perceive problems that are invisible to subjects occupying other locations. Furthermore, those occupying marginal social positions may, from the perspective of standpoint, be capable of articulating deep problems about the legitimacy of the knowledge practices of their disciplines. What needs to be emphasized is that those with standpoint are not only liable to see more problems than those without standpoint, but that the nature of the problems that they perceive are deeply linked with their social location. Furthermore, because of the centrality of shared experience to the construction of standpoint, the particular problems that standpoint articulates are not simply situated in particular social locations, but also collectively constructed.

But is problem finding creative? One of the key themes of this chapter has been that problems are not necessarily self-evident, but often require that we learn how to

perceive them. Consider again feminist standpoint theory, which shows us how certain

problems only become apparent from certain social locations, and that even these social

locations, in and of themselves, do not necessarily bring these problems into a state of

visibility. To recall Haraway, standpoint is not simply about positioning, it is about

critical positioning, which is the capacity to reflect upon the relations between the

processes of knowledge production and social location, and this capacity is a skill that

must be learned. Standpoint is an accomplishment, and the same holds true for the sorts

of problems that standpoint is able to clarify and bring to awareness. Furthermore, once

these problems have been established as problems, those who perceive them have a

transformed, and potentially highly creative, orientation to their discipline. Thus when a

researcher notices that important aspects of her experiences are absent from the

knowledge produced by her discipline, are not even considered to be a legitimate topics

for research, the problem that this absence presents to her is not only creative because

seeing this as a problem is new, is novel and useful because it allows for a potentially

more complete picture of reality, but it is also creative because the subject that is now

attuned to this problem also sees their discipline and its practices from a very different

perspective than her colleagues. This new orientation not only adds to the knowledge

produced by the discipline through the inclusion of previously unstudied phenomenon,

but also holds the potential to transform the discipline itself through the introduction of

new methodologies, styles of thinking, and practices like strong reflexivity. The problem

is creative in this way even before a solution to the problem is arrived at.

CHAPTER 4
SITUATED ACTION AND CREATIVITY

The previous chapter attempted to clarify the social dimension of creative activity. This was done by means of an analysis of feminist standpoint theory, wherein the achievement of standpoint is understood as a socially situated form of subjectification that attunes the subject to certain problems that those without standpoint are unaware of. The problems to which standpoint attunes its subjects are related to the particular contexts within which these subjects are constituted, for example the specific practices that women are expected to engage in such as child raising and housekeeping. Because of the particular sorts of problems to which standpoint is attuned, due to shared experiences, styles of reasoning, and concerns, the achievement of standpoint creates the conditions for producing creative knowledge practices and accounts of the world that those from less marginal social locations would not be able to articulate.

The situatedness of standpoint was conceived of, in the previous chapter, exclusively in terms of social location. However the human subject is not only situated in relation to other human beings and within diverse social structures and institutions; the human subject is also situated in diverse material environments. In this chapter I want to turn more directly to the role that the material situation of creative activity plays in the creative process. I am going to take the position that the material world is not simply something that is acted upon, something passive that is wielded and shaped by human creative action. Rather, the material context shapes and informs the creative process itself in an essential way. To develop this point, I want to consider a way of understanding action that takes seriously the entanglement of action, perception, and cognition in

particular material situations. What I am concerned with is thus a situated theory of action.

4.1- Planning Theory of Action and an Alternative

Hans Joas and Lucy Suchman have both developed important situated theories of action, and it is with regards to their theories that I will develop an account of situated action as it is relevant to the study of creativity. Hans Joas is a social theorist whose work attempts to bring the thought of pragmatist philosophers, most notably John Dewey and George Herbert Mead, to bear upon sociological theories of action. Interestingly, Joas sets out to articulate what he explicitly identifies as a creative theory of action, which emphasizes the inherent creativity of all action, as an alternative to traditional theories of action which misconceive of human agency and, Joas argues, renders action's creative capacity unintelligible.[1] Lucy Suchman, an anthropologist working with an ethnomethodological approach, develops her theory of situated action in order to critique conventional approaches to human-computer and human-machine interaction which conceive of human action as being necessarily preceded and determined by explicit plans for action.[2] Representationalist models of human action, Suchman claims, misrepresent the nature of action, and this can have interesting and problematic consequences when such models are implemented into the design of human-machine interfaces. The artifact is thus designed with an idealized subject, and an idealized set of interactions, in mind,

---

[1] Hans Joas, *The Creativity of Action* (University of Chicago Press, 1996).
[2] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions* (Cambridge University Press, 2007).

which thus limits the interactive possibilities of the object.[3] Furthermore, representationalist models of the mind encourage the creation of artifacts that are unintelligible to the user because the design process presupposes that the user has an explicit understanding, an internal representation, of how to use the object. In contrast, a design practice that takes seriously the situated nature of action would encourage the design of artifacts that are more sensitive and open to the situations of their use and more transparent with regards to how we may interact with them. The function and use of an artifact should be legible in the design of the artifact itself.

In short, both Joas and Suchman reject theories of action which regard explicit plans and goals, which take the form of mental representations, as necessarily preceding and determinative of action. According to conventional accounts, the mental processes of goal formation and planning are primary, and action follows from this cognitive activity as derivative and dependent. For example, if I find myself in the wilderness with bad weather approaching, I may acquire the goal of building a shelter. I will then conceive of a plan, a mental imagining of the dwelling I will construct, and only after I have this plan in mind will I commence to construct the shelter. On such an account, action is essentially distinct from the process of acquiring a goal and conceiving of a plan. One is a mental process, the other a physical process, and the former determines the latter. The metaphysics underpinning this view of action should be familiar. As Joas writes, "concealed behind the notion that an act of goal-setting must precede action is the assumption that human cognition is independent of action or that it could and should be

---

[3] Ibid, 186.

made independent of action."[4] In other words, a distinction such as this, of action from planning and goal setting, must be seen as an instance of the traditional Cartesian distinction between mind and body and self and world.

This sharp distinction between cognition and action illuminates a prominent, and analogous, distinction in many theories of creativity. Consider again the accounts of creativity given by Boden and Dasgupta.[5] Both theorists conceive of creativity as a cognitive process that generates a plan or idea that both precedes and determines the act of production. Neither Boden or Dasgupta incorporate into their models of creativity the productive, physical activity of generating a novel object. The creative product is the mere outward expression of the creative process. The expression of the idea, the process by which the plan or concept is concretized in an end product, is not itself seen to be creative. This distinction between creative cognitive activity and merely material productive activity, which is not in itself creative, depends upon or assumes a notion of action conceived of as distinct from yet determined by cognitive activity. As such, articulating an alternative theory of action that rejects the conventional distinctions between cognition and action offers the opportunity for a reconceptualization of the creative process itself.

4.2 – The Role of Plans and Perception in Situated Action

Again: planning theories of action take mental representations that specify a course of action, that is to say plans, as determinative of action. Situated theories of

---

[4] Hans Joas, *The Creativity of Action*, 157.
[5] Margaret Boden, *The Creative Mind: Myths and Mechanism* and Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality*.

action, however, claim that "actions are structured in relation to specific circumstances and need to be understood in those terms."[6] One of the primary goals of this chapter will be to examine how a theory of situated action necessitates a reconceptualization of the creative process. However, before we pursue these points further, I want to first clarify how exactly situated theories of action differ from more conventional planning theories of action.

Though situated theories of action reject the claim that actions are determined by plans, this should not be interpreted as either the claim that plans are in all circumstances irrelevant to action or the more extreme position that human beings do not possess the capacity to produce mental representations of their intended course of action in the first place. Rather, the claim made by both Suchman and Joas is that, contrary to planning theories of action, human beings do not necessarily require explicit plans for action in order to act. In fact, we often, if not usually, act without a clear, explicit, or well defined conception of what we are doing and how we are doing it.[7] In spite of lacking clear representations of action, meaningful and purposeful action is still possible by means of habit acquisition and the structure imposed upon our actions by our environment. For example, when I am trying to get to a movie theater across town, I may have an orientation toward a more or less specific goal, but the manner in which I achieve this goal is largely habitual, improvised, and realized in relation to what is at hand and what occurs as the action unfolds. In other words, the particular course of my action emerges out of my interactions with the environment.

---

[6] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 20.
[7] Hans Joas, *The Creativity of Action*, 154.

Furthermore, even when we do engage in explicit planning, these plans need not be, and arguably never are, as detailed as planning theorists would suggest. Many researchers in cognitive science, for example, contend that the human mind does not, in fact, create the sorts of detailed and robust representations of the world which are often attributed to it. To quote Andy Clark on the representational capacities of the visual system, the visual system is opportunistic,

> always ready to make do and mend, to get the most form what the world already presents rather than building whole cognitive routines from neural cloth. Instead of attempting to create, maintain, and update a rich inner representation (inner image or model) of the scene, it deploys a strategy that roboticist Rodney Brooks describes as 'letting the world serve as its own best model.'[8]

Simply stated, it is incorrect to conceive of the mind in essentially or primarily representationalist terms because we are embodied organisms embedded in particular environments, and we use these environments to guide our actions and support our cognitive operations. We are constantly immersed in a world and we acquire our sense of being present in the world, of locatedness, through our continuous and fluid interactions with that world. It is this continuous engagement with our world, not detailed internal representations of the world, that is the source of our perception of where we are and the possibilities of acting that are available to us.

But, if not determinative of the course of action nor as detailed as planning theories of action suggest, do plans have a role to play in shaping our actions? Suchman, on the activity of navigating a canoe, writes that

> a great deal of deliberation, discussion, simulation, and reconstruction may go into such a plan. But however detailed, the plan stops short of the actual business of getting your canoe through the falls. When it really

---

[8] Andy Clark, *Natural-Born Cyborgs,* 68.

comes down to the details of responding to currents and handling a canoe, you effectively abandon the plan and fall back on whatever embodied skills are available to you. The purpose of the plan in this case is not to get your canoe through the rapids, but rather to orient you in such a way that you can obtain the best possible position from which to use those embodied skills on which, in the final analysis, your success depends.[9]

The act of planning thus functions to orient us with regards to the particularities of our environment, and may serve to help position us in our environment and give us a sense of its salient features, but it does not function to absolutely determine the course of action. A plan does not represent all of the details of the intended course of action or the environment within which it occurs. The planning process attunes and situates the subject such that it may skillfully navigate its environment, but more relevant to the course of action itself are embodied skills and environmental interaction.

However, as should be now clear, situated theories of action do not claim that plans do not exist, that we do not sometimes devise more or less explicit and detailed plans of action. The point is simply that plans do not exist and function in the way that the planning model suggests. Plans are not the sole determinates of or even a necessary prerequisite for action, but are simply one element in a whole ensemble of other elements which function to structure our behavior. Furthermore, such explicit planning is usually employed only when routine, unproblematic action runs into difficulty.

The theory of situated action found in Joas and Suchman presupposes a theory of perception that should perhaps be considered a bit more closely. The point is that the mind does not need to create elaborate internal representations of its environment because the organism is usually present to that which is supposedly being represented. If an

---

[9] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 72.

organism is present to its environment and can acquire information about its environment as it needs it, why devote neural resources to creating a detailed inner representation of that environment? However, not only does the availability of the world to perception function to eliminate the need for robust and detailed inner representations, but our immediate perceptual grasp upon our environment directly contains within it a sense of the possibilities of action open to us. That is to say, perception does not reveal a world devoid of significance about which we then make determinations regarding, for example, the proper courses of action within it as a secondary cognitive activity, as a judgment about that which is given, because perception is immediately invested with such potentials for action. The world that perception reveals to us is in the first instance not action neutral, but primarily structured by and intelligible in terms of the possibilities for action within it. For example: I see a mug before me, and when I focus my attention upon the object, it discloses without the need for further judgment certain possibilities for action. It suggests and calls forth certain sorts of interactions and not others. The handle suggests to me that I might pick it up. The sheen on the exterior of the cup anticipates the smoothness of the thing when it is in my hands. I perceive its solidity, its smoothness, and the types of interactions that it allows for directly, without the need of additional judgments. My perception is structured, largely non-consciously, in anticipation of these interactions and guides, without the need any explicit judgments or planning, my actions.

J. J. Gibson coined the term "affordance" to refer to these possibilities of interaction.[10] Affordances are properties of objects that depend upon the capabilities of other agents in their environment for their existence. That is to say, these properties, these

---

[10] James J Gibson, *The Ecological Approach to Visual Perception*, 127.

affordances, are not inherent in the object but are relational in nature.[11] Thus the branch

affords perching for the hawk, but not for the elk. What makes Gibson's analysis of

affordances particularly relevant to our present purposes is the manner in which he claims

we are aware of the affordances in our environment. Gibson writes

> the theory of affordances is a radical departure from existing theories of
> value and meaning. It begins with a new definition of what value and
> meaning *are*. The perceiving of an affordance is not a process of
> perceiving a value-free physical object to which meaning is somehow
> added in a way that no one has been able to agree upon; it is a process of
> perceiving a value-rich ecological object.[12]

These affordances, Gibson claims, are directly available to perception. They are not

added on to the perceived object by a secondary cognitive act. Just as we do not hear a

sound and only later interpret it as a word but directly hear the word itself, just so we see

the objects in our environment as directly affording certain possibilities for action. This

object that affords for certain possibilities of interaction is what is primary in perception.

The treatment of the environment as action neutral, and of action as depending upon

explicit representations of that environment, in planning theories of action is what leads

Suchman to characterize, and then reject, traditional cognitive science as holding the

position that "the background of action is not the world as such, but *knowledge* about the

world."[13] Representationalist notions of the relation between action and the world

conceive of action as guided solely by our representations of the world, but not by the

world itself, which, while being that which we act upon and come to know about, is not

itself immediately meaningful.

---

[11] Ibid.

[12] Ibid, 140.

[13] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 64.

Situated theories of action thus understand our perception of the world to be, in the first instance, structured by our capacity to act upon it, and as intrinsically meaningful. As Joas writes

> our perception of the world appears to be structured by our capacities for, and experiences of, action. Even when we are not pursuing any immediate intention of action, the world exists not simply as an external counterpart to our internal self, but in the form of possible actions. …. Given that the fundamental forms of our capacity for action lie in the intentional movement of our body in connection with locomotion, object-manipulation and communication, our world is initially structured according to this dimensions.[14]

It should now be clear why detailed and robust internal representations of our plans for action are unnecessary. Such plans are unnecessary because the world as it is perceived guides and channels the course of our action. I can look about me and see directly what is possible for me, and I can act upon my world without needing to plan an explicit course of action or even take a well-defined goal. Planning theories of action conceive of the world as not originally structured by embodied activity, and thus our perception requires further judgments with regards to determining the proper course of actions within the world; that is to say: plans. The central question for the situated action theorist is not how the organism represents its environment, but determining the methods by means of which the organism interacts with its environment in order to guide its actions, and in what ways does the environment of the organism structure its behavior.

There is a sense in which we can see situated theories of action as reversing the priority given to cognition over action in more conventional theories of action. Instead of seeing cognition as a precondition for action, the situated theories of action found in Joas and Suchman, as well as those we would find in cognitive scientists like Brooks and

---

[14] Hans Joas, *The Creativity of Action*, 158.

Clark, see our embodied interactions with the world as the means by which our world becomes meaningful and intelligible.[15] Cognition depends upon, or perhaps more accurately is interwoven with, action. Our orientation within the world depends upon a prior history of embodied engagement with the world. The world becomes knowable to us through our actions upon it, and how it responds to us. Furthermore, we should not see action and the determination of ends and means as separate, alternating phases of a process. Rather, it is through acting upon the world that the means for further action, and even the determination of ends that we did not previously possess, become intelligible.

Though this notion that our perception of our environment is in the first instance structured by our capacities for acting upon and our continuous engagement with our environment does not represent the mainstream of cognitive science or philosophy of mind, it is an increasingly influential idea with important philosophical precursors, most notably the pragmatist and phenomenological traditions. Consider, for example, the writings of Dewey, Merleau-Ponty, and Heidegger.[16] For these thinkers our practical and embodied engagement with the world is a precondition for the processes of abstract reasoning and planning that have traditionally been conceived of as the *sine qua non* of the human subject. by and derived out of our primary mode of access to the world. However, in spite of the strong tradition and increasing popularity of such ideas, the implications of theories of situated action to how we are to understand creativity has by

---

[15] Rodney Brooks, *Cambrian Intelligence: the Early History of the New AI*. (Cambridge, Mass: MIT Press, 1999) and Andy Clark, *Natural-Born Cyborgs*.
[16] John Dewey, *Art As Experience (*New York: Berkley Publishing Group, 2005); John Dewey, *Experience and Nature* (New York: Dover Publications, 1958); Martin Heidegger, *Being and Time*; Maurice Merleau-Ponty, *Phenomenology of Perception*.

and large not been considered by creativity researchers. In what follows I want to show how a situated theory of action can contribute to our understanding of creativity.

4.3 - Situated Action and Creativity

If we take seriously the view of action proposed by situated theories of action we will be required to substantially rethink the creative process. Let us consider, first of all, the process of problem solving. Problem solving is the process of determining an appropriate means to achieve a certain end. The end toward which problem solving is oriented is more or less set, with the means toward achieving that end being what needs to be determined. Planning theories of action conceive of problem solving as a strictly internal cognitive act, and the solution to the problem is a mental representation, which is to say a plan. However a situated theory of action reveals problem solving to be a process that may necessitate constant interactive engagement with the environment. Instead of solving problems through a process of generating and evaluating mental representations, problem solving may involve a process of repeated interactions with the environment. That is to say, the solution to a problem may only reveal itself in the process of acting upon the world itself. The Rubik's Cube provides a nice example of this, for it is solved not through a process of reflecting upon the object in order to determine a plan that is then enacted, but through continuous interactive engagement with the object. When you want to evaluate whether a certain twist of the Rubik's Cube will get you closer to solving the puzzle, you do not imagine the altered state of the object in your mind; you manipulate the object and consider the results.

Furthermore, when I am attempting to solve a difficult problem that does require some degree of explicit planning, I can simplify the cognitive process by "offloading" some of the cognitive process onto the environment. That is to say, even when we must engage in the activity of planning, these representations need not exist solely in the brain of the agent. Through our interventions in the world, the act of planning may be distributed out into the world itself. For example, when we write a paper, we may take notes and make outlines, and these notes and outlines are important because we might not be capable of internally representing to ourselves the nature of a complicated argument. The outlines that we sketch out allow us to transcend the representational limitations of the human brain and become guiding elements of the process of composition. Furthermore, having externalized our plan in physical outlines, we can more easily examine and transform the plan. Andy Clark offers the interesting example of the creative process of painting, and how this process is materially distributed across the environment as the artist sketches, considers the sketch, and then resketches. Clark writes that

> In this looping process the artist first sketches and then perceptually, not merely imaginatively, re-encounters visual forms, which she can then inspect, tweak, and re-sketch so as to create a final product that supports a densely multilayered set of structural interpretations. The fossil trail of this process remains visible in the sequence of sketches themselves. … This sketch pad is not just a convenience for the artist, nor simply a kind of external memory or durable medium for the storage of fully formed ideas. Instead, the iterated process of externalizing and re-perceiving turns out to be integral to the process of artistic cognition itself.[17]

Because of the limits of the human brain, it enrolls the physical environment into its cognitive process, especially those that are highly complex. We require these external structures, objects, and processes because the representational capacity of the pad of

---

[17] Andy Clark, *Natural-Born Cyborgs*, 77.

paper, pen, and brain together are much greater than that of the brain alone. The brain alone is incapable of generating detailed representations without the aid of these non-neural elements, without this process of sketching and resketching, and without this active engagement with the material world. Clark's claim is that the sketch is an actual element of the representational process itself. If a creative process requires complicated representational activity, this process of representation is not necessarily limited to the activity of the brain alone. In fact, the more complex our representations are required to be, the less and less these representations can be accomplished by the unaided brain.

The process of interacting with the world may be vital to the process of determining the solution to a problem, the means to the solution, but it can also shape the ends toward which action is directed in the first place. Both Suchman and Joas reject the idea that it is possible to extract "a stable goal from the flow of action."[18] As Suchman writes, "it is frequently only on acting in a present situation that its possibilities become clear, and we often do not know ahead of time, or at least not with any specificity, what future state we desire to bring about."[19] Joas echoes this point when he writes that "only when we recognize that certain means are available to us do we discover goals which had not occurred to us before."[20] That is to say, the goal or end toward which we are oriented is only clarified in the course of action itself, and this end is always being transformed in the process of acting. When we attend to the course of our action, what we find is not the pursuit of stable and clearly defined goals, but a process by which our goals are continually revised and adjusted. Said otherwise, creative action can result from our

---

[18] Hans Joas, *The Creativity of Action*, 152.
[19] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 72.
[20] Hans Joas, *The Creativity of Action*, 154.

discovery of certain means in our environment that determine or redirect the ends towards which our actions are directed.

Consider, as an example of how the situation of action may interact with the embodied agent so as to produce goals in the course of action itself, non-linear, open world videogames. Such games place the player in a virtual world, and their experience of that world is not determined by an overarching narrative or linear gameplay mechanics. As they explore the world and learn the capacities of the character they control for acting upon that world, as they learn what sorts of activities the world of the game affords for, goals emerge. These goals may be more or less creative. For example, the goals may simply conform to the expectations and intentions of the game designers. At the other extreme, and arguably more creatively, these goals may involve attempting to "break" the game and do things within the constraints of the gameworld that were not anticipated by the designers. In all of these cases, however, the goal emerges in the course of action itself, as the player movies through and interacts with the virtual world of the game.

But this example is not about embodied, situated action, or is it? I want to argue that it is. What makes this example interesting is that it reveals that our sense of embodiment is not limited to our biological bodies. According to Clark,

> our sense of bodily presence is always constructed on the basis of the brain's ongoing registration of correlations. If the correlations are reliable, persistent, and supported by a robust, reliable causal chain, then the body image that is constructed on that basis is well grounded. It is well grounded regardless of whether the intervening circuitry is wholly biological or includes nonbiological components.[21]

---

[21] Andy Clark, *Natural-Born Cyborgs*, 105.

