

METAPHOR: A BRIDGE BETWEEN
SCIENCE AND ETHICS

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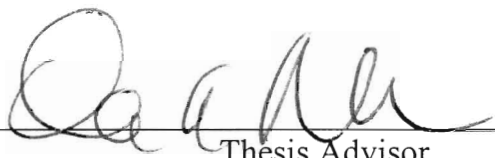
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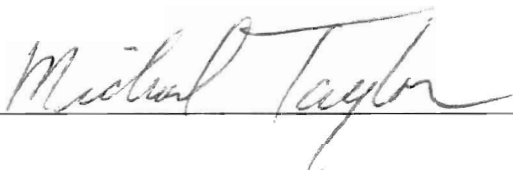
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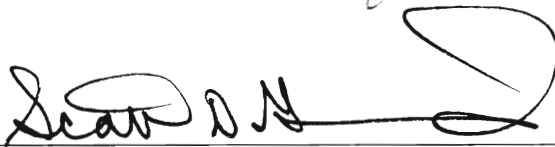
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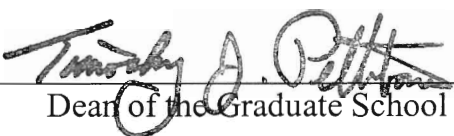
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Chapter I: Introduction

Motivation

Science and ethics are two areas that within philosophy are often considered disjoint. A typical separation between the two delineates science as a description of the way things are, while philosophy, especially ethics, is concerned with an evaluation of human action and how we ought to be. One historical motivation for this split can be referenced to Hume's mention of the *naturalistic fallacy* (sometimes called the "Is-Ought" or "Fact/Value" problem) in his work, *A Treatise of Human Nature* (3.1.1.27). The naturalistic fallacy claims that a person cannot maintain logical validity and simultaneously draw a valued conclusion from a set of purely factual premises. For example, given that a soft drink contains poison, a person cannot logically conclude that the soft drink should not be ingested unless it is also the case that a person should not consume poisoned drinks. Simply put, the naturalistic fallacy concerns itself with surreptitiously placing value where none is conventionally found. Thus, fear of committing the naturalistic fallacy gives is a reason to be cautious about injecting moral value into science or deriving moral value from science. Nevertheless, people still combine scientific theory with ethical considerations, for example, in *Social Darwinism*. A question naturally occurs: What, if anything, is the underlying connection between science and ethics? Dr. Doren Recker's work with metaphor suggests a possible answer.

Dr. Recker is investigating the cognitive functions of metaphors, especially metaphors used in science. It is my understanding that part of his research maintains that

successful metaphors used in science are misused in pseudo-science, e.g., in the evolution-creationism debate. Recker's work brings out two ideas: (1) the idea that metaphor can play one of two basic roles—either as a cognitive tool for understanding or as a rhetorical tool for more colorful language—and (2) the idea that metaphor can be a bridge between two areas.

This paper explores aspects of metaphor theory that lead to a possible application of metaphor as a cognitive connection between science and ethics. I suggest (although do not fully defend) that this is the first step in an exploration into the possibility that the success of the use of metaphor in science is “bleeding” over into the use of metaphor in ethics. Several case studies suggest this: understanding the world as “a machine” vs. the world “as an organism” as used in science and ethics, “survival of the fittest” in Darwin's evolutionary theory with “survival of the fittest” in Social-Darwinism's socio-economic-political theory. Although it would be an interesting empirical pursuit, this thesis is not concerned with proving that the successful use or misuse of metaphor in ethics is causally related to the successful use of metaphor in science. In other words, the thesis is not trying to establish a causal relationship between metaphor in science and metaphor in ethics. Instead, this project sets out to investigate aspects of metaphor theory and metaphor as used in science and ethics. I hope to clarify the role of metaphor as a hypothetical foundation for a cognitive connection between science and ethics. I ultimately conclude that since metaphor structures thought by providing a mechanism for understanding one area in terms of another, it should be no surprise that when science and ethics use metaphor, then there will be a connection between the two.

Outline

This thesis is roughly divided into three parts: Theory, application, and miscellaneous information. Chapter two concentrates on the evolution of metaphor theory as seen through the path of three traditional theories of metaphor: Comparison, Interaction, and Speech-Act. This chapter is not attempting a complete analysis of those three theories, but trying to understand how to get to a cognitive view of metaphor. Chapter three continues this exploration by examining Donald Davidson's comments on metaphor. We further explore George Lakoff and Mark Johnson's account of metaphor. Ultimately, we see how a cognitive view of metaphor endorses understanding one area in terms of another. Chapter four begins the first of the application chapters. In this chapter we look at two foundational metaphors "The World is a Machine" and "The World is an Organism." We see how these metaphors structure science and ethics. This is the first major example of metaphor providing a link between science and ethics. Chapter five also is a major example of metaphor linking science and ethics. In this chapter, we look at evolutionary metaphor in Darwin's Theory of Evolution and how his metaphors are then used in ethics. Chapter six presents three short examples of metaphors in action. We see how the Nazis used metaphor to establish "Truth" (with a capital T) to justify genocide. Then we see how Garrett Hardin uses metaphor to arrive at "truth" (with a lower case t) to solve population problems. Finally, we get back into science by drawing out some implications of George Lakoff and Rafael E. Núñez's work with metaphor in mathematics. Chapter seven finishes the thesis by offering a summery and conclusion.

