FREE WILL IN THE 21$^{\text{ST}}$ CENTURY: AN INVESTIGATION OF
THE SIGNIFICANCE OF CONTEMPORARY NATURALISM
AND TECHNOLOGICAL INNOVATION FOR HUMAN
FREEDOM

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FREE WILL IN THE 21ST CENTURY: AN INVESTIGATION OF THE SIGNIFICANCE OF CONTEMPORARY NATURALISM AND TECHNOLOGICAL INNOVATION FOR HUMAN FREEDOM

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Table of Contents

Introduction

Philosophy is a discipline that, for better or worse, has been gripped by perennial questions since its inception. A host of philosophical problems that thinkers currently grapple with—love, education, equality and God, for instance—are questions that were dealt with by the individuals first engaging in philosophy, and this was often done in great detail. Plato's model for the "ideal state" in *The Republic* is one that is still studied closely by students of Ancient Philosophy. Though considered largely debunked in the 20th century, essentialism guided the sciences until Francis Bacon and other thinkers involved with the Scientific Revolution rocked the very foundations of scientific thought in Europe. While his ideas concerning science may not hold much sway any longer, Aristotle is an oft cited thinker in ethics classes in the English-speaking world, and this is true even though we have lost a great deal of his works. It is hard to imagine what kind of impact Aristotle would still have on the world today had we discovered all of his writings.

Of course, the tide of brilliant thought was not stemmed with Aristotle's musings, nor is it likely to be stemmed anytime in the near future. While not endless, the list of philosophical ideas that has irrevocably impacted the Western intellectual tradition is long, daunting and intimidating to any student of philosophy, yet it is also illuminating. Any student familiar with the history of philosophy will notice that, instead of actually "solving" a problem by eliminating all doubt associated with a particular idea, most new philosophical propositions have a tendency to give birth to a slew of contentious questions that they create in their upheaval of the established order. Instead of solving all of the problems associated with pre-Socratic metaphysics, Plato's forms instigated a debate that is still continued in the halls of universities around the world. While noble, Descartes' attempts to find a foundation

for all knowledge that was impervious to skepticism was an endeavor that lent itself to the creation of two schools of thought: rationalism and empiricism. Hume's skepticism, while a wrecking ball of modern philosophy, was elegantly handled with Kant's notion of synthetic *a priori* knowledge. This was, of course, accepted with great satisfaction by some, and it was rejected with equal enthusiasm by others. The point here is not to provide a comprehensive history of philosophy; instead, it is to prove a point: rather than being the final and definitive authority on a particular issue, most philosophical "breakthroughs" usually lead to more questions instead of terminal answers.

This aspect of academic philosophy is of great annoyance to many who feel that the answers to these questions should be definitive. Of course, this is not a position to dismiss as "childish" or "arrogant"; in fact, there are well-articulated approaches that offer plausible suggestions as to why these sorts of conundrums arise in philosophy. David Hume, a role model to anyone who holds a deep appreciation for "analytic philosophy," offers a thought-provoking analysis as to why this occurs in the problem of freedom (the *raison d'etre* of this thesis) in *An Enquiry Concerning Human Understanding*:

> It is true, if men attempt the discussion of questions which lie entirely beyond the reach of human capacity, such as those concerning the origin of worlds, or the economy of the intellectual system or region of spirits, they may long beat the air in their fruitless contests, and never arrive at any determinate conclusion. But if the question regard any subject of common life and experience, nothing, one would think, could preserve the dispute so long undecided but some ambiguous expressions, which keep the antagonists still at a distance, and hinder them from grappling with each other (Hume, 1907, p. 83).

The wisdom behind this point should not be ignored. In fact, uncontested and unacknowledged differences in one's definition of freedom have undoubtedly contributed to a good number of misunderstandings in the past. However, this is not the end of Hume's commentary on the issue of free will. He continues:

This has long been the case in the long disputed question concerning liberty and necessity; and to so remarkable a degree that, if I be not much mistaken, we shall find, that all mankind, both learned and ignorant, have always been of the same opinion with regard to this subject, and that a few intelligible definitions would immediately have put an end to the whole controversy (Hume, 1907, p. 83).

On the one hand, this is a strong statement, and its impact should not be ignored. While some may call this account "reductionist," a term with which many compatibilists (those who assert that determinism and free will are compatible concepts) are familiar, there is something to be said for the logic behind this statement. If it is the case that I am thinking of a radically different concept than my opponent when I am debating the finer points of "freedom" with him or her, it stands to reason that our conversation will be beset with difficulties due to a lack of clarity. A common difficulty that plagues many casual conversations about freedom is the difference between ontological and practical freedom. A debate about ontological freedom, often the main focus of many discussions regarding freedom, often does not pay much mind to the expression of the freedom that they speak of; more often than not, while not set aside as an issue of non-importance, opportunities for this expression are often taken for granted for the sake of argument. A debate about practical freedom will often do the opposite; many compatibilists, the camp to which David Hume belongs, feel that the ability to express one's freedom through a lack of coercion or forbidding circumstances is what we truly mean when we speak of freedom. It should be easy for the reader to see how a discussion without any clear definition of what the participants are talking about could quickly devolve into unfocused gibbering that does nothing but frustrate each side of the debate.

On the other hand, reducing the debates surrounding freedom to mere "misunderstandings" seems arrogant or at best uninformed. To suggest that the rich dialogue

that has been produced over two-and-a-half millennia centers largely around an inability to come to an agreement on simple terminology seems absurd. It is often the case that different thinkers have different definitions and conceptions of freedom; this is usually due to the vocabulary and conceptual frameworks that philosophers' metaphysics (or lack thereof) can bring to the table. For Plato, it could be argued that freedom is something that is to be desired in an ontological sense but not necessarily in a practical sense. In fact, a more practical expression of freedom would be a burden to the designs of Plato's "ideal state." On the other hand, thinkers like John Stuart Mill or Daniel Dennett are more concerned with a practical freedom that does not require the ontological freedoms outlined by Plato and Descartes. These suggestions and their differences are often deliberate and not due to the negligence of the author. While this is sometimes not the case, most of the time these systemic differences are the result of providing a comprehensive picture.

Despite its drawbacks, there is much wisdom in Hume's analysis, and I believe that the basic thrust what he is addressing could serve the current debates surrounding ontological and practical freedom well. Any casually informed reader of contemporary philosophy will know that one of the biggest issues of contention involves the infusion of science into philosophy and the rising influence of empirically grounded philosophies of freedom. Additionally, the rise of technological innovation in the modern world has profoundly affected the world of philosophy; unfortunately, the converse may not be the case at all, though the jury is still out on that issue. Regardless, it is now beyond reasonable doubt that scientific and technological developments have affected our conception of humanity and freedom. In this sense, there is much work to be done with regard to clearing up issues that these innovations have muddied or complicated. Hume's call for clarity will serve as a

guiding force throughout this thesis as I address both ontological and practical aspects of human freedom using criteria that Robert Kane, a philosopher from the University of Texas, uses to determine whether or not a person can possess a truly "free" will. While I will not be arguing for a Libertarian view of free will, I still believe that this distinction between two types of freedom will be helpful for an investigation into what science and technology have to say about human freedom.

The first criterion Kane discusses is Ultimate Responsibility (UR). One of the more common elements of a debate involving advocates of free will and determinism is the chain of causality and what constitutes a "regress stopper" in a long chain of events. While many Libertarians are eager to posit human beings as these regress stoppers, this task is not simple in any regard. As a matter of fact, countering the notion that a human being is not just as determined as a non-human element of nature or a machine is exceedingly difficult (philosophically speaking). Much to the chagrin of science-minded Libertarians like Kane, many Libertarians of the past have used obscure or scientifically unverifiable concepts of agency; Kant suggested that "noumenal selves" were what allowed for human freedom, and more recent Libertarians like Roderick Chisholm have created their own type of causality with "agent causation." Regardless of their efforts, the quirky nature of these exotic solutions usually serve as a deterrent to those who would normally take a Libertarian view of free will seriously.

Realizing that these ideas were largely falling on deaf ears, Kane turned to what is usually used as persuasive elements of compatibilist rhetoric: science and empirical evidence. By using clever thought experiments and making references to quantum interactions that take place in the brain, Kane develops a sophisticated argument that gives Libertarian free will

scientific plausibility, something that normally eludes a doctrine of radical freedom. In *Freedom Evolves*, Daniel Dennett makes swift work of Kane's doctrine by pointing out conceptual flaws in the assumptions underlying Kane's philosophy. Despite the force of Dennett's criticisms, there does remain one issue that neither he nor anyone else has addressed adequately: if we are to take Kane's account of human freedom as accurate, then *what exactly* can we say is free? As Dennett points out in *Freedom Evolves*, the issue of identifying agency in the brain becomes an enormous problem for Kane; denying the plausibility of undetermined interactions in the brain seems premature, but making these undetermined sources of causation. While defending Kane's intriguing account of Libertarian free will is not on the agenda for this thesis, it does provide an avenue into questions concerning ontological freedom and its scientific plausibility.

The second criterion that Kane postulates as a necessary condition for freedom is Alternate Possibilities (AP). Kane defines this as "the ability to do otherwise," which requires two elements in order to be fully actualized. First, this criterion requires a universe that is indeterministic in some way, shape or form; if it were deterministic, then it follows that there would only be exactly one possible future, which is contrary to the notion of AP. Second, this criterion requires that an individual's environment be free of coercion, limiting circumstances, or any other artificially imposed limitations on an agent's ability to exercise his or her own will. Therefore, in addition to its more metaphysical requirement, there is a sense in which practical freedom is extremely important for the Libertarian and the compatibilist.

As such, there will be two sections of this thesis. First, the metaphysical issue must be addressed, at least in part. To that end, I plan to address the debate between Daniel Dennett

and Robert Kane over the significance of indeterminate causation in the brain to the free will debate; this will take place in the first chapter of the thesis. Second, the more practical issue of the expression of "freedom" must also be examined in great detail. Accordingly, in the second chapter, I will draw primarily on the works of Bruno Latour and Andrew Feenberg, who both examine the impact of technology on the possibility of this sort of expression. Finally, after these two issues have been addressed, I will argue that there must be a concentrated effort to provide alternative conceptions of humanity and human freedom in order to more adequately explain the disconcerting trends that we are seeing with recent and rapid developments science and technology. What is common to both scientific and technological innovations is their potential to erode the significance human beings attach to the notion of a central self. Much like the Copernican revolution hundreds of years ago, discoveries that run contrary to the conventional wisdom espoused by society (and even academia) often demand a reconsideration of human beings and their place in the natural order.

The significance of the debate surrouding UR will be obvious as soon as it is properly exposited. If it is the case that no physical or virtual "regress stopper" can be found in the chain of causality, then one of the consequences that would result from this alleged lack of freedom would be placing our "privileged" place in the natural world in jeopardy. If we are not ontologically free, then "what separates us from the animals" becomes far less clear as our intuitive notions of freedom are abandoned. Furthermore, this rejection of ontological freedom also renders the outlandish possibilities discussed in posthumanist literature grimly realistic. Needless to say, the importance of this debate regarding human agency, its bounds, and its scientific realities to humanism and conventional philosophies cannot be overstated.

The debate regarding the more practical aspect of AP also has considerable import to the way we view humanity. If it cannot be said that we have some meaningful say in the way that our society is run, then this begs the question of what it means to be a responsible citizen and a human being in society. If our freedom is indeed circumvented by new modes of organization and technological innovation, then a transformation from a free-thinking, rational human agent to a mere cog in a machine seems inevitable. The outlooks of these bleak investigations of humanity's nature are often grim, but to not pursue even the most macabre line of questioning seems disingenuous.

My ultimate purpose in writing this thesis is twofold. First, I would like to open up new inroads for inquiry into the problem of freedom through clearing up conceptual muddles I feel have hindered it in the past. This purpose will drive the first part of my thesis. Second, I wish to reexamine questions of significance regarding mankind's place in the natural order. This has been a topic of much discussion since the late 19$^{\text{th}}$ century, but the fast-paced nature of technological innovation has made this topic especially pertinent to humankind's future.

The ideas presented in this paper will be bold ones. However, this is not something that bothers me. Perhaps this is largely due to the fact that this paper is merely an undergraduate thesis, but I have learned from the past that one should never be afraid of making mistakes. In fact, one should welcome mistakes and the boldest ones at that, for it is the boldest mistakes that often lead to the best discoveries. Ultimately, as history has shown us, this kind of boldness is what philosophy has always been about.

Ontological Freedom

Ontological Freedom and Naturalism

Naturalism is undoubtedly one of the more influential intellectual forces in the modern world. Science, itself a bastion of naturalism since it seeks out purely naturalistic explanations, has achieved a privileged position within the academic world due largely to its predictive and explanatory powers. Indeed, its influence has spread far beyond the confines of the laboratory and has affected the humanities and social sciences in ways that seem impossible to reverse.

One of the debates that naturalism has irrevocably altered is the debate about free will. With a long and contentious history, some of the more intriguing discussions on this question have been due to new developments in physics and neuroscience. However, science has not been universally embraced by all philosophers that participate in the free will debate. Those that espouse Libertarian doctrines of freedom are particularly guilty of this, save one: Robert Kane. Kane, a naturalist himself, has taken it upon himself to try to provide a model in which a Libertarian form of free will can be seen as scientifically plausible.

Kane's Theory of Libertarian Free Will

Kane's theory is an attempt to shore up Libertarian notions of free will in a scientifically plausible way. Much to Kane's apparent chagrin, the Libertarians that have preceded him have not made any efforts to move much past the aim of mere conceptual coherence (or ideas that make sense in relation to one another), and even the degree of clarity they achieve can be questioned when one considers the elusive devices and forms of agency that many of these theorists have employed in order to salvage the strong sense of responsibility that they insist upon. Despite his commitment to forming a naturalist theory of

Libertarian freedom, Kane does not make any sacrifices when it comes to the end goal that he as a Libertarian seeks to achieve. Kane is an incompatibilist, which means he holds that meaningful free will is not compatible with a world where there is only one possible future. Given that most philosophers alive belong to the compatibilist camp, Kane is fighting an uphill battle when he espouses Libertarian freedom.