That is to say, our sense of bodily presence in the world is determined by our interactive entanglement with the world. My experience of presence is shaped by my capacity to act upon the world and fluidly register the world's response to that action. Embodiment is thus not a matter of physiology, but a construct of interactive casual loops between us and the world. Because these causal loops can enroll non-biological objects as prosthetic extensions of our capacity to act upon the world, these same non-biological entities can become integrated into our sense of self, become part of our embodied engagement with the world. In a very literal sense the driver at the wheel of the car and the illustrator with a pen in their hand have extended their feeling of embodiment into these technological objects. Furthermore, so long as these interactions are fluid and information rich, there is no reason to think that this sense of embodiment is incapable of being extended into virtual spaces, like the spaces that players navigate in video games. A gamer does not simply control an avatar on the screen, but in a very real sense comes to be embodied in that virtual space and to perceive the various affordances open to them. True, this is perhaps an unexpected or unusual form of embodiment, but as Clark argues, embodiment is not about the body as a biological entity, embodiment is about loops of interaction. Furthermore, as Clark suggests, we should not expect that these new modes of embodiment that will necessarily be like those that we are accustomed to. Clark writes that "the greatest potential of the technologies of telepresence, VR, and telerobotics may be transformative rather than replicative. . . . it is about expanding and reinventing our sense of body and action."[22]

---

[22] Ibid, 111.

All of which is to say that our specific manner of embodiment is not a given, but a creative accomplishment generated out of our continuous engagement with the world, and an accomplishment that is always in the process of being redetermined and revised. To clarify this claim that embodiment is a creative accomplishment, let us consider the closely related phenomenon of habit acquisition. Hans Joas writes that:

> All perception of the world and all action in the world is anchored in an unreflected belief in self-evident given facts and successful habits. However, this belief, and the routines of action based upon it, are repeatedly shattered; what has previously been a habitual, apparently automatic procedure of action is interrupted. The world reveals itself to have shattered unreflected expectations; our habitual actions meet with resistance from the world and rebound back on us. This is the phase of real doubt. And the only way out of this phase is a reconstruction of the interrupted context. Our perception must come to terms with new or different aspects of reality; action must be applied to different points of the world, or must restructure itself. This reconstruction is a creative achievement on the part of the actor. If he succeeds in reorienting the action on the basis of his changed perception and thus continuing with it, then something new enters the world: a new mode of acting, which can gradually take root and thus become an unreflected routine.[23]

As Joas frames it, habit acquisition is a creative process, and the actor that acquires new habits also acquires a new way of being in the world. For example, habit acquisition can be seen as a form of problem solving in which the organism adjusts its behavior to accommodate some sort of resistance to or disturbance of its fluid relation to its environment. The result of these new habits is a new way of being in the world. The creativity of human embodiment suggests that we do not enter the world with an already determined set of habits; our way of being embodied is open ended and flexible, and the habits we acquire are our solutions to the particular problems that we encounter in the world.

---

[23] Hans Joas, *The Creativity of Action*, 128-9.

Our particular manner of embodiment and the set of habits that are characteristic of it are creative accomplishments achieved in relation to specific material circumstances. However the situations in which human agents act, and which directs and shapes the course of human actions, are also constituted by these agents' very same activity. This reciprocal co-constitution of agent and situation is emphasized by both Suchman and Joas's theories of situated action. Drawing on Charles Sanders Peirce and the enthnomethodological approach of Harold Garfinkel, Suchman conceptualizes this co-constitution in terms of the indexicality of meaning:

> by 'index' Peirce meant not only that the sign relies for its significance on the event or object that it indicates but also that the sign is actually a constituent of the referent. So language more generally is not only anchored in, but in large measure constitutes, the situation of its use. Ethnomethodology generalizes this constitutive function of language still further to action, in the proposition that the purposefulness of action is recognizable in virtue of the methodic, skillful, and therefore taken-for-granted practices whereby we establish the rational properties of actions in a particular context.[24]

That is to say, like language, which not only derives its meaning from the situation of its use but also constitutes that very situation through its use, meaningful action also has this reciprocal relation to the situation of its enactment. Through acting upon our environment, a world becomes intelligible and meaningful to us. Similarly, Joas, in developing Dewey's philosophy of action, asserts that "human beings discovered and appropriated the world through their actions."[25] What I want to suggest is that not only is our sense of embodiment a creative accomplishment; so is the world, which is a space

---

[24] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 80.
[25] Hans Joas, *The Creativity of Action*, 132.

that is permeated with significance and affordances and which only emerges as the particular world it is in interaction with embodied agents.

In summary, situated theories of action conceive of action in a way that is markedly distinct from conventional, representationalist theories of action. Representationalist theories of action conceive of the act of planning, and of determining means and ends, as a cognitive act that precedes and determines action. Furthermore, not only does the act of planning precede the act, but it is also a cognitive process that occurs autonomously of its environment. Situated theories of action deny both of these points and conceive of the course and end of action as determined within the course of action itself and in interaction with an environment. The situation of action serves to illuminate and direct the course of action without requiring explicit planning. To the extent that action is creative, which is to say to the extent that action recreates the world and the actors that inhabit it, the situational determination of action reveals a creative process that is essentially interactive. Furthermore, to the extent that the mind regularly enrolls the world as an element of its cognitive activity, to the extent that cognition is interwoven with action, creative cognition requires a theory of situated action in order to be understood. Creativity is messy, ad hoc, improvisational, and attuned to its particular circumstances.

4.4 - Situated Action and Disability

An important dimension of situated theories of action that has so far gone unaddressed is that of collective action. The collective nature of action is important for

both Suchman and Joas. Joas, following Mead, even argues that collective action is the precondition for meaningful individual action.[26] The reason for this is that the meanings of my actions are not developed within the context of my own personal history alone, but in the larger context of other actors with whom I coexist and with whom my actions are coordinated. What follows from this notion that collective action is a condition for individual action is that subjects and worlds are constituted not by individual actors, but by collectives of coordinated actors. That is to say, collective action constitutes the world as an intersubjective phenomenon.

However it is important to take note of the fact that social practices do not just give an interpretation to the world, but physically restructure it. Our world is constituted not solely in terms of the various meanings we have given to it, but also by the physical form we impose upon it. Furthermore, the way in which we sculpt and restructure our world through our material practices reflects a certain set of values, a certain sense of what is important, a certain idea of who we are, what makes us human, and who or what we might become. But the built environment is not simply the outward, material expression of the various ways in which we understand the world and our place within it; it also acts to structure and determine our understanding of our world. For example, the fact that public restrooms are sexed as male and female is not only the result of a binary conception of sex and gender, this design practice also encourages a point of view, a perception, that conceives of sex as being binary in nature.

Another example: consider the way in which Philadelphia's subway system was designed to be accessed. Most of the stops are accessible only by a flight of stairs, and the

---

[26] Ibid, 189-90. For Suchman, see *Human-Machine Reconfigurations: Plans and Situated Actions*, 76.

gates through which one passes to get to the subway platform are a set of narrow turnstiles. What this means is that if you, for example, use a wheelchair the subway system is encountered as not affording for your particular mode of embodiment. This is because accessibility, at least traditionally, has been understood in terms defined by a particular conception of a normal human body. That is to say, and this is a point that both Suchman and Joas, as well as Dewey Merleau-Ponty, Gibson, and Clark, more or less completely overlook, the world is appropriated and constituted in a way that does not reflect the variability of human embodiment, and of human bodies, but rather a particular conception of a normal human body. However, and again, the design of the built environment not only reflects a conception of what the normal human body is like and what it is capable of, but it is also constitutive element of how we come to understand normalcy and ability. A particular human body comes to appear as an able body, is intelligible as a normal body, to the extent that it is able to navigate an environment built to conform to a particular conception of human ability. A flight of stairs, a lever on a door, informs my understanding of what a human body should be able to do.

What should thus be taken note of is that this collective appropriation of the world is accomplished in a manner that excludes and marginalizes particular sorts of bodies, rendering these bodies in such a way that they appear as abnormal. This fact about collective action is one that situated theories of action have not adequately attended to. For example, when Suchman writes that "the stability of the social world . . . is not due to an eternal structure but to situated actions that create and sustain shared understanding on specific occasions of interaction," what is glossed over is that this shared understanding is constituted in relation to a conception of typical human

112

affordances and modes of embodiment that are in fact not shared.[27] This "shared

understanding" is achieved through exclusion. Also consider Joas, who writes that

> humans anticipate the way partners in action would potentially behave in
> response, and create an inner representation of that response. This ability
> enables humans to gear their behavior to what potentially would be that of
> partners. As the partner, assuming it to be a human being, also had the
> same ability, a completely new pattern in the history of evolution emerges
> for coordinating behavior: coordination by means of a shared orientation
> towards patterns of mutual behavioral expectations.[28]

Implicit in Joas' account of human interaction is a normalized notion of the human body

with the sorts of abilities that we should expect of a normal human body. The variability

of human bodies, the diversity of human embodiment and how this matters for how we

coordinate and anticipate the actions of others, is not registered as a problem by Joas.

Given this, the emerging discourse of disability theory could be put into a very

productive and interesting dialogue with situated theories of action. My intention in

bringing disability theory and theories of situated action into communication with one

another is not to reject situated theories of action, but to amend them in such a way that

makes them more attentive to the diversity of human bodies, and in a way that I believe

both Joas and Suchman would welcome. If human action and our sense of our own

embodiment is constituted in particular situations, a situated theory of action should

attend to the diverse ways in which human beings are embodied as well as the causes and

consequences of our notions of ability and disability, of normal and abnormal bodies.

Furthermore, disability itself is a situated phenomenon; disability is not strictly biological

in nature, but is situationally produced within particular material and social

circumstances. As such, the remainder of this chapter will be concerned with considering

---

[27] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 83.
[28] Hans Joas, *The Creativity of Action*, 187.

the implications of disability theory for theories of situated action and, more importantly, how we should understand creativity.

To build up to this, let us consider several ways in which disability is understood, starting with the medical model. The medical model conceives of disability as being a defective state of the body that can, and should, be treated medically. In contrast to this, there is the social model of disability, which, writes Tobin Siebers, differs from the medical model by "situating disability in the environment, not in the body. Disability seen from this point of view requires not individual medical treatment but changes in society."[29] That is to say, according to the social model of disability, disability is produced by prejudiced and negative attitudes towards certain types of bodies, the social exclusion of these abnormal bodies, and the constitution of the physical environment in such a way that reflects a preference for certain sorts of bodies over others. On the social model, disability is not a defect of the body, but a result of a particular sort of oppressive social order that has identified certain sorts of bodies as abnormal and undesirable and which then subjects these bodies to exclusion and correction.

It is according to the medical and social models of disability that disability is most commonly understood. Seibers, however, argues for an alternative to both of these models, a model of disability based on the notion of complex embodiment:

> complex embodiment raises awareness of the effects of disabling
> environments on people's lived experience of the body, but it emphasizes
> as well that some factors affecting disability, such as chronic pain,
> secondary health effects, and aging, derive from the body. These last
> disabilities are neither less significant than disabilities caused by the
> environment nor to be considered defects or deviations merely because

---

[29] Tobin Siebers, *Disability Theory* (University of Michigan Press, 2008), 73.

they are resistant to change. Rather, they belong to the spectrum of human variation, conceived both as variability between individuals and as variability within an individual's life cycle, and they need to be considered in tandem with social forces affecting disability

The idea of complex embodiment tries to account for one of the key problems with the social model of disability, which is that it renders the body more or less infinitely malleable and changeable according to social determinations. The body itself, on the social model, has no agency of its own, but is only a blank slate for the social to inscribe itself upon. However, though the notion of complex embodiment attends more seriously to the physical and experiential reality of the body and its impairments, unlike the medical model of disability the notion of complex embodiment abandons any sort of norm from which the supposedly disabled body is to be registered as departing. Complex embodiment accepts the variability of the human body as a fact that, if recognized, should undercut the ideological distortion produced by the notion of a normal body against which all bodies are measured. Disability, understood in terms of complex embodiment, is a phenomenon produced at the intersection of the body, and its experiences and limitations, and the various social and material processes and structures in which it is embedded. As Siebers writes, "disability creates theories of embodiment more complex than the ideology of ability allows, and these many embodiments are crucial to the understanding of humanity and its variations, whether physical, mental, social, or historical."[30]

Disability theory also presents us with an opportunity to rethink the relationship between the individual and their material and social situation. Consider Lennard Davis, who writes, in articulating his theory of dismodernism, "that dependence, not individual

---

[30] Ibid, 9.

independence, is the rule."[31] Later, Davis continues "In a dismodernist mode, the ideal is not a hypostatization of the normal (that is, dominant) subject, but aims to create a new category based on the partial, incomplete subject whose realization is not autonomy and independence but dependency and interdependency."[32] The dismodernist subject is thus conceived of in a markedly different way than the subject of modernism. The dismodernist subject is always being remade, experiences dependence as a condition for survival, is constituted within a social order defined by interdependence, and is to be understood without reference to notions of normalcy from which it can be seen to deviate. It is in thinking through the essential dependence of all human subjects, revealed by Davis' dismodernism and disability theory more generally, that I think disability theory can make an important contribution to how we think about creativity.

To understand this, it is important to note the extent to which creativity is conceived of in ableist terms. In the various ways that creativity is conceptualized, it is almost invariably conceived of as either a property of independent and autonomous agents at the height of their extraordinary abilities or, with regards to those theories of creativity less sympathetic to notions of creative genius, creativity is grounded in the normal cognitive functioning of the human mind. Consider, for example, Robert Weisberg's claim that "it may not be necessary to assume that creative individuals differ from the noncreative in any significant way, except for the knowledge they possess."[33] Weisberg work is characteristic of much contemporary psychological approaches to creativity to the extent that he is trying to disentangle creativity and madness.

---

[31] Lennard Davis, *Bending Over Backwards: Disability, Dismodernism, and Other Difficult Positions* (New York University Press, 2002), Davis 26.
[32] Ibid, 30.
[33] Robert Weisberg, "Creativity and Knowledge: A Challenge to Theories," 248.

Traditionally there is a strong tradition of conceiving of madness and creativity as linked, and in showing that creative issues do not differ, cognitively, in any fundamental way from noncreative individuals, Weisberg is attempting to break that link. The creative individual, on this account, is just a normal person, with a normal mind, and all that distinguishes them from other normal people is that they have more knowledge.

The ableism of Csikszentmihalyi is even more apparent. The creative individual set forward in his writings is the image of good health. Csikszentmihalyi explicitly articulates his theory of creativity in opposition to Romantic notions of creativity that associate creativity necessarily with the archetype of the suffering genius.[34] Rather, the creative person as Csikszentmihalyi finds him is "upbeat and positive."[35] Consider also Csikszentmihalyi's characterization of the creative personality as exhibiting great energy but also the capacity to be quiet and restful, as smart but a little naïve, as playful yet disciplined, as prone to flights of fancy yet grounded nonetheless, as introverted but also extroverted, as humble and proud, as rebellious and independent yet well-versed in tradition.[36] The creative person is thus just right, is balanced, is a moderate person not given to unhealthy extremes. As such the state of creativity becomes, under Csikzsentmihalyi's analysis, not only a condition for the creation of novelty and innovation, but also a state of optimal human flourishing and functioning.

This linking up of health and creativity is also apparent in Csikszentmihalyi's discussion of flow, a state that he considers to be characteristic of the creative process and which is experienced "as an almost automatic, effortless, yet highly focused sate of

---

[34] Mihaly Csikszentmihalyi, *Creativity,* 19.
[35] Ibid, 16.
[36] Ibid, 58-72.

consciousness."[37] This state of flow, which Csikszentmihalyi characterizes as a state of

"optimal experience," involves a total undistracted immersion in an activity that, though

challenging, does not exceed the skills of the actor engaged in them.[38] Creative flow is

achieved by people operating at the peak of their abilities, as they are immersed in skillful

activity. This linking up of creativity with flow, as an optimal state in which one is

operating seemingly effortlessly at peak ability and who merge with their task,

characterizes creativity in essentially ableist terms. Creativity, as a state of flow, is thus

achievable only by the person that meets no resistances in his or her environment and that

can effortlessly merge with and lose itself in its task. Creativity is an optimal state of

experience, is a state of wellbeing and enjoyment.

Yet it is also true that creativity has long been associated with madness and

suffering, states of being that we typically associate with disability or abnormality. This

is particularly evident in romantic notions of creativity, in the image of the Byronic hero,

in quite common linking up of self-destruction and creativity that constitutes the myth of

artists as diverse as Jackson Pollock, Raymond Roussel, Roberto Bolaño, and Sylvia

Plath. However, though romantic notions of creativity may seemingly be more positive in

their evaluation of certain forms of disability, we should not take this as a sign that these

notions somehow fall outside of or present an alternative to traditional ableist conceptions

of creativity. Such romanticizations of madness, which conceive of madness as a source

of creativity, only recasts an apparent disability as an ability. As Siebers writes "the

ideology of ability requires that any sign of disability be viewed exclusively as

---

[37] Ibid, 110.
[38] Ibid, 110-15.

awakening new and magical opportunities for ability."[39] It is in this sense that romantic theories of creativity, and any thinking that attempts to recast disability as ability without bring the whole apparatus which produces ability and disability into question, still clearly operates within the space of ableist ideology.

What we need, then, is to rethink ability and its relation to creativity. But what, exactly, is an ability? By ability, we mean a power or capacity to act in some way or another. Additionally, however, we tend to conceive of these abilities as if they inhere in the individual. We conceive of abilities as if they reside in us. It is exactly this conception of ability that disability theory allows us to question. If ability and disability are the products of complex embodiment, then abilities do not dwell within us but are effects of complex relations between our body and our material and social situations. The abilities that we manifest emerge out of our particular manner of being situated in the world. Ability, in this sense, is not a property of an individual but resides in the relations between particular agents and their environment.

Creativity, as we have seen in previous chapters, is typically understood to be an ability that inheres in the creative actor, conceived of as an autonomous individual. If we want to understand why people are creative, the account we give is developed in terms of individual psychology; we focus upon the particular ways in which the creative person thinks, feels, and imagines. However, from the perspective of disability theory, I want to claim that creativity appears not as a possession of an individual agent; rather creative resides in the relations between people and their situations. I think this insight is important because it challenges two of our core presumptions about creativity. One is that

---

[39] Tobin Siebers, *Disability Theory*, 63.

creativity is an ability that an individual possesses. The other is that creativity is has, as one of its conditions, the achievement of mastery.

Concerning the notion of mastery, we say that creativity in literature requires mastery of the literary tradition in which one writes and the language in which one composes. Musical creativity requires mastery of one's instrument. The creativity of the dancer requires mastery over their own body. This notion of mastery, however, obscures the reality of dependence. Mastery suggests that an individual agent is capable of dominating other agents and/or its environment such that what is mastered becomes bent to the will of the master. The musician commands an instrument. The author commands a language. However this subject capable of drawing upon its own inherent abilities and demonstrating its mastery over its environment is not a real subject, but a fiction. Such subjects do not exist. What disability theory brings our attention to is that our abilities depend upon and are constituted by our relations to particular situations. As we enter into various relationships of dependence, we exhibit certain sorts of abilities and become certain sorts of agents. Furthermore, in contrast to the conception of the master that uses its abilities to realize its intentions in the world, if we attend to the relations of interdependence that define all actors, the end towards which action is directed does not issue from a single actor but is fundamentally shaped by those elements upon which that actor depends in order to act. This understanding of human ability de-hierarchizes the relationship of the human agent to that upon which it acts. If the master, and its activities, orientations, and goals, is shown to be, to some degree, an effect of the world that it apparently masters, are we still talking about mastery or about something else?

With our considerations of standpoint theory and of situated action we were able to gain some insight into the situated nature of creativity. That is to say, the creative process is structured and shaped by particular social and material situations. Disability theory's emphasis upon human dependence allows us to deepen the insight of situated theories of action as well has challenge the tendency to conceive of human bodies as all alike in their capacities and mode of embodiment. Because ability and disability are situationally produced, ability can no longer be seen as a possession of or as inhering in individuals. Rather, what we are capable of, including our capacity to act as creative agents, depends upon particular ways of being situated in the world. The situated nature of creativity also reveals a creative process in which the human agent is not entirely in control of either the means or the ends of its activity. The subsequent chapter will develop these ideas in two ways. First, I will argue that to understand creativity, what we need is a certain sort of posthumanist approach to that is less anthropocentric than conventional approaches to creativity. Secondly, and by implication, we must take seriously the activity of nonhumans in the creative process.

CHAPTER 5
A POSTHUMANIST CONCEPTION OF CREATIVITY: AN ATTEMPT TO TAKE
SERIOUSLY THE ROLE OF NONHUMANS IN THE CREATIVE PROCESS

Thus far, my efforts to articulate a situated theory of creativity have, like the

theories of creativity that I have argued against, largely retained as their focus individual

human actors. Though I have argued that we must understand the creative process as

structured and informed by the social and material situation in which it occurs, I have not

yet considered the particular situations of creative activity, and more precisely the various

nonhuman things and processes that define these situations, as creative actors in their

own right. In this chapter I want to turn explicitly to this question and explore the extent

to which nonhumans can be regarded as not simply serving to structure and delimit the

creative activity of humans, but as active participants in the creative process itself. That is

to say, what I am concerned with is nonhumans as actors and the question of how these

nonhumans participate in the creative process.