Chapter II: Traditional Theories: the Big Three¹

The first part of this project involves exploring the nature of metaphor. This will involve trying to establish a basic idea of what metaphor is by looking at specific theories of metaphor: the comparison theory, the interaction theory, and the speech-act theory. This section concludes with elements extracted from these and other theories.

Generally, it is understood that language can be separated into either literal or figurative objects. For example, the phrase “He was caught red-handed” originally could have referred to catching a murderer with bloodstained hands. Today this phrase can display other literal or figurative meanings. “He was caught red-handed” could still be literal (in the case that “he” had a painting accident that resulted in his hand being covered in red paint) or figurative (in the case that “he” had been caught committing a crime). Traditionally, a metaphor is a part of figurative speech in which one class of objects refers to another class of objects.² For example, “My work is a sea of troubles” associates the classes “things that are my work” with “a sea of troubles.” Before examining the different theories, it may be helpful to specify some of the terms employed to describe differing aspects of a metaphor. Consider the simple metaphor “Jean is a turtle.” I define a simple metaphor as a metaphor that can be symbolized “S is P.” “Jean is a turtle,” for example, can be symbolized as “S is P” where S stands for “Jean” and P stands for “a turtle.” We can look at “S is P” either as a whole, which is the frame/focus,

¹ This follows Martinich’s outline from the *Routledge Encyclopedia of Philosophy*.

² Although it is not always clear if this relationship is with underlying metaphysical reality or epistemological understanding.

or at its parts, the target/descriptor. When viewed as a whole, in a literal sense, we are looking at the *frame*³; whereas the *focus* is the statement when considered non-literally, e.g., as a metaphor. “S” is the *target*, the object we are trying to classify (it’s the “unknown,” what Black calls the focus), while “P” is the *descriptor*, an object that has been classified (it’s the known). Another example, “The afternoon sun on a cloudy day is a diamond in the rough” can be rewritten as S is P. A literal interpretation would give the *frame*; a figurative interpretation would give the *focus*; the *target* is S (the afternoon sun on a cloudy day), while P (a diamond in the rough) is the *descriptor*.

Reviewing some common theories of metaphor may aid understanding. According to Martinich, the three most influential theories of metaphor are The Comparison Theory of Metaphor (CTM), The Interaction Theory of Metaphor (ITM), and The Speech-Act Theory of Metaphor (STM).⁴ This review is not aimed as an analysis of all the strengths or weaknesses of these theories. Rather, the review is offered to suggest the path to a cognitive view of metaphor.

³ I’m using Black’s Frame/Focus terms, but not necessarily with his meaning.

⁴ Martinich A.P. *Routledge Encyclopedia of Philosophy*

Comparison Theory

The *Comparison Theory of Metaphor* asserts that metaphors involve a comparison of similarity between two or more objects. Aristotle seems to hold this view in his Poetics, stating, “But the greatest thing by far is to be a master of metaphor. It is the one thing that cannot be learnt from others; and it is also a sign of genius, since *a good metaphor implies an intuitive perception of the similarity in dissimilars.*”⁵ Thus, “Jean is a turtle” involves noting a similarity between “Jean” and “a turtle.” Searle’s essay, *Metaphor*,⁶ implies that CTM involves one or more of the following two claims. First, CTM is a metaphysically based theory, i.e., the two objects of comparison—what I have called the target and descriptor—have to exist, this existence is independent of humans, and the common similarity must also exist. Second, metaphors are literally similes with the “like” or “as” deleted and the respect of the similarity left unspecified. In his essay, Searle attacks each of these claims of CTM.