Kane contends that two demanding criteria must be met in order for Libertarian freedom to be plausible at all. The first of these criteria is Alternate Possibilities (AP). In short, AP is the requirement that the agent not be bound by only one possible future. The agent must "be able to do otherwise" in a given situation and not be bound to only one course of action. This criterion is probably the less controversial of the two, especially since twentieth-century physicists have definitively proved that the universe is not as rigidly determined as we previously thought. The random "swerve" that Epicureans once sought after can be found at the subatomic level, and there are very few people who would argue against this; those who do can only be found on the fringes of academia. Contending that the universe is bound to only one possible future is to be stuck in the past, and it would require one to ignore a large body of science that suggests very strongly that the contrary is true. In this sense, incompatibilists like Kane need not worry about proving the undetermined nature of the universe; they need only worry about proving that this is significant to human behavior, and this is by no means easy.

The second criterion that must be met, however, is where the debate gets interesting. Kane calls this second criterion Ultimate Responsibility (UR) and defines it this way:

> The basic idea is this: to be *ultimately responsible* for an action, an agent must be responsible for anything that is a sufficient reason, cause, or motive for the action's occurring. If, for example, a choice issues from, and can be sufficiently explained by, an agent's character and motives(together with background conditions), then to   be

> *ultimately* responsible for the choice, the agent must be in part responsible by virtue of choices or actions performed in the past for having the character or motives he or she now has (Kane, 2005, p. 121).

In short, UR requires that the agent, at one point or another, can be held responsible for the decisions that he or she makes. In order for this to be a possibility, "we must be responsible for forming the wills or characters that now determine our acts" (Kane, 2005, p. 121). Of particular importance is the notion that *we*, not a sufficient cause, are responsible for the formation of the wills that make future decisions, whether or not those decisions are determined by those wills. It is important to note that Kane does not require that every action be undetermined in order to have free will. Instead, what is required is a free (or undetermined) will-setting action. According to Kane, "will-setting actions occur...when agents make a choice or decision between two or more competing options and do not settle on which of the options they want more, all things considered, until the moment of choice or decision itself. They thus 'set' their wills in one way or the other in the act of choosing itself and not before" (Kane, 2005, p. 128). These will-setting actions, Kane argues, require that a set of "plurality conditions" be met in order to assure that whatever the agent does is truly free. The course of action the agent has come to must be arrived at voluntarily, intentionally and rationally. By voluntarily, Kane means to say that the agent must have arrived at this decision in accordance with his or her own will (Kane, 2005, p. 128). Arriving at a decision intentionally requires that the course of action the agent ultimately decides upon must not be one that was reached by accident; instead, the decision an agent makes must be made purposefully. Lastly, an agent must decide rationally. By this, Kane means that the behavior exhibited by the agent must be brought about by reasons that are the agent's own. These decisions are what Kane calls self-forming actions (SFAs).

To sum it up, both of these criteria address different (but interrelated) areas of the problem of freedom that Libertarians regard as crucial. Kane sums up the general nature of these criteria when he discusses two Libertarian arguments for incompatibilism:

> When one argues for the incompatibility of free will and determinism from alternative possibilities or AP, as we have seen, the focus is on notions of "necessity," "possibility," "power," "ability," "can," and "could have done otherwise. The argument from UR, by contrast, focuses on a different set of concerns about the "sources," "grounds," "reasons," and "explanations" of our wills, characters and purposes. (Kane, 2005, p. 123)

Using these criteria, Kane develops a unique, science-savvy version of Libertarian freedom. Of course, reconciling this kind of freedom with the natural world is a difficult task. However, Kane makes a bold attempt to wed this strong version of freedom with what modern science has shown us about the brain, and the result, though ultimately something I dispute, is stunning and inventive.

As mentioned earlier, the first obstacle that incompatibilists must overcome is making the indeterminism found at the quantum level relevant to human behavior. As Kane himself says, in order for this to be possible, atoms "must swerve where it would matter for human choice and action, for example, in the brain" (Kane, 2005, p. 133). Fortunately for Kane, "some neuroscientists have suggested that quantum indeterminacies in the transmission of...chemical ions across the cell walls of neurons might make the exact timing of the firings of individual neurons uncertain, thus introducing indeterminism into the activity of the brain and making 'room' for free will" (Kane, 2005, p. 133). However, this sort of indeterminism is functionally useless without the help of deterministic chaos, which is the amplification of the effects of miniscule events in what is itself a determined process in dynamic systems. These systems, often found in parallel-processing assemblages like the human brain, are sensitive to minute changes in their initial conditions (like a previously insignificant indeterminate

reaction in the brain). For Kane, this enables a "'stirring up [of] chaos' in the brain that makes it sensitive to micro-indeterminacies at the neuronal level. The uncertainty and inner tension that we feel at soul-searching moments of self-formation would thus be reflected in the indeterminacy of our neural processes themselves" (Kane, 2005, p. 135).

In order to show how this type of neural activity is important for human freedom, Kane creates an imaginary situation that he believes to be conducive to creating the self-forming actions (SFAs) that can fulfill UR:

> Consider a businesswoman who faces a conflict of this kind. She is on her way to an important meeting when she observes an assault taking place in an alley. An inner struggle arises between her conscience on the one hand (to stop and call for help for the assault victim) and her career ambitions, on the other hand, which tell her she cannot miss this important business meeting (Kane, 2005, p. 136).

Here we have the kind of tension that Kane contends is capable of creating the kind of uncertainty required for will-setting actions. This is the sort of dilemma that is necessary for one to achieve an SFA, an action that cannot have a sufficient cause. He continues with a further analysis of this thought experiment:

> She has to make an effort of will to overcome the temptation to do the selfish thing and go on to the meeting. If she overcomes this temptation, it will be the result of her effort to do the moral thing; but if she fails, it will be because she did not *allow* her effort to succeed. For while she willed to overcome temptation, she also willed to fail. That is to say, she had strong reasons to will the moral thing, but she also had strong reasons, ambitious reasons, to make the selfish choice that were different from, and incommensurable with, her moral reasons (Kane, 2005, p. 136).

Kane contends that the special atmosphere in which decisions like this (SFAs) can be made is due to the brain's ability to act as a parallel processor. In this way, non-linear neural networks have the capacity to create the kind of "noise" that can protect the efforts of the agent from the determining impact of the past and allow him or her to make a genuinely free decision. Specifically, this allows the agent to potentially set his or her will for future actions in such a

way that he or she can be held ultimately responsible for his or her actions.

Of particular importance is this model's ability to inoculate itself against several traditional objections with the invocation of what Kane calls *plural voluntary control.* Put simply, plural voluntary control enables the agents to "bring about *whichever* of the options they will, *when* they will to do so, *for* the reasons they will to do so, *on purpose*, rather than being compelled in doing so or in willing to do so, or otherwise controlled in doing or in willing to do so by any other agents or mechanisms" (Kane, 2005, p. 138). Taken in conjunction with the notion that both of the businesswoman's competing wills faithfully represent her desires as a human agent, the notion of plural voluntary control lays to rest the notion that her action, whether it be a moral or a selfish one, was not made voluntarily, intentionally and rationally. Clearly, the woman was not forced into deciding one way or another; she was not coerced into making either a moral or selfish decision by any external forces. In Kane's thought experiment, the decision she makes is hers and hers alone. As far as intent is concerned, the action that the woman eventually took is not one that can be described as "accidental" or "unintentional." Clearly, after deliberating on which course of action to pursue, the course of action she eventually chose, *even if* it was not one that she would endorse later in hindsight, was not accidental; it clearly reflected her intent to act one way or the other. Also, as stated clearly in the thought experiment, the businesswoman had clear reasons to act the way she did, regardless of how she acted; if she acted morally, then she did so for moral reasons, and if she acted selfishly, then she did so for selfish reasons.

By the end of the thought experiment and ensuing analysis, Kane presents us with a scientifically minded theory of Libertarian free will that thoughtfully takes into account the complexities of both natural agency and the demands of incompatibilist views of free will. It

certainly cannot be said that Kane's theory lacks vision and philosophical innovation. This does not mean, however, that it can pass muster when put to the test.

Alternate Possibilities and Its Implications

It could be well argued that AP is the less controversial of Kane's two criteria for Libertarian free will. After all, most physicists insist that, at some level, indeterminacy exists; therefore, it seems absurd to argue that our universe only has one possible future at any given time. Thankfully for those of the Libertarian persuasion, since these undetermined reactions exist at some level in our universe, the viability of the "garden of forking paths" is no longer something that can be readily dismissed or laughed away. Furthermore, if we are to take Kane's model as valid, then the objection that indeterminism is insignificant to larger, more complex systems in biology no longer holds any weight, since the indeterminism can be magnified by deterministic chaos. At this point, not only is the "garden of forking paths" a possibility on a scale larger than the subatomic, but it is also possible on a scale relevant to the agent: the decisions he or she makes throughout life. Even though the agent's paths may not fork with every decision that he or she makes, the path *does* fork, leaving room for the fulfillment of AP. The only thing left for Robert Kane to do is to make this indeterminism significant to the agent's ability "to do otherwise," and to do so in a way that is meaningful to Libertarian free will.

Indeterminism's involvement in Kane's model makes it difficult to address on an empirical level. However, this does not mean that it cannot be addressed on a conceptual level. In *Freedom Evolves*, Daniel Dennett takes issue with Kane's definition of AP: "(AP) The agent has *alternative possibilities* (or can do otherwise) with respect to A at *t* in the sense that, at *t*, the agent *can* (has the *power* or *ability* to) do A and *can* (has the *power* or *ability* to)

do otherwise" (Kane, 1996, p. 33). Dennett places great importance upon Kane's use of "at

time *t*"; unlike most phrases that reference objects designed to be manipulated in logical

formulas, Kane's use of "at time *t*" has great significance for the conceptual coherence of AP.

Dennett creates his own thought experiment to illustrate why this is the case:

> Imagine that your faculty of practical reasoning is equipped with a dial, with a needle
> showing which way the scales are currently tipping as the mulling goes on, hovering
> between Go and Stay (supposing those are the options you're currently considering)
> and wandering back and forth, perhaps even quivering, oscillating swiftly between the
> two values (Figure 4.6). And suppose that at any moment you can terminate the
> process of deliberation by pressing the *Now!* Button, sealing your choice with
> whatever side, Go or Stay, happens at that instant to be favored by the deliberation up
> to then. Suppose, for the moment, that all the processing by your faculty of practical
> reasoning is deterministic; it "sums the weights" by some deterministic function of all
> the input it has so far considered, and yields a moment-by-moment value that swings
> this way and that, between Go and Stay, depending on the order in which
> considerations are processed and reprocessed in light of further deliberation.
> (Dennett, 2004, p.119).

Dennett's visual representation of this model can be found on the same page, and it looks

something like this:
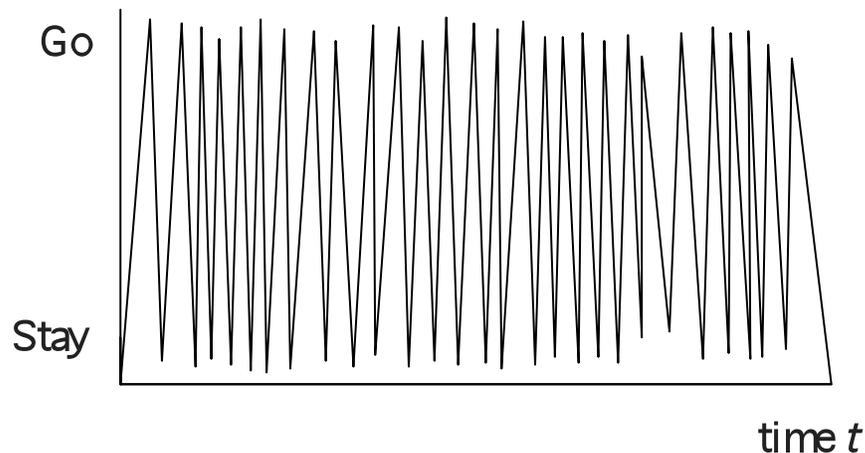
Figure 1

Especially when taken in conjunction with the figure referenced in the quote, a more

visual interpretation of the businesswoman's situation can be seen. Further, this image seems

to provide a faithful representation of Kane's thought experiment. After all, on the left side of

the graph we have the options formed by the agent, Go and Stay. According to Kane's model,

these two options were formed by the past experiences and other determining factors that

have comprised the agent up to this point. After these initial formations, what ensues (via

parallel processing in the brain) is indeterministic noise that screens the agent's decision off

from the determining influences of the past. At this point we reach time *t*, where one of the

competing inputs reaches a threshold, a state-transition in the brain where an impulse

becomes a decision. Thus, if we were to take a closer look at what is actually going on at

time *t*, we would most likely see needle pointing at either the Go or the Stay option.

      While this is an initially compelling model, the fulfillment of Kane's criteria does not

follow immediately from it. Even AP alone, something that could be taken as a given in a

situation where both inputs are considered outside sufficient causation, does not immediately

follow from this model. Dennett argues that this stems from Kane's insistence upon having

both options available to the agent "at time *t*"; remember, this means that the agent should be

able to pursue both the Go and Stay at *the precise moment* he or she makes a decision.