In arguing that we need to take nonhumans into account so that we might

adequately understand creativity, the theory of creativity that I am proposing becomes

classifiable as posthumanist in its approach. This is because the emphasis upon

nonhumans as active, as actively participating with us in the creation of the world, is a

chief characteristic of posthumanism. Consider Pickering, who sees posthumanism as

articulating a theoretical "space in which the human actors are still there but now

inextricably entangled with the nonhuman, no longer at the center of the action calling

the shots."[1] Similarly, Barad writes that posthumanism entails the "recognition that

---

[1] Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science* (University of
Chicago Press, 1995), 26.

nonhumans play an important role in natrualcultural practices, including everyday social

practices, scientific practices, and practices that do not include humans."[2] To this end, I

will rely upon a few important posthumanist theorists, namely Latour, Haraway,

Pickering, and Barad, as I develop the significance of nonhuman actors to the creative

process [3]

To the end of developing what is, in essence, a posthumanist theory of creativity,

I will begin this chapter by examining the central characteristics that I take to define

posthumanist theoretical perspectives and how these characteristics manifest themselves

in various posthumanist thinkers. As I identify them, the core characteristics of a

posthumanist theoretical perspective are as follows: 1) a conception of nonhumans as

active participants in their world, as actors, 2) a rejection of anthropocentrism more

generally, which strives to challenge the centrality, in our thinking, of human concerns

and human ways of articulating and inhabiting worlds over those of nonhumans and 3) a

rejection of any ultimate distinction between nature and culture and between the human

and the nonhuman.

5.1 - Posthumanist Actors

Because the posthumanist conception of nohumans as active participants in the

world is central to my own approach to creativity, I want to consider how posthumanism

---

[2] Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, 32.
[3] For example, see Bruno Latour's *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford University Press, 2005) and *We Have Never Been Modern* (Cambridge: Harvard University Press, 1993), Andrew Pickering's *The Mangle of Practice: Time, Agency, and Science*, Karen Barad's *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, and Donna Haraway's *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991).

recasts the notion of agency in such a way that nonhumans as understood active and creative participants in the world. That is to say, nonhumans are understood to be agents. Within the posthumanist literature, from Haraway to Latour and Barad to Pickering, the notion of nonhuman *agency* is central. In Chapter 6, to the extent that I am elucidating how these thinkers develop this notion of nonhuman actors, I will employ the terms "agency" and "agent" where they are needed. However, where I am not immediately engaged in this interpretative work but rather attempting to develop my own account, I will simply refer to these various humans and nonhumans as actors, not as agents. My reasons for this are twofold. One is the notion of agency, as an attribute of nonhumans, raises a controversy concerning whether nonhumans can really have agency that seems to obfuscate getting to the point that I think needs to be established, which is simply, though probably not noncontroversially, that nonhumans are active participants in the creative process. The second reason is that I want to make room for the alienness of nonhuman forms of action, the strangeness of how they act. Though attributing agency to nonhumans may be nonanthropocentric, I think it may also anthropomorphize nonhumans to such an extent that the differences between how different types of actors act may be overlooked. As such, elsewhere in this dissertation I will prefer to speak of nonhumans as actors, not as agents, but in elucidating the posthumanist approach in this section, I will use the word "agency," as that is how these theorists speak of it.

To take seriously the notion of nonhuman agency is to allow that nonhumans are not just passive objects upon which human meanings and purposes are imprinted, are not mere resources and tools to be utilized in the realization of human projects, and are not simply constructs of human social practices. Against this conception of nonhumans as

passive objects of human activity, nonhumans in fact exhibit a degree of independence from human intentions and play themselves an *active* role in determining the nature of the world in which they exist and how it is rendered knowable. What this means is that the structure and meaning of the world we live in is not reducible to human intentions, for our world is also structured by the activities of nonhumans, and this is true even of those domains which are seemingly the most purely and unquestionably human. For example, consider the arts which are often understood to be solely a matter of individual and/or collective human expression. However, even in domains such as this I believe that we can locate the active and creative contributions of nonhuman actors and that, contrary to what most people might think, the arts are not only about human express. A posthumanist theory of creativity will consider the extent to which the creative process is shaped by the participation of nonhuman actors.

We tend to think of agency, which is the capacity to act, as a power residing within the actor. Agency, thus conceived, is a property of an individual. However, as understood by actor-network theory, which is a prominent posthumanist approach, agency is essentially collective and distributed.[4] Agency is not a property of an individual actor but instead always plays itself out across a whole web of associated actors. This relocation of agency, from being centered upon a single actor as a property of that actor to issuing from a constellation of actors, is one of the defining aspects of actor-network theory's notion of agency. To understand this, consider that the individual actor's capacity to act is generated out of the various associations in which it is embedded. For example, what happens to me when I enter into association with an object like a computer

---

[4] Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory,* 44-5.

mouse? First, it must be noted that the design of the mouse affords for a certain set of interactions and excludes, conceals, or inhibits others, and this establishes the sorts of associations that I might make with the object. These affordances set up the possibility of particular associations that, when made, generate new possibilities of acting in and upon the world. When I take the mouse in my hand, when I enter into this particular association with it, I am thus empowered with a new set of capacities that I previously did not exhibit. Thus associated, I can navigate files and menus on a computer screen or move through the virtual space of a video game. If agency is the capacity to act upon the world, what we find here is that my actions are always constitutively entangled with other actors.

However, it is not enough to say that an actor is empowered to act in particular ways by the types of associations that it makes and that it is in this sense only that agency is distributed or collective. Such a view retains as its focus the individual actor, albeit with situationally or associatively transformed capacities. However not only do actors form associations with other actors and act through them, but these actors act together, in concert with one another, and often retain, in their activity, a certain degree of autonomy from those actors with which they associate. If, through skilled use, the keyboard may in a sense merge with the intentions of the human actor, still other actors may not so seamlessly disappear into our intentions. Consider the launching of a space shuttle: which agent is in control here? Which agent is acting? The shuttle? The pilot? Mission control? In situations like these, attempts to designate a single actor that controls the course of action seem increasingly misguided. Instead, what we have is an assemblage of actors acting in concert with one another and empowering each other with various capacities,

and such assemblages are not at all unusual. Human actors always act on and through

other actors, and as we enter into associations with other actors in order to achieve

particular goals, these actors will shape, redefine, and channel my intentions, will alter

my goals; that is to say, the behavior and goals of an assemblage of actors is an effect of

the whole constellation of actors, and not any one, single actor.

Here it is helpful to recall Latour's distinction between two types of actors:

intermediaries and mediators. Latour defines mediators as "actors endowed with the

capacity to translate what they transport, to redefine it, redeploy it, and also to betray it"

in unpredictable ways.[5] Actors that function as intermediaries, however, respond in a

predictable fashion when acted upon and associated with.[6] Simply stated, when I attempt

to communicate via an intermediary actor, the output of a given input is predictable, but

if I attempt to act through a mediator, the mediator will transform my action in ways that

I don't intend or necessarily anticipate; that is to say, given a particular input, I will not

---

[5] Ibid, 81.

[6] Ibid, 39. Latour also writes, on the same page, that "an intermediary . . . is what transports meaning or force without transformation: defining its inputs is enough to define its outputs" and later, with regards to mediators, that "their input is never a good predictor of their output." Here it seems to me that Latour is confusing, on the one hand, the unpredictability of an output with the output being different from the input, and, on the other hand, the output being predictable with it being the same as its input. However, we can think of many actors which generate an output which is predictable yet different from its input. By inputting the correct instructions to an ATM machine, it outputs something quite different than the input, but nevertheless predictable: money. If I press my finger down on the keyboard of a piano, it predictably plays a certain note. Given this interpretive problem (do intermediaries merely transmit without transforming a force, or do they simply act predictably), I am going to propose the understanding which makes the most sense to me, and which seems most in the spirit of ANT: intermediaries are actors which, given a particular input, generate a predictable output and mediators are actors for which the output is unpredictable. Further, a black box is simply an assemblage of actors that function as intermediaries, and therefore predictably, in relation to one another, and thus can be taken to form a system in which the parts are integrated into the functioning of the whole.

be able to predict the output. One of Latour's goals in introducing this distinction is to show that sociologists have tended to treat nonhuman actors as mere intermediaries of social processes so that, for example, social forces are simply transmitted through material objects without alteration. These sociologists of the social, as Latour terms them, see nonhuman actors as immaterial with regards to determining the structure of the social; nonhuman actors, as seen by the sociologist of the social, are mere intermediaries, and thus don't make a difference in the world and don't need to be given an account of. However, while these sociologist of the social will tend to see the world as populated by intermediaries (the Ferrari in the garage or the expensive painting on the wall serving simply to transit and symbolize, to instantiate, the values and power of the upper class), for the sociologist of associations, which is one way in which Latour characterizes actor-network theory, mediators are the more interesting and more important type of actor. From the perspective of actor-network theory, nonhuman actors, as mediators, do not simply transmit social forces, but are significant determinants of the form and meaning that the social order will take. If from the perspective of a sociologist of the social a surveillance camera is seen to transmit and enforce the power of the ruling class, from the perspective of an actor-network theorist, the surveillance camera both constitutes and inflects, with particular meanings, forms, and techniques, this power. Said otherwise, the social does not simply work through nonhuman actors, these nonhuman actors participate in determining the nature of the societies that they inhabit.

In certain situations mediators may go beyond simply inflecting and transforming the intentions of other actors in peculiar and unexpected ways and act to undermine and overturn these intentions completely. This sometimes disruptive and surprising autonomy

of nonhuman actors from human intentions, particularly in their ironic inversions of human intentions, recalls Haraway when she writes that "acknowledging the agency of the world in knowledge makes room for some unsettling possibilities, including a sense of the world's independent sense of humor."[7] Haraway captures the independent sense of humor of nonhuman actors though the image of the Trickster, and in particular the Coyote of various Native American folklores, who exhibits an essential mutability and propensity for breaking and bending rules and overturning expectations. Mediators, in the unpredictable ways that they channel the forces and meanings which flow through them, often play precisely this Trickster role in relation to the actors with whom they form associations. What will result from these associations and who we may become via such associations may differ radically, perhaps humorously and perhaps horribly, from what we are able to anticipate and accommodate. Haraway writes that, attuned to the existence of Trickster agencies, "feminist objectivity makes room for surprises and ironies at the heart of all knowledge production; we are not in charge of the world."[8] This insight is important not only to what Haraway calls feminist objectivity, but also to articulating a posthumanist understanding of how we come to act within and have knowledge of our world.

Now whereas, according to Latour, most sociologists tend to see nonhumans as functioning mainly, if not exclusively, as intermediaries, actor-network theory is a methodology attuned to the existence and activities of mediators. It should be noted, however, that an actor is not in essence either a mediator or an intermediary, but can

---

[7] Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," 199.
[8] Ibid.

move back and forth between these roles. One of the principle difficulties for the actor-network theorist results from this fact, for in any smoothly functioning assemblage of actors, mediators will tend to become intermediaries as the various distortions and transformations of meaning and force are accommodated, stabilized, and rendered predictable by the other actors within the assemblage. A consequence of this is that when an actor becomes an intermediary in its associations within a particular assemblage, it has become, for all intents and purposes, fully integrated into that assemblage. It is not that these intermediaries no longer alter what forces and meanings pass through them, but that these alterations are now part of the normal and predictable functioning of the assemblage of which it is a part, that the transformations effected by these intermediaries are part of the intentions of the agents who associate with them, and thus the differences that their being there make becomes hard to detect. Because of this, when intermediaries begin to predominate within an assemblage, and as it begins to function, as a whole, in a stable and regular fashion, this assemblage may be treated as an individual actor and not an assemblage of actors. It has become, in the parlance of actor-network theory, a black box. This is why, for the actor-network theorist, assemblages that are in the process of forming or those which are undergoing some sort of controversy or crisis are the most interesting, as it is in such states that the active contribution of nonhuman actors to the nature and functioning of the whole assemblage is more easily detectable. These assemblages under formation, because of the unpredictability of the results of the various associations being made and unmade, reveal more clearly the contributions made by nonhuman actors as active determinants, as active creators, of the world they inhabit; in such situations we are positioned to more clearly see nonhuman actors, and their

activities, as being on equal footing with human actors. However, because actors may move back and forth between being mediators and intermediaries, even stable assemblages of intermediaries may break down into less stable or predictable associations between mediators. The black box, in such instances, opens up and its inner workings become available for investigation.

At this point it is important to take note of and avoid the following misconception, which is that human actors have clear and unambiguous intentions, that these intentions are theirs and theirs alone, and that these intentions only get transformed once they are transmitted through a chain of mediators. Such a position assumes an already existing actor, with a predetermined set of intentions, that it then enacts. Actor-network theory, however, conceives of individual actors as being relationally constituted within the webs of associations in which they are embedded. The actor, through the lens of actor-network theory, reveals itself not as a pre-existing individual that then enters into a series of associations, but as emergent out of the associations in which it is embedded. It is thus not only the case that actors, when they form associations with one another, alter and transform the forces that pass through them, for they also produce in one another new sorts of behaviors, capacities, intentions, and orientations. Simply stated, I am the sort of actor that I am because of the sorts of associations that I maintain. Or, as Latour states, an actor "is made to exist by its many ties: attachments are first, actors are second."[9] It is in this sense that actor-network theory can be understood as articulating a relational ontology.

---

[9] Bruno Latour, *Reassembling the Social,* 217.

The nature of these constitutive associations must also be understood properly. These associations are not made once and then able to endure indefinitely. Rather, these associations must be continuously re-established, renegotiated, and enacted in order for them to be maintained. Associations are, as such, performative in nature; associations are not a thing that actors have, but are an activity that actors collectively engage in. It is this collective process of making, unmaking, and maintaining associations that particular actors, with their particular capacities for acting, emerge out of. This collective activity defines the capacities of the individual actor and articulates the boundaries between actors. Barad sums up this performative and collective notion of agency nicely when she writes that "agency is a matter of intra-acting; it is an enactment, not something that someone or something has. Agency cannot be designated as an attribute of subjects or objects (as they do not preexist as such)."[10]

To summarize, according to actor-network theory and related theoretical perspectives agency is a delocalized and collective phenomenon, and actors themselves are the performative results of the associations in which they are engaged. So what counts as an actor? Humans, obviously, but also a whole array of nonhumans: dragonflies, orchids, mountain goats, cell phones, transit tokens, Swiss Army knives, scanning tunneling microscopes, electrons, black holes, and hydrothermal vents. This list could go on without end. Further, given that the condition for being an actor is simply the capacity to function in a more or less unified or coherent manner, some larger, more amorphous, and perhaps stranger phenomena might also be countable as actors: things such as social

---

[10] Karen Barad, *Meeting the Universe Halfway,* 214.

groups, economic systems, jet streams, ecosystems, and animal populations, as well as hybrid entities like musicians and their instruments, fish with *Cymothoa exigua* dwelling in their mouths, and cyborgs. Pickering offers an example of these strange sorts of actors that posthumanist ontologies make possible with reference to E. P. Thompson's *The Making of the English Working Class*. Pickering conceives of the English working class as a macroactor which comes into being by "delineating its own boundaries, constructing its own characteristic institutions, articulating its own interest, making itself a macroactor – in a temporally emergent dialectic of resistance and accommodation with machines, architectures, factory workers, the state, the church."[11] Through achieving a certain degree of cohesion through a set of institutions, machines and technologies, practices, and a sense of common purpose, the working class becomes not just a mass of interacting actors, but a large scale actor in its own right. Further, it is a thoroughly posthumanist actor, as it is formed not just by interacting humans, but also a whole array of nonhuman actors.

Further, just as every actor may enter into association with other actors to form larger actors, for example the macroactor of the working class mentioned above or a group of musicians with their instruments, so too all of these individual actors may be decomposed into constituent actors. Consider, for example, the human body, which through analysis can be broken down into a whole array of nested and overlapping actors: cells, tissues, organs, organ systems, etc. The significance of opening ourselves up to the existence of this endless array of heterogeneous actors is that we should not approach any situation with a strict and limited preconception of what sorts of actors exist and matter

---

[11] Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science*, 235.

and expect to understand what is happening; rather, we must be willing to let ourselves be surprised by the variety of strange actors that may show themselves to be relevant to our understanding of what is going on around us.

5.2 - Human and Nonhuman Actors

A worry we might have regarding actor-network theory is that it erases the various real differences between human and nonhuman actors. If both atomic clocks and humans are seen as actors, then does that not obscure the significant differences that exist between these actors? Are not the differences between humans and nonhumans significant enough to caution us against collapsing the distinction between the two categories? After all, it is human actors that exhibit characteristics like rationality, intentionality, and consciousness, not graphing calculators or neutron stars. Andrew Pickering is sensitive to this issue and attempts to account for it by constructing his account of scientific practice around two sorts of actors: human and nonhuman actors. In relation to one another, nonhuman and human actors perform what Pickering calls the dance of agency:

> the dance of agency, seen asymmetrically from the human end, thus takes the form of a *dialectic of resistance and accommodation*, where resistance denotes the failure to achieve an indented capture of agency in practice, and accommodation an active human strategy of response to resistance, which can include revisions to goals and intentions as well as to the material form of the machine in question and to the human frame of gestures and social relations that surround it.[12]

To attempt to explain the dance of agency a bit more concretely, say a scientist develops a particular theory and a method for testing that theory. After constructing the needed

---

[12] Ibid, 22.

apparatus and putting it into action, the human actor becomes a passive observer and watches as his or her intentions, as materialized in the apparatus, encounter the resistances of nonhuman agency; that is to say, the scientist's expectations are defeated and the apparatus does something other than what was anticipated. In response to these resistances, the scientist must then adapt to the situation at hand, which may involve something as simple as a modification of the apparatus to more radical transfigurations of goals and theories. What results over the course of these alternating phases of resistance and accommodation, out of unfolding of this dance of agency, does not necessarily resemble what the human actors had initially intended.

This dialectical process through which goals meet either accommodation or resistance, and thus emerge transformed, is what Pickering calls the mangle of practice.[13] Pickering chooses the word "mangle" because "it conjures up the image of the unpredictable transformations worked upon whatever gets fed into the old-fashioned device of the same name used to squeeze the water out of the washing. It draws attention to the emergently intertwined delineation and reconfiguration of mechanic captures and human intentions, practices, and so on."[14] Pickering conceives of the mangle as not simply pertaining to what occurs within scientific practice, but as operating at all levels of scale, with mangling occurring in the scientific emergence of the entities we now call quarks as well as large scale historical transformations like the industrial revolution in Britain, and maybe even providing a sort of theory of everything.[15] That is to say, if the mangle is taken on more metaphysical terms, everything that exists, all actors, result from

---

[13] Ibid, 22-3.
[14] Ibid, 23.
[15] Ibid, 240, 246-52.

the mangling of various agencies. This more metaphysical ambition of Pickering's theory can be intuited as early as his insistence that the mangle is a way of conceiving of the "constitutive intertwining and reciprocal interdefinition of human and material agency."[16]

Given Pickering's articulation of the mangle, his insistence upon maintaining the binary of human and nonhuman agency seems strange. Consider again this assertion of Pickering's that human agency is constitutively defined in interaction with nonhuman agencies. Pickering writes that "the world makes us in one and the same process as we make the world."[17] What I would like to take this to mean is that there is no universal human essence, but only particular contingent ways of being human that emerge out of the mangle of agencies. However, it does not seem that Pickering has this in mind at all. Instead, he claims that "human agency seems intrinsically bounded. In making, setting in motion, and tending each generation of machines, we humans seem to display the same old powers, just disciplined differently."[18] In other words, beneath the variability generated out of various disciplinary procedures, human nature and its capacities are, on Pickering's account, more or less fixed.

To the extent that Pickering appeals to a more or less fixed human nature, he perhaps fails to fulfill one of the more intriguing promises of posthumanist theory, which is that posthumanism allows us to think about being human not in terms of a fixed essence, but in terms of diversity and variety. Instead of positing a notion of human agency, conceiving of it as universal, and opposing it to nonhuman or material agency, a

---

[16] Ibid, 25-6.
[17] Ibid, 26.
[18] Ibid, 242-3. A further problem we may note with regards to Pickering's distinction between human and material agency is that material agency, on his account, is primarily considered in terms of machines. The agency of animals, for example, is not at all considered.

more promising posthumanist approach to human agency should attend to how the particular type of agency that we call human agency emerged, be more attentive to the diversity of human agency, and to the extent that there are qualities universal to all human agents, be willing to give an account of how these qualities became universalized. Latour, it would seem, is in accord with such an approach. He writes that "it is impossible to define the human by an essence."[19] We can not define the human by an essence, according to Latour, because what it means to be human is a complicated and often seemingly disunified effect of the various associations being made within a swarm of diverse and not merely human actors.[20]

A second problem with Pickering's distinction between material or nonhuman agency and human agency is that the differences within the category designated by nonhuman agency is seemingly far greater than any difference between the category of the human and the nonhuman. If nonhuman agency simply means any form of agency which is not human, suddenly we are dealing with actors as diverse as geodes, bulldozers, thunderstorms, slime molds, glaciers, supercomputers, lemurs, and cosmic strings. [21]The differences between these various sorts of nonhuman agencies is often vast, and further, the agency of a lemur is probably far closer to human agency, with regards to its capacities for interacting with its world, than it is to the agency of, for example, a strange astronomical object like a neutron star. To maintain a rigid distinction between human and nonhuman agency while simultaneously eliding the vast differences between

---

[19] Bruno Latour, *We Have Never Been Modern*, 136.
[20] Ibid., 136-8.
[21] As should be clear from this list, if something exists, it exists because it has agency, and if it has agency it exists. What should also be clear is that there are diverse forms of agency, and just because something exists that does not mean it exists in the world, and acts upon it, in ways identical to other actors.

agencies contained within the category of "nonhuman" is both anthropocentric and might lead us to fail to appreciate the diversity of actors that fall within the category of the "nonhuman."