Searle gives two examples of how it is possible to have a metaphor in which one part does not really exist, attacking the claim that CTM is metaphysically based. The first example is “Sally is a block of ice.” Searle points out that this does not mean literally that $(\exists x)$ (x is a block of ice, such that x is comparable to Sally). Instead, “Sally is a block of ice,” under CTM, compares properties shared by Sally and a block of ice. Searle, however, objects that it is not always possible to find a literal similarity between the objects of comparison. In the example, “Sally is a block of ice” we interpret that Sally is cold and hard.⁷ Yet, “Cold” and “Hard” are not predicates that “Sally” and “a

⁵ Aristotle. Poetics. 1459^a

⁶ Reprinted in: Martinich, A.P. The Philosophy of Language. 408-429

⁷ Searle uses a paraphrase, Sally is an extremely unemotional and unresponsive person. However, this does not seem to capture the metaphorical meaning. A problem that Searle mentions later in his essay.

block of ice” literally share.⁸ If we literally meant Sally is cold and hard, then we could just as easily say, “Sally is a block of granite in the dead of winter.” Yet most people understand that comparing Sally to a block of ice or a block of granite does not necessarily give the same meaning. For example, in certain contexts, comparing Sally to either a block of ice or a block of granite would depend on a person’s perception of Sally as a either a romantic object or a casual acquaintance. Suppose Sally acted unmoved by compassion or unyielding in certain situations. In such a case, we might say that Sally is cold and hard. If a person, however, were inclined to pursue Sally romantically, while Sally acted cold and hard toward that person, then the person—when searching for an expression to capture his ideal of Sally—would call her a block of ice. If the same person, however, were inclined to treat Sally as just another person and Sally acted cold and hard toward life, then she would be more properly classified as a block of granite.

However, context can change this analysis. Dr. Taylor, one of my advisors, pointed out “If I were to describe Sally’s demeanor toward others, then a ‘block of ice’ might be more appropriate. Suppose S. is alienated from her family—her children, say. Then, if she remained unmoved and impervious by attempts to restore relations, we would likely use the ‘block of ice’...” I think that this brings up the interesting notion of how physical experiences influence the metaphors we use. Heat or coldness often characterizes emotional states. For example, we often hear of “The flaming passion of love,” “The frosty glare,” “The fight was a heated exchange,” “You’re as cold as ice,” etc. Lakoff and Johnson claim that these metaphors, like many metaphors, have a physical basis characteristic of experience.⁹ Physically, like many animals, we humans heat up when

⁸ Assuming that Sally has not been dead for a while.

⁹ Lakoff and Johnson. Metaphors We Live By. E.g., chapter four

excited, e.g., while experiencing love or fighting; we cool down when distancing ourselves, e.g., shock; and in extreme cases, our manner is such that people feel like we are drawing heat out of the surroundings (or even them!), e.g., we are “cold as ice.”¹⁰ I think that the case of Sally and her estranged family properly falls within this latter category, i.e., Sally has gone beyond just distancing herself like a true stoic. Sally presents an image that people “feel” to be cold; she is sucking the life out of them or the heat from the surroundings. This is an example of the experiential aspect of metaphor covered in chapter 3. I fully agree with Dr. Taylor that his case of “Sally and the Estranged Family” would be one in which it was not appropriate to say that she is a block of granite. However, I submit that there are cases, e.g., Sally the Stoic, in which a block of granite is more appropriate as a metaphor, and there are cases where the block of ice is more appropriate.

Searle’s next counter-example aims at demonstrating that CTM is not metaphysically based. Searle uses the following example: A person says, “Richard is a gorilla” with the meaning that “Richard is fierce, nasty, prone to violence, and so forth.” The inference assumes that “Gorillas are fierce, nasty, prone to violence, and so forth.” The comparison works only if we feel justified that “Richard and gorillas are similar in several respects; viz., they are fierce, nasty, prone to violence, and so forth.” What makes metaphors not metaphysically based is that fact that gorillas “are in fact shy, sensitive creatures, given to bouts of sentimentality.” In other words, the comparisons, according to Searle, are false. This means that within *metaphorical context* the statement “Richard is a gorilla” with the meaning “Richard is fierce, nasty, prone to violence, and so forth” is “true.” While the

¹⁰ The physiological bases could be tested in the lab. For example, showing various pictures of situations and having the subject rate the “warmth” of the person shown. This could be correlated with physiological readings of the subject’s body.

literal statements, “Gorillas are fierce, nasty, prone to violence, and so forth” and “Richard and gorillas are similar in several respects; viz., they are fierce, nasty, prone to violence, and so forth” are “false.” From here Searle concludes “In many cases the metaphorical statement and the corresponding similarity statement cannot be equivalent in meaning because they have different truth conditions.¹¹” Because there are different truth conditions between the statements, the metaphor provides a function of understanding one subject in terms of another; it further shows that metaphors need not be based on a particular metaphysical reality.