Otherwise, Kane argues, the subject cannot be free. However, this view holds negative

consequences for his model. If we were to adopt a strict interpretation of Kane's definition of

AP, then we would not see what was described in Dennett's thought experiment above. After

all, when we zoom in on the given graph at time *t*, we see that only the "Go" option was

available to the agent since it was the one that reached the threshold in the brain required to

make a decision. On the contrary, we would have to see the needle pointing at both options at

once:
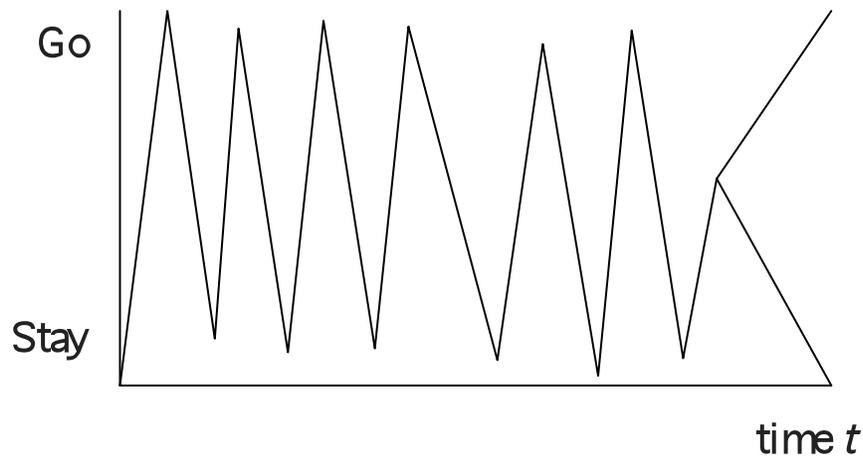
Figure 2

This model would certainly satisfy Kane's requirement that " the agent *can* (has the *power* or *ability* to) do A and *can* (has the *power* or *ability* to) *do otherwise*" at time t, because both options are directly available to the agent at time t. Still, its implications for Kane's model are not favorable to the type of freedom he seeks. It is clear that this interpretation of AP would unquestionably insulate the individual from his or her sufficiently caused past, but it would come at the cost of rendering all of the mulling back and forth within the agent prior to time *t* functionally useless. After all, if both options must be available at time *t* and whichever one actually ends up being the agent's decision is undetermined, then what came before it would be *of no consequence* to what happens at time *t* because of its indeterminate nature. If what happens at time *t* is undetermined and by hypothesis cannot be determined by anything that precedes it, including indeterministic noise that represents the agent's struggle to choose one of the options, then the agent's phenomenological experience is of no consequence to the decision that is made. This sort of indeterminism is so radical that whatever ensues *would not even be up to the agent.* Clearly, this is not a favorable avenue for Kane if he wants to be able

to claim that his model represents Libertarian free will.

As a result, Dennett argues that we must make a slight revision to Kane's definition of AP so that we can view it in terms of a window of time rather than a fixed time t. In this way, we would consider the agent's ability to pursue either option over space and time. Given the indeterminate nature of the neural noise coming from both of the inputs in Kane's thought experiment, the exact time of time t would, for all intents and purposes, be unknowable. At this point, we can restore the agent's access to being "able to do otherwise" in a meaningful way. Also, at the point when we are abandoning the type of random indeterminism shown in the above example, it would seem as if the agent has been given a greater degree of control over the deliberations taking place in the brain since it is not subject to indeterminate causation over which it has no determining influence. However, UR's viability in this model is yet to be seen.

Clearly, the issue of AP is an important one for Kane; without it, his project to provide a science-savvy model for Libertarian free will would be a lost cause. However, as Kane concedes, the presence of only AP is not sufficient for Libertarian freedom; on the contrary, it guarantees nothing of the sort, as the mere "swerving" of atoms does nothing to attribute responsibility to the individual. In light of this, UR takes on an even more important role as a key criterion for Libertarian freedom. However, in order for Kane's model to fulfill the extremely demanding criterion of UR, the issue of control needs to be thoroughly addressed. There are numerous objections that could be lodged against Kane's model and its ability to meet this criterion, but the most powerful ones come from issues surrounding the nature and location of human agency in the brain.

Agency: Placement and Control

Ever since the time of Descartes, placement of human agency has been a source of heated debate. Rene' Descartes, an advocate of mind-body dualism, thought that the point of contact between the non-physical will and the brain rested in the pineal gland, a small structure in the center of the brain. Without any scientific data, this seems a logical place to situate human agency. While it has ultimately been shown that the pineal gland is part of the endocrine system and has virtually nothing to do with human consciousness or moral agency, other locations have been suggested as the host of these two important concepts. Regardless, the idea of a central seat in the brain for human consciousness and "who we are," one of our most natural intuitions, has a broad appeal and has found many defenders in the Western intellectual tradition.

Unfortunately, the problem modern neuroscience poses for philosophy is that our ideas regarding a centralized concept of agency and consciousness are dashed on the rocks by factual observations to the contrary. This has grave consequences for those who want bright lines drawn around where "we" are in the brain, and Kane must do this if he wants to effectively assign responsibility to the agent. In *Consciousness Explained*, Dennett argues against the notion that there is a privileged seat of consciousness in the brain "where it all comes together." Asserting that this notion is a holdover from a Cartesian mind-body dualism, Dennett dubbed this mythical area of the brain the "Cartesian Theater." The denial of this notion by most philosophers and neuroscientists carries with it significant consequences for the free will debate. To say there is no location in the brain "where it all comes together" is to say that consciousness (and consequently human agency) is spatiotemporally distributed throughout the brain. Since there is no central location for

agency and consciousness in the brain, there is no privileged finish line for consciousness or consciously made decisions. Since there is no place "where it all comes together" in the brain, any sharp demarcations that are made regarding conscious experience, decision-making and their respective finish lines are ultimately arbitrary.

Kane's theory seems to rely on a centralized notion of agency when he constructs his model, which makes good use of the neurochemistry that occurs on the neuronal level. Consider again the quote that describes plural voluntary control, which states that "the agents are able to bring about *whichever* of the options they will, *when* they will to do so, *for* the reasons they will to do so, *on purpose*, rather than being compelled in doing so or in willing to do so" (Kane, 2005, p. 138). Clearly, there is an agent hovering over the decision-making process that is going on inside the brain. We can find this further when we examine the following statement made in the chapter dedicated to explaining UR: "To be *ultimately* responsible for what we are, and therefore to have free will, we must be responsible for forming the wills or characters that now determine our acts" (Kane, 2005, p. 121). When we view these two statements in juxtaposition, it becomes apparent that Kane is assuming a center of agency and consciousness like Dennett's Cartesian Theater. While it is true that the Cartesian Theater can be phenomenologically accurate while remaining neurophysiologically inaccurate, this lack of coherence between the phenomenological and the neurological would have adverse effects for Kane's theory of freedom, since it is grounded in naturalism. After all, if there is no way to explain the type of freedom we experience phenomenologically with natural causes, then the naturalist must presume that what we experience is a mere illusion.

Kane would most likely object that this is a misrepresentation of his model. Instead of viewing the agent as hovering above the undetermined efforts that represent his or her

"wills," it is important to view these undetermined, conflicting wills as part of the agent's struggle to achieve a resolution. Each of these wills can be represented by different neural networks, where the parallel processing of two or more inputs facilitates the creation of neural noise that amplifies an alleged indeterminism, and the neural noise that each of these networks generates serves as an obstacle to the other competing will. The unpredictable nature of this neural noise is what allows for the agent to break with the deterministic causation of the past and form a will for himself or herself. Given that the efforts of the agent are represented by competing neural networks and that both examples are representative of the agent's desires and will, then this model is consistent with something like the modular "multiple drafts" model of consciousness that Dennett espouses. Therefore, Kane would contend that there is no need for a centralized agency of any kind in order to support his theory of Libertarian freedom.

While this is certainly an elegant way to handle my objection, it does not hold with regard to the way that Kane conceives of agency in his theory. First, at the very least, something like the Cartesian Theater is strongly suggested by the language Kane uses when he presents his theory. Referring to agents choosing between two or more conflicting wills hints at the idea that there is some evaluative measure outside of the efforts themselves that ultimately arbitrates and makes the call when it comes to making a decision. Still, for the sake of argument (at the moment), let us examine Kane's theory without the use of centralized agency. If we presume that the evaluative process is done solely in the context of competing neural networks, then there are several objections that arise. First, this does not represent the totality of moral agency. While these competing wills do represent a significant portion of a human agent, they are not constitutive of an agent or even the decision-making

process, which requires that criteria be employed in order to reach a decision. If we accept Kane's model on its face, then it is likely that the criteria used in determining which decision would be preferable are embedded in the undetermined efforts represented by the multiple wills battling out in the agent's mind. Kane would be committed to this by his naturalist conviction that the totality of the brain is all there is to the human mind. From the naturalist perspective, it would seem that our brains are like (but far more advanced than) the ones our non-human animal cousins possess, large, complex systems that, for all intents and purposes, operate under a deterministic set of rules and laws. This determined nature is compounded by the nature of human agents that have not experienced a will-setting action, since they are the byproduct of their past experiences and genetics.

This is where one of the chief motivations behind Kane's theory can best be seen. Without any metaphysical measures to alter the case, human agents are determined creatures if one adopts a naturalist perspective. Anything that is determined, whether it be biologically or externally (causal means that lie outside the agent), cannot be free by hypothesis; after all, anything that can only give one possible output given a certain set of antecedent conditions cannot make a free decision. Since this is the case, then it would be a considerable detriment to Kane's project to presume a centralized notion of agency in a naturalist framework, since this agency would undoubtedly be determined. A few unique conclusions follow from this set of premises. If it is true that what is indeterminate cannot be determined and that the neural noise generated from the inputs (the competing wills formed by determined agency) is indeterminate, then the processes that ensue after the formation of the inputs cannot be influenced by the agent. If the process were so influenced, then determinism would creep back into the equation, and this would obstruct Libertarian freedom. However, without some

form of agency presiding over the neural noise in the agent's brain, the element of chance becomes something that Kane must contend with again. If the agent does not have an evaluative role in the decision that is eventually made, then it could be argued that his or her control is severely compromised.

This discussion of agency leads us to an important disjunct. Either there is a centralized form of agency that controls or has some sort of evaluative role when it comes to the competing wills in question, or the agent's input is confined to the inputs (the competing wills) themselves, thus falling short of the kind of control Kane's theory seeks out. Neither one of these is a good option for Kane if he wishes to form a scientifically grounded theory of Libertarian freedom. As mentioned earlier, the first half of the disjunct is obviously bad news for Kane; if the theory requires a centralized notion of agency in order to be cogent and maintain the control that Libertarian free will demands in its agents, then it will be impossible to reconcile his concept of freedom with science since a naturalist conception of agency must be determined.

The second half of the disjunct requires an investigation into the language Kane uses to draw out its significance. The way Kane initially represents the Austin-style examples, which were used to highlight the significance of neural noise to decision-making and responsibility, is what best exemplifies the conceptual muddle that Kane falls into. When presenting the examples of Austin's attempt at holing a putt, the assassin's making an attempt on the prime minister's life, and the incensed husband's efforts to break a table in a fit of rage, Kane presents the neural noise that each of these agents faces as an obstacle to achieving their goals. When discussing the agents' actions in terms of responsibility, this makes sense, especially when we view the agent's will to achieve his or her goal (holing a putt,

assassinating the prime minister and breaking a table) as an effort to overcome an obstacle,

which is neural noise in this case. However, the nature of neural noise changes when Kane

changes the terms of the assassin's example:

> Suppose that just before pulling the trigger, the assassin has doubts about his mission.
> Pangs of conscience arise in him, and a genuine inner struggle ensues about whether
> to go through with the killing. There is now more than one motivationally significant
> option before his mind. So his will is no longer clearly set one way (he is no longer
> sure he wants to pull the trigger); and he will resolve the issue one way or the other
> only by consciously deciding and thereby setting his will in one direction or the other
> (Kane, 2005, p. 129).

It is abundantly clear that this type of struggle is considerably different from the one-

dimensional Austin-style examples Kane provided earlier in the chapter. Instead, in Kane's

own words, "unlike the original assassin example, neither outcome in this case would be a

mere accident or mistake; either outcome would be a voluntary and intentional decision to go

through with the killing or to stop" (Kane, 2005, p. 129). Clearly, this difference holds with

the example of the businesswoman. In that thought experiment, the woman is torn between

the desire to do what is moral and her own selfish desires, and this creates a situation in

which two different inputs compete. These different inputs, which represent the conflicting

wills of the subject, create neural noise by their competition, with each will becoming an

obstacle to the other's success.

This fairly clear picture of a decision-making process becomes complicated, however,

when Kane elaborates on the victorious will in the businesswoman's thought experiment:

"her choosing in spite of the noise obstacle will be like your solving the tough math problem

in spite of the distracting background noise" (Kane, 2005, p. 138). However, there is an

important sense in which these two processes are completely different. Unlike the distracting

background noise in the example of solving a tough math problem, the neural noise in the

mind of the businesswoman, as stated by Kane himself, comes from a competing desire to do something else, whether that something else be the moral or selfish course of action in the thought experiment. As a result, the issue of "success" becomes far less apparent, and the issue of "choice" between two competing alternatives emerges. First, this complication of the thought experiment dramatically raises the stakes of the decision the agent makes with regard to his or her action as a "will-setting" one. Instead of being a situation where success and failure are clearly defined as in the case of the simpler assassin thought experiment, the businesswoman's situation is far more nuanced. Second, the disparity in these two thought experiments underscores the importance that control plays in the implementation of UR. By Kane's own admission, the model he sets up provides an obstacle to the agent's wills and desires; after all, the neural noise generated by these competing wills does serve as a distraction to the agent. As stated in the assassin and math problem thought experiments, the neural noise serves as a distraction to the agent's desires to kill the prime minister and solve the math problem respectively. While this serves as a mild detriment to the agent's control over the situation, it does nothing to subvert the agent's control over his or her own will. In this case, the agents in question are not trying to will something contrary to their intentions; the assassin is not willing anything other than the successful assassination of the prime minister and the hopeful mathematician is not willing anything other than successfully solving the problem in front of him or her. While the outcomes of these situations are not guaranteed by the determined nature of the human mind, the wills of both of these agents are set on what they hope to achieve. The businesswoman, however, is torn between two competing and very persuasive desires to go or stay. In this scenario, the focus of the thought experiment is on which one of these competing wills becomes the agent's decision and intent,

not on the effects quantum determinacy has on what happens outside of the agent's mind; in the case of the assassin, the question is whether or not the assassin is able to kill the prime minister and the nondescript agent can solve the perplexing math problem. Control is important in these scenarios, but these scenarios do not require any kind of evaluative input in order to attribute control to the agent. However, in order for the businesswoman to make a decision that we would consider responsible, she would have to maintain a degree of control over the evaluative process in the brain.