Perhaps we should look at this issue a bit more closely so that we can get a sense of what exactly Pickering thinks distinguishes human from material or nonhuman forms of agency. To get right to it, it is human intentionality, our capacity to plan ahead and act in a goal oriented fashion, that for Pickering makes human agency unique. Pickering writes that "scientists usually work with some future designation in view, whereas it does not help at all to think about machines in the same way. Human intentionality, then, appears to have no counterpart in the material realm."[22] Later, Pickering speaks of this distinction as constituting two realms, that of human agency and that of material agency. Machines function as a sort of hybrid entity at the interface of these two realms, and out of which humans are able to capture and produce knowledge about material agency. One sometimes gets the impression that for Pickering the entire dance of agency occurs at this boundary. Consider, for example, the following quotation: "resistances . . . exist on the boundaries, at the points of intersection, of the realms of human and nonhuman agency."[23] A few questions, then: what about the resistances, the give and take of agencies, that occurs between nonhuman actors? What about the resistances between nonhuman actors? Our capacity to make plans and orient our actions according to goals makes us an interesting sort of actor, but does this capacity make us different enough from other sorts of actors to invoke an absolute distinction between human and nonhuman realms? Does this distinction not suggest a re-emergence of Cartesian

---

[22] Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science*, 17-8.
[23] Ibid, 54.

thinking, and should not a properly posthumanist theory resist this as much as possible? Finally, to what extent does the human capacity to direct itself according to goals and make plans rest upon associations with nonhuman actors? Consider all of the artifacts, such as maps, diagrams, timetables, and blueprints, and institutions, which are not simply the expression of human intentions, but the scaffolds upon which human actors are enabled to organize their activities and plans in more complex and coordinated fashions.[24] Against Pickering's claim that impurity exists only at the border between human and nonhuman realms, as embodied in machines, I want to suggest that as we begin to consider the questions above, we will also begin to see that such a distinction is unsustainable and that human agency is interwoven with nonhuman agency. We will note that there is no pure realm of human agency, and that whatever we take to constitute this supposedly pure realm of human agency, whether it be intentionality, consciousness, or whatever, accounts in fact for far less of what we are and what we do as human actors than Cartesian, and crypto-Cartesian, ideologies suppose.

For the reasons gone through above, I find it hard to justify making a hard distinction between human and nonhuman actors. My intention with regards to conceiving of creativity from a posthumanist perspective is to be as nonanthropocentric as possible. To treat humans as the only sorts of creative actors and to see nonhuman actors as, at best, the instruments and expressions of human creativity would indicate a failure to achieve this goal. In order to articulate an adequately posthumanist theory of

---

[24] See Andy Clark's *Natural-Born Cyborgs* for a discussion of the ways in which human cognition, particularly that which is engaged in more elaborate processes of reasoning and planning, depends upon the environment of the human actor and the various artifacts with which it interacts.

creativity, refusing an absolute distinction between the human and the nonhuman seems essential.

5.3 - A Posthumanist Approach to Creativity

Having articulated a posthumanist approach to actors, both human and nonhuman, I now want to address more directly the implications of this approach for thinking about creativity. One implication that we should note immediately is that if, since the beginning of more rigorous and scientific investigations into the nature of creativity, creativity has remained a somewhat mysterious psychological process, at least the locus of creativity has remained more or less clear: an individual human being. Posthumanism, as articulated in the approaches of Latour, Haraway, Pickering, and Barad, threatens this certainty. The nature of this ambiguity regarding the source of creativity is at least threefold: first, the individual actor's capacity to act is derived from the sorts of associations it maintains; second, actors never act alone, but always in concert with other actors; and third, actors may alter in unpredictable ways the forces that associated actors attempt to pass through them. In contrast to conventional approaches to creativity, in which the individual human being is the locus of creative activity and possesses the capacity to be creative within itself, posthumanism distributes the creative process across a constellation of actors, not all of which are human. However this ambiguity concerning the location of the creative process is not a defect of the posthumanist perspective. Rather, this ambiguity, which posthumanism is attuned to, is a real ambiguity inherent in the creative process. The number and nature of creative actors at work in any creative process only appears to be clear and certain when, as in traditional accounts, you exclude

most of the relevant actors from the account. Yet, as Latour writes, "action is not done under the full control of consciousness; action should rather be felt as a node, a knot, and a conglomerate of many surprising sets of agencies that have to be slowly disentangled."[25] To the extent that this is true of action, it is true of creative action as well. Instead of seeing creativity as having its source in a single actor, we should see creativity as, every step along the way, enacted by collectives.

Exploring further the issue of collective creativity will be one of the concerns of the next, and final, chapter. What I want focus on for the rest of the present chapter is the creativity of nonhuman actors. My core claim is that because all nonhuman actors are active articulators of the world we inhabit, and because they don't simply extend and adapt themselves to human purposes, we should also see them as unqualified and active participants in the creative process as well. Given the existing discourse on creativity, given how we have been trained to think about creativity, this may seem bizarre, as creativity has been almost thoroughly identified with the operation of the human mind. However, to what extent are we justified in maintaining this association? And even if we restrict creativity to the process of ideation, can we still justify the exclusion of nonhumans from the realm of creative actors? However, if as I have argued in previous chapters cognition is in fact situated and distributed, even the production of novel ideas is a process that occurs situated in relation to and distributed across networks of human and nonhuman actors. For example, with our historically recent acquired capacity to form associations with computers that are capable of modeling complex systems with many independent variables, human actors are thus enabled to think about phenomena that

---

[25] Bruno Latour, *Reassembling the Social,* 44.

exhibit a far greater degree of complexity than they would otherwise be able to. The creative accomplishments of such fields as are concerned with complex, multidimensional systems are cognitive accomplishments that are only possible in relation to computers capable of simulating such systems, and which thus play an integral and defining role in the creative process.

Having said that, it would nevertheless be a mistake to restrict creativity to the process of ideation, and our concern for nonhuman actors should not be limited to their role in the process of ideation, for many of the products of creative activity are not simply new ideas, but new material actors as well: new technologies, art objects, or social assemblages, none of which can be reduced, in their genesis, to the a novel idea. Because we humans act in association with nonhuman actors that behave in ways that are often not reducible to our intentions, expectations, and wishes, the products of creative action will not reflect our intentions, our representations of what we intend, purely, and in fact, if the account of agency that I have aligned myself with is correct and particular actors emerge out of networks of associations, our intentions are never purely our own to begin with.

Thus, although convention and common sense tells us that it is humans that are the creative actors, and that to treat nonhumans as creative actors boarders on perverse, from the posthumanist perspective I have articulated I can see no good reason to continue to restrict creative power to humans alone. Instead of resisting this counterintuitive implication of such a perspective, I propose that we instead adopt it, test it out, and see how the creative process manifests itself to us when we approach it nonanthropocentrically. What follows are some examples of creative processes which I

believe can only be properly understood when we attribute to nonhumans full-fledged creative powers.

The first example I want to consider is Donald Glaser's invention of the bubble chamber, as analyzed by Andrew Pickering.[26] In the early 1950s, Glaser was attempting to invent a device to detect strange particles. This device was based upon the cloud chamber, which is, essentially, a container filled with pressurized vapor within which, when depressurized, trails of droplets would momentarily form along the paths of any particles that had recently passed through the instrument. Glaser believed that if he used a denser medium than vapor, it would be possible to create a device that would register the presence of the strange particles he was looking for. The result of Glaser's research would be the bubble chamber, but the path from cloud chamber to bubble chamber passed, to use Pickering's language, through the mangle.

Glaser's attempts to detect strange particles met with various failures, which is to say, resistances of material actors to which Glaser made adjustments and accommodations. In order to detect strange particles, Glaser reasoned that something of higher density than vapor was going to be needed, so at first these adjustments amounted to testing various denser substances. The end result of this process was filling the chamber with not a gas, but a superheated liquid that, when the pressure of the chamber was released, would boil and form bubbles along the tracks of particles. However, given the difficulty in triggering the chamber to depressurize when a cosmic ray passed through it, due to the unpredictability of the arrival of cosmic rays which required the construction of a second detector device to trigger the depressurization of the chamber,

---

[26] Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science*. My account will be a summary of Pickering's.

this resulted in a second mangling of Glaser's scientific practice: the movement from the culture of small science to that of big science with its more expensive and complicated machinery, including particle accelerators. Big science, with its large teams of scientist and technicians, significant funding needs, and bureaucratic organizational structure, was an emerging scientific culture that Glaser resisted, but the particle accelerators that big science had access to made it possible for Glaser to pass particles through the bubble chambers "at precisely timed intervals, so that one could expand the chamber by the clock, and the problem of triggering would not arise."[27] Glaser, however, was resistant to the culture of big science, and made this transition to big science at the same time as he resisted it, resulting, according to Pickering, in a hybrid of the two.[28] One of the means by which Glaser resisted this transition was by using xenon to fill the chambers, which, being denser than hydrogen - a substance that other researchers were using but at the expense of having to construct larger tanks - would allow for the construction of smaller bubble chambers, and thus enable Glaser to evade full-on participation in big science. However these xenon filled bubble chambers still did not produce tracks, an obstacle that was eventually overcome by adding ethylene as a quenching agent to the chamber in addition to xenon, the success of which not only resulted in a working particle detector, but also prompted "a reappraisal of the mechanism of bubble formation by charged particles."[29] It is this bubble chamber that earned Glaser the Nobel Prize in 1960.

When we consider this sketch of the creative process, Glaser's invention of the bubble chamber did not issue purely from his mind and embody itself, unproblematically,

---

[27] Ibid, 43.
[28] Ibid, 48.
[29] Ibid, 45.

in an artifact. Rather, the creative accomplishment of the bubble chamber emerged out of a tangle of actors. In Pickering's account, nonhuman actors most often manifests itself as resistance to human intentions and goals. Thus, as presented above, we have a series of resistances to Glaser's attempts to build device capable of detecting subatomic particles, culminating in a "last sequence of resistance and accommodation in accelerator physics [that] mangled both the material and conceptual aspects of the culture of particle physics: a new material form of the chamber, the quenched xenon chamber, and new knowledge, a new understanding of the chamber's functioning, emerged together."[30] Further, with the move from a small laboratory to the institutions of big science, "the social dimension of Glaser's practice was mangled in the xenon project, too."[31] To give an account of only Glaser's changing goals and intentions, his theorizing and experimentation, would be too narrow in scope to grasp the creative process that occurred here. The manner in which our goals are transformed and redirected is unintelligible without considering the ways in which material actors resist and transform our intentions.[32] As such, the role of nonhuman actors, and how they resist human actors and their intentions, must also be accounted for when giving an account of a creative accomplishment because these resistances, which shape the course of a creative process, are independent of the goals, plans, and intentions of us humans. As Pickering writes, "Glaser's detectors *did* things – boiling explosively or along the lines of tracks or whatever – and that these things were importantly separate from Glaser."[33]

---

[30] Ibid.
[31] Ibid.
[32] Ibid, 57.
[33] Ibid, 51.

One limitation, however, of Pickering's account is that nonhumans are too often treated as simply resisting human intentions and goals, and thus only requiring the adjustment of human actors to these resistances. As such, it is too easy to conceive of nonhuman actors as simply placing limits upon human activity, and not as actively participating in the production of novelty themselves. To see nonhuman actors as simply resisting human intentions severely underestimates the autonomy of these actors, so I want to consider, as an example of how nonhuman actors can enter into the creative process as active participants in the production of novelty, the guitarist Keith Rowe. When you see a picture of Rowe's guitar set up, you are probably struck by how unusual it looks; the guitar is laying flat on a table, its neck and body are invaded by objects of various sorts, and plugged into an array of electronic devices, including various pedals, radios and a laptop. Instead of a coherent and unified object, we see a bewildering assemblage of interacting parts. Further, Rowe's guitar setup is not a static object, but one which he continuously changes and experiments with, and as such his instrument is constantly evolving. Perhaps as unusual as Rowe's instrument, however, is Rowe's relation to his instrument. First, in addition to manipulating the various devices in which the guitar is enmeshed, Rowe interacts with the guitar itself via a variety of nonstandard objects, from violin bow to things as unusual as a Brillo pads and other common objects. Even more unusual, however, is Rowe's relation to the act of performance itself: he claims that he never rehearses with his instrument at home because rehearsal "dilutes the relationship between you and the instrument."[34] It is thus interesting to compare Rowe's relationship to his instrument with how we normally conceive of musicians. When we

---

[34] "Interview: Keith Rowe," last accessed October 23, 2012, http://ronsen.org/monkminkpinkpunk/12/rowe.html.

think, for example, of a professional violinist, we tend to conceive of the musician as cultivating a very intimate and tightly woven relationship to their instrument; they become, perhaps, a single hybrid entity of human and instrument. Rowe's technique, however, is an attempt to refuse any such hybridity, and to keep his relationship to his instrument as simply that: a relationship between two meaningfully autonomous actors. Rowe maintains this more distanced relationship to his instrument, which results from the continuous evolution of his instrument and abstaining from practice, because it allows for more spontaneous performances. The sort of spontaneity that he wants to achieve would be inhibited if, through familiarity with his instrument, the performer were to develop a particular playing style, sound, or set of habits. Writing of performing with his band AMM, for example, he says that "AMM has always been about searching for the sound in the performance. I can honestly say that after forty years I still look at the guitar with absolute terror. I'm terrified of it. I've never got used to it. I still view it as something quite empty."[35]

One of the consequences of Rowe's interesting relation to his instrument is that the instrument never becomes intelligible as an extension of Rowe's will or intentions. Rather, in a significant sense the instrument seems to stand apart from the performer. As such, instead of an instrument responding fluidly to the intentions of the musician, as an extension of the musician, what we seem to have here is a more equal, a more leveled relation between musician and instrument in which each responds to the actions of the other. Further, how his instrument behaves is never completely reducible to Rowe's intentions, and what it does may not be able to be precisely anticipated by him. Rowe

---

[35] "Interview," last accessed October 23, 2012,
http://www.paristransatlantic.com/magazine/interviews/rowe.html

discusses an instance of this when, unexpectedly, the hard drive of his laptop went into standby mode, and the sound of it shutting down was picked up by one of the speakers in his setup. This was an unexpected event in the performance, enacted by the hard drive of the computer, which Rowe found to be interesting and incorporated it into his later performances.[36] Further emphasizing the degree to which his performances are shaped by events and actors which are beyond his ability to precisely anticipate or control, Rowe claims with reference to his use of radios in his performances, and whether he monitors what is broadcasting before introducing it into the performance, that "normally I just turn it on, and deal with it."[37] In essence, what Rowe's musical practice presents us with is a performance in which the instrument acts as a relatively external and autonomous actor in relation to the human performer and, in its activity, shapes the nature of the performance in a way that is not neatly reducible to the intentions of the performer. The resulting performance is not a product of the activity or intentions of any one actor, but rather emerges improvisationally out of how these various actors act upon and respond to one another.

To put this in the language of actor-network theory, with regards to Rowe's actions, the instrument exists as a mediator. What the instrument will do, how it will respond, exhibits a certain degree of unpredictability, and though it may be acted upon with certain intentions, it is likely to transform and distort these intentions as they are passed through the assemblage of interacting parts that constitute it. We might also say that, with reference to Haraway, Rowe's instrument exhibits trickster qualities. This is an

[36]"Interview: Keith Rowe," last accessed October 23, 2012, http://ronsen.org/monkminkpinkpunk/12/rowe.html.
[37] "Interview," last accessed October 23, 2012, http://www.paristransatlantic.com/magazine/interviews/rowe.html

interesting contrast, again, to how we normally think of musicians as engaged in a process of mastering their instrument and turning it into an extension of their will. However, even when we consider musicians who exhibit virtuosity with regards to their instrument, the situation, as seen from a posthumanist perspective, is not one of mastery, if by mastery we mean that the instrument merely submits to the will and intentions of the user. With regards to musicians who cultivate such skills, the instrument becomes an intermediary, but this does not necessarily entail mastery in the traditional sense. The reason for this is because the process by which an actor becomes an intermediary for another requires that both actors become transformed in the process. That is to say, a musician does not have a preexisting expressive capacity that he or she then becomes able to realize through mastering an instrument. Rather, in becoming skilled at a particular instrument, they become through forming that association a new type of actor with new goals and capacities for acting upon the world.

As another example of nonhuman actors at work as active participants in the creative process, let us consider Mitchell Whitelaw's analysis of artists who use, as their medium, the technologies and techniques of artificial life, and in particular the subset of artist who utilize computer programs that simulate evolutionary processes. Karl Sims is one of the most prominent artists in this field, and his work *Genetic Images* is exemplary of this approach. As Whitelaw describes *Genetic Images*,

> each image is the product of a complex equation, evaluated and displayed by the installation's computer. When an image is selected by a visitor, its equation is randomly altered fifteen times to produce a new set of equations and a new set of images. But metaphorically this is an image breeder, and its process is founded on analogies with genetics and evolution. The image's equation is analogous to the genotype or genetic code, and the image itself corresponds to the phenotype or organism. In *Genetic Images* an image's equation might be altered randomly as it

149

"reproduces," just as in living things rare variations in the replication of genetic material produce mutations. When two images in a set are selected, their equations are spiced together in a process analogous to sexual reproduction: the following generation of "children" contain various mixtures of the "parent" images' equations.[38]

Further, Whitelaw explains that the evolution of these images is not simply a matter of altering values within the existing parameters, for the computational process can even add new sections of code that can alter the parameters that define what sorts of forms are possible.[39] This allows for the resulting images of this evolutionary process to be highly unpredictable and surprising. What I want to propose is that the creative process we are dealing with here involves, as active participants in the process, at least the following four types of actors: the programmer who engages in setting up the parameters of the evolutionary system, but never has full knowledge of what the system will do, the program that generates the code for each image and then transforms that code into an image, the hardware that runs the program,[40] and, given the selection mechanism of *Genetic Images*, the users which then select which image they find most pleasing or whatever. The behavior of the code and hardware, not to mention the behavior of the users, in their relative independence from that of the artist can not be seen as simply offering resistances to Sim's intentions, for Sims deliberately deemphasizes the role of his own intentions with regards to determining the creative production of novelty, thus

---

[38] Mitchell Whitelaw, *Metacreation: Art and Artificial Life* (*C*ambridge, Mass: MIT Press, 2004), 27-8.

[39] Ibid, 29.

[40] In some cases, the hardware is more obviously enrolled into the creative process of simulating these evolutionary processes. See Nik Gaffney's *Mutagen*, which includes a variable temporal distance between virtual creatures as a feature of the artwork, the variability of which is determined by the slowing down of the computer as the load of that which it must compute increases. See Mitchell Whitelaw, *Metacreation: Art and Artificial Life*, 41-44.

allowing the nonhuman elements of the creative process more autonomy in determining the creative product.

Though *Genetic Images* models a highly abstract evolutionary process independent of any ecosystem of interacting organisms, other artists have simulated virtual ecosystem within which artificial creatures may interact and co-evolve. One example of this is Troy Innocent's *Iconica*, which involves user interaction with a strange ecosystem structured by an artificial language. Whitelaw writes

> for the visitor, *Ionica* is initially a completely bewildering experience; bizarre iconic entities spin, walk, twitch, flash unfamiliar glyphs, emit strange noises. Are they pursuing something, attacking something? What is it they want? Faced with learning a new language, the visitor resorts to simple questions, trying to glean clues about both the world and the language that forms it. The linguistic and ecological structures become gradually more familiar; learning occurs through testing these structures and through play: what happens if I drop this food form over this entity? If I ask it what it is made of? The work offers various interfaces for viewing and interacting with the world; the user can generate new forms….[41]

What should be emphasized here, however, is that even as the user learns how to interact with and guide the system, which is the virtual world of *Ionica*, they can never master this system, and its activity and future will remain importantly distinct from the activity of the its users and designer. Like *Genetic Images*, *Ionica* presents us with a creative process that generates novelty in a manner that is not reducible to the intentions or expectations of a human user or designer. In fact, what is interesting about works like these is their capacity to confound the expectations and intentions of user and designer alike. This openness to being interacted with yet refusal to submit to human intentions is, in fact, one of the aspects of these and similar works that make them appealing. When people interact with these artworks, they experience not an inert object, but an active yet

---

[41] Ibid, 84.

alien actor or system of actors that may respond to us in startlingly perplexing, surprising, and creative ways.

Simply stated, what both *Ionica* and *Genetic Images* present us with are striking examples of creative processes in which the human actor, as the locus of creativity, has been de-emphasized or decentered. That is to say, by enacting a relinquishing of control over the creative process as a part of the creative process itself, what we see here is a "self-marginalization on the part of the artist."[42] However, though works such as these set forward a willful marginalization of the artist within the creative process, this practice should not be seen as peculiar to the activity of these perhaps unusual artists, but as illuminating something which is true of creativity more generally. To quote Whitelaw on Sims' own understanding of the significance of his work, "creativity lies not with the user as an individual but with the whole evolutionary process – a process which accounts not only for biological diversity, Sims suggest, but for 'scientific theories, religious beliefs, or even artistic styles.'"[43] In other words, by calling upon us to attend to a creative process that is distributed across a whole system of interacting actors, including most notably programmers, hardware, software, virtual creatures, and users, these works provide a mode of accessing certain truths about the creative process more generally. For example, we see that creative processes may be, one might say, acephalous; guided by no actor that has absolute control over the process and structured by no hierarchy. Each actor can attempt to nudge the process in particular directions, but what results might best be understood as emergent in such a way that it is not linearly reducible to the simple sum of goals, intentions, and behaviors of all of the participating actors. Further, the nonhuman

---

[42] Ibid, 193.
[43] Ibid, 58.

actors in these creative processes, or to take a specific example, the programs which produce, combine, and mutate these abstracted artificial genomes, do things that are independent of the human actor, which the human actor did not and could not do, and that are not anticipatable by the human actor. Because, in the creative process, we humans must enter into association and act with various nonhuman actors with different propensities, inclinations, and ways of behaving, and because these other actors are often unpredictable, what emerges from this creative process is not the sole result of our intentions. It is this aspect of artificial life, both as an art and as a science, which interests me. These artificial organisms, or simulations of organisms, have a tendency to slip out of our control, to act in ways which we can not only not anticipate but even necessarily understand. In such instances, "artificial life begins to peel away from design, intent, and human conceptual models, and becomes alien."[44]

In the examples of a-life art given above, "human creativity appears to echo the inherent creativity of nature or matter" and it thus becomes difficult to establish some sort of absolute demarcation between the two.[45] With that in mind, let us consider one final example, and in so doing I want to set out and make explicit what seems to me to be, if we take it seriously and think through its implications, an unavoidable result of my posthumanist approach to creativity, which is that there are creative processes in which human actors not only play decentralized or maybe even marginal roles, but in which they play no role at all. The example I want to consider is the origin of eukaryotic cells as articulated by endosymbiotic theory. Endosymbiotic theory is today most widely associated with Lynn Margulis who, while not the originator of the theory, was

---

[44] Ibid, 225.
[45] Ibid, 232.

instrumental in legitimating it. In essence, Margulis' claim is that the nucleus and other

organelle found within the cells of eukaryotes had their origins as independent

prokaryotes that over time, and over many generations, developed symbiotic relations

with one another and eventually evolved into a compound organism; the eukaryotic cell.