It seems that the “truth-condition” can be either a metaphysical judgment about the way the world really is or that it can be an epistemological judgment about how a person understands a particular aspect of the world. Within the discussion of metaphor, arguments such as Searle’s, which rely on differing “truth-conditions,” rarely make this distinction. (Oddly enough, when Searle implies that CTM compares objects that exist, his example of the gorilla—by his own rule—does not apply to CTM.) Thus, the arguments against CTM appear to rest on the ideas that (a) CTM is a metaphysical claim between two objects and (b) we have access to what is *really real*. This rejection of CTM is unfortunate because it ignores that CTM can reflect an epistemological theory about how we categorize and understand differing objects. Epistemologically speaking, the comparison is only contingent to our perceptions, not to the underlying metaphysical reality. Therefore, if our understanding of gorillas, even if a misunderstanding, corresponds to “Gorillas are fierce, nasty, prone to violence, and so forth,” then essentially we are making a relevant comparison. Thus, for epistemological reasons, it appears that a CTM is partially salvageable if we relax the requirement of being

¹¹ Searle, John. *Metaphor*. 415

metaphysical/existential in nature. One interesting attempt to reconceptualize CTM and possibly making it a valid theory is by incorporating a simile theory of metaphor.

Comparison Theory: Simile theory

The Simile theory appears to have its roots in Aristotle's Rhetoric: "The simile also is a metaphor; the difference is but slight...All these comparisons [examples in Aristotle's text] may be expressed either as similes or as metaphors; those that do well as metaphors can obviously be turned into good similes; and you can turn the similes into metaphors by omitting the words of comparison."¹² Some people take this to mean that Aristotle holds a particular view of CTM in which metaphor is a simile.¹³ Martinich claims that the merit of this simile theory is in a "double simplicity."¹⁴ First, we will not have to deal with both similes and metaphors because they are one in the same; that is, we can treat them similarly. Second, analyzing similes is relatively easy; each object just needs one similar feature, so, by extension, the examination of metaphor should also be relatively easy by just turning it into its corresponding simile. There are several objections indicating that a simile theory of metaphor does not adequately explain some aspects of metaphor, i.e., the objections indicate that metaphor must be more than just simile.

Let us start with Searle's attack on simile theory. Searle's strongest complaint is that simile theory does nothing to account for computing the meaning of a metaphor, stating that explanations as to how "the speaker and hearer are able to go from 'S is P' to 'S is R'" do not exist.¹⁵ (However, Searle's speech-act theory of metaphor used CTM as a starting place to derive meaning.) Whether this complaint necessarily invalidates CTM (or Simile Theory) or merely argues for expanding the CTM depends, more or less, on Searle's next objection to simile theory. This objection is a more interesting attack on the

¹² Cooper, Lane. The Rhetoric of Aristotle: An expanded translation with supplemental examples for students of composition and public speaking. (1406^b – 1407^a)

¹³ Martinich claims this, but an alternate conclusion is that Aristotle holds that simile is a type of metaphor.

¹⁴ Martinich. *Routledge Encyclopedia of Philosophy*

¹⁵ Searle, John R. *Metaphor*. 417

(read “point nine nine nine repeating is equal to one).¹⁷ I dare say that to most people there are two reactions: (1) that is a false claim (we can keep adding nines as long as we want, but we will never really get to one), although (2) “. 999...” is *close enough for government work* to equal “1.” In other words, they can read it as either .999... is 1, or .999... is like one; we could read “. 999... = 1” as literally false, but figuratively true. Yet, these reactions are wrong. “. 999... = 1” is literally true whenever a person understands the correct “context” of mathematics.¹⁸ A simple proof from “Dr. Math¹⁹” is that given “ $1/3 = .333...$ ” multiply both sides by 3 to get “ $1 = .999...$ ” see appendix 1 for the more rigorous proof from Dr. Math. This example shows that within a statement, whether it be “. 999...=1” or “Time is a Frisbee,” there are contextual clues outside of the statement itself that may alert us to an interpretation of what is being displayed. In the former case, we have to realize that .999...=1 is shorthand for a limit operation. This shows that leaving out signs or symbols in math does not necessarily change the underlying truth-value because of the context. Thus, analogously, it is not necessarily the case that leaving out signs or symbols in the English language will alter the truth-value. In this analogy, we might say that “. 999...=1” is the “metaphor” for “limit.” This suggests that the concepts of “literal” and “figurative” are not as clearly designated as people typically use them. Let us look at how this can work in language.

Consider “Time is a Frisbee” versus “Time is like a Frisbee.” The literal truth-values of these two sentences are “False” and “True” respectively, according to Searle’s

¹⁷ Lakoff and Nunez use this example in [Where Metaphors Come from: How the Embodied Mind Brings Mathematics into Being](#) to discuss how metaphors are necessary to understand math.

¹⁸ Its actually more complicated than this. It is true, under certain circumstances, for real numbers. It is false, under certain circumstances, e.g., hyperreal numbers or computers that have not been programmed to lie.