At this point, Kane would most likely remind us of the importance that plural voluntary control plays in his model of Libertarian freedom. According to Kane, the businesswoman "will have succeeded in doing what she was *trying* and *wanting* to do all along" regardless of her decision, given that the woman had good reasons for wanting to be moral and for wanting to be selfish. However, the notion of plural voluntary control loses staying power when we consider a slight alteration of Kane's thought experiment. Suppose we were to remove the indeterminacy from the woman's brain, and suppose the woman now decides to "to do otherwise." It does not matter what her original decision would have been. What does matter, in this case, is that the woman did not succeed in doing what *she* really wanted to do. For this to occur, the decision would need to be a determination made by her as an agent, and this decision would have been shaped by the sum of her past experiences. Of course, this case is clearly antithetical to the type of freedom Kane seeks to ground in naturalism. However, in an ironic way, it does give the agent the type of control he or she seeks when she is making a decision of this magnitude. After all, in order for an individual to be ultimately responsible for the course of action he or she takes, it is not unreasonable to require that he or she be in control of the decision-making process.

Kane is familiar with this objection, and his reply to it is impressive. He admits that this objection is not mistaken, nor is it entirely misguided; indeed, Kane's model does provide obstacles to the will of the businesswoman. However, he would say, it is also important to recognize that it provides an obstacle to both of the businesswoman's *wills* and that the resistance each of these wills faces comes from the other. These wills are at least partially representative of the businesswoman's practical reasoning, as it incorporates elements from her past. After all, the options of Go and Stay were not spontaneously generated. Further, he would argue, the introduction of the businesswoman's determined agency would allow for sufficient causation to reenter the equation, which would compromise AP. These impediments to the agent's wills, while perhaps unfortunate in one sense, are integral to the agent's ability to pursue other options and obtain genuine freedom. Without these competing wills providing obstacles to one another, Kane argues, each agent would be limited to exactly one possible future and the series of events that led up to an agent's actions would have been out of his or her control. This seems an even more genuine threat to human freedom than my objection. Lastly, to Kane, it seems ludicrous to contend that the businesswoman could not be held responsible for whatever she chooses to do. After all, as Kane has argued, each of these competing wills is representative of what the businesswoman is trying to do; as complicated creatures, human beings are capable of wanting to do more than one thing in a situation. Unfortunately, due to our constraints as human beings, we are only capable of doing one thing at a time. Kane's model provides resolution to those kinds of conflicts, and it does so while breaking the deterministic effect of the agent's past.

The comprehensiveness of Kane's response to this objection is matched only by its

cleverness and its appeal to our unscientific intuitions about decision-making. However, this response still does not properly address the issue of the agent's control over the decision-making process his model proposes. It may be true that the type of undetermined neural noise in Kane's theory is required for the fulfillment of AP. However, the existence of AP comes at a cost to UR. If we accept that human agents are determined by their past experiences and genetic makeup (as Kane does for individuals that have not yet experienced an SFA), then it follows that any influence a human agent would consciously and deliberately exert over the neural noise that ensues after the two competing wills are formed must be construed as either determining or ineffective. Both of these alternatives would be anathema to Kane. If the businesswoman's conscious efforts beyond the formation of the two competing wills were determining, then it is clear AP would be compromised. Likewise, if the businesswoman's efforts to control the indeterministic noise in her brain were ineffective, then declaring the agent ultimately responsible for the decision and action that ensues after this process is inappropriate.

Kane compares the choices made in his model of human freedom to a novelist's development of a heroine's character. However, among other of its problems, this analogy presumes that the agent has a great deal of control over processes going on in his or her brain. Ironically, this problem is exacerbated when Kane compares his model of decision-making to another instance of parallel processing that takes place in the brain: vision. While it is true that vision utilizes the parallel processing capabilities of the brain (in a way that is far more rudimentary than Kane's decision-making model), what is also true of vision is that it is an involuntary process in the brain. Outside of closing one's eyelids, an agent does not have any control over the product of the involuntary discriminations that take place in the

process of forming vision. Undoubtedly, Kane's theory is different; it would be absurd to presume that the agent does not have any degree of control over what takes place in Kane's decision-making model. After all, the agent forms the wills that compete against one another for supremacy. However, it is the case that the discriminations that take place after the formations of these wills are, in a very important way, involuntary. It is true that no one is coercing or forcing the agent into acting a certain way. Still, the agent's control of the undetermined neural competition that takes place within his or her neural pathways remains as inaccessible to him or her as the discriminations that take place in the process of forming a visual image, even though the process in the former case is considered a function of the faculty of practical reasoning. The process is the agent's only in the sense that the indeterminism and neural noise are taking place inside his or her brain and not outside it, but it is not the agent's in that he or she cannot be reduced to the competition taking place between the two inputs in the form of neural noise. In a naturalist framework, the indeterminate nature of the neural noise created by Kane's model precludes any meaningful control that they could have over this "deliberative" process, because control would *mean* that the agent was *determining* the outcome of the decision-making process. This is made worse for agents like the businesswoman, who are thrust into uncomfortable situations and are forced (by the circumstances of the situation) to make some kind of decision. In short, there is no option for the agent to close his or her eyes when confronted with a situation like the businesswoman's. If this is the case and the discriminations taking place in the agent's brain are involuntary, then it is impossible to hold the agent responsible for what takes place after the competing wills are formed. Indeed, the ensuing action may come from the agent, but this is the extent to which discussions of responsibility make sense for Kane. Given that

the type of control Libertarians insist upon does not occur at the neuronal level, assigning "responsibility" to the agent for the action that ensues after an indeterminate decision-making process becomes little more than a semantic notion. Ironically, merely semantic maneuvers are exactly what many Libertarians accuse compatibilists of doing when they speak of holding agents accountable.

This discussion has debilitating consequences for Kane. To put it simply, Kane cannot achieve the type of control required for a criterion like UR and maintain his commitment to naturalism simultaneously. If he were to try to achieve the degree of control required by most versions of Libertarian freedom (and his own criterion of UR), then there must be some sort of agency that can have a meaningful role in the competition taking place between these two wills while the agent is unconstrained by the determining effects of the past. If this is not the case and the evaluative process is left up to incomplete forms of agency (represented by the competing desires of the agent), then the agent in question does not have any sort of significant control over the decision-making process, for such control would require that he or she *determine* an outcome through conscious deliberation and not just experience one. The idea of spreading the agent over multiple desires is attractive to most individuals that have naturalist convictions; unfortunately, it provides little ground for making meaningful contributions to Libertarian free will, even when combined with the unpredictable element of probabilistic causation.

Conclusion

Kane's model, while eloquent and thorough in attempting to cover its bases, fails in attempting to find secure footing for Libertarian freedom on naturalist grounds; this is due to his inability to balance both AP and UR simultaneously while faithfully adhering to naturalist

convictions. Indeed, it seems impossible to provide the individual with a "garden of forking paths" and hold him or her ultimately responsible for his or her actions at the same time. Due to the demands of both naturalism and Libertarian free will, Kane is forced into the uncomfortable dilemma of either sacrificing an agent's control over his or her own deliberations or allowing for determinism to find itself back into the equation through a presiding central agency that can meaningfully arbitrate between the two competing wills. While this dilemma is easily resolved in more traditional doctrines of Libertarian freedom by positing a supra-normal form of agency that does not answer to the deterministic laws that govern the physical world, Kane, as a committed naturalist, does not have this option. As a result, it would seem as if, despite his inventive and valiant attempts to reconcile free will and naturalism, Kane is forced to choose one of two options, neither of which is favorable to the reconciliation.

However, the importance of practical freedom to what we view as, to borrow Dennett's phrase, "varieties of free will worth wanting" still needs to be discussed. While many thinkers in the Western intellectual tradition have explored this topic, the 20th century gave birth to an avenue that most thinkers of our past did not think to mention or consider altogether: the impact of technological innovation on the practical expression of human freedom. Far from a decided issue that trends toward utopian or dystopian views, the diverse discourse on this topic carries some important implications for human freedom.

Practical Freedom

Freedom as a Dynamic Concept

Ontological freedom is, without a doubt, one of the most important aspects of the discussion of human freedom. Many Libertarians contend that any "freedom" we may have in the political realm is useless without it. Robert Kane holds this view, arguing that there is no meaningful sense of human freedom without a "regress stopper" when it comes to human responsibility. This ontologically-grounded "ultimate responsibility" (UR) that Kane searches for is independent of the "garden of forking paths" that he argues is equally important for freedom, the multiplicity of options he refers to as "alternate possibilities" (AP). Of course, the criterion of Alternate Possibilities is ultimately ontological; after all, Kane goes through a great deal of trouble to introduce indeterminism and *genuine* uncertainty instead of psuedo-randomness, which can exist unproblematically in a deterministic setting. While it is true that AP has an ontological element to it, it is also true that AP has a practical element to it: namely, the availability of options to an agent, and this practical element is just as important to its ontological counterpart when it comes to the freedom of the agent. After all, the lack of options available to the agent precludes any chance for free will in either a metaphysical or a practical sense. The type of free will that most individuals seek requires that there be a variety of options available to an agent. Without it, one's ontological ability to express himself or herself freely and without coercion becomes severely diminished.

Nevertheless, Plato, Boethius, and many other thinkers from the classical world shy away almost entirely from practical expressions of freedom in favor of attachments to ontological notions of freedom from vice and the constraints of the material world. For Plato,

we must ascend out of the cave and pursue knowledge in the world of the forms. The image

of freedom that emerges from Plato's *Republic* is one that values fulfilling one's role as an

individual with a gold, silver, or bronze soul rather than choosing one's own lot in life.

Therefore, a practical expression of freedom, while possible in Plato's world, is not a good

thing when it falls outside of the role in society your soul assigns you. Taking this notion

outside of Plato's "ideal state," Boethius argues that we must conform our will to the will of

the divine and forsake all the worldly pursuits we have previously occupied ourselves with.

The divine mind resides in a different plane of existence than fate, which is merely

Providence's spatiotemporal execution. Boethius elaborates:

> Comparison can be made with the craftsman who first envisages in his mind the shape
> of the object which he is to create. He sets to work on it, and stage by stage he
> produces what he had earlier visualized as a unity, and at a single moment. In the
> same way, God by Providence orders what is to be done in a unified and unchanging
> manner, but by Fate he carries through these arrangements in a manifold way within
> the bounds of time. (Boethius, 2000, p. 88)

Therefore, like Plato, Boethius contends that human beings must elevate themselves above

the concerns of the earthly world in order to attain pure happiness, which is unity with the

divine mind. As Boethius writes, "Mortal creatures have one overall concern...to attain the

one goal of happiness," (Boethius, 2000, p. 41) and "God is happiness itself" (Boethius,

2000, p. 59). If we accept these as truths, then we are led to a paradox. If an individual

pursues happiness in the correct fashion, then this individual will be increasingly led away

from a "garden of forking paths" and toward a unity with the "indivisibility of Providence"

(Boethius, 2000, p. 88); to put it simply, a greater harmony with the divine would

proportionally erode the usefulness of AP as a criterion for freedom. On the other hand, if an

individual pursues happiness in a wicked fashion and repeatedly chooses vice-ridden courses

of action, then that individual reaches "the furthest degree of slavery...and abrogate[s] the

possession of reason which is theirs" (Boethius, 2000, p. 99). In this way, the "garden of forking paths" image that we see first becomes whittled down to a straight line of action that is determined by God's will and not the agent's:

Original Garden of Forking Paths
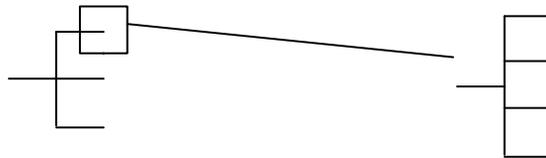
Garden of Forking Paths for Boethius
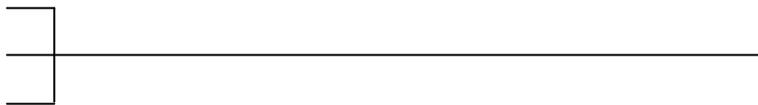
The type of freedom that Boethius seeks radically changes the nature of the discussion of human freedom. For Boethius, severely restricted lives, like the life of monastic isolation, are not a problem; in fact, one could argue that regiments like the Benedictine Rule, constrictive as they may be, are a boon to an agent's freedom, seeing as they could allow him or her to seek a greater unity with the divine. Therefore, what we are left with in a Boethian discussion of human freedom is one that almost entirely forsakes the practical element of AP; while it seems implausible to presume that Boethius would deny the ontological importance of AP, he does deny the importance of AP's more practical requirement: that a variety of options be open to an agent.