On the origin of eukaryotes, Margulis and Dorian Sagan propose a scenario in which

> independent prokaryotes entered others. Inside them they digested cellular
> wastes; their waste, in turn, was used as food. The outcomes of such
> intimate sharing were permanent relationships, cells reproducing offspring
> well adapted to life within other cells. With time these populations of
> coevolved bacteria became communities of microbes so deeply
> interdependent they were, for all practical purposes, single stable
> organisms, - protists.[46]

I suspect that some will protest my claim that this is a creative accomplishment, but from

a posthumanist perspective, on what grounds can we do so? After all, the emergence of

the eukaryotic cell opened up strange new possibilities of being and the vast majority of

multi-cellular life on Earth are eukaryotes. What kind of things could be alive on Earth,

after this point, was opened up in a quite radical fashion.

Through the lens of posthumanism, creativity comes to look something like this:

the generation of new possibilities of being in the world, which are opened up through the

enactment of new types of associations and new ways of affecting and being affected, of

acting and being acted upon. The creation of new ideas, while clearly creative, is thus not

the only type of creative activity. The invention of the bubble chamber, Keith Rowe's

performances, and a-life art are all creative accomplishments that can not be reduced, in

their entirety, to the creation of a new idea. They are more than just new ideas. These

creative processes generate and leave behind new scientific devices, new social

---

[46]Lynn Margulis and Dorion Sagan, *Microcosmos: Four Billion Years of Evolution from our Microbial Ancestors* (Berkeley: University of California Press, 1997), 118-119.

formations, new ways of acting upon and interacting with the world, new art objects, and

generate new affects through novel performances, groupings, and encounters. However, it

is true that all of these examples nevertheless have a distinctive cognitive element, and

produced novel ideas about, for example, artistic practice and the nature of the physical

world. The final example concerning the evolutionary emergence of eukaryotes is meant

to challenge this assumption that the creative process must necessarily have a cognitive,

conscious, or intentional dimension to it by proposing, as a creative accomplishment, an

evolutionary event which occurred well over a billion years before humans, and perhaps

any conscious beings, existed but which reconfigured in a revolutionary way the

possibilities of life on Earth. This event opened up new ways of being, which is to say

new ways of associating and assembling and new ways of acting and being acted upon.

Given such an example, the question we should ask ourselves is what does

consciousness, cognition, intention, or whatever add to such a process that would be

necessary for it to count as creative, especially given the fact that even in those creative

processes which are clearly under some level of conscious control or influence, the

novelty which is produced is often generated by processes and actors that are beyond

conscious control and which constantly defeat our expectations and intentions. If the

creative process is never a straightforward realization of the intentions of a human actor,

if the creative process itself often warps, transforms, and sometimes even completely

overtakes these human intentions, then in what way is intentionality essential to the

creative processes? If the creative process is never just the outward expression of some

cognition of a human agent, but is always a tangle of diverse interacting actors, none of

which exert any absolute control over the outcome, what about consciousness is essential

to this process that makes it creative? Again: according to the posthumanist approach that I have outlined in this chapter, creativity comes to appear as nothing more than the coming into being of new possibilities of being, and "being," given the performative and relational ontology of the thinkers I have been working with, means nothing other than the capacity to enter into associations or assemblages with other actors, to act and be acted upon. Seen from a posthumanist perspective, these supposedly uniquely human qualities like consciousness or intentionality, though interesting, no longer seem to be essential to creativity.

CHAPTER 6
CONCLUSION: CREATIVITY AS A SITUATED AND DISTRIBUTED PROCESS,
WITH FURTHER CONSIDERATION OF THE ROLE OF NONHUMANS AS
CREATIVE ACTORS

I want to now articulate as clearly as possible the posthumanist approach to creativity that I have been developing, and which I believe will allow us to get a more complete and accurate understanding of the creative process than those approaches which currently predominate. Again, most contemporary attempts to develop a theory of creativity rest on Cartesian assumptions that understand the world and thought to be separate and opposed realms and which furthermore conceive of cognition in strictly individualist terms; that which cognizes is an individual human agent. What follows from this is that creativity has been understood as a special type of individual cognitive process; one that produces novel and appropriate ideas. Because of this narrow focus upon the individual and its cognitive abilities, insufficient attention is given to how creative cognition is affected by the social and material situations in which this cognitive activity is embedded and the various ways in which creative cognition may be distributed across an array of human and nonhuman actors. Furthermore, that creativity may not be, in any essential way, a cognitive process is a possibility that is all but unaddressed in the contemporary literature on creativity.

The central claims that I am making about creativity are that creativity is not a property of an individual and that creativity can not be understood as abstracted from the concrete settings within which particular creative processes occur. Rather than occurring within the minds of individuals, the creative process is in essence situated and distributed, and further, creativity is, without exception, a collective process. My contention that the

members of these collectives need not be humans derives from my posthumanist

commitment to questioning anthropocentrism, to questioning our modern tendency to

conceive of nonhumans as passive resources for human action. What I want to do in this

concluding chapter is work through the various threads that I have so far developed; to

draw them together and work out their implications for how we should understand

creativity.

Drawing on the performative and associative ontologies of actor-network theory

and related posthumanist approaches, and in particular the work of Bruno Latour, Donna

Haraway, Karen Barad, and Andrew Pickering that I considered in the previous chapter, I

want to argue that a creative process is a process that generates new or transformed types

of actors, and assemblages of actors, through the making and unmaking of associations.

These new actors may be, for example, new ideas, new works of art, or new scientific

theories, but creative processes are not necessarily restricted to the realm of cognition or

human practice, for even in the associations and activities of nonhumans we might find

the creative generation of new types of actors. Creativity is, in essence, the process by

which new possibilities of being and becoming are generated. In what follows I want to

consider in detail the nature of this ontology and its implications for thinking about

creativity.

6.1 -Actors, Associations, Performativity, & Creativity

As understood in a performative sense, there is no actor that preexists its actions

and which then acts. An actor only becomes the sort of actor it is through action, through

affecting and being affected. Latour, Pickering, and Barad, from whom I take my

158

ontological cue, all make precisely this claim regarding the nature of actors; the claim in essence being that it is only under these conditions, as actors acting and being acted upon, affecting and being affected, that anything can be said to exist at all. Something can not reasonably be said to exist if it doesn't do anything, if we can not register the effects of its existence on other actors in the world. This idea is not entirely without precedent, even within the Western philosophical tradition. For example, such a perspective can be found in Nietzsche, who writes that "there is no 'being' behind doing, acting, becoming; 'the doer' is merely a fiction imposed on the doing—the doing itself is everything."[1] What Nietzsche is asking us to do is, instead of looking beneath or behind actions for the thing that acts and then positing that thing as the source of action, to instead see action as primary and the apparently stable thing that appears to act as the result of action. Action is what constitutes the actor, what makes it the sort of actor it is. This priority given to action itself over a subject that acts is characteristic of what we might now call a performative ontology. Traditionally, philosophical positions of this sort have been rather uncommon; in recent decades such approaches have become more prominent and influential. Perhaps the most famous contemporary example of this approach is Judith Butler's notion of gender performativity, her claim in essence being that gender is not a property possessed by an actor, but rather that certain behaviors produce the effect of a gendered actor. Further, gender is not just the product of a single, individual act, but is the continuously reproduced effect of an iterative process.[2] We are, in other words, continuously enacting and in so doing achieving our gender, and what this suggests about gender is that it is not fixed, but rather a deeply unstable effect that could be performed in

---

[1] Friedrich Nietzsche, *On the Genealogy of Morality,* 25-6.
[2] See Judith Butler, *Undoing Gender* (New York: Routledge, 2004).

other ways and which, in virtue of its instability, has called into being a whole set of oppressive discourses which police and regulate appropriate forms of gender performativity. In fact, these discourses that generate knowledge about gender, and that produce gender norms and the procedures and practices which enforce these norms, are an essential element in gender formation and regulation.

A significant limitation of Butler's approach for my purposes, however, is that the primary performative processes by which actors come into being are, on her analysis, social in nature, and as such, the activity of nonhumans, to the extent that these activities are irreducible to social practices, is of little consequence. In short, Butler's notion of performativity is, like Foucault's discursive theory of subject formation to which Butler is indebted, anthropocentric. As an alternative to Butler's articulation of performativity, I want to consider here some of the details of Barad's theory of agential realism, as Barad's work is a significant inspiration for my own approach. Barad develops her theory of agential realism as, in part, a posthumanist attempt to overcome this anthropocentric limitation in Butler's notion of performativity.[3] The theory of agential realism is intended to provide an account for how anything that exists comes to exist; not just gendered subjects, not just subjects, but anything that can be said to exist. That is to say, performativity is not conceived of by Barad as simply social in nature, and is not merely the process by which particular types of subjects are produced; even nonhuman actors come into being through performative processes. This rethinking of performativity is connected to Barad's posthumanist refusal to see the nonhuman or non-biological world as an inanimate, passive resource for human action; everything that is is active. Barad's

---

[3] Karen Barad, *Meeting the Universe Halfway,* 189-222.

agential realism is a non-anthropocentric ontology through the lens of which all actors, human and nonhuman, can be seen as actively participating in the articulation of their own being through performative processes.

Barad's notion of performativity not only opposes anthropocentrism, it also brings into focus the de-individualized nature of performativity; performativity is not only a pre-individual phenomenon, a condition for the emergence of particular actors, but is also not circumscribed by the boundaries of any particular actor. Performativity occurs within a field of relations within which various actors come into being and into association with one another. To this end, Barad conceives of performativity as intra-action, which designates the "mutual constitution of entangled agencies."[4] Barad employs the term "intra-action" because the prefix "inter" in the word "interaction" suggests that action occurs between already existing agents. The term "intra-action," on the other hand, captures the fact that action happens within a field of interdependent, entangled, and co-constituting actors that are not, in any basic way, distinct and autonomous from one another. As Latour argues, the autonomy and distinctness of an actor is not a starting point, but rather the result of the behavior of a community of actors that creates the conditions within which a particular actor may act autonomously.[5] Similarly, Barad argues that it is through intra-action that apparently distinct actors emerge. Barad writes that actors "are only distinct in relation to their mutual entanglement; they don't exist as individual elements."[6] It is the various associations or relations that actors maintain that

---

[4] Ibid, 33.

[5] See, for example, Bruno Latour "The Historicity of Things," *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, Mass: Harvard University Press, 1999), 145-73.

[6] Karen Barad, *Meeting the Universe Halfway*, 33.

generate these actors as the particular actors that they are. These acts of associating, of forming, reforming, and maintaining relations, also articulate the boundaries between actors. However, holding that actors are intra-actively constituted does not require us to see these actors as illusory, fictive, less real, or unreal. To think that an actor which has a dependent existence is less real than that upon which it depends is one of the core features of Cartesian ontology. As an alternative to this way of thinking I want to hold that these dependent actors are fully and really real, that their reality is one of embeddedness in fields of intra-action that have become differentiated and sedimented in particular ways, and that everything that exists exists in this way.[7]

The various processes by which particular actors become individuated, through iterative intra-actions, boundary formation, achieving internal coherence, etc., can not be adequately developed at present.[8] What I want to focus on instead is the collective nature of action, and by extension, actor formation. Recall that Barad understands individuation to be an effect of a pre-existing field of intra-action; if we grant that, this performative process presents itself not only as preceding, as a condition for, any particular actor, but also as extending beyond any particular actor. That is to say, the pre-individual field of intra-action does not map directly on to an actor, but rather extends beyond and encompasses an actor and is threaded through many co-constituting actors simultaneously. As a consequence, Barad's agential realist approach prohibits one from conceiving of action or actors in an individualistic sense, according to which action is

---

[7] Ibid, 179-85.
[8] However, articulating how individuation might be achieved through intra-action is one of the primary concerns of Barad's book *Meeting the Universe Halfway*. Using a different vocabulary, that of actor-network theory, Latour is also concerned with how actors become individuated in nearly all of his writings. Though their positions are not identical, I see Latour and Barad's approaches as largely complimentary.

attributed to and stems from autonomous actors; rather, even when we concern ourselves with the actions of seemingly autonomous actors, agential realism requires us to conceive of action as always collective. However, action is not collective in the sense that the things that act are collectives, in which case the source of action would simply be relocated from the individual to the collective, but rather action is collective in the sense that action never issues purely and unproblematically from any particular source. Action is always displaced and spread out over; synchronized and coordinated with; solicited from; assisted, called forth, afforded for, provoked, reinterpreted, completed, mediated, redirected, betrayed, diverted, and so forth by other actors. A particular action is thus not attributable to an individual actor, for action is always accomplished by a multitude of entangled actors. For any particular actor to act, it depends upon the other actors with which its actions and capacities are entangled.

The collective nature of action is what Latour is concerned with when he addresses the "*uncertainty* about action" which results from the fact that "action is dislocal, it does not pertain to any specific site; it is distributed, variegated, multiple, dislocated and remains a puzzle for the analysts as well as for the actors."[9] Action is a matter of uncertainty because when we attempt to determine what exactly is acting, we find that action is spread out across an array of intra-acting actors. An individualist ontology may clear away this uncertainty by attributing action to individual actors, but it does so at the expense of abstracting action out of the concrete situations and networks of associating actors within and across which action actually unfolds. This may seem to clarify the nature of a particular action, but this clarity is gained at the expense of giving

---

[9]Bruno Latour, *Reassembling the Social*, 60.

an accurate account of the action. It is only as embedded in particular situations and associations that action can be adequately understood.

To summarize, according to Barad's intra-active articulation of the concept of performativity, action is best understood not as issuing from a particular actor, but as occurring between actors as the very means by which actors become associated with one another and the process by which actors become individuated. Associations are active and generative. Creativity, in this intra-active context, is reconceived as the generation of novel actors, and what it means to be an actor is nothing other than to be actively associated. It is with reference to the ways of thinking about the nature and constitution of actors articulated by writers like Barad and Latour that I want to understand the terms situated and distributed as they are applied to creativity. Creativity is situated to the extent that different possibilities for creative activity are structured, conditioned, and called forth by the various associations that a particular actor makes with other actors and its environment. Creativity is distributed in the sense that creative activity involves the participation of multiple entangled actors acting in association with one another. If we want to determine the nature of the process by which a creative accomplishment was achieved, what we need to do is begin to determine which actors generated the novelty, the nature of their associations, and the manner in which the creative process was distributed across these actors.

Given the above attempt to articulate, nutshell-like, the nature of my posthumanist approach to understanding the creative process, I want to now unpack it a bit. We can start by differentiating my approach to creativity from those that conceive of creativity as

an inward mental process that is only secondarily given an external form that allows it to be communicated to or shared with other cognitive agents. According to this approach, the poet composes the poem in their mind and the resulting poem is only a record, and external product, of that creative process, the painter has an idea of what they would like to paint and the painting is the mere material expression of that idea, and the inventor has a technological insight and the invention is simply the artifact that embodies that insight. In each of these cases it is the cognitive process, conceived of as separate from the material and social worlds with which the human actor interacts, that is understood to be creative and the product of that process is only the outward expression of that creative process. I refer to these ways of understanding creativity as Cartesian theories of creativity. The Cartesian nature of such a construal of creativity should be evident. The individual cognitive agent, acting more or less autonomously, is the primary actor in the creative process, and the external world is the passive material upon which the creative process leaves its trace and is externalized.

Cartesian theories of creativity are what predominate in the study of creativity and can be found in various forms; for example in attempts to understand creativity as the product of a particular set of cognitive operations,[10] as characterized by divergent thinking or bisociation,[11] as associated with particular personality traits,[12] or as the

---

[10] See the various essays collected in Steven M Smith et al, *The Creative Cognition Approach* as well as Robert Weisberg's *Creativity: Genius and Other Myths* and *Creativity: Beyond the Myth of Genius*.

[11] See Arthur Koestler's *The Act of Creation*, for the first articulation of the notion of bisociation. Guilford seems to be the first to place an emphasis upon divergent thinking as characteristic of creativity. See Joy Paul Guilford, *The Nature of Human Intelligence* (New York: McGraw-Hill, 1967).

product of subconscious psychological processes.[13] In all of these cases the role of the

material and social world is minimized; if the world is present in these theories at all, it is

only there as a constraint or an input, but it is never an active part of the creative process.

The approaches to creativity articulated by Boden and Dasgupta, both of which were

examined in chapter two, are exemplars of Cartesian theories of creativity.[14] Both Boden

and Dasgupta understand creativity in computationalist terms; as, in essence, symbol

manipulation.

There are two primary ways in which my approach to creativity can be seen as

opposing Cartesian theories of creativity. The first follows Lucy Suchman's criticisms of

planning theories of action, which hold that plans are formulated in the mind and then,

only secondarily, enacted or expressed. Suchman criticizes planning theories of action on

the grounds that such theories do not take account of the extent to which our actions are

guided, structured, and determined by our material and social environment; we do not

need, Suchman claims, elaborate plans for action because the world is already rich and

suffused with information about how we might act within it. As such, our actions are not

simple enactments of plans; rather, our actions emerge out of the interaction of a human

agent with a cognitively rich environment.[15] Paralleling Suchman's response to planning

theories of action, with regards to Cartesian theories of creativity I want to claim that the

---

[12] See, for example, Howard Gardner, *Creating Minds: An Anatomy of Creativity Seen Through the Lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi* (New York: Basic Books, 1993).

[13] See George Mandler, "Origins and Consequences of Novelty," in *The Creative Cognition Approach,* 9-26, as well as Dean Keith Simonton, *Origins of Genius: Darwinian Perspectives on Creativity*.

[14] See Margaret Boden, *The Creative Mind: Myths and Mechanism* and Subrata Dasgupta, *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality* and *Technology and Creativity*.

[15] Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*.

creative product is not simply the outward expression of some sort of interior creative process because the cognitive processes involved in creative activity actually occur in interaction with particular social and material settings, and the cognitive elements of this process, the plans and goals, are revised and improvised upon in response to the changing circumstances of the creative process. That is to say the setting in which a creative process occurs is not simply acted upon as a raw material or support for the process, but directs, channels, and informs the creative process in particular ways. None of this is to say that plans or goals do not exist, or that they do not play an important part in the creative process, but rather that they are not absolutely determinative of the creative process and are subject to revision and rejection as the process unfolds. For example, consider improvisational forms of music, in which the musicians do not express a strictly predetermined musical work, but rather create the work through a process that is characterized by responsiveness to the situation at hand and to what occurs during the performance itself. This situated way of looking at the cognitive dimension of the creative process is not compatible with Cartesian theories of creativity because the cognitive content that is "expressed" does not pre-exist its outward expression, but only emerges out of interaction with concrete social and material circumstances. A situated approach to creativity sees particular creative processes as inextricable from, and not completely knowable without reference to, the particular social and material situations within which they unfold.

The second and more radical way in which my posthumanist approach to creativity opposes Cartesian theories of creativity is that, on my account, we can not limit our conception of the creative process such that creativity is understood simply as

pertaining to novelty producing cognitive processes that emerge out of the interaction of human agents with concrete social and material worlds, for creativity always occurs out in the world amongst and distributed across diverse actors, both human and nonhuman. That is to say, nonhumans are also creative actors. Recall the example from the previous chapter concerning the emergence of eukaryotic organisms via the symbiotic associations of formerly independent organisms. The process that generated these new entities, these new actors, was creative, and this process was not at all cognitive in nature and occurred independent of human interactions because this event preceded humanity. Even in creative processes that clearly involve some form of cognition, and thus seem irreducibly human in nature, the cognitive element of the creative process is often not only situated in particular material and social worlds, but may also distributed across nonhuman actors and form a distributed cognitive system.

Because a creative accomplishment is not an expression of an individual actor's cognitive process but rather results from the active participation of a multitude of heterogeneous actors, there is no central controller of the creative process that has absolute authority over what results from the creative process. Some creative processes may be more centralized or hierarchically structured than others, but they are never under the sole control of an individual actor. Further, the behavior of these various associated actors need not be smoothly coordinated with one another. Rather, the creative process may involve various associated actors that behave in ways that are contrary to or in conflict with one another, undercutting and redirecting the actions of other actors in interesting and unexpected ways. The sometimes discordant or disunified relations between actors is captured in Pickering's discussion of the dance of agency, wherein

human actors act with a certain set of intentions and expectations and have those intentions and expectations overturned by the responses of various nonhuman actors, to which the human actors then respond by reconsidering and revising their expectations and plans of action.[16] In his account of the invention of the bubble chamber Pickering depicts this dance of agency as tending towards the unification or harmonization of the behaviors of the various actors involved, as tending toward a state in which the performances of the various actors are integrated into or accommodating of each other. The bubble chamber is the result of the human actor's successful accommodation and capture of the behavior of nonhuman actors. However, we should be careful to not conceive of the creative process as necessarily tending toward the successful coordination and integration of various actors, for there are numerous creative accomplishments that result from processes that do not exhibit or tend toward such a coordination of actors; creative accomplishments that result from processes which are open to and perturbed by the unexpected and unanticipated effects of certain unruly actors, and that are thus characterized by a certain degree of dis-integration and loss of control.