¹⁹ <http://mam2000.mathforum.org/dr.math/abt.drmath.html>

objections to CTM being a Simile. Yet it is possible for a person to conclude that “Time is a Frisbee” is literally true by restricting the universe of discourse. Restrict knowledge to just the understanding that the objects “time” and “Frisbee” share some common element, e.g., movement. This conclusion would require that the movement is understood to be the same, which could require a foundation of further metaphors used to understand time, space, and movement. One conception of time is that it is flowing; “Time is a river.” A river has a beginning, can flow fast or slow, can stop for a while at a particular place, etc. Likewise when one throws a frisbee, there is a beginning; it can fly fast or slow; it can stop in a place for a while, etc. This could be the wrong foundational metaphor. As one of my advisers pointed out, “the frisbee’s movement is spatial – so won’t the movement of time have to be like movement of space? ...Does space move? Or do things in space move (is the idea of movement applicable to space, or only to things in space?)? If time is like space with regard to movement, will time move or only things ‘in’ time?” To answer this we may assume that space and time are identical in that objects move through them (two metaphors?). This relies on the metaphors that space and time are containers. In this case, “time is a frisbee” can still be literally true if a frisbee is also a container. If players of Ultimate Frisbee can be trusted, a regulation frisbee can hold an entire pitcher of beer.²⁰ Thus, a frisbee is a container. Now, granted, these examples could be totally without any practical value. Nevertheless, the point is that the idea of literalness and truth-value depend on context.

People often interpret “Time is a Frisbee” as literally false because of their background assumptions of context. A person understands that there are overriding

²⁰ Because I am on a Graduate Student’s salary, I have not bought a frisbee and a pitcher of beer to empirically verify this claim. However, I’m sure that we can carry on some scientific research after (or during) the thesis defense.

relevant differences between the two objects of comparison. In one case (literally true) the comparison relation focuses on the sameness between the objects, in the other case (literally false) the focus is on the differences. Now consider using the term “like.” “Time is like a Frisbee” invites (or allows) the reader to ignore the differences by restricting the universe of discourse to similarity, while stating “Time is a Frisbee” forces the reader to search a bit on her own to decide whether to consider similarity or difference and the proper degree of relevance. The relevant difference involves an understanding of the context of the statement and the readers own understanding of the situation. The context is partially defined by whether or not the term “like” or “as” is used in the statement. Thus, if metaphor is a substitution of a simile, then there is really no necessary change in the truth-value between a metaphor and its corresponding simile. For other discussions about the differing truth values, or interpretations of similes and metaphors see Davidson’s “What Metaphors Mean” and Kittay’s “Metaphor: Its Cognitive Force and Linguistic Structure.”

Let us summarize the idea with another math example. If a teacher asks her college class about the truth-value of “ $a^2+b^2 = c^2$ ” then the students typically will respond by indicating that the statement is “true” in a literal sense. Yet the statement is only true within certain situations—for instance, when using a right triangle in Euclidean geometry where “a” and “b” are the legs with “c” representing the hypotenuse of the triangle. In the Euclidean case, a person can find any one value when given the other two, e.g., given $a=3$, $b=4$, then a person can calculate that $c = \sqrt{a^2+b^2} = \sqrt{3^2+4^2} = \sqrt{25} = 5$. However, in another situation, the equation is not necessarily true. Obviously, using shorthand does not necessarily change the understood truth-value. Thus, claims that

metaphors and their corresponding similes have differing truth-values do not necessarily establish that metaphors and similes are substantially different. They may be different in degree, not kind.

Nevertheless, I suggest that the idea of metaphor as a substitution of a simile is conceptually flawed. Conceptually speaking, a metaphor is much broader than its corresponding simile (if it has one). As has been shown, similes, by using “like” or “as,” restrict the universe of discourse to only similarities; whereas metaphors do not. This shows how, contrary to some interpretations, Aristotle might have viewed similes as metaphors, not metaphors as abbreviated similes. This classification also better fits with the classification system of going from general to specific (or broad to narrow) categories. For example, we would typically classify “a Hyundai is (necessarily) a car” not that “a car is (necessarily) a Hyundai.” It seems that the proper understanding of the relationship between a metaphor and a simile is that a simile—despite looking longer, syntactically—is an explicitly restricted metaphor. Furthermore, this restriction (or lack of) gives the appearance of a change in truth-values, where the “truth-value” merely identifies an underlying change in scope. Therefore, metaphors are not just similes, although as we have seen, Aristotle held “the simile also is a metaphor.”²¹

A summary of CTM: “Comparison views probably derive from Aristotle’s brief statement in the Poetics: ‘Metaphor consists in giving the thing a name that belongs to something else; the transference being either from genus to species, or from species to genus, or from species to species, or on grounds of analogy (1457^b).’²²” Based on my readings, I believe that the rejections of CTM occur because CTM is too restrictive or