What emerges from these classical discussions of human freedom is particularly

pertinent to our discussion of what technological and scientific innovation means for human freedom. These two authors, overwhelmingly preoccupied with the metaphysical and ideological, found freedom not in physical expressions of ontological freedom but in the ontological freedom itself. However, this attitude does not reflect modern attitudes towards freedom; in fact, aside from attitudes in monastic or other marginal circles, it is radically different from most modern and postmodern views of freedom. What we consider "freedom" to be seems to change with the values we possess and the environment we find ourselves in. To elaborate, Boethius, while once at the height of success in early Medieval society, found himself under house arrest and unable to live anything resembling the lifestyle he once had. As a result, he found solace in the paradoxical view of freedom that he espouses. However, Daniel Dennett, who has written on freedom in the 20th and 21st centuries, espouses a compatibilist view of freedom that is more in line with the intellectual current in the English-speaking world. What we can infer from this is that this notion of human freedom, while important to nearly every generation in written history, is dynamic, one that has changed over time.

It could be argued that what we are actually seeing is merely a shift in emphasis instead of a more conceptually fundamental one. After all, if we break the issue down along Kane's criteria, we have an entirely ontological criterion, UR, and a partly ontological criterion, AP. If we eliminate the ontological elements of freedom from our consideration, which is what compatibilists are doing, then we still are only talking about a shift of emphasis in the same conceptual framework. The type of freedom compatibilists are discussing can be found in Libertarianism as part of a broader concept of freedom that seeks an ontological ground.

This objection does not take into account the full thrust of what compatibilists are trying to achieve. One of Dennett's key phrases throughout his works on freedom involves finding "varieties of free will worth wanting." This phrase, along with Dennett's project of forming naturalist conceptions of consciousness and human freedom, carries with it a shift away from metaphysical notions of who we are and how free we are to ones grounded in empirical observations. This is more than just a shift of emphasis. Compatibilists are radically redefining who and what we are at the core; what they are doing constitutes a conceptual shift. Referring to the compatibilist project as a mere shift in emphasis misses the breadth and the depth of what they are trying to accomplish.

It could also be objected that these changes have no bearing on their veracity. Despite the fact that their metaphysics may not be shared by many moderns, a Platonic or Boethian account of human freedom might nevertheless be true. It does not follow from the differences between these accounts that one is more valid than the other, and it does not follow that a particular doctrine of freedom, though perhaps ancient in origin, becomes antiquated as soon as another viewpoint arises. For example, while Boethius' view of freedom is admittedly not commonplace, this does not mean that there is no important insight to be gleaned from his ideas. In fact, the opposite is true, given that Boethius' work on freedom laid a solid foundation for intellectuals like Peter Abelard to build on hundreds of years later.

While this objection is not without merit, I will make no attempt to say that one type of doctrine is inherently more valuable than another, nor will I claim that traditional views of human freedom are bereft of any kind of wisdom. Still, this objection misses the thrust of the idea that I wish to communicate, which is that what we consider human freedom to be is inextricably tied into the values people possess and the environment that they find

themselves in. If this is true, then the nature of human freedom is inescapably dynamic, though it may share similarities to doctrines and ideas that have been brought up in the past.

Still, this answer seems unsatisfying as far as our discussion is concerned. Even if we grant that human freedom is a dynamic concept that is contingent upon the values and environment of the present, this still begs the question of which conception accords with reality. Of course, given the nature of our society, which is almost always in a state of flux, this becomes a difficult task. Further, it is certainly true that consensus only goes so far when it comes to determining the truth or falsity of a particular claim. Therefore, especially within the confines of this thesis, disproving the overall validity of ontologically grounded freedom is not something that I am empowered to do. Regardless, I will attempt to approach the practical problems that technological innovation raises for human freedom with the help of Daniel Dennett and his analysis of algorithms. These algorithms become extraordinarily helpful when he explains the mechanics of evolution in *Darwin's Dangerous Idea*, and this concept becomes equally helpful when discussing the possibilities for human action in a modern society.

Heuristic Algorithms and Practical Freedom

Practical freedom, specifically construed as AP or a "garden of forking paths," means being able to do otherwise in a given situation, even for those who espouse a compatibilist view of free will. As such, it plays an important role in determining what kind of subject is free and what kind of subject is not. In order to understand the role of "the garden of forking paths" as it pertains to human freedom, employing Daniel Dennett's notion of an algorithm becomes extremely helpful if we modify it to reflect the options an agent can choose in a given case. In *Darwin's Dangerous Idea*, Dennett employs algorithms to explain the process

of natural selection. In this sense, algorithms "are simple steps that can be executed with stupendous reliability by one simple mechanism or another" (Dennett, 1996, p. 51). Of course, this phrase does not adequately explain the term as it pertains to our project because of its parsimonious nature. Therefore, in order to explain the importance of the algorithm to our project, it is necessary to show a few examples of the relevance that these "simple steps" have to new insights about human freedom.

Darwin's Dangerous Idea is filled with examples of algorithms. Dennett lists some that demonstrate the idea of an algorithm brilliantly, like elimination for a tennis bracket or an elaborately worded recipe (one that, if followed to the letter, would not allow for any mistakes). Another example that can shed some light on the nature and power of algorithms, though more complicated than an elimination bracket for a tennis championship, can be seen in Mill's methods of induction designed to explain causation in a particular situation. A thought experiment involving some of my friends and me can provide a demonstration of the algorithmic nature of Mill's methods. Suppose that Jordan, Katie, Shawn, Micah and Rachel all went to the ice cream shop to get vanilla ice cream on a hot day in July. They arrive at the ice cream shop, and all is well; they have vanilla in stock and plenty of it. Now suppose that Katie, in one of her trademark changes of heart (perhaps due to some quantum indeterminacy in her brain), decided to be the odd-one out and get a cone of chocolate ice cream instead. After eating our ice cream cones, we decided to go home and watch some daytime television. Finally, suppose that all of us except for Katie come down with a nasty stomach ache. Of course, the clear culprit in this example is the chocolate ice cream.

This type of reasoning process, as well as any other type of inductive reasoning, may have the appearance of being unscripted and strictly intuitive, but it can be effectively

reduced to something far simpler: an algorithm. Taken in this light, a set of instructions (like those in Dennett's recipe for even the densest of aspiring chefs) could eventually lead to the conclusion that vanilla ice cream was the cause of our stomach aches. The following, while certainly not comprehensive enough to account for all of Mill's methods, could be applied to the ice cream example and seamlessly reach the conclusion that the vanilla ice cream is to blame for our stomach troubles:

1) Identify the potential cause in question.

2) Ask yourself: did all of the individuals have this particular cause in common?

   a) If yes, return to step 1 and proceed with a different cause.

   b) If no, proceed to step 3.

3) Who had this cause in common and who did not?

   a) If the unaffected individual (Katie) had this cause in common with any of those that were affected, return to step 1 and proceed with a different cause.

   b) If not all of those who were affected experienced the cause in question, return to step 1 and proceed with a different cause.

   c) If all those that were affected had this cause in common and Katie did not, then proceed to step 4.

4) Identify this as the cause (*ceteris paribus*) for the effect in question.

Of course, if we were to assume a greater degree of intuition on the part of the entity following the algorithm, then this process of elimination could be narrowed down to one sentence. However, if this algorithm were to be coded for use by a computer, it would have to be drawn out in its full logical splendor, leaving no detail unchecked. What is certain is

that, given usable input (a situation in which a cause can be determined), this type of algorithm will produce reliable results every time it is employed. Because of its reliability and general usefulness as an explanatory device, I hope to use an algorithm in order to explain the importance of practical freedom and its relation to technological innovation.

Of course, it will be strongly objected that the notion of a simple algorithm cannot hope to capture the broad scope of human nature and behavior. While algorithms can go a long way in explaining the more primal elements of our behavior, these base algorithms could not hope to capture the eccentric behavior of those that fall in love and exhibit behavior that would defy the conventional wisdom of a particular algorithm. Algorithms, often reducible to simple if-then statements, could not hope to describe the flourishing art and culture that has sprung up from human civilization over the past several thousand years, let alone the intricacies and complexities of human freedom. If algorithms cannot explain how these great works of art came to be, then it seems wildly implausible that these simple sets of instructions could prove a useful explanatory device when examining human behavior; they simply aren't powerful or complex enough.

There is a great degree of truth in this objection. It is absurd to propose that simplistic algorithms could be used to explain the complex patterns of human behavior, even on an individual basis. The presumption that one adopts with this sort of belief is that humans are entirely driven by instinctual instructions that are hard-wired into our brain, which does not even begin to explain most of the patterns that make up human behavior. While these sorts of simplistic algorithms might suffice in situations where we are examining fight-or-flight reactions, simplistic algorithms simply will not do when it comes to the more complicated aspects of human social activity. However, this does not mean that the algorithm must be

abandoned as an instrument with which we can explain the actions of human beings, especially when we are examining these actions under the auspices of free will. In order to salvage the algorithm as a potential explanatory device, however, we will need to consider the merits of heuristic algorithms instead.

Heuristic algorithms, as defined by Dennett, are algorithms that seek to "learn" from experience and improve with use. An example of a heuristic checkers program designed by IBM research scientist Arthur Samuel in 1955 illustrates this idea clearly:

> Samuel's program played checkers, and it got better and better by playing against itself through the small hours of the night, redesigning itself by throwing out earlier versions that had not fared well in the nightly tournament and trying out new mutations that were mindlessly generated. It eventually became a much better checkers-player than Samuel himself, providing one of the first clear counterexamples to the somewhat hysterical myth that "a computer can really only do what its programmer tells it to do" (Dennett, 1996, p. 208).

While the behavior of this program is still a far cry from the complexities of human behavior, this program illustrates the power that algorithms have to transform themselves and become more than simple sets of instructions. Despite the ever-increasing speed of computer processors in today's world, Dennett stresses the importance of "heuristic" searches when he points out that "the space of possible checkers games has on the order of 10^{40} choice points, 'which, at 3 choices per millimicrosecond, would still take 10^{21} centuries to consider'" (Dennett, 1996, p.209). He continues, "The search space is Vast, so the method of search must be 'heuristic'–the branching tree of all possible moves has to be pruned by semi-intelligent, myopic demons, leading to a risky, chance-ridden exploration of a tiny subportion of the whole space" (Dennett, 1996, p.209). Simply put, heuristic algorithms do not sift through every possible move in design space, for this is an impractical goal for any worthwhile computer program. Instead, these algorithms engage in what Dennett calls a

"risky search," which is a type of endeavor designed "to yield highly interesting, reliable results in reasonable amounts of time," though these results are not guaranteed like those of their more simplistic counterparts (Dennett, 1996, p. 210). As a result, what emerges is a form of intelligence that, while perhaps rudimentary in comparison, mimics human behavior.

Of course, there are objections to equating heuristic algorithms to intelligence on any level, and one of the most influential objections in this line of thought comes from Gödel's theorem. A thorough understanding of Gödel's incompleteness theorem, which is quite complex in its pure form, is not required for the analysis that is going to follow. In fact, a simple summary from Dennett will suffice as far as our needs are concerned:

> What Godel proved, beyond any doubt, is that when it comes to axiomatizing simple *arithmetic* (not plane geometry), there are truths that "we can see" to be true but that can never be formally proved to be true...for any *particular* axiom system that is *consistent* (not subtly self-contradictory—a disqualifying flaw), there must be a sentence of arithmetic, now known as the Gödel sentence of that system, that is not provable within the system but is true (Dennett, 1996, p. 429).

While this may initially seem to have very little to do with using heuristic algorithms as faithful analogues for human behavior, the implications of this theory for the human mind are astounding. If it is true that there are certain truths that the human mind can discern by sheer "intuition" without the use of an algorithm, then it follows that the brain, equated to an algorithm-driven machine, cannot be the source of the human mind, since truths are not "readily apparent" to algorithms. If this is the case, then it follows that heuristic algorithms, while particularly useful in the advancement of computer programming, are not fair analogues for human behavior since these analogues cannot faithfully mimic the human mind.

This objection, while powerful, is difficult to demonstrate in actuality. Borrowing from Dennett once again, this sort of objection loses steam when we turn to a criticism of it

that Douglas Hofstadter made in his famous work *Gödel, Escher, Bach*:

> How can we distinguish a case of somebody (or something) "grasping the truth" of a mathematical sentence from a case of somebody (or something) just wildly guessing correctly, for instance? You could train a parrot to utter "true" and "false" when various symbols were written on the blackboard in front of it; how many correct guesses without an error would the parrot have to make for us to be justified in believing that the parrot had an immaterial mind after all (or perhaps was just a human mathematician in a parrot costume) (Dennett, 1996, p. 431).

While the argument from Gödel's incompleteness theorem may raise ontological predicaments for a (heuristic) algorithmically driven mind, this objection falls short of ending our use of the heuristic algorithm as an analogue for human behavior. First, as Dennett shows, demonstration of an immaterial mind, while perhaps possible from a first-person, phenomenological account, is difficult to produce when a verifiable account is demanded. As the example illustrates, the criteria by which we could establish the existence of an immaterial mind evade any sort of concrete identification. Further, even if these standards were to be articulated, it seems plausible that any standards that allowed for a human margin of error could be met by a well-tuned heuristic algorithm. The full power of this notion is realized when we consider that, far from being my position on the ontological workings of the human mind, I intend to employ heuristic algorithms merely as a tool to model human behavior at an abstract and impersonal level. While this sort of abstraction may fall victim to the same sort of errors that a heuristic algorithm would in trying to "fool" a human observer in a Turing test, it does not seem unreasonable to presume that an algorithm intending to mimic human behavior could be afforded a modest margin of error. Further, the algorithm that I intend to utilize is not a complicated one; I intend to argue that human agents will act in such a way that their actions will (more often than not) reflect their own rational self-interest. Interestingly enough, this does not necessarily exclude acts of unrequited kindness or

altruism (Dennett's commentary on the evolutionary origins of altruism and their roots in a "selfish gene" is illuminating in this regard).