To recall from last chapter my discussion of artists whose work is defined by an engagement with the artificial life sciences, we should once again take note of that fact that many of these artists attempt to accommodate the unpredictability of their programs' outputs, the surprising interactions of the virtual actors in their virtual ecosystems, and the active participation of the audience or viewer in shaping the creative process. Aleatoric compositional techniques, whereby chance is allowed to determine some elements of the composition, also seem to signal an openness on the part of the composer

---

[16] Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science*.

to disunified creative processes that do not unambiguously reflect the intentions of the composer. A final example we might consider is Harmony Korine's recent film *Trash Humpers*, which was recorded on Camcorder to worn VHS tapes and edited on VCR. The performances were largely improvised and recorded in public, and as such the filming itself was subject to unexpected encounters. The film which resulted from this process is a film that is significantly affected by chance and randomness. For example, the image on screen is, in an informational sense, noisy: the image is grainy and distorted, the figures are often indistinct, and tracking lines and static frequently burst across the image. These "deficiencies" are an essential part of *Trash Humpers'* aesthetic, and because some of these visual elements result from uncontrollable factors such as errors or malfunctions of equipment, which can not be precisely determined or controlled, the creative process that generates this film, and the film itself, is marked by disorder and unpredictability.

To better understand the unruliness of certain actors, and the creative power of their unpredictability, recall my discussion in chapter 5 of Latour's distinction between intermediaries and mediators. Intermediaries act in ways that can be anticipated and that may be smoothly integrated into the functioning of an assemblage. Mediators, on the other hand, behave in ways that are unexpected and unruly, that resist assimilation and that may redirect or alter the whole orientation of a particular creative process. The point is not to say that mediators are creative and that intermediaries are not, but rather that in a particular creative process, different actors will play different roles, and that we may broadly distinguish between two different categories of roles, namely those of intermediary and that of mediator. When we consider the well-made musical instrument in the hands of someone who has disciplined and coordinated their behaviors to it, what

we are dealing with are two (instrument and musician) or one (instrument-musician or musician-instrument) intermediaries. On the other hand, Harmony Korine's Camcorder, as well as the VHS tapes on which the film was recorded and the VCRs on which it was edited, exhibit a certain degree mediator-like behavior to the extent that they cause the creative process to drift and be perturbed in ways that are not strictly under the control of the director.

6.2 - Creativity and Mastery Reconsidered

Because the creative process is distributed across networks of often disunified actors, we must question the extent to which creativity can be necessarily associated with mastery. The notion of mastery shows up repeatedly in the literature on creativity in the sense that, as it is often claimed, it is only after a certain period of study or practice that one is able to master the material and practices of their domain, and in so doing be in a position to accomplish anything creative. That is to say, mastery is often conceived of as a condition for creativity. But what exactly is mastery? The notion of mastery suggests domination and authority, and, and I do not think this distorts our sense of the word, when we say that someone achieves mastery what we mean is that the master has the capacity to bend that which they have mastered to their own will. The notion of mastery is hierarchizing, with that which is mastered becoming subordinated to that which masters it. For example, if what is mastered is a particular instrument the use of which requires the acquisition of a particular skill, one is then able to express one's intentions through and upon that which is mastered without these intentions being distorted or interrupted by the medium or means of expression. If creativity is understood to entail

mastery, then we will also tend to see the guitarist who fumbles with their instrument as not being as able to fully realize their intentions, and by extension not capable of being as creative, as someone who is a virtuoso.

To this extent, mastery seems tied up with or at least complimentary to Cartesian theories of creativity. The master, through their mastery of the means of expression and the content of their discipline or field, does not allow the often recalcitrant or difficult world of things and other people to interfere with their creative expression. The world is made subordinate to their will, their intellect, their cognitive abilities, their creative powers. However, when we speak of someone who has become skillful at a particular task, is it really right to see in this apparent mastery such a complete alignment of the creative process to the intentions of a single actor? One question I want to ask, as a challenge any affirmative answer to the previous question, is this: to what extent is the "master" mastered by that which they master? If, for example, I am said to master a particular language, whether, for example, my first language of English or a technical or academic language accessible to only a few, does focusing upon mastery not obscure another process, which is that of me being mastered by this language, being acquired and remade by it as its subject. Or consider a skilled musician. The particular intentions that are realized in the performance are not the intentions that the human actor had, or could have had, prior to being conditioned, through practice and training, into forming particular sort of associations with their instrument, an instrument that as an actor itself brings a particular set of constraints, capacities, and inclinations to the performance. Further, the development of this association between the musician and their instrument occurs within and is regulated by a particular disciplinary context that seeks to determine

and enforce, among the numerous associations that could be made, what the appropriate associations and forms of interaction are. The point I am making is that if this so-called master is remade by that which they master, as well as by the disciplinary context that regulates the acquisition of mastery, then perhaps mastery is not the best way to speak of what is going on here. What seems to be happening instead is that these actors, in forming particular associations with one another, each actively condition and channel the capacities and intentions of each other. Rather than mastery, which entails the subordination of a process to one will and one set of intentions, perhaps we should instead speak of what is occurring as a process by which diverse actors become coordinated with one another.

However, beyond noting that the concept of mastery doesn't quite capture what is going on when an actor becomes skilled in a particular field of activity, there is an additional issue we may address: to what extent does creativity even require that one be skilled in the first place? Are there examples of creative accomplishments in which the skill of the human actor is either inhibited or even not present in the first place? In literature we can find many examples of creative accomplishments that involve the authors' deliberate hindering of their own linguistic fluency. One famous example of this is Samuel Beckett, whose decision to write in French, the language in which most of his major writings were produced, was in part an attempt to counteract his fluency in English and to simplify, to make more minimal, the manner of his expression. Another example can be found in the practice of employing writing constraints, many of which might

appear to needlessly complicate and make difficult the writing process.[17] Consider the lipogram, a writing technique that consists in the compositional constraint that certain letters are prohibited from use. Georges Perec's novel *La Disparition*, which was translated into English as *A Void*, was composed under just such a constraint: in particular, he composed the novel without using any words that contained the letter "e." When writing under such a constraint, the fluidity of an author's own expression, the author's expressive ability, is often quite severely undermined or restricted. The author's own mastery of the language is compromised because, in a certain sense, they are no longer writing in the language in which they have mastery. However, the point of such constraints is not to simply make the writing process more difficult, but to open up new literary possibilities or channel the author out of their normal habits of writing. Constraints thus can actually encourage or facilitate creativity.

Let us consider examples such as these, in which the human actor deliberately inhibits their own mastery through the use of constraints which make the task more difficult rather than easier, in relation to Csikszentmihalyi's attempts to connect creativity with flow.[18] Csikszentmihaly's work is important in this regards because of his attempts to explore the creative process in relation to the absorption of the creative actor in their task, and this absorption is characterized by mastery and flow. Csikszentmihalyi's claim is that flow, which is characterized by complete absorption in an activity that is challenging and interesting by a skilled actor, is not achievable when a task is too easy or

---

[17] However, we should not assume that constraints necessarily make the writing process more difficult. In fact, in some cases constraints might make writing process easier in certain respects, as they channel the writing process in particular ways and eliminate certain possibilities that one might otherwise have open.

[18] Mihaly Csikszentmihalyi, *Creativity*.

too difficult, where the actor either becomes, respectively, bored or anxious. Someone who has mastery but is engaged in a task below their skill level will probably not exhibit a great degree of creativity. This is also true of someone who is engaged in a task that is well above their skill level. Accordingly mastery itself is not the only condition for flow and the creative behavior that flow, according to Csikszentmihalyi, fosters. Beckett's decision to write in French and Perec and the other Oulipo writers' decisions to utilize writing constraints were possibly made with the intention of making the task of writing more challenging by hindering linguistic fluency, but with the consequence of also making the writing task more interesting and thereby making flow easier to achieve. Under these new constraints writing may become not only more challenging, but also more absorbing and, Csikszentmihalyi would argue, more creative. Examples such as this seem to indicate that it is not mastery as such that is important for achieving creativity, but tasks that are challenging, that move actors out of their habits and routines.

However, though I think there is some value in Csikszentmihalyi's notion of flow and his understanding of how it relates to creativity, we should be hesitant to see creativity as necessarily correlated with flow. After all, though Csikszentmihalyi does not necessarily see mastery in and of itself as a sufficient condition for creativity, nevertheless mastery and the highly skilled performance is privileged by Csikszentmihalyi. Creativity emerges from mastery to the extent that the master is engaged in a task that elicits an optimal performance of the master's skills. Further, Csikszentmihalyi's articulation of flow also suggests that without mastery, there is a limit to how creative one can be. Simply stated, the reason that mastery is of central importance to flow is that Csikszentmihalyi conceives of flow as characterized by full

absorption in a task, and the most significant condition for this absorption is mastery of the skills relevant to the task. But how justified is Csikszentmihalyi in conceiving of absorption, which entails the unity and integration of the self into the task and its environment, as a condition of creativity. Consider, for example, the musician in a state of flow: they are absorbed in the performance, and though the performance is challenging, the performer has also seemingly integrated the instrument into their being; the instrument has become an extension of their own body. If the performer loses control of their instrument or if it malfunctions, the state of flow is brought to an end. But, as I have tried to show above by drawing attention to the creative power of unruly actors that disrupt our expectations and intentions, we should be reluctant to regard such a unity or merging of actors with their tasks, instruments, and environment as a necessary condition for creativity, and as such we should also be reluctant to follow Csikszentmihalyi in associating flow with creative accomplishment. Further, though we can imagine that flow might be an achievable state with regards to Beckett writing in French, and perhaps even in the case of Perec writing a novel-length lipogram, flow seems unimaginable in tasks when the constraints become as severe as in the case of the poet Christian Bök's composition of *Xenotext*, the centerpiece of which are two mutually enciphered poems, written as responses to each other, one of which is encoded and embedded into the DNA of a bacteria and the second of which is encoded in the protein that is the product of Bök's engineered segment of DNA. Bök himself speaks of *Xenotext*, the composition and engineering of which has taken him nearly a decade, as a task of immense difficulty, and as less a matter of expression than of discovery; the discovery of a poem within the set of

constraints, both biological, technological, and poetic, that frame his activity.[19] Given the laborious task of composing *Xenotext*, a task that seems to exclude flow as a possibility, can we say that the process that generated it is not creative, or even that *Xenotext* is necessarily less creative than the products of poets engaged in tasks that are more felicitous to flow? Examples such as Bök's *Xenotext* suggest we can not say this, and that flow, at best, can only be seen to be characteristic of certain sorts of creative processes, but is in no way essential to creative accomplishment. Further, creative processes characterized by the inability to become absorbed in an activity, the loss of control or breakdown of mastery or coordination, even the shear lack of a particular skill, may harbor their own particular creative possibilities.

Let us develop this point by returning to feminist standpoint theory, which we considered in chapter 3. As was noted then, the achievement of standpoint also creates the conditions under which many creative insights may be made; insights that are not available to those without standpoint. Standpoint is a response to social inequality, to the systematic discrimination experienced by women and other subordinated groups. What standpoint yields is a not only consciousness of marginalization, but reflection upon the mechanisms by which this marginalization is accomplished and justified. However, as marginalized and in a way that is not necessarily related to a lack of skill, it is hard to imagine that these subjects can become easily absorbed into their tasks and their world, in particular within domains were highly skilled and educated women continue to experience discrimination. Standpoint may, as a consequence of a disinclination women with standpoint may feel about being absorbed into and identifying with the very

---

[19] See "Christian Bök," last accessed January 10, 2013, http://vimeo.com/38403806 for a video of Bök discussing *Xenotext*.

institutions that marginalize them, inhibit rather than promote states of flow. They may

not only feel that they do not belong, but also that they do not *want* to belong. Sara

Ahmed, in her book *The Promise of Happiness*, discusses Csikszentmihalyi's notion of

flow in a way that might be useful to articulating this point. Ahmed writes that when

"subjects are not 'in flow' they encounter the world as resistant, as blocking rather than

enabling an action. Unhappy subjects hence feel alienated from the world as they

experience the world as alien."[20] In other words, marginalized subjects have a different

affective relationship to the world than those that are not marginalized; they encounter

the world as something alien, as not really having a place for them, and as resistant to

their intentions and goals. Following upon this insight, Ahmed writes

> what if the world "houses" some bodies and not others, such that some
> bodies do not experience that world as resistant? We might need to rewrite
> happiness by considering how it feels to be stressed by the very forms of
> life that enable some bodies to flow into space. Perhaps the experiences of
> not following, of being stressed, of not be extended by the spaces in which
> we reside, can teach us more about happiness.[21]

Ahmed believes that this inability to flow into the world can teach us something about

happiness, namely that, as she will go on to argue, happiness is promised upon the

condition that one is able to assimilate oneself to, and form the "correct" types of

associations within, a world that has been organized to accommodate certain subjects and

not others; I believe that these types of experiences may also be able to teach us

something about creativity as well. In particular, the feeling of being an outsider, of being

stressed by a world to which you do not quite belong, of inhabiting institutions within

which you will only ever find an awkward fit at best, of not really being able to go with

---

[20] Sara Ahmed, *The Promise of Happiness* (Durham NC: Duke University Press, 2010), 11.

[21] Ibid, 12.

the flow, generates a sense of alienation which may be the source of many critical insights into the nature and constitution of the world. Standpoint and its creative potential are developed through becoming conscious of and reflecting upon this feeling of not really belonging, not through attempts to fit in and become absorbed by those institutions that marginalize you.

Another reason we should be suspicious of mastery as a criterion of creativity is that what counts as mastery is itself constituted within particular domains or disciplines, and those who are socially marginalized are also often denied mastery, either because their talents are denied or because, as envisioned by notions of a successor science, these marginalized people are engaged in the development of alternative forms of practice with different standards of evaluation. Mastery is a product of, evaluated by, and maintained within various disciplinary systems. Disciplines do not simply evaluate whether a given actor has attained mastery or not, but construct the conditions that must be met for mastery to be achieved. As actors enter into and become trained within these disciplines, they become a different sort of actor, one that not only more or less successfully embodies the skills and modes of evaluation of their discipline, but also, as an emissary of their discipline, reproduces them in others. These disciplinary procedures may be creative in certain ways, for example by imparting into the actors so subjugated certain capacities for action that may allow them to engage creatively with the particular problems and issues that the discipline is oriented toward, but disciplinarity might also inhibit creativity by proscribing certain modes of acting and ways of engaging with the world which themselves may be creative alternatives to the predominant modes.

These alternative forms of practice may not only involve the development of alternative skills and ways of evaluation skill, but also the rejection of the valorization of skill or mastery. Further, this rejection of mastery, and the different possibilities of practice that are thereby opened up, can itself be creative. The emergence of punk music in the 70s is an example of just such a creative revolt against notions of mastery and skill. That is to say, the anti-establishment ethos of the movement entailed a rejection of the very terms by which success was usually determined, and if the music failed to be good according to conventional standards, to be tasteful and skillful, this failure itself might be an index of a certain sort of success. We might also recall Korine's film *Trash Humpers*, which must certainly strike the viewer as inept, as tactless and unfunny, as annoying and juvenile, as structured in a way that feels more or less ad hoc and without a clear direction. But what we are seeing in these examples is not the product of artists with no skill; what we are seeing is rather a refusal to value skill and the very pursuit of mastery and good taste itself, and this refusal of mastery is creative because it generates new modes of acting and allows for the formation of new types of associations and actors.

6.3 - Creativity and Disability

With regards to the recurring association of creativity and mastery, we can see the degree to which ableist ways of thinking shape how we conceive of creativity. To say that creativity requires mastery is to say that creativity only manifests itself at a certain level of ability, that there is a positive correlation between ability and creativity. In fact, in our conventional ways of thinking about ability and creativity, creativity seems to become an ability that inheres in an individual human actor. Creativity is seen to be a character trait,

a cognitive style, or associated with particular sorts of personalities, for example. What I want to recall at this point is the social model of disability, which claims that disability is not a property of a human subject, but rather that disability is socially produced.[22] That is to say, certain bodies only register as disabled in relation to particular notions of normalcy and to environments built to accommodate certain bodies, that is to say normal bodies, and not others. Disability activism has as two of its primary goals the acceptance of diverse forms of embodiment and the creation of spaces that are accessible to these diverse bodies. The issue we must then concern ourselves with is the extent to which the association of creativity with mastery, and the existence of disciplines that manufacture particular notions of mastery and the actors that come to embody them, has come to prohibit certain actors from being able to participate in or being recognized as participating in creative activity. A notable example of exactly this happening is the Degenerate Art exhibit, curated by the Nazis during the Third Reich, which included paintings by artists such as Paul Klee and Henri Matisse. This exhibit was an attempt to demonstrate the supposed abnormal and degenerate nature of groups deemed racially inferior, and to demonstrate this through how this inferiority manifests itself in the artworks they produce. As such, a notion of normalcy and the designation of particular groups as abnormal and inferior was used to disqualify these groups as capable of being creative. We should also recall the tendency, which was noted in chapter 4, among

---

[22] See Tobin Siebers, *Disability Theory*. Siebers is, however, critical of the social model of disability, for it tends to erase our own experiences of embodiment, in particular suffering, and treat disability as purely a social construction. Siebers instead articulates his notion of complex embodiment as an alternative to the medical and social models of disability, which tries to capture both the social construction of disability and our own very real experiences of our body and its limits. In this sense, in refusing a strictly social constructionist account of disability, Siebers' notion of complex embodiment is very amenable to posthumanist ways of thinking and to my current project.

certain researchers on creativity, most notably Csikszentmihalyi, to associate creativity

with health and flourishing, the idea being that we are at our most creative when we are

functioning in an optimal fashion and that creativity is itself a sign of healthy functioning.

Flow itself is conceived of by Csikszentmihalyi as paradigmatic of a healthily functioning

organism; one only has to look at the subtitle of his book *Flow* to see this: "The

Psychology of Optimal Experience."

Opposing this tendency to associate creativity with the healthy functioning of the

organism and exceptional ability is a perhaps more widespread, at least outside of the

academic study of creativity, alignment of creativity with certain forms of disability.

More precisely, there has been an influential tradition of thought that links creativity to

madness and other mental disabilities, and we can see the influence of this tradition

everywhere from English and German Romanticism, the movie *Beautiful Mind*, and

documentaries about the savant and sculptor Alonzo Clemons. What is in effect occurring

in each of these cases is an attempt to reconceive of an apparent disability as an ability,

and to this extent all such attempts exhibit an ableist ideology, which is characterized by

the conception of human worth in terms of ability. In the above examples, the disabled

individual is rescued from disability, at least partially, by the same ideology that

constructs them as disabled. Consider Gilles Tréhin and his detailed illustrations and

documentation of the fictional city of Urville. On the back cover of the book that surveys

Tréhin's work, we find this statement: "this book offers fascinating evidence of and

insight into the creative power of the autistic mind."[23] In other words, the disability of

autism bears within it the creative power to construct, in Tréhin's case, the intricate city

---

[23] Gilles Tréhin, *Urville* (London: Jessica Kingsley, 2006).

of Urville. Such attempts to construe disability as having, somehow inhering in it, certain creative powers can not usefully combat ableist ideology because, for one, it still conceives of ability and disability as residing in the subject; seeing the ability within the disability simply turns the disabled person into the object of a human interest story that dramatizes the overcoming of self-limitations, the odds against them, without subjecting to scrutiny the social processes that generate these limitations and stack the deck against them. Instead of focusing upon finding and placing value upon the ability within disability, we must instead attend to the ways in which ability and disability are generated out of concrete material and social situations and, furthermore, we must see if we can do away with the idea of normalcy altogether and take seriously the real diversity of human bodies and the particular associations within which these bodies are formed and situated. In so doing we should speak of creativity not as if it inheres in normal or abnormal bodies, but rather of the creativity that arises out of human diversity and the diverse ways that we have come to inhabit the world together.

However, disability theory not only allows us to see how creativity has been systematically conceived of in ableist terms and thereby bring into question this very association between creativity and ability; disability theory may also help to reinforce my present attempt to generate an alternative account of the creative process. Siebers writes that "a focus on disability provides another perspective by representing human society not as a collection of autonomous beings, some of whom lose their independence, but as a community of dependent frail bodies that rely upon one another for survival."[24] That is to say, though we tend to think of dependency not as a norm, but as pertaining only to

---

[24] Tobin Siebers, *Disability Theory*, 183.

those who are disabled or otherwise disadvantaged, Siebers' claim is that dependence is a condition of all humans. Dependency is universal. If this interdependence, or intra-dependence, of all actors is not immediately apparent, if it does not appear as self-evident, it is because we live in a world that has been engineered to accommodate "normal" bodies and in so doing conceal their dependency. Lennard Davis develops the same point with his theory of dismodernism, through the lens of which the normal and autonomous subject disappears to be replaced by the "partial, incomplete subject whose realization is not autonomy and independence but dependency and interdependence."[25] The human subject, as conceived of by Davis, is in essence "disabled, only completed by technology and by interventions."[26] I want to understand Davis' claim that human actors are essentially incomplete and partial in terms of the associative ontology that I have been working with, according to which action is only possible in association with other actors. Actors are complete, which is to say capable of acting, only when embedded in a web of associated actors. For the dismodernist disability theorist, then, the focus is upon how all human actors attempt to become whole and complete in relation to particular environments which support their activities and functioning. In a way that seems wholly compatible with our earlier discussions of Barad and Latour, as these actors seek to complete themselves through becoming embedded in particular situations, maintaining particular associations, and even becoming hybridized with other actors, they come to manifest particular capacities for action and the formation of different sorts of associations. The generation of novel actors and assemblages out of this process, perhaps especially those that challenge and undermine notions of normalcy, as well as the way in

---

[25] Lennard Davis, *Bending Over Backwards*, 30.
[26] Ibid.

which these novel actors open up further possibilities of action and association, is itself creative. Further, if Davis is correct that the independent and autonomous subject is a myth, and I believe he is correct, then not only is all action accomplished only under conditions of interdependence, but that interdependence is true of creative action, as a particular type of action, as well. In fact, the posthumanist philosophies of Barad and Latour would encourage us to see this vulnerability and dependency as not only a universal condition of human actors, but of all actors.