²¹ Aristotle. Rhetoric 1406^b – 1407^a

²² Black, Max. Models and Metaphors. 36

weak. As we have seen, CTM is often presented as a metaphysically based theory. Yet, as Searle has shown with “Sally is a block of ice,” there does not actually exist properties that both literally share. Searle also showed, with “Richard is a gorilla,” many metaphors rely on mistaken assumptions, like the nature of gorillas. One weakness of viewing a metaphor theory as a metaphysical claim is that there may be a danger that instead of focusing on what the metaphors are doing, people argue about whether or not something *really* is something else (a theme taken up in the next few chapters). More importantly, CTM is weak because it does not give a method to interpret metaphor beyond simple literal comparison. This becomes a problem, for example, because it is not always possible to articulate what is being compared, e.g., “Gravity is super-percolating coffee grinds.” This is a further problem, as we will see, because the notion of “literal” is problematic.²³ However, the CTM does bring up two interesting issues when considering the simile view: (1) Arguments about truth-conditions raise issues of context, and (2) similes are restricted metaphors. The interaction theory builds on CTM.

²³ Nothing is context independent, e.g., “You’re warm.”

Interaction Theory

A recurring theme in the previous analysis of metaphor as a comparison is that there is a difference between viewing metaphor as a metaphysical theory or as an epistemological theory. As a metaphysical theory, metaphor seems on shaky ground, i.e., it seems rather limited and presents problems, especially when trying to determine a truth-value for a claim. With the interaction theory of metaphor, we shift from a metaphysical theory to an epistemological theory of metaphor. This shift will draw out the notions of irreducibility (discussed later), focusing power, similarity creation, and demonstrate a cognitive force associated with metaphor.²⁴ At the heart of ITM is the idea that a metaphor has both a literal element and a metaphorical element, thus giving two parts to the metaphor. This gives the basis of the interaction theory of metaphor “an interaction between a literal element in a sentence and a metaphorical element.”²⁵

The development of ITM we consider primarily come from work by Max Black and Eva Feder Kittay. We look mostly at Max Black’s development of ITM in Models and Metaphors: Studies in Language and Philosophy.

According to Black, one word or phrase of a metaphor becomes the focus because it does not make sense in a literal way; e.g., “The chairman plowed through the discussion.” Here, “plowed” does not make literal sense.²⁶ Because of this discontinuity, we can identify parts of the metaphor. For Black, the focus is the metaphorical element in the sentence —“plowed”— while the rest of the sentence is the frame. Rather than focusing on identifying metaphors, Black focuses on the possible uses of metaphors. Black claims

²⁴ Kittay, Eva Feder. Metaphor Its Cognitive Force and Linguistic Structure. 13

²⁵ Martinich A.P. *Routledge Encyclopedia of Philosophy*

²⁶ That is, in the literal sense of plowing on a farm or a ship plowing through the sea. It is not until the metaphor gets established that people think that plowed can refer to a discussion.

that metaphor usually serves one of two functions—namely, as a type of substitution of meaning (as in CTM) or (more importantly) by giving new meaning. He further claims that if metaphor is used as substitution, then it is merely spicing up language and not very significant (unless one is a poet). As giving new meaning, Black argues, metaphor is crucial to understanding.

To get new meaning, Black claims, “Understanding a metaphor is like deciphering a code or unraveling a riddle...Metaphor plugs the gaps in the literal vocabulary.²⁷” In other words, sometimes a language does not have a term for an object. Rather than adding new terms to a language, metaphors are used. As examples, Black gives “cherry lips,” “the leg of a triangle,” “Osculating curves that kiss,” and the color “orange” coming from the fruit. These all are examples of *Catachresis* – the use of a word in some new sense in order to remedy a gap in the vocabulary; catachresis gives new senses to old words.²⁸

Because of the use of metaphor in giving meaning, Black claims that CTM does not accurately describe how metaphor works. Black uses the example “Richard is a lion” to demonstrate this. The metaphor is about both parts of the sentence; i.e., it is about Richard and lions. It is about our understanding of lions and how we forge a connection between Richard and lions. Whereas with simple substitution, Richard is a lion – is about Richard because the word “lion” is a substitution for a list of characteristics understood to be about hypothetical lions. In addition, if these characteristics accurately described how we wanted to understand Richard, we would have used the list to begin with.

²⁷ Black, Max. *Models and Metaphors*. 32

²⁸ D. Fraser Harris gives many examples of Catachresis with science in his article *The Metaphor in Science*. Oxygen, Phlogiston, Adrenalin, Nerve Reflex, and Malaria are some of the examples he discusses.