Therefore, as far as an abstract, bird's-eye view of human behavior is concerned, an algorithm that stresses the rational self-interest of the agent in question, while perhaps not completely faithful to the complex nature of the human mind, reflects the end product of human behavior accurately enough for our purposes. If this is the case, then we can eventually turn our attention toward providing a concrete definition of the concept of human freedom.

Practical Freedom Defined

The heuristic algorithm that I wish to use emphasizes a human being's tendency to act in his or her self interest. While the deficiencies admitted in the previous section still exist, we need not be too concerned with the algorithm itself. Instead, we should turn our attention to the input that this algorithm will receive. Since we are abandoning (for the moment) a discussion of the ontological precursors to human fredom, the "garden of options" becomes a subject of paramount importance.

Practical freedom becomes much easier to define once we abandon the trappings of ontological freedom. If we assume that the structure of the algorithm is that a human being will act in his or her own rational self-interest, then it follows that the nature of the input (which should represent the number of options available to a human being at any given moment) is where the focus of a philosophy concerning itself with practical freedom lies. Of course, the number of options available to a human agent will vary according to time and place; for instance, I will have far more options available to me (as far as practical freedom is concerned) if I am idly sitting at home than I would if I were idly sitting in church, where I

would likely be prevented from even leaving the establishment at my own convenience except in the case of an emergency. This analysis can be extended to the broader realm of types of societies. However, it becomes far more difficult to discern which individual is freer: the individual in a 21st century urban environment or the individual in the nomadic, hunter-gatherer society. Both of these individuals are subjected to different restrictions and are permitted different freedoms. Still, what undoubtedly follows from these analyses is that any options available to a human agent are spatiotemporally contingent, and they can be influenced by any number of different external forces.

Therefore, what becomes more desirable in a world where practical freedom is important is a "garden of options" rather than a "garden of forking paths." While a subsidiary and a necessary condition for the ontological portion of AP, the "garden of options" is integral to any sort of meaningful human freedom. A "garden of options" is the availability to an agent of meaningful options for action. Whether or not the agent is determined to choose one option over another is irrelevant to the point of this investigation. What is relevant, however, is the agent's ability to do what he or she desires. Outside of what is agreed upon by legal consensus (ideally in a society with faithful political representation), any extra or supremely constrictive limitations on an agent's "garden of options" is detrimental to his or her freedom.

Technology and Its Detrimental Impacts on Human Freedom

While there are myriad different forces that can positively and adversely affect prospects for human freedom, technology is perhaps the most controversial of them all. Advocates from one side of the spectrum can make (sometimes unwittingly) compelling cases for why continuing technological innovation is anathema to human freedom.

Additionally, the implications that stem from more optimistic philosophical forays into the world of technology can be a boon for human freedom, though often in unexpected and new ways. However, as with most philosophical issues, the issue is far from easily decided.

It is not difficult to imagine how someone advocating that technological innovation is to the detriment of human freedom might go about making his or her case. After all, the adverse effects of technology on human freedom, especially when considered in light of our algorithm and the "garden of options," are not difficult to see. For one, overpopulation and increasing urbanization have certainly led to increased restrictions on human behavior, for better or for worse. In one sense, these restrictions are merely *de facto* alterations of our behavior that result from living in closer quarters than we might in another scenario. For example, I usually pay attention to the volume level of my music (even if my roommates do not) so that I do not disturb the peace and quiet that they value; this is especially true in the wee hours of the morning. While nothing is coercively preventing me from blasting my music without any regard for my roommates, the consequences of such an action are usually sufficient to prevent me from doing such a thing. In another sense, there are *de jure* restrictions that are direct consequences of living in an urban environment. In keeping with the example of the volume of music in a given area, many communities have noise ordinances that are put in place in order to prevent those with little or no regard for the well-being of certain neighbors from wantonly eroding the peace and quiet these communities value. While one might argue that these sorts of restrictions can also be found in rural areas, noise ordinances of this sort are rarely found in the country, and where they are formed, they are even harder to violate when the nearest neighbor is over a mile down the road.

Additionally, concerns over environmental integrity and the degradation

industrialization has caused over the past couple of centuries have served to curtail human freedom even further. While this is arguably a step in the right direction, it seems undeniable that this shift in the public consciousness toward an increase in environmental stewardship involves implications that do not bode well for human freedom. Specifically, as Bruno Latour argues in his essay, "A Collective of Humans and Nonhumans," this redefinition of the public's attitude towards the environment could feasibly involve "granting to nonhumans some sort of rights and even legal standing." Latour continues:

> As with all crossovers, all exchanges, this one mixes elements from both sides, the political with the scientific and technical, and this mixture is not a haphazard rearrangement. Technologies have taught us how to manage vast assemblies of nonhuman; our newest sociotechnical hybrid brings what we have learned to bear on the political system. The new hybrid remains a nonhumans, but not only has it lost its material and objective character, it has acquired properties of citizenship. It has, for instance, the right not to be enslaved....*Literally*, not symbolically as before, we have to manage the planet we inhabit, and must now define a politics of things (Latour, 2004, p. 182).

Of course, the "hybrid" that Latour is referring to in this passage is the Earth's environment. As a result, what emerges from a world that finds itself increasingly enmeshed in a deteriorating environment is a demand for a new type of politics that can adequately manage it. In order to bring about this end, many are arguing for a political ecology that grants rights to nonhuman entities, like an endangered species of trees. While this has not yet taken place, if this were to occur, then the environment that human beings find themselves in is no longer something to be subjugated or harnessed as a mere resource; instead, the environment is now something that should be treated with a respect that is not unlike the respect we accord fellow human beings. This sort of respect could (at the very least) realistically put out of reach a variety of natural resources commonly utilized by human beings on an industrial or personal basis, thereby placing new practical limitations on human freedom.

Perhaps most importantly, there is the idea that we are becoming increasingly systematized through the lessening distinction between what Latour calls the human and the nonhuman. Latour takes great care to elaborate on this initially confusing notion by dispelling the modernist's tale of progress, which is grounded in a distinction between subject and object. Using what he calls the "arrow of time" (which is merely a metaphor for the unidirectional and linear flow of time), Latour paints a picture of both the modernist and his perspective on what the flow of time has in store for "clarity." From the modernist perspective, the advance of time will bring nothing but an increasing distinction between subject and object. This growing distinction is usually justified by advances in technological and scientific innovation, which serve as further clarifications and enhancements of the objective knowledge that these fields represent. By virtue of these discoveries, the contrasting side of this equation, the subjective, is distanced from the objective, and the nuances of morality and other aspects of life that belong to the subjective will be increasingly recognized for what they are: considerations that cannot, by hypothesis, have any objective standing or veracity.

While this picture is not without its charm, Latour argues that this modernist conception of the world is fallacious and is contrary to the truth. Rejecting the subject/object distinction as an unwarranted relic of the past, Latour contends that in his world of humans and nonhumans, the advance of science and technology do very little to widen a distinction between these two entities; in fact, Latour argues that the converse is actually the case. Latour justifies this by pointing out how the sociotechnical imbroglios that we find ourselves in, which can be anything from increasingly technological day-to-day arrangements to fundamental shifts in organizations within society, contribute to the decline in this

distinction. Latour uses a "pragmatogony" (what he describes as a "mythic origin of technology) that details relations between human and non-human entities throughout history, which increase in complexity with each advancing stage. The argument becomes clearer as he elucidates the details of his pragmatagony: "If the successive crossovers are summed up, a pattern emerges: relations among humans are made out of a previous set of relations that related nonhumans to one another; these new skills and properties are then reused to pattern new types of relations among nonhumans, and so on; at each mythical stage the scale and the entanglement increase" (Latour, 2004, p. 189). While this may sound like picturesque progress in a modernist narrative, this situation is complicated when what is being "reorganized" is examined with greater scrutiny. Latour believes that the most recent crossover in the relation between humans and nonhumans is taking place in political ecology, where we see the granting of rights, privileges, and legal standing to entities that do not exemplify any sort of recognizable agency or intelligence; most importantly, these entities are not human.

The crossover between human and nonhuman becomes far more perilous for human freedom when we consider the type of order that we often find machines in. While it is certain that there are computers with heuristic algorithms that are employed in the machine-driven "social orders" that Latour speaks of in his essay, most hierarchies that employ machines resemble a centralized, assembly-line structure that leaves little room for freedom or error. Streamlined for efficiency, these types of organizations do not value any sort of creative input from a "free-spirit" or "thinking thing." An example of a hybrid that has emerged from this concept can be found in the systematic nature of 20th century governmental bureaucracy. A more assembly-line approach can be seen in the way that

governments approach their constituents, if only because of their sheer numbers. Instead of being known simply by my name, I am also known as a social security number, which has very little to do with the qualities I possess as a human being. Of course, as far as efficiency is concerned, who I am on a personal level has little to do with the IRS and their collection of my income taxes every year and the efficiency of that process. Also, it would be unfair to presume that these systems are not without their benefits; after all, an increase in efficiency inherently implies a decrease in waste and other undesirable qualities that plague less-regulated systems. Unfortunately, the implications that these crossovers have for the way we pattern relations among humans, specifically as it pertains to human freedom, can also be devastating. If more of such crossovers were to occur, then any meaningful sense of human freedom would be severely compromised, for we lose flexibility as human agents when things become over-systematized. This is most clearly seen in the lack of attention given to the individual in such grandiose systems, and a clear example of this can be found in No Child Left Behind (NCLB). While the intent behind NCLB is probably a good one, the means through which it attempts to elevate national standards for education, standardized testing, are questionable at best. Through a long chain of accountability and harsh punishments, what emerges from NCLB is a culture that encourages "teaching to the test," sacrificing much of the open-ended elements of a good education. This over-standardization of a school's curriculum can have severe consequences, for it limits a child's exposure to valuable information.

Of course, it could be objected that NCLB does not represent the death of human freedom. Clearly, this is the case; especially with the advent of the internet, one need not feel absolutely damned to a life of ignorance due to NCLB's (or any other misbegotten

educational policy's) shortcomings. If an individual possesses a desire to learn and seek out knowledge wherever he or she may find it, then all he or she needs is access to a public library that has computers with internet access, something that is wonderfully easy to find in the 21st century. It may be difficult for people who come from disadvantaged backgrounds to obtain the type of education that they need to become successful in life; however, this pursuit has not been rendered impossible by NCLB. As a result, the claim that the over-systematization of education (or anything else, for that matter) in the United States destroys human freedom cannot withstand criticism. While it may make certain pursuits more difficult, it does not completely preclude their possibility.

I agree that it would be ludicrous to presume that NCLB represents such dramatic consequences for human freedom, so this objection is not without merit. In principle, it is true that, even in the most underperforming of public schools, the potential for a student to obtain a high-quality, enabling education still exists. However, the broader implications of the restrictions NCLB inadvertently imposes on students in the United States are harrowing. For instance, it is a given that not everyone has practical access to public libraries or computers with internet access, whether due to a lack of adequate transportation or other mitigating circumstances. Even if this were not the case, an individual without an adequate grasp of the English language will be unable to harness the information that he or she could find in his or her educational pursuits outside the classroom. Of course, one could venture that this agent could obtain an adequate grasp of the English language in an environment where students were "taught to the test" as long as the standards of those tests represented what would constitute a competent understanding of English language. Unfortunately, this objection does not hold up to empirical scrutiny. Graduation rates across the nation,

especially for students that come from disadvantaged and traditionally underrepresented backgrounds, remain abysmal for the United States. It could be argued that not even graduation from high school represents the quality of education required for responsible decision-making in the 21st century. I agree; however, the fact that not even this standard can be met is troubling, and it signifies that over-systematization, especially viewed in conjunction with its tendency to whittle-down the scope of a school's curriculum, is anything but a boon to education. While it is likely that other causes may have contributed to these abysmal graduation rates, such as an abusive home environment or parental neglect, this does not absolve the public school system from responsibility in this matter.

The broader significance that the decline in education holds for human freedom is catastrophic even when viewed on its own. Generally speaking, students suffer from a decrease in information in a classroom haunted by the specter of standardized testing. With this decrease in information, an agent's ability to make informed and responsible decisions may be compromised, which is detrimental to the idea of a truly free agent, because an agent without meaningful autonomy is not truly free. After all, individuals that lack the kind of autonomy required to make free and responsible decisions may find themselves susceptible to manipulation by demagogues and other persons of influence, which renders them more like cogs in a machine than individuals to be valued in and of themselves.

Unfortunately, this contributes even further to Latour's notion of overstandardization by extending it even further into the realm of the political and the management of human beings. From a bird's-eye, abstracted view, two things happen to the garden of forking paths.

First, the range of options available to an individual is limited by the over-systematization Latour's model seems to get at. As we develop newer technologies, we

employ the methods of organization that stem from those new technologies to the human sphere, thereby reducing its difference from the world of the non-human. In the case of education, we are employing standardized, assembly-line like tactics to disseminating knowledge to our children. Of course, these assembly-line tactics extend to other realms of human influence, but education represents one of the more important elements of our society relating to responsible decision-making. In any case, let us assume that standardized education devoid of any real worth to a child's education continues unabated. When the child is not cultivated into a responsible, well-informed decision-maker, we end up with a model that is even more restricted than what emerges from a society in which we all have to live together in close quarters (noise ordinances and similar mitigations of more trivial freedoms); what comes to be is an agent that lacks the capacity for advanced foresight, which can affect his or her understanding of the options available to him or her. Therefore, the options available to an agent in the "garden of forking paths" are diminished even further.