To extend the above point, disability theory's insight that ability resides in interdependent relations between bodies and between bodies and their environments suggests that, at the very least, we should be hesitant about conceiving of creativity as a property that is possessed by some actors and not others. That is to say, it is not correct to conceive of any given actor as creative, as bearing the property of being creative, for creativity occurs between actors, in the associations and networks that actors find themselves in. Our focus should not be on whether or not a particular actor is creative, but rather whether a particular actor is so situated and associated as to participate in creative activity and what sorts of actors, associations, and situates tends toward creative action. If we want to encourage creativity, we should focus not only upon modifying the behaviors of particular actors; we must also question the idea of normalcy in favor of recognizing human diversity and the consequent diversity of settings and associations that can be conducive to creativity. Just as ability and disability seem to inhere in individuals because of a how we collectively shape the world in ways that reflect our understandings of bodily norms, creativity has also come to appear as if it inheres in subjects and not in the associations formed between subjects. We collectively shape our

world to facilitate the creative activity of particular sorts of actors, we discipline human actors such that they mold themselves to the prevailing sorts of creative activity, and then we judge those actors that flourish creatively in such environments to bear the property of being creative. But if creativity is not a property that inheres in actors but rather is a property of the associations formed between actors, then we must consider the possibility that if we design our world to accommodate and reflect the diversity of human modes of embodiment, this might allow human actors that were previously judged to be uncreative to manifest previously unsuspected capacities for creative activity.

6.4 – Are Certain Situations and Associations More Creative Than Others?

Even given the diversity of situations and associations that might be conducive to creative activity, I still think we might be able to make some somewhat general statements about what sorts of settings and associations might best produce creative activity. If creativity is a process that circulates through networks of associated and interdependent actors, what sorts of circulations and interactions are the most creative? Is it possible to provide an at least provisional account of what sorts of associations and distributions of actors tend to be more creative than others?

As we saw in chapter 2, marginal social locations seem to be sites of great creative activity. To summarize the content of chapter 2: because women have traditionally occupied positions of marginality in society, they may be situated in such a way as to be more creative than their male counterparts. For example, in sociology a woman sociologist may be able to provide more innovative and useful accounts of how society operates due to their awareness of how the experiences and practices of women in

society are systematically ignored by the discipline. By being situated and becoming subjects in zones of social marginality, women are positioned to notice things that their male counterparts might miss, as well as perceive new sorts of problems and generate new theoretical tools and practices. It is not the case, however, that by default women will produce better sociological accounts and theories than men, for the ability of women to make creative use of their marginality is at least in part conditioned by the extent to which these women have achieved standpoint. Standpoint itself, which entails a critical and reflexive relation to the very processes of power and knowledge production itself, is arguably a creative accomplishment, independent of what those who have achieve standpoint are able to accomplish with it. Nevertheless, what is true of the marginality of women, and the creative possibilities to be found within this marginality, may also hold true of marginality as such. Because marginality can provide access to under-theorized experiences and practices, encourage the development of reflexivity about knowledge practices, and foster split identifications and antagonism toward the center and the conventions and worldviews that it disseminates, marginal locations as such might be more creative than non-marginal spaces.

Spaces that exist at the boundaries of different cultures or areas of practice may also be highly conducive to creative activity. To illustrate this point, we might look to Galison's notion of trading zones. Regarding the interactions that happen at boundaries between different cultures or sub-cultures, Galison writes that

> two groups can agree on rules of exchange even if they ascribe utterly
> different significance to the objects being exchanged; they may even
> disagree on the meaning of the exchange process itself. Nonetheless, the
> trading partners can hammer out *local* coordination despite vast *global*
> differences. In an even more sophisticated way, cultures in interaction
> frequently establish contact languages, systems of discourse that can vary

> from the most function-specific jargons, through semispecific pidgins, to full-fledged creoles rich enough to support activities as complex as poetry and metalinguistic reflection.[27]

In other words, at the points of contact between often very different cultures or subcultures, what Galison calls trading zones emerge; zones of hybridized practice and discourse initially developed in order to facilitate communication between different cultures which may become generators of creative associations, transformations and perhaps even important and increasingly autonomous subcultures. The creative power of boundaries can also be observed if we consider again the artists that are in dialogue with the artificial life sciences, because these artists are engaged in hybrid practices (those of the particular arts and sciences that they are working within or between) and discourses (their understandings and articulations of their own practices are shaped both by the discourse of the arts, but also by those of the life sciences; their own texts seem to suggest the formation of a hybrid form of discourse). The creative potential of boundaries resides in at least two facts about boundaries. The first is that, as we saw in the above examples, at boundaries we have an encounter between sometimes radically different material and social systems. Thus a-life art emerges at the boundary between the very different practices, institutional structures, and discourses that define biology, the sub-discipline of artificial life, and the arts. Second, actors that behave predictably when well within the zones of normal disciplinary practice may begin to act strangely and unpredictably when they encounter other sorts of actors and practices at the boundaries of the spaces within which their practices are defined. That is to say, they may begin to function less like intermediaries and more like mediators. The formations that emerge at

---

[27] Peter Galison, *Image and Logic: A Material Culture of Microphysics* (University of Chicago Press, 1997), 783.

these boundaries, as mediators are re-interpreted and integrated into new sorts of practices and assemblages, are the results of collective and hybrid creative processes.

Systems, of various scales, that circulate actors through different settings might also be significant sources of creativity. In *The Black Atlantic*, Paul Gilroy articulates just such a system, that system being the "Atlantic as a cultural and political system" as experienced by black people, which came into being with the enslavement of Africans by Europeans.[28] This system encompasses Europe, the Caribbean, the Americas, and Africa, and what Gilroy seeks to show is that modern black identity can not be conceived of in essentialist terms, and as related directly and unproblematically back to Africa, but has instead been produced, and is continuously being reproduced, in the circulation of black peoples throughout the black Atlantic world. The effects of this circulation through the black Atlantic are present throughout black culture. Gilroy shows, for example, how the works of W. E. B. Du Bois and Richard Wright are marked by the international interests and travels of each writer, and further that their work needs to be understood in virtue of this movement through the system of the black Atlantic.

Understanding black creativity after European colonialism is only possible, according to Gilroy, when one takes into account the functioning of this cultural and political system of the black Atlantic, which has as one of its defining characteristics the circulation of actors across various boundaries; Africa to the Caribbean, Europe to America, America to Africa, etc., as well as various internal boundaries, such as movements between the southern and northern United States. Consider Gilroy's discussion of the emergence of hip hop:

---

[28] Paul Gilroy, *The Black Atlantic: Modernity and Double Consciousness* (Cambridge, Mass: Harvard University Press, 1993), 15.

> hip hop culture grew out of the cross-fertilization of African-American vernacular cultures with their Caribbean equivalents rather than springing fully formed from the entrails of the blues. The immediate catalyst for its development was the relocation of Clive "Kool DJ Herc" Campbell from Kingston to 168th Street in the Bronx. The syncretic dynamics of the form were complicated further by a distinctly Hispanic input into and appropriation of the break dance moves which helped to define the style in its early stages. But hip hop was not just the product of these different, though converging, black cultural traditions. The centrality of "the break" within it, and the subsequent refinement of cutting and mixing techniques through digital sampling which took the form far beyond the competence of hands on turntables, mean that the aesthetic rules which govern it are premised on a dialectic of appropriation and recombination which creates special pleasures and is not limited to the technological complex in which it originated.[29]"

There are a few things that I want to take note of in the above quotation. First, and most importantly as it is in keeping with the theme of boundary crossing, is that hip hop is born out of the circulation of people within the system of the black Atlantic. This boundary crossing circulation of people puts into communication, for example, African-American and Caribbean forms of cultural expression that would be hybridized in hip hop. Second, though singling out the movement of Clive Campbell from Jamaica to New York City as formative in the development of the genre, the emergence of hip hop is nevertheless seen by Gilroy as a collective process, and as such in no way reducible to the intentions of Campbell. Further, along with the various interacting cultural traditions, we also have the influence of various sampling technologies; nonhuman actors that played a significant role in defining the form and practice of the genre. Finally, because of the centrality of sampling, the genre itself is based on the reappropriation, recontextualization, and reassociation of musical elements. Out of the interactions of these elements and practices, hip hop emerges as a hybrid form of cultural expression. Its aesthetics and practices are

---

[29] Ibid, 103-4.

not those of purity, but of the impurity and strange associations made when actors begin to circulate across boundaries.

If boundaries and systems that circulate actors across boundaries are generative of creative activity, so perhaps are the phases in which that which is bounded breaks down. To clarify this point, let us consider Kuhn's notion of a scientific crisis.[30] Normally, according to Kuhn, scientific disciplines function in accordance with a set of unquestioned assumptions, practices, and research questions; that is to say, with a scientific paradigm. This not only allows the discipline to engage in normal science, but also to define itself against that which it is not and to regulate and encourage correct scientific practice in those who enter, as practitioners, into the discipline. However, when a discipline enters into a state of crisis, as a result of being unable to resolve certain problems that have come to plague it, the paradigms that structure the discipline lose authority and it becomes less able to police itself and correspondingly more open to alternative forms of scientific practice and theorizing. This is what Kuhn calls extraordinary science, and although the practice of extraordinary science indicates a state in which the discipline is in crisis, such states are also, on Kuhn's account, times of great creativity. The post-apocalyptic genre of science fiction can be seen as both a recognition and exploration of the creative power of disorder; more precisely, not disorder as such, but the reordering of the world that occurs as the old world collapses.

In summary, actors that are marginalized, circulating across boundaries, situated at boundaries, or occupying spaces that are undergoing some sort of crisis are the types of actors that we should expect to act or be acted upon more creatively. Furthermore these

---

[30] Thomas Kuhn, *The Structure of Scientific Revolutions* (University of Chicago Press, 1996).

boundaries, margins, transboundary circulations and structures, and dis- or re-ordered

disciplinary spaces indicate properties of networks of association across which

particularly creative sorts of reconfigurations and meetings are possible. This list

certainly does not exhaust the types of creatively interesting spatial features or processes,

but it does give us a sense of what kinds of structural properties and what kinds of effects

to look for. In particular, we should note that processes and actors that cause or are

themselves hybridized or impure may be more conducive to creative activity than those

that, at least at first glance, appear to be more unitary and whole.

6.5 - Defining Creativity

What I want to do now is return again to the conventional definition of creativity

and see how, from the perspective of the posthumanist theory of creativity that I am

developing, this definition may be reconceived. Recall again the standard definition of

creativity, which typically goes something like this: creativity is the production of novel

and appropriate products. At first glance, such a definition seems relatively

noncontroversial, but if we pose certain questions to it, problems emerge. How novel

must something be to be creative? Who decides whether something novel is also

appropriate, valuable, or beneficial? What are we to make of works of art, for example,

that are at first met with obscurity or ridicule, and are only later reevaluated as being

creative? Does it become creative then, at the moment its value is affirmed by the

relevant community or group experts, or was it always creative? Does the requirement of

"appropriateness" not construe creativity as too reactive a phenomenon, as necessarily

adaptive to the circumstances and problems at hand? What about creative processes that

result not, reactively, in solutions to particular problems, but rather actively engage in the transformation and reconfiguration of the world? The conventional definition of creativity becomes increasingly problematic when subjected to such questions. What I want to now do is more directly address the above questions in an attempt to reconceive of creativity from the posthumanist perspective that I have been working with.

Regarding the requirement of novelty, I want to align my own approach with attempts to conceive of creativity as not primarily characterized by radical novelty and sudden creative leaps, but gradual processes of transformation and reconfiguration. When we place too much emphasis upon novelty we also risk overstating the discontinuity of the creative product from that which already exists. Within the existing discourse on creativity, attempts to deemphasize novelty as a criterion of creativity and focus instead on instances of "everyday" creativity are not without precident. It is, from such a perspective, not necessary to focus upon figures like Albert Einstein and James Joyce when trying to understand the creative process, as we exhibit creativity even when engaged in something like everyday problem solving or artistic practice, and there is no fundamental difference between this sort of creativity and the creativity exhibited by the practitioners of modernist literature as they collectively rewrote the rules of literary production.

Further, as Dasgupta has observed, behind even highly novel creative accomplishments such as *Ulysses* or the theory of relativity,[31] which seem so unprecedented, we should be able to locate a more sustained and gradual creative process

---

[31] Or, in Dasgupta's case, the invention of the microprocessor. See *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality*, which was examined in chapter 2 of this dissertation.

at work. As we saw in chapter 2, Dasgupta attempts to reconstruct, behind the apparent

creative leap, a linked series of smaller cognitive transformations and in so doing

discover a more gradual or incremental cognitive process. However, in rendering the

creative process as entirely cognitive in nature, and as not situated and distributed in any

meaningful sense, Dasgupta neglects the role played by nonhumans in the creative

process. From the perspective of the posthumanist theorists we have considered, behind

the emergence of any radically novel actor or assemblage, there exists a swarm of other

actors contributing to its emergence; actors making, unmaking, and modifying the

associations between themselves that change the space of possible action itself. The

associative processes that occur within this swarm of actors must be tracked or

reconstructed when trying to give an account of a particular creative process.

In emphasizing incremental or gradual creative processes and in deemphasizing

novelty, my own approach to creativity may diverge from the widespread conception of

creativity as springing suddenly from inspiration or genius, however there does not seem

to be a significant tension between my own position on this matter and how creativity is

studied within, for example, psychology and cognitive science. A focus upon everyday

forms of creativity and gradualistic creative processes is not uncommon within these

disciplines. It is with regards to the second condition of the standard definition of

creativity, that to be creative that thing that is novel must also be useful, valuable, or

appropriate, that my own analysis more strongly diverges from conventional approaches.

The condition that a novel accomplishment must be useful, valuable, or

appropriate to count as creative entails an act of evaluation. This act of evaluation, by

which something novel is deemed valuable, useful, appropriate or not, is often conceived

of as performed by a field of experts and on certain accounts, such as Csikszentmihalyi's, a novel product is in fact not creative until it has been so evaluated. There are a few reasons why we should find this way of defining creativity problematic. First, how are we to account for people like Melville or Nietzsche; people whose work was largely ignored during their own lifetimes, only to have it later recovered, reevaluated, and recognized as creative? What about those whose accomplishments are at first very highly evaluated, but later fall out of favor? Do these works become creative, or uncreative, as a result of how they are received and evaluated? Or is the creativity of these works autonomous of the evaluation, but it is only because of the evaluation of these works as valuable by experts that we can know if they are creative? Further, we can not assume that these evaluations occur within a space that is not subject to the same sorts of social and political forces that shape society at large; those very same or similar processes that disempower and marginalize people within the whole of society also operate when judgments regarding value, appropriateness, and usefulness are being made. These issues regarding evaluation become especially problematic when we claim, like Csikszentmihalyi, that the positive evaluation and acceptance of a novel accomplishment does not simply indicate that an accomplishment is creative, but that this positive evaluation somehow helps constitute this accomplishment as creative. This is problematic because it is unclear how, by what mechanism, this evaluative process actually makes what it evaluates creative. What is needed is an alternative to these types of criteria that preserves the useful insight they contain, namely that the notion of evaluation introduces an at least minimal appreciation of creativity as a collective and situated process, while at the same time resisting making creativity wholly and uncritically dependent upon the often prejudiced, poorly informed

or motivated, and arbitrary nature of the evaluative procedures that determine usefulness, appropriateness, and value.

The alternative that I wish to propose is related to my earlier attempts to argue that the capacity to act creatively is not a property that inheres in the particular products of creative activity. I want, at this point, to make the same claim regarding creative products. Both the creative process that generates new actors and the status of the product of the process as creative do not inhere in particular actors, but rather in the associations between actors. That is to say, it is not correct to say, on my account, that Einstein's scientific theories or Joyce's novels are, in and of themselves, creative. Rather, what is creative are specific interactions, or intra-actions, that form between groups of actors and between actors and their environment; if these associations are transformative, if they entail a change in the space of possible action and becoming, then we can evaluate these particular associations as creative. It is thus not the actor that results from a particular generative process that is creative, but what it does; the sorts of interactions and associations it maintains in particular situations. Further, because associations are not static but must be continuously enacted, because associations are continuously being re-made, strengthened, loosened, adjusted, reasserted, etc., a scientific theory or work of art may not be continuously creative, but perhaps only periodically, when it comes to be engaged in creative associations. That is to say, if I want to ask whether we can count Comte de Lautréamont's *Les Chants de Maldoror* as creative, what we have to really look at is what sorts of associations this text has entered into and whether, how, when, and to what extent this text has participated in the reconfiguration of the space of

possibilities that it inhabits. Did this text change its readers and alter the practice of literature? Did it always do that? If not, when was it creative?

My claim that a particular creative processes' product's status of being creative is not a stable property of that object but rather resides in the various, often fleeting associations that this product maintains has a few implications that need to be drawn out. The first is that an actor that is not, at present, engaging with the world in a way that appears particularly creative may yet, in other circumstances, exhibit such creativity. Conversely, an actor that at present may be associated in a very creative way may not be so associated in the future. More importantly, however, because creativity is never a property of an individual actor, but rather an event that occurs between actors, when a particular product is evaluated as creative or not, when judgments are being made as to whether something is valuable, useful, appropriate, or even novel, this evaluative process must not be seen as determining whether, once and for all, a particular actor is creative or not. Rather, what is being determined is whether a particular association is creative, namely that association being made between the particular product or products being evaluated and the actors, or assemblage of actors, doing the evaluating. What is being determined is whether these actors, associated as such, are creatively associated or not, not whether the product under evaluation bears the property of being creative or not. Further, if the various actors involved in this process of evaluation do in fact form creative associations with one another, this cannot happen without all of the associated actors being transformed, including the product being evaluated, for, again, actors are constructed out of nothing but the very various associations that they make, enter into, and are distributed across. We can make sense of the creative propensity of actors to

transform and form new associations in terms of the performative nature of actors; actors are always iteratively enacting the particular associations that have come define them, but they are also always undergoing processes of transformation and alteration that may cause them to drift or slip out of their normal associations. As these creative products take up new associations and alter existing ones, these actors are again and again engaged in creative transformations.

An interesting example concerning the re-discovery and re-evaluation of particular accomplishments as creative are the writings of Philip K. Dick, which have been highly influential within the community of science fiction writers and readers, as well as the inspiration for many popular movies such as *Blade Runner* and *Total Recall* and comic books like Grant Morrison's *The Invisibles*. However, it is only within the last decade or so that there has been a critical re-evaluation of his work outside of the science fiction community, a re-evaluation that has been at times conflicted and awkward, but which nevertheless has resulted in The Library of America recently publishing several volumes of his works. We might say, then, that the texts of Philip K. Dick have long been engaged in creative associations within the community of actors involved in the production and consumption of science fiction, but only recently have the networks of actors that participate in the production and consumption of so-called serious literature become reconfigured so as to be able to enter into creative associations with these previously off-limits texts, and this process of re-evaluation, or re-association, has resulted in the transformation of these texts themselves. If Dick's novel *Valis* is now being read and appreciated, and thus affecting, the very same sort of person who might also be reading Philip Roth, Mark Twain, and John Cheever, is it still the same text that

was read by readers of William Gibson, Ursula Le Guin, and Arthur C. Clarke? I want to argue that it is a new or at least transformed text, that as it is discovered by new readers it takes up new meanings and is allowed to be creative in ways that it was perhaps previously not creative. That is to say, Dick's texts are now being evaluated as creative by a new readership, and this discovery of his texts by a new readership not only changes that readership in creative ways, but creatively changes his texts as well.

In essence, what I am claiming is that we can never make a definitive and general claim about whether a particular product is creative or not; rather, we are restricted to making judgments about whether in particular, concrete situations particular products are able to form creative associations or not. We might, from what we know of similar assemblages of actors, of how actors like this have tended to associate in other instances, or of what sorts of possible associations that a particular actor and situation affords, be able to make determinations regarding the relative openness of an actor to forming novel associations, but such conclusions will only be provisional and speculative. Because, for example, the language of a poem is more open to diverse associations than a piece of technical writing, we might assume that a particular lyric poem will therefore enter into more diverse and creative associations than the results pulled up by a Google search for "hardware stores in Philadelphia," but the poem may remain unread, and thus unassociated, upon the paper upon which it was printed and the Google search results might be appropriated and recontextualized by a Flarf poet and posted to a blog that is read and appreciated by thousands.

To attempt a summary: creativity is a process that restructures the space of possibilities for acting and becoming by means of often gradual processes of forming and

reforming associations. The notion of novelty, which emphasizes to too strong a degree

the discontinuous and unprecedented nature of the creative product, is substituted, on my

account, with an emphasis upon continuous change, recombination, and mutation. In

place of notions of acceptability, value, and usefulness and the procedures of evaluation

that they entail, I want to focus instead upon the many associations made between

creative products and diverse groups of evaluators and the extent to which these

associations are capable of making enduring changes, getting communicated to other

actors and assemblages, and giving way to further modifications and transformations.

Emphasizing the durability, communicability, and reconfigurability of these creative

modifications makes creativity not dependent upon whether or not a certain group of

experts evaluates the creative product as creative; rather, something is creative because of

what it does in the world.

This is in keeping with my attempts to conceive of creativity from a posthumanist

perspective, which deemphasizes the role and significance of the human actor in favor of

trying to give a more non-anthropocentric account of the world within which we live.