Black further objects to CTM because it assumes that the meaning is already contained within the terms. Yet

We need the metaphors in just the cases when there can be no question as yet of the precision of scientific statement. Metaphorical statement is not a substitute for a formal comparison or any other kind of literal statement, but has its own distinctive capacities and achievements. Often we say, “X is M,” evoking some imputed connection between M and an imputed L (or, rather, to an indefinite system, L_1, L_2, L_3, \dots) in cases where, prior to the construction of the metaphor, we would have been hard put to it to find any literal resemblance between M and L. It would be more illuminating in some of these cases to say that the metaphor creates the similarity than to say that it formulates some similarity antecedently existing.²⁹

Now we see the creative nature of metaphors. Metaphor can create the similarity, for example, “Gravity is super-percolated coffee grounds.” In what way was there already a similarity between gravity and coffee grounds until I made up the metaphor? The similarities only exist when consciously considered.

Meaning, in an interaction view of metaphor, derives from an *interaction* of the elements of the metaphor; i.e., meaning develops from the discontinuity in meaning between the elements in the metaphor. For example, there is a discontinuity in the elements of Ben Johnson’s metaphor regarding time, “That old bald cheater, Time.”³⁰ The meaning of the metaphor directly depends on the interaction that happens between the elements of the metaphor (maybe reaction would be a better term, in the sense that one typical reaction when confronted with a metaphor seems to be “What the...?”). (Searle’s essay, “Metaphor,” draws out a methodology for metaphoric interpretation that seems close to this idea.) Black further suggests that metaphors may act as a filter, a

²⁹ Black, Max. *Models and Metaphors*. 37

³⁰ Bartlett, John, comp. *Familiar Quotations*

filter that relies on a shared world-belief concerning what the individual elements usually mean. For example in the statement

‘Man is a wolf’...the metaphorical sentence in question will not convey its intended meaning to a reader sufficiently ignorant about wolves. What is needed is not so much that the reader shall know the standard dictionary meaning of ‘wolf’ – or be able to use that word in literal senses – as that he shall know what I will call the *system of associated commonplaces*.³¹

These commonplaces are merely what people typically interpret the terms to mean. They need not be true but “they should be readily and freely evoked.³²” Filtering gives metaphors the potential for insight: “The wolf-metaphor suppresses some details, emphasizes others – in short, organizes our view of man.³³” The insight that metaphor offers is a result of the filtering and transforming aspect of metaphor. Another example from Black is in describing a war by using a chess vocabulary; “The chess vocabulary filters and transforms: it not only selects, it brings forward aspects of the battle that might not be seen at all through another medium. (Stars that cannot be seen at all, except through telescopes.)³⁴” This “war” vocabulary would also filter and transform with, e.g., regard to drugs and terrorism. It is interesting to note that Nancy Reagan campaigned for “The War on Drugs” not “The Treatment Program for Drug Illness.” Further, we do not “Negotiate with terrorists” we are (currently) “At war with terrorism.³⁵”

Kittay has expanded and commented on ITM. She has also identified six salient features of ITM, some of which we have already seen³⁶: (1) Metaphors are not just one element in a statement; metaphors are entire sentences, not isolated words. Only by

³¹ Black, Max. *Models and Metaphors*. 39-40

³² Black, Max. *Models and Metaphors*. 40

³³ Black, Max. *Models and Metaphors*. 41

³⁴ Black, Max. *Models and Metaphors*. 42

³⁵ For an interesting analysis of metaphors in politics, see *Metaphor in Politics: An Open Letter to the Internet from George Lakoff (1991)*

³⁶ Kittay, Eva Feder. *Metaphor Its Cognitive Force and Linguistic Structure*. 22+

examining the sentence, as a whole, can it be decided whether a literal or metaphorical interpretation is preferable. This helps to establish the context of the sentence to determine the interpretation of the sentence. For example, the sentence “Jean is a turtle,” relies on contextual clues to decide if there is a turtle named Jean or the meaning is closer to Jean being slow. (2) As I have previously pointed out, a metaphor consists of two components: the target and descriptor. In the metaphor “Jean is a turtle,” Jean is the target, while turtle is the descriptor. The target is, roughly speaking, that aspect of a metaphor that we try to understand, while the descriptor is the aspect of a metaphor that we (presumably) understand. (Black calls the target the focus or metaphorical element in a statement; while the frame is the rest of the statement. However, it does not seem as if the statement contains the metaphorical element, but the statement as a whole must be the metaphorical element.) (3) There is a tension between these two components. The identification, or relationships, between the components of the metaphor are not normally made (until the metaphor is dead), tension first hinting at a metaphor being used. The tension also helps one part of the metaphor organize or conceptualize the other. Much like in the example of the evening star or the morning star, these are two ways of presenting the same object. (4) As we have seen, the components are understood as systems; each part has with it an associated background of meanings. For example, in the previous example from CTM— “Richard is a Gorilla”—there has to be a shared belief concerning Gorillas. (5) The interpretation or meaning of a metaphor arises from interplay of these components. (6) The meaning of a metaphor is irreducible and cognitive: “The cognitive significance of metaphor arises from its capacity to restructure or to induce a structure on a given content domain...The irreducibility of metaphor is

importantly tied to the incongruity between the domains of the topic and vehicle.³⁷”