What we are left with now is an algorithm that is barely functional. While the agent in question still (at the moment) surpasses the unsophisticated, simplistic algorithm of a recipe for black bean brownies or the slightly more complex methods introduced by Mill, Latour's notion that technology is heralding a decreasing distinction between the human and the nonhuman could lead to a decrease in the distinction between the more heuristic nature of our algorithmic analogue and the simplistic algorithms seen in our previous examples. While largely due to a decrease in options available to an agent, the modification of the algorithm representing the agent itself also cannot be ignored. As previously stated, if an individual is not cultivated as a responsible decision maker, then his or her ability to make responsible decisions is circumvented due to a lack of foresight as well as by any direct, circumstantial

limitations that may arise from technology.

In the end, it seems as if we would be heading towards a practical "garden of options" similar to one that Boethius would implement. However, this system is without the willful action that makes his system ontologically meaningful. In Latour's world of creeping systematization and the decreasing distinction between human and non-human, human freedom has little future. Therefore, it seems as though if we were to take Latour's analysis as truth, technological and scientific innovation hold nothing but grave consequences for what we consider human freedom to be. Aside from subscribing to metphysical systems that provide relief from these quandries (which are not necessarily invalid ways of approaching this sort of system), it seems inescapable that human freedom is a wash under this analysis. However, there are several objections that could be made to this bleak view of how technology shapes human civilization, and while it involves many similar elements, the implications of these two discussions of technology could not be any more disparate.

The Social Dimensions of Technological Innovation and Their Significance for Freedom

Thankfully, one can lodge objections to this grim view of the decreasing distinction between the human and nonhuman. Especially in light of our earlier discussion of the difference between a heuristic and a simple, non-heuristic algorithm, I contend that the most promising area to launch a critique of Latour's analysis lies in his conflation between order and social order. Even if we are to commit grave errors of what Dennett calls "greedy reductionism," which is tantamount to trimming human beings down to being merely heuristic algorithms, there is an enormous difference in predictive power, foresight and "intuition" between a heuristic algorithm and a simple algorithm that can never be more than the sum of its instructions. I believe that the former of this pair represents the more open-

ended nature of human social orders and the latter the more constrictive nature of any order that machines may exhibit. Machines, at least at this stage of our technological development, cannot rise above the limits of their material existence, whether that be the most advanced artificial intelligence or the simplest pulley- or lever-driven assembly. On the other hand, even if we concede that human creative potential and social orders are determined, they are significantly more complex when we consider all of the cultural trappings humanity has generated in the past 10,000 years. While our concepts of justice, language, morality and truth may all be formulaic in some sense, they are often not reducible to mere algorithms; at the very least, they are heuristic in that they are clearly more than the sum of their parts.

While Latour's argument does not ignore the social realm of technological innovation, I do not believe that he gives it the fair treatment it deserves. It is clear that there is significant crossover from the nonhuman world into the human world, hence implying a social dimension to technological innovation, but Latour's portrayal of this influence is unidirectional. Andrew Feenberg, another thinker who has focused many of his efforts on the philosophy of technology, contends that these sorts of examinations ignore the influence that human beings may have on technological innovations themselves. One of his more significant examples comes from safety issues in steamboat boilers in the 19th century:

> Steamboats were necessary in a big country without paved roads and lots of rivers and canals. But steamboats frequently blew up when the boilers weakened with age or were pushed too hard. After several particularly murderous accidents in 1816, the city of Philadelphia consulted with experts on how to design safer boilers, the first time an American governmental institution interested itself in the problem. In 1837, at the request of Congress, the Franklin Institute issued a detailed report and recommendations based on rigorous study of boiler construction. Congress was tempted to impose a safe boiler code on the industry, but boilermakers and steamboat owners resisted and government hesitated to interfere with private property (Feenberg, 2004, p. 219).

Of course, as Feenberg points out, the safety hazards posed by substandard boiler

construction did little to dissuade passengers to stop using the steamboat. After all, these

individuals needed to get to different places in a large country, so they would often take

steamboats out of necessity and a lack of any viable alternatives. Still, due to the deaths of

thousands more between the time Congress first looked into the issue of boiler safety in 1816

until 1852, when Congress passed legislation regulating the manufacture of boilers, around

5,000 people were killed due to accidents caused by boilers (Feenberg, 2004, p. 219).

However unfortunate the loss of those lives may be, Feenberg points out that this

development is significant to establishing the influence of social change on technology:

> The accident rate fell dramatically once technical changes such as thicker walls and
> safety valves were mandated. Legislation would hardly have been necessary to
> achieve this outcome had it been technically determined. But, in fact, boiler design
> was relative to a social judgment about safety. That judgment could have been
> made on strictly market grounds, as the shippers wished, or politically, with
> differing technical results (Feenberg, 2004, p. 219).

As Feenberg demonstrates, the issue of public safety became inextricably intertwined with

the development of the boilers when Congress intervened and mandated that manufacturers

produce safer boilers. Far from a knee-jerk reaction one would associate with a simple

algorithm, the human capacity for voicing concern and enacting change through the exertion

of social (and consequently political) influence is indicative of a more complex, heuristic

algorithm at the very least. Therefore, it seems an error in judgment to compare the order we

see in machines and assemblages of machines to human social organization. Feenberg cites

another example of the social realm's influence on the scope of technological innovation, this

time on the propensity for human beings to force systems to adapt to their social needs:

> It is instructive to compare this case to the movements of AIDS patients. Just as a
> rationalistic conception of the computer tends to occlude its communicative
> potentialities, so in medicine, caring functions have become mere side effects of
> treatment, which is itself understood in   exclusively technical terms. Patients
> become objects of this technique, more or less "compliant" to management by

physicians. The incorporation of thousands of incurably ill AIDS patients into this system destabilized it and exposed it to new challenges (Feenberg, 2004, p. 224).

In this way, AIDS patients and those subjected to sub-standard school systems hold at least one thing in common: the over-systematization of the situation that they are in. Much like the AIDS patients spoken of in Feenberg's example, students in underperforming schools become the "objects" of the curriculum that guides their learning process, and they become "compliant" to the management techniques employed by their superiors, whether they be teachers or educational administrators. The more beneficial aspects of education are reduced to statistical values and thus become "understood in exclusively technical terms." Also, much like the medical system responding to "thousands of incurably ill AIDS patients," public school systems are strained by the introduction of millions of "at-risk" students, which often leads to disciplinary problems as well as the pre-existing problem of inducing genuine learning. Feenberg continues with his analysis of AIDS patients and their resistance to a "highly technologized medical system":

> The key issue was access to experimental treatment. In effect, clinical research is one way in which a highly technologized medical system can care for those that it cannot yet cure. But until quite recently, access to medical experiments has been severely restricted by paternalistic concern for patients' welfare. AIDS patients were able to open up access because the networks of contaigion in which they were caught were paralleled by social networks that were already mobilized around gay rights at the time the disease was first diagnosed (Feenberg, 2004, p. 214).

In this regard, the potential for AIDS patients to organize into an effective force was already present due to the fact that they generally contracted the disease from the social movements they were already involved with. Their capacity for mobilizing around a cause was already present. Of course, one could argue in either direction regarding "at-risk students" and the demographics that they represent. What is not evident, however, is how they are particularly precluded from organizing in a fashion similar to the AIDS patients mentioned in Feenberg's

example.

> Instead of participating in medicine individually as objects of a technical practice, they challenged it collectively and politically. They "hacked" the medical system and turned it to new purposes. Their struggle represents a counter tendency to the technocratic organization of medicine, an attempt at a recovery of its symbolic dimension and caring functions (Feenberg, 2004, p. 214).

It is clear that the obstacles "at-risk" students in underperforming schools face are far more daunting than those that faced the AIDS patients in this example, who benefited from preexisting social networks from which they could project influence and effect change. However, what is also clear from this example is that the sorts of populations represented by at-risk students are subject to these substandard conditions. While they are certainly a fact of life for many individuals throughout the world, the human capacity for counter-organization against injustices and unfair systems is something that mere machines cannot currently replicate. This is largely due to the intuition that humans display, and it is not important to the practical dimension of this paper whether or not that is due to their status as extremely advanced heuristic algorithms or beings with some kind of an immaterial mind that is not bound by the rigid physics that exists at the level of the human brain. Either way, human beings need not bow helplessly before the onslaught of technically determined innovation; such fatalism, even if tempting, is not warranted in even the most determined of universes where no ontological freedom exists. Practically speaking, human beings do have the ability to resist this force, which makes them practically free to do so.

In an ironic sense, technology can even contribute to this type of counter-organization. Instead of being limited by more traditional means of disseminating information, which rely on the distribution of leaflets and slow-traveling word of mouth, people in the 21st century can transmit information at previously unheard of speeds through

the internet and other forms of mass media. Message boards, chat rooms, and websites all form unique venues through which people can form advocacy and special interest groups that focus their efforts on unique cases of injustice or oppression. If we relate this back to the "garden of options," several new options, hence forking paths, are available to the agent *because* of technology.

Instead of being limited by preexisting methods of information transmission, the agent now has multiple venues for advocacy, which constitutes an increase in his or her freedom. While it is also true that the increase in information transmission may "drown out" an agent's voice for change, it is now less likely that it will go unheard. This is an improvement in one's practical freedom that most people would favor.

Conclusion

It is true that there is considerable torque left in Latour's point that technological innovation may have damning consequences for human freedom. After all, with the ever-decreasing distinction between the human and the nonhuman being something we must confront, technology only seems to fuel the fire of that decreasing distinction. However, as Feenberg demonstrates, this is not necessarily the case.

Even in a world where cultural homogenization seems imminent, marginalized underrepresented or special interest groups have the potential to resist centralized, systemic modes of organization that are unfavorable to them; while it is true that technology often fuels these systems, it is not the case the technology is essentially bad. In fact, these groups can often make use of technology in order to gain momentum and influence. Technological innovation is a mixed bag when it comes to human freedom, carrying with it both favorable and unfavorable consequences for what we conceive of as human freedom.

In the end, some might object that while technology does bring about new venues of advocacy and expression for the individual, they are made inherently less valuable due to their multiplicity and increasing popularity in such a technological world. However, I do not believe that this necessarily follows. It is true that the plentiful nature of advocacy with the advent of the internet makes each protest less unique, but it does not make them less valuable in any inherent sense; the agent is still saying what he or she is intending to say, and he or she is simply doing it with the aid of technology. This objection begs the question of what it means to be inherently valuable, which lies far outside the scope of this thesis, but the increased presence of voices does not necessarily mean that they are without value. Indeed, one could make the argument that an increase in influence can result from such an increase in the volume of a particular type of advocacy, thus making it more valuable in a practical sense. This increase in influence also holds true for differing forms of expression through technological means, since something is automatically deprived of value due to its origins in technology.

Admittedly, my theory of practical freedom is far from comprehensive, and it only addresses one of many controversial issues that affect the freedom of human agents in the 21st century. However, I believe that this theory takes into consideration the idea of realizing the potential for human freedom from the ground up (in the naturalistic sense of seeking out natural causes to explain various phenomena), which is what any good theory grounded in empirical reality attempts to do. Of course, this theory does not make it possible for every individual to make their wildest dreams come true; in fact, it is fortunate that it does nothing of the sort. Instead, it does provide a theoretical model in which individuals can find the *potential* to enact change that stems from their wills, even in light of something as

intimidating as technological innovation and the centralized, hegemonic power structures it

facilitates.

Conclusion

After the discussions presented in this paper, it would be a stretch to call the debate over human freedom "settled" in any overall sense; admittedly, something as tremendously difficult as ruling out the possibility for ontological freedom is outside the scope of this thesis. However, in the first part of the thesis, I have strongly rejected the most comprehensive attempt at reconciling naturalism and Libertarian freedom, two doctrines that have, to date, resisted any such grafting onto one another. In Kane's case, this is because the incompatibility of these two systems of thought forces him into the dilemma of either abandoning naturalism or failing to make sense of the agent's control over his or her decisions. The incompatibility that generates this dilemma stems from differing conceptions of agency. While naturalism contends that human agents are determined creatures of the natural order, traditional libertarian doctrines have insisted on an undetermined form of agency that defies all current scientific knowledge about the brain; it is this radically metaphysical type of agency that gives Libertarian theorists the ability to evade the ominous chains of determinism while giving the agent a great degree of control over the decision that he or she makes. Unfortunately, Kane cannot account for both of these doctrines with his theory. He must choose between one or the other, as providing for the demands of Libertarian freedom within a naturalist framework is impossible.

These types of uncomfortable decisions are not new in the intellectual tradition. In fact, one of the more famous dilemmas similar to Kane's came about with the dawn of the Copernican Revolution. Prior to this advance in astronomy, it was widely held that the Earth, not the Sun, was the center of the universe. In these geocentric models of the universe, planets, themselves perfect circles (not spheres, as we hold them to be today), orbited the

earth in a circular fashion. As one might expect, however, astronomers before Copernicus

had to make extensive modifications to this model of the universe in order for it to account

for all of the observable facts available to astronomers of that time. Of these observations, the

retrograde motion of planets in the sky and the tendency for some planets to appear closer

than usual at certain times caused the greatest problems for astronomers that believed planets

orbited Earth in a circular pattern. These observations prompted astronomers to respond with

the invention of the epicycle, which consisted of a deviation from its normal circular orbit

around Earth. Conveniently, epicycles addressed the problems of retrograde motion and

planets appearing larger than normal at different points in their orbit around earth. However,

unfortunately for epicycles and proponents of geocentricism, it is demonstrably not the case

that the Earth is the center of the universe or that the planets follow a circular orbit (complete

with epicycles) around Earth. Granted, Copernicus didn't have it all right, either. There were

still metaphysical trappings in his model of a heliocentric universe, and it is absolutely

certain to any astronomer (and most educated individuals) that the sun is not the center of the

universe.

Regardless, what makes Copernicus' model so powerful in the history of science is its

reformulation of fundamental assumptions about our existence in light of empirical fact.