Further, in defining creativity as occurring in the associations made between actors, and

not as a property or power of any individual actor, I have hopefully shown how creativity

can not be understood as an ability possessed by an individual actor and clarified the

manner in which creativity is situated and distributed. Creativity is situated to the extent

that the possibilities for creative action are determined by the particular associations that

it maintains and how these associations structure, produce, call forth, afford, etc.,

different types of potentially creative behavior. Creativity is distributed in the sense that it

always occurs across a network of associated actors. The creative process that results

from these networks of associated actors is not a simple sum, then, of the activities of all actors. Rather, because of the surprising ways in which these various actors interact with and empower one another, the creative process itself is best seen as an emergent phenomenon, and the product that emerges from this activity, the new or reconfigured and reassociated actors that result, is as such not reducible to the effect of a single cause.

To conclude, let us consider an example of a distributed and situated creative process that defies individualist notions of creative activity, namely David Turnbull's account of the construction of gothic cathedrals.[32] As Turnbull observes, when a contemporary person attempts to conceive of the process by which these cathedrals were built, the narrative that is given is one that begins with a cognitive process that conceives of, in detail, a plan that dictates the final form that the cathedral will take. It is only after this plan has been articulated that the construction process begins, and this process is determined by the plan at every moment. However, bringing to mind Suchman's critique of planning theories of action as inadequate for understanding the more complicated ways in which action and thought are interwoven, Turnbull argues that to better understand the actual process by which these cathedrals were created, we need to deemphasize the role played by plans. The reason for this is that there is no evidence that detailed architectural plans of the sort that we are accustomed to today actually existed when these cathedrals were being built. Furthermore, there is plenty of evidence that such plans were not necessary to the creation of these cathedrals.

---

[32] David Turnbull, "Talk, templates, and tradition: How the masons built Chartres Cathedral without plans," in *Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge* (New York: Routledge, 2000), 53-87.

If not the result of a detailed planning process, then how were these cathedrals

built? To begin to understand the creation of these buildings we have to abandon the

notion that anything so complicated must issue forth from an individual will or a unified

set of intentions. The Chartres cathedral, for example, appears to the eye not as a coherent

whole, but as something rather more disunified; as one examines the building, one notes a

series of stylistic shifts that disrupt the unity of the building, as if it is an amalgam of

several distinct structures. This discontinuity is a consequence of the fact that, as

Turnbull writes,

> there were nine different contractors or master masons who took between
> thirty-five and thirty years to build the cathedral in thirty distinct
> campaigns, There were thirteen major design and structural changes in
> that thirty year period but there was no overall designer, just a succession
> of builders.[33]

But without even a continuous group of designers or builders to construct this cathedral,

how did it get built? How were all of the materials and builders coordinated? One

coordinating element was that of tradition itself, which through education and training

transmits a memory of various building practices, and of what practices worked and what

did not.[34] Though the actors that constructed these cathedrals may have come and gone in

waves over the course of the construction process, continuity is in part preserved through

these actors belonging to a common tradition. Further, the fact that these builders travel

from one building project to another may be a significant source of creativity: "this

exposure to new sites and the work of others was a constant spur to innovation."[35] The

existence of a common tradition thus serves not only to create a certain continuity of

---

[33] David Turnbull, "Talk, templates, and tradition: How the masons built Chartres Cathedral without plans," 57.
[34] Ibid, 77.
[35] Ibid, 65.

practice among builders distributed across large geographical areas, but also as a catalyst to creative transformations of practice. On the sites of specific building projects unity and innovation may also be generated through talk. That is to say, "interaction between patron and mason and between masons and other craftsmen enabled the radical innovations as well as the constant design changes."[36] What this talk allows for is the dissemination of knowledge throughout the building project, which both coordinates the building process and allows for innovations to propagate throughout the site.

However, the relative unity of the building project and resulting cathedral was not only the result of talk and tradition, but also the circulation and activity of various nonhuman actors, in particular tools and most notably, on Turnbull's account, templates. Templates are patterns that allow stones to be cut into standardized shapes, and these templates may be duplicated, circulated around the building site, and transmitted to new sites. What these templates accomplish is

> the transformation of amorphous masses of stone into an enduring stable structure whose stability is achieved despite the lack of what we would take to be the basic essentials for producing the specifications for a particular component in a building: a common and precise mode of measurement, a knowledge of structural mechanics, and a detailed scale plan.[37]

I think we have to understand these templates as playing an active role in coordinating the construction of these cathedrals. They don't simply express the intentions of the builders, but coordinate and direct them as well. Templates are active participants in the construction of these cathedrals.

---

[36] Ibid.

[37] Ibid, 68.

As Turnbull argues, talk, tradition, and templates are three of the most important factors that coordinate the construction of these cathedrals in the absence of plans or a unified intention. This building process was ad hoc and site specific, with important design decisions being responses to very specific situations that arise during the building process itself. It is in this sense that Turnbull argues that the sites of these cathedrals are in a sense laboratories. The cathedrals were not only the products of certain sorts of practices and knowleges, but were the site at which these practices and knowledges were developed. Turnbull concludes that

> the structures of the cathedrals results from the combination of religious beliefs and aesthetic values, a developing but limited set of building practices, economic opportunities, modes of communication, and the work of others. These factors all interact as a whole to produce a particular form. The 'Gothic style', as such, was not in the minds of the cathedral builders. That had no theory of the 'Gothic', nor could they have had. The notion of a particular style implying a unifying set of rules or principles is a construct of contemporary analysts and critics.[38]

As Turnbull has examined it, the creative processes that generated these cathedrals were a rather disunified, with lots of heterogeneous, interacting elements. Even given the presence of a master mason, the creative process that resulted in these cathedrals was markedly decentralized and distributed, which is to say spread out over the coordinated activity of many actors, both human and nonhuman. These cathedrals are not the product of a singular creative genius, or even of a team of human actors with a unified set of intentions, but of a situated, distributed, discontinuous, and posthumanist creative process.

---

[38] Ibid, 75.

6.6 – Final Statement

The world is constituted by actors. These actors are of diverse sorts, with diverse capacities for acting. As these actors intermingle, associate, hybridize, and enter into various sorts of assemblages, the capacities of particular actors are determined. Action, however, is essentially collective in nature; it never issues from a single actor, but is always distributed across an array of associating actors. It is here, distributed across entangled and associating actors with situated capacities for action, that creativity occurs. Creativity occurs not in the mind of the isolated human being, but out in the world and in the activity of actors as they collectively redefine what sorts of actors are possible and bring these new actors into being. When it became possible for scientists to create theories about the Higgs boson, to think about and consider this novel entity, this new actor, this scientist with the Higgs boson as a potential object of consciousness, was not brought into being by the cognitions of a single individual, not by Peter Higgs, but rather was the creative accomplishment of the collective behavior of a wide array of actors, including not only other scientists but also and at the very least the technologies and institutions of Big Science, as they interacted and redefined the nature of their field. This creative accomplishment, like any creative accomplishment, will never really be understood if the creative process is approached as the mere cognitive process of an individual. If we want to understand creativity, we must consider nonhumans as full participants in the creative process, and if we want to study the creative accomplishments of particular human beings, their creativity must be understood in terms of their immersion in worlds of social and material interaction.

BIBLIOGRAPHY

Ahmed, Sara. *The Promise of Happiness*. Durham NC: Duke University Press, 2010.

Amabile, Teresa. *Creativity in Context*. Boulder, Colorado: Westview Press, 1996.

Aristotle. "Poetics." In *The Complete Works of Aristotle: The Revised Oxford Translation*, Vol. 2, edited by Jonathan Barnes, 2316-40. Princeton University Press, 1984.

Arp, Robert. *Scenario Visualization: An Evolutionary Account of Creative Problem Solving*. Cambridge, Mass: MIT Press, 2008.

Artaud, Antonin. "The Theater and The Plague." In *The Theater and Its Double*, translated by Mary Caroline Richards, 15-32. New York: Grove Press, 1994.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press, 2007.

Bateson, Gregory. *Steps to an Ecology of Mind*: *Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology*. University of Chicago Press, 2000.

Bechtel, William, and Adele Abrahamsen. *Connectionism and the Mind: Parallel Processing, Dynamics, and Evolution in Networks.* Oxford: Wiley-Blackwell, 2002.

Boden, Margaret. *The Creative Mind: Myths and Mechanisms*. London: Routledge, 1990.

---, editor. *Dimensions of Creativity*. Cambridge: MIT Press, 1994.

--- "What is Creativity?" In *Dimensions of Creativity*, edited by Margaret Boden, 75-117. Cambridge: MIT Press, 1994.

Butler, Judith. *Undoing Gender*. New York: Routledge, 2004.

Brooks, Rodney. *Cambrian Intelligence: the Early History of the New AI*. Cambridge, Mass: MIT Press, 1999.

Clark, Andy. *Being There: Putting Brain, Body, and World Together Again*. Cambridge: MIT Press, 1998.

--- *Natural Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence.* Oxford University Press, 2003.

Csikszentmihalyi, Mihaly. *Creativity: Flow and the Psychology of Discovery and Invention*. New York: Harper Perennial, 1996.

--- "Implications of a Systems Perspective for the Study of Creativity." In *The Handbook of Creativity*, edited by Robert Sternberg, 313-335. Cambridge University Press, 1999.

Collins, Mary Ann, and Teresa Amabile. "Motivation and Creativity." In *The Handbook of Creativity*, edited by Robert Sternberg, 297-312. Cambridge University Press, 1999.

Collins, Patricia Hill. "Learning from the Outsider Within: The Sociological Significance of Black Feminist Thought." In *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, edited by Sandra Harding, 103-26. New York: Routledge, 2004.

Dasgupta, Subrata. *Creativity in Invention and Design: Computational and Cognitive Explorations of Technological Originality*. Cambridge University Press, 1994.

--- *Technology and Creativity*. Oxford University Press, 1996.

--- "Shedding Computational Light on Human Creativity." *Perspectives on Science*, 16. 2 (2008): 121-136.

Davis, Lennard. *Bending Over Backwards: Disability, Dismodernism, and Other Difficult Positions*. New York University Press, 2002.

---, editor. *The Disability Studies Reader*. New York, Routledge, 2010.

Descartes, René. "Meditations on First Philosophy." In *The Philosophical Writings of Descartes: Volume II*, translated by John Cottingham, Robert Stoothoff, and Dugald Murdoch, 1-62. Cambridge University Press, 1985.

Dewey, John *Experience and Nature*. New York: Dover Publications, 1958.

--- *Art As Experience.* New York: Berkley Publishing Group, 2005.

Feist, Gregory. "The Influence of Personality on Artistic and Scientific Creativity." In *The Handbook of Creativity*, edited by Robert Sternberg, 273-96. Cambridge University Press, 1999.

Foucault, Michel. "What Is an Author?" In *The Foucault Reader*, Edited by Paul Rabinow, 101-20. New York: Pantheon Books, 1984.

--- *The History of Sexuality: Volume 1: An Introduction*, translated by Robert Hurley New York: Vintage Books, 1988.

--- *Discipline and Punish: The Birth of the Prison*, translated by Alan Sheridan. New York: Vintage Books, 1995.

Freud, Freud. "The Moses of Michelangelo." In *On Creativity and the Unconscious: The Psychology of Art, Literature, Love and Religion*, edited by Benjamin Nelson, 11-40. New York: Harper Perennial, 2009.

Galison, Peter. *Image and Logic: A Material Culture of Microphysics.* University of Chicago Press, 1997.

Gallagher, Shaun. *How the Body Shapes the Mind*. Oxford: Clarendon Press, 2005.

Gardner, Howard. *Creating Minds: An Anatomy of Creativity Seen Through the Lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi*. New York: Basic Books, 1993.

Gibbs, Raymond. *Embodiment and Cognitive Science*. Cambridge University Press, 2006.

Gibson, James J. *The Ecological Approach to Visual Perception*. Hillsdale, New Jersey: Psychology Press, 1986.

Gilroy, Paul. *The Black Atlantic: Modernity and Double Consciousness.* Cambridge, Mass: Harvard University Press, 1993.

Gruber, Howard E., and Doris B. Wallace. "The Case Study Method and Evolving Systems Approach for Understanding Creative People at Work." In *The Handbook of Creativity*, edited by Robert Sternberg, 93-115. Cambridge University Press, 1999.

Guilford, Joy Paul. *The Nature of Human Intelligence*. New York: McGraw-Hill, 1967.

Hallam, Elizabeth, and Tim Ingold, editors. *Creativity and Cultural Improvisation*. Oxford: Berg, 2007.

Haraway, Donna. *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991.

--- "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." In *Simians, Cyborgs and Women: The Reinvention of Nature*, 149-181. New York: Routledge, 1991.

--- "Situated Knowledges: The Science Question in Feminism and the Privileged of Partial Perspective." In *Simians, Cyborgs and Women: The Reinvention of Nature*, 183-201. New York: Routledge, 1991.

--- *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse: Feminism and Technoscience*. New York: Routledge, 1997.

Harding, Sandra. *The Science Question in Feminism*. Ithaca, N.Y: Cornell University Press, 1986.

--- *Whose Science? Whose Knowledge?: Thinking from Women's Lives*. Ithaca, N.Y: Cornell University Press, 1991.

---, editor. *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s. New York: Routledge, 2004.

--- "Rethinking Standpoint Epistemology: What is 'Strong Objectivity?" In *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, edited by Sandra Harding, 127-40. New York: Routledge, 2004.

Hartsock, Nancy. "The Feminist Standpoint: Developing the Grounds for a Specifically Feminist Historical Materialism." In *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, edited by Sandra Harding, 35-53. New York: Routledge, 2004.

Heidegger, Martin. *Being and Time,* translated by John Macquarrie and Edward Robinson. Oxford: Blackwell, 1962.

Howe, Michael. *Genius Explained*. Cambridge University Press, 2001.

Hurley, S. L. *Consciousness in Action*. Cambridge: Harvard University Press, 1998.

Hutchins, Edwin. *Cognition in the Wild.* Cambridge: MIT Press, 1995.

Jager, Alison. "Feminist Politics and Epistemology: The Standpoint of Women." In *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, edited by Sandra Harding, 55-66. New York: Routledge, 2004.

Jameson, Frederic. "*History and Class Consciousness* as an 'Unfinished Project.'" In *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, edited by Sandra Harding, 143-52. New York: Routledge, 2004.

Joas, Hans. *The Creativity of Action.* University of Chicago Press, 1996.

Kant, Immanuel. *Critique of Judgment*. Translated by Werner Pluhar. Indianapolis: Hackett Pub. Co, 1987.

Keller, Evelyn Fox. *Reflections on Gender and Science.* New Haven: Yale University Press, 1995.

--- *A Feeling for the Organism: The Life and Work of Barbara McClintock*. New York: W.H. Freeman and Company, 2003.

Koestler, Arthur. *The Act of Creation.* London: Arkana, 1989.

Knorr Cetina, Karin. *Epistemic Cultures: How the Sciences Make Knowledge.* Cambridge: Harvard University Press, 1999.

Kuhn, Thomas. *The Structure of Scientific Revolutions*. University of Chicago Press, 1996.

Latour, Bruno. *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, Mass: Harvard University Press, 1987.

--- *The Pasteurization of France*, translated by John Law and Alan Sheridan. Cambridge, Mass: Harvard University Press, 1993.

--- "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts." In *Shaping Technology/Building Society,* edited by Wiebe E. Bijker and John Law, 225-58. Cambridge: The MIT Press, 1992.

--- *We Have Never Been Modern.* Cambridge: Harvard University Press, 1993.

--- "The Historicity of Things." In *Pandora's Hope: Essays on the Reality of Science Studies,* 145-73. Cambridge, Mass: Harvard University Press, 1999.

--- *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford University Press, 2005.

Lukács, György. *History and Class Consciousness: Studies in Marxist Dialectics*. Cambridge: MIT Press, 1971.

Mandler, George. "Origins and Consequences of Novelty." In *The Creative Cognition Approach,* edited by Steven M Smith, Thomas B. Ward, and Ronald A. Finke, 9-26. Cambridge: MIT Press, 1995.

Margulis, Lynn, and Dorion Sagan. *Microcosmos: Four Billion Years of Evolution from our Microbial Ancestors.* Berkeley: University of California Press, 1997.

Merleau-Ponty, Maurice. *Phenomenology of Perception*, translated Donald Landes. Oxford: Routledge, 2012.

Nietzsche, Friedrich. *On the Genealogy of Morality,* edited by Keith Ansell-Pearson, translated by Carol Diethe. Cambridge University Press, 2007.

Noë, Alva. *Action in Perception*. Cambridge: MIT Press, 2004.

Paris Atlantic Magazine. "Interview." Last accessed October 23, 2012. http://www.paristransatlantic.com/magazine/interviews/rowe.html.

Pfeifer, Rolf, and Josh Bongard. *How the Body Shapes the Way We Think: a New View of Intelligence*. Cambridge: MIT Press, 2007.

Pickering, Andrew. *The Mangle of Practice: Time, Agency, and Science*. University of Chicago Press, 1995.

Policastro, Emma, and Howard Gardner. "From Case Studies to Robust Generalizations: An Approach to the Study of Creativity." In *The Handbook of Creativity*, ed. Robert Sternberg, 213-225. Cambridge University Press, 1999.

Plucker, Jonathan A., and Joseph S. Renzulli. "Psychometric Approaches to the Study of Human Creativity." In *The Handbook of Creativity*, edited by Robert Sternberg, 35-61. Cambridge University Press, 1999.

Richards, Ruth, ed. *Everyday Creativity and New Views of Human Nature*. Washington D.C.: American Psychological Association, 2007.

Robbins, Philip, and Murat Aydede. "A Short Primer on Situated Cognition." In *The Cambridge Handbook of Situated Cognition*, edited by Philip Robbins and Murat Aydede, 3-10. New York: Cambridge University Press, 2009.

Rose, Hilary. "Hand, Brain, and Heart: A Feminist Epistemology for the Natural Sciences." In *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, edited by Sandra Harding, 67-80. New York: Routledge, 2004.

Rosen, Josh. "Interview: Keith Rowe." Last accessed October 23, 2012. http://ronsen.org/monkminkpinkpunk/12/rowe.html.

Rowlands, Mark. *Externalism: Putting Mind and World Back Together Again.* Montreal: McGill-Queen's University Press, 2003.

Runco, Mark, editor. *Problem Finding, Problem Solving, and Creativity*. Norwood, N.J: Ablex Pub. Corp, 1994.

Sawyer, R. Keith. *Group Creativity: Music, Theater, Collaboration.* Mahwah, New Jersey: Lawrence Erlbaum Associates, 2003.

--- *Explaining Creativity: The Science of Human Innovation*. Oxford University Press, 2006.

Siebers, Tobin. *Disability Theory*. University of Michigan Press, 2008.

Simonton, Dean Keith. *Greatness: Who Makes History and Why*. New York: The Guilford Press, 1994.

--- "Creativity from A Historiometric Perspective." In *The Handbook of Creativity*, edited by Robert Sternberg, 116-133. Cambridge University Press, 1999.

--- *Origins of Genius: Darwinian Perspectives on Creativity.* Oxford University Press, 1999.

Smith, Dorothy. "Women's Perspective as a Radical Critique of Sociology." In *The Feminist Standpoint Theory Reader: Intellectual and Political Controversie*s, edited by Sandra Harding, 21-33. New York: Routledge, 2004.

Smith, Steven M., Thomas B Ward, and Ronald A. Finke, editors. *The Creative Cognition Approach*. Cambridge: MIT Press, 1995.

Solomon, Miriam. "Standpoint and Creativity," *Hypathia* Volume 24.4 (Fall 2009): 226-237.

Sternberg, Robert J, editor. *The Handbook of Creativity*. Cambridge University Press, 1999.

Sternberg, Robert J., and Todd I. Lubart. "The Concept of Creativity: Prospects and Paradigms." In *The Handbook of Creativity*, edited by Robert Sternberg, 3-15. Cambridge University Press, 1999.

Suchman, Lucy. *Human-Machine Reconfigurations: Plans and Situated Actions.* Cambridge University Press, 2007.

Thompson, E.P. *The Making of the English Working Class.* New York: Vintage, 1966.

Turnbull, David. "Talk, templates, and tradition: How the masons built Chartres Cathedral without plans." In *Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge*, 53-87. New York: Routledge, 2000.

Tréhin, Gilles. *Urville.* Philadelphia: Jessica Kingsley, 2006

Vimeo. "Christian Bök." Last accessed January 10, 2013. http://vimeo.com/38403806

Vygotsky, Lev. *Mind in Society: The Development of Higher Psychological Processes*, edited by Michael Cole, Vera John-Steiner, Sylvia Scribner, and Ellen Souberman. Cambridge: Harvard University Press, 1978.

--- *Thought and Language*, edited by Alex Kozulin, translated by Eugenia Hanfmann and Gertrude Vakar. Cambridge: MIT Press, 1986.

Ward, T.B., S.M. Smith, and R.A. Finke. "Creative Cognition." In *The Handbook of Creativity*, edited by Robert Sternberg, 189-212. Cambridge University Press, 1999.

Weisberg, Robert. *Creativity: Genius and Other Myths*. W H Freeman & Co, 1986.

--- "Case Studies of Creative Thinking: Reproducing versus Restructuring in the Real World." In *The Creative Cognition Approach*, edited by Steven M Smith, Thomas B. Ward, and Ronald A. Finke, 53-72. Cambridge: MIT Press, 1995.

--- "Creativity and Knowledge: A Challenge to Theories." In *The Handbook of Creativity*, edited by Robert Sternberg, 226-50. Cambridge University Press, 1999.

Whitelaw, Mitchell. *Metacreation: Art and Artificial Life. C*ambridge, Mass: MIT Press, 2004.

Wilson, Robert A. *Boundaries of the Mind: The Individual in the Fragile Sciences*. Cambridge University Press, 2004.