Especially at the time when Copernicus came up with this model, it was particularly

dangerous to propose ideas like this. This is largely due to the fact that, in addition to flying

in the face of centuries of scientific tradition, Copernicus' model endangered the perception

that mankind's existence was privileged in the universe. After all, it seems absurd that the

sun, a mere source of light, should be privileged as the center of the universe. Naturally, this

paradigm shift was not without its important metaphysical implications, and these made it

especially hard to accept.

Today, most of us would find a model that posited the Earth as the center of the known universe laughable. In contrast, even if Kane's theory does suffer from conceptual problems, no reasonable person can find it ludicrous. It is likely that there are many reasons for this, but one of the more significant reasons Kane's theory has such appeal and staying power is that it plays to our own intuitions about freedom and responsibility, which are formed through the experiences we have in the world on a daily basis. Kane's model, even though it may have its eccentricities when dealing with quantum indeterminacy and deterministic chaos, squares nicely with the important decisions that many of us have had to face in life, and its defense of the strong type of free will many seek certainly does nothing to dull its luster.

This appeal can be seen in an image that was briefly alluded to in the previous section, involving an author and the development of a female heroine:

> Imagine a writer in the middle of a novel. The novel's heroine faces a crisis and the writer has not yet developed her character in sufficient detail to say exactly how she will act. The author makes a "judgment" about this that is not determined by the heroine's already formed past which does not give unique direction. In this sense, the judgment (*arbitrium*) of how she will react is "arbitrary," but not entirely so. It had input from the heroine's fictional past and in turn gave input to her projected future. In a similar way, agents who exercise free will are both authors of and characters in their own stories all at once. By virtue of "self-forming" judgments of the will (*arbitria voluntatis*) (SFAs), they are "arbiters" of their own lives, "making themselves" out of a past that, if they are truly free, does not limit their future pathways to one. (Kane, 2005, p. 145).

This image is not one that many would laugh off as absurd psuedo-science, infused with indefensible metaphysical propositions that are scientifically indefensible. However, even by Kane's own admission, our philosophical intuitions about consciousness and what goes on in the brain are often dead wrong when we look at the data coming in from neuroscience. If we

are to put any stock in my refutation of Kane, then just like the Cartesian Theater, a naturalist doctrine of freedom that requires the fulfillment of both AP and UR is just as scientifically indefensible as a geocentric model of the universe.

I argue that the conceptual difficulties that arise in Kane's theory stem largely from his infusion of metaphysics into science. While nature tends to work in terms of gradation, metaphysics tends to make sharp delineations and distinctions when approaching the world. Kane's theory bears this idea out; the agent must be free to choose between option A and option B *at time t*, and there must be a privileged "regress stopper" located within the agent so that we can hold him or her ultimately responsible for his or her actions. The metaphysics of Descartes, Kant, and other proponents of Libertarian freedom draw sharp lines between the mind and the body, noumenal and phenomenal, and other elusive explanatory devices that appeal to the macroscopic intuitions that come naturally to many of us. Unfortunately, in addition to its tendency to upset our intuitions when things get really small, the natural world often resists the sharp boundaries we try to impose upon it. Even though it is one of our most intimate intuitions about existence, no scientific evidence can be found to support the idea that there is a place where everything "comes together" to form consciousness in the brain. The exact nature of consciousness, in and of itself a mysterious product of the brain, continues to elude neuroscientists and philosophers alike. However, a fact that has not escaped our attention is that if we are to put any stock in the findings of neuroscience, then our most intimate intuitions about consciousness have been horribly mistaken all along.

The metaphysical significance of Libertarian freedom is no less clear than the metaphysical importance the geocentric model of the universe once held. Libertarian freedom lays claim to naïve (which is not to say childish or unimportant) intuitions about justice,

responsibility, interpersonal relationships, success, failure and a host of other concepts that have an important role in the day-to-day affairs of humanity, and the conceptual muddle it has found itself in is inextricably connected to how we view ourselves. Some feel that the loss of credibility this type of freedom is experiencing is dealing a considerable blow to the idea that mankind has a privileged place in the natural order. This may be true in some sense, and it is also true that naturalism has not helped in restoring credibility to this idea. However, naturalism has not been been a detriment to the idea that we have a special place in the natural order. While the special nature of our place in the world is not magical, there is a naturalist argument for the uniqueness of human beings. Even though naturalism insists that our brains are the location of the human mind and that our brains are determined, our capacity for foresight, judgment, compassion and morality extends far beyond anything our non-human cousins can muster, even non-human primates.

Furthermore, acceptance of the determined nature of human beings could also be a boon to society in a variety of ways, and the justice system could serve as an example of this. Sadly, it is no secret that there is a disproportionate representation of minority populations in the United States prison system. Aside from outlandishly racist arguments that would attribute this unfortunate fact to the genetic constitution of these minorities, it is clear that environmental considerations hold a great deal of responsibility in this situation, and yielding to a compatibilist perspective could arguably lead to placing more importance on discovering the root causes of this problem rather than focusing on mere punishment. Of course, suggesting that punishment would play no role in a justice system that subscribed to determinism is absurd; at the very least, holding criminals accountable for their actions is crucial to maintaining the established order. Without any semblance of accountability, the

justice system would lose any efficacy it might otherwise possess. Regardless, if the spectrum of opinion in society were to shift toward compatibilism, then identification and resolution of the problems that cause a disproportionately higher number of minorities to be incarcerated would be far more important than doling out punishment.

Another example in which the benefits from this sort of paradigm shift can be seen lies in education. From a determinist's perspective, the proper emphasis in education lies in the cultivation of the child as a responsible decision-maker. Of course, placing an emphasis on individual initiative and achievement would still be an important part of education under the auspices of determinism. While the effects of praise and blame would arguably be tapered, their importance to the learning process is still not circumvented as they would still be effective motivational tools. However, the bottom line is that assuring an environment in which all students were given an equal opportunity to learn would be of paramount importance under a deterministic framework.

One could object that neither of these examples provides anything that is inherently incompatible with a Libertarian framework. After all, these considerations are important even if we are radically free; even though those who were incarcerated "could have done otherwise," they (arguably) had very good reasons for doing what they did. The influences behind these decisions are still negative, and it would be irresponsible to say that they were not a detriment to society as a whole. Similarly, any reasonable individual would contend that learning is made all the more difficult when a child is exposed to an environment that does not nurture his or her abilities. While it is true that the child is ontologically free in a Libertarian framework, it does not follow from this that his or her educational environment is not an important consideration.

This objection is well taken, and it would certainly be ludicrous to presume that Libertarian frameworks preclude any of the important issues involved in both of these examples. Regardless, the benefit of determinism is that it eradicates ??????? judgments that the Libertarian's strong sense of AP permits. This Libertarianism promotes the idea that, despite the fact that the agent in question (whether it be an incarcerated minority or an "at-risk" student who attends a sub-standard school) was subjected to a harsh environment, someone *can always do otherwise* regardless of extenuating circumstances. Especially in a complicated world where practical considerations can almost entirely abrogate one's freedom, this attitude often obscures the root causes of the negative behavior society ought to strive to reform.

I am convinced that, while initially disorienting and troubling, the fallout from modern neuroscience and naturalized agency will be as insignificant to future generations as the fallout from the Copernican Revolution is to us now; while the roles of the Copernican Revolution in initiating the Scientific Revolution and (arguably) giving birth to modern astronomy are important, most of us moderns find the conclusions it came to quite unexceptionable. In the same way, I am convinced that the trend towards naturalized agency in neuroscience and naturalist circles of philosophy will herald exciting new developments when it comes to how we view ourselves and the world around us. For this, future generations will be as grateful as we are to Copernicus for starting a series of events that had a profound impact on the way we currently view the world. However, I am confident that those future generations will not find the idea that we are determined creatures that are (largely) products of our environment and genetic makeup to be horribly controversial. Far from permanently losing our privileged place in the world, I believe that these sorts of

developments in science and philosophy open up new, previously untrodden avenues for thinkers to explore.

Naturally, this re-imagining of humanity will be intimately tied to scientific and technological innovation. It is obvious that as we find out more about our brains, who we are and what we are will likely become clearer, for better or for worse. Perhaps even more important to our development as a species, however, is the influence that technological innovation has (and will likely continue to have) on our way of life. Nothing in the history of humankind has changed the way that we act, think and feel more than technological innovation, and this becomes especially evident when one examines the exponentially increasing speed at which technology continues to change the way we comport ourselves to the world around us. The internet has, in both good and bad ways, changed the way that we relate to one another in previously unimaginable ways. Dating websites have become a popular avenue for busy, single professionals to find love when their schedules otherwise would not be conducive to it. Social networking sites have made keeping in contact with old friends much easier, and anonymous internet message boards have acted as a modern-day Ring of Gyges, exposing the capacity for some to commit heinous acts when assured of their "invisibility."

Overall, the efficiency granted by the internet and the increased communication it facilitates is beneficial to most of us. However, most of the sites that drive this type of communication do so at a cost to our privacy. Many popular social networking sites use data mining, a technique that uses the personal information of its users for commercial purposes, in order to fund their operations. While it is true that every user agrees to these terms when they create an account on these websites, this does not change the fact that the use of these

services constitutes an invasion of what most people previously considered private. The fact that a particular user of MySpace or Facebook may be fond of baroque music and 20th century British literature may be used by marketing firms for trend analyses without the user's knowledge. For many, this is not an issue of great concern, as the advertisements directed at users on these social networking sites are generally restricted to text-based mediums with small- to medium-sized graphics. Still, it would be interesting to see if this concern were to remain ancillary to the users in question if the advertisements started to talk to them and refer to them by name. I may be speaking solely for myself, but I know that I would find it *tremendously* disconcerting.

The lesson from this trade-off is clear: we must always be vigilant of the freedoms that we abdicate in favor of increased efficiency through technological innovation. In the case of social networking sites, it seems implausible that the data mining techniques used by commercial firms will ever amount to a radical violation of an individual's freedom. After all, this individual must freely choose (without coercion from outside forces, that is) to enter into a contract with MySpace, Facebook or any other site that employs data mining for income. However, it is not the case that the freedoms we give up in light of technological innovation will always be this benign to our overall freedom as human agents. Political ecology, if handled incorrectly, could lead to disastrous consequences for human freedom. The situation, while perhaps wildly implausible from the standpoint of a 21st century United States citizen, may not be so outrageous if the human race continues its current pace of development. A major component of political ecology consists in according rights to non-human entities, specifically to provide them with protection from the overreaching human beings are often guilty of in unregulated free-market capitalism. It has also been argued that our species

crossed the Earth's carrying capacity threshold in terms of population. Suppose for the sake of argument that we had to eliminate 1 billion human beings to ensure the survival of the human race: who would be involved in deciding who will live and who must die? Naturally, a "neutral" entity (like the Government) would step in to administer the cold, hard justice that would be required for our species' survival. Still, even if this process were to be completely random, the only way that I could even consider such an atrocity "fair," it would be tantamount to genocide, and it would certainly constitute an abrogation of human freedom for the unlucky 1 billion chosen to be exterminated for "the greater good."

Let us hope that this sort of situation, which bears significant resemblance to Michael Foucault's concept of Biopower, remains a dystopian musing of thinkers with an overactive imagination. However, even as a mere musing, it cannot be denied that this sort of situation is entirely possible within the scope of our technological development. As such, safeguarding the freedoms that would prevent us from ever entering into such a situation becomes an extremely important consideration. Ironically, the prevention of these abrogations of freedom may be best provided for by increased environmental regulation, which does constitute a violation of some of our freedoms as human agents. Regardless of what would actually prevent such a moral catastrophe, what is required of us as responsible decision-makers is to keep a watchful eye on the effects that technological innovation has on the way we relate to one another and to the future of our species. In short, we should never let things proceed to the point where we can view the extermination of 1 billion human beings as an ethically permissible action. To live with ourselves after such an awful occurrence would require that we relegate those 1 billion human beings to sub-human status, something that blunts the force of any major ethical system. While the loss of such ethical systems might not result in

our death as a species, it would constitute a loss of what makes us human (if any of our current accounts of what that is are to be taken seriously).

Understanding the potential that modern technology has for human societies becomes extremely important if we are to make it through the next hundred years. Specifically, the impact that development of new technologies has on the way we relate to one another and the world around us is crucial to our survival as a species. Of course, it could be argued that technological and scientific innovations happen at such a rapid pace that keeping tabs on their effects on society as a whole is a fool's errand; it simply cannot be done. This may be so, but this only enhances the appeal that doctrines designed to curb this tendency have for individuals that feel our technological advancements, among other things, have been recklessly pursued at break-neck speed.

It may be objected that doctrines like the precautionary principle are anathema to healthy economic development; this has been the line of many conservative hardliners. I cannot argue that this is not the case, but I can contend that, like any other important decision, any course of action that we choose with regard to our pace of technological innovation will have enormous consequences for the human race, whether they be good or bad. These developments and their consequences will have a significant role in defining what we become as a species in the not-too-distant future. It is too early to predict whether or not these changes will be good or bad. While our development has heretofore been extremely reckless, causing the extinction of far too many animal species and the destruction of far too many environments, programs like Cradle to Cradle, which emphasizes ecologically sustainable development, provide hope that humanity may find a means to satisfy its urge to create in ways that are simultaneously environmentally sound and profitable.

Throughout the course of defining who we are and what we are, the freedom to act in one way or another (even if it isn't ontological) is integral to a flexible approach to this problem. If we cannot act with such flexibility, then we really are determined in the most rigid sense possible. However, if we do keep our wits about us and maintain the freedoms we all hold so dear, then any failures we may be guilty of will not be due to a stark lack of options. It will be because we made mistakes, and, in one way or another, it is likely that we will be held accountable for them.

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