Kittay also has more on cognition:

The cognitive force of metaphor comes, not from providing new information about the world, rather from a (re)conceptualization of information that is already available to us. Information which is not articulated and conceptualized is of little cognitive importance. Metaphor is a primary way in which we accommodate and assimilate information and experience to our conceptual organization of the world. In particular, it is the primary way we accommodate new experience. Hence it is at the source of our capacity to learn and at the center of our creative thought. In the process of accommodation and assimilation through metaphor, we gain a needed epistemic access to the metaphorical referent.³⁸

I think that this last point of Kittay’s is a bit misleading. As we will see in later chapters, the cognitive force of metaphor does two things: (1) restructures current information, and (2) provides new ways of understanding that do lead to new information about the world.

I also think that in the sense that metaphors are made, not found, they are capable of being new and of providing new information about the world.

There are several objections to ITM. We will look, first, at some of Searle’s objections to this theory.

According to the interaction theory, a change exists in the meaning in the terms of the metaphor. This occurs when the object in the metaphorical sentence does not make sense with the rest of the sentence; e.g., “The chairman plowed through the discussion.” Searle denies that there is any change in meaning of any term in a metaphor; there is simply a change in the semantics. This seems to argue against the idea that within a statement there is a “metaphorical element.” Searle expands the metaphor to include the whole statement. To do this, Searle claims that people confuse what he calls *speaker’s*

³⁷ Kittay, Eva Feder. Metaphor Its Cognitive Force and Linguistic Structure. 37

³⁸ Kittay, Eva Feder. Metaphor Its Cognitive Force and Linguistic Structure. 39

utterance meaning (what the speaker means by uttering words, sentences, and expressions) with *word or sentence meaning* (what the words, sentences, and expressions mean). The utterance (in metaphors) means something different from the sentence, but, Searle maintains, the expressions still mean the same thing.

Searle also objects that under ITM the metaphor relies on the literalness of the sentence. What Searle might mean is that in a given statement, like “Life is a box of chocolates,” the interpretation relies on first understanding the literal meaning of the parts of the statement. Then, after noticing that there is something wrong with the fit of the parts, we should know to interpret the statement as a metaphor. Yet, Searle notes, “It is not logical necessity that every metaphorical use of an expression occurs surrounded by literal occurrences of other expressions.³⁹” As a counter-example, Searle cites “Russell’s example of a completely nonsensical sentence, ‘Quadrilaterality drinks procrastination,’ is often given a metaphorical interpretation as a description of any postwar four-power disarmament conference.⁴⁰” This objection emphasizes that it can be difficult, if not impossible, to identify a “metaphorical element” that is distinct from a “literal element” in a metaphorical statement; it does not appear that any part of the statement serves as the frame of the metaphor (as Black classifies metaphors or what I am calling the descriptor).

Finally, Searle objects that in the ITM the meaning of “interaction” is not clear. For example, in “Sally is a block of ice,” it is not clear just what the interaction is or where it occurs. To answer this, perhaps it would be best if interaction were understood as either part of the tension between the parts of the statement, resolving the tension between the various components of the metaphor, or resolving the tension between a literal and

³⁹ Searle, John R. *Metaphor*. 416

⁴⁰ Searle, John R. *Metaphor*. 416

figurative interpretation of the metaphor. For example, we know that Sally is not really a block of ice; we know that there is a problem with a literal interpretation of the statement. The interaction occurs by trying to reconcile the parts of the statement. Perhaps the people who use ITM intend “Interaction” to be a metaphor to describe the metaphor theory.

Ultimately, ITM shows that metaphor is much more than simple comparison between two objects. Metaphor has a cognitive component that brings together (forges meaning). This is partially accomplished by the focusing aspect of metaphor. We will see more examples of this in following chapters. Now we turn to the speech act theory of metaphor.

Speech Act Theory

As the primary example of a speech act theory of metaphor, we will look at the theory as given by Searle in his essay *Metaphor*.⁴¹ We all have experiences where a person says one thing yet intentionally means another; for example with irony, joking, sarcasm, or some type of indirect speech act. In his essay Searle desires a theory of metaphor that explains how a speaker can say one thing, “Sam is a pig” and mean a different thing, “Sam is a fat filthy slob.” Searle observes that there are often two possible interpretations of sentences. One interpretation bases itself upon what the speaker intends to communicate, previously identified as “speaker’s utterance meaning.” The other aspect’s basis is the literal meaning of the words, previously identified as “word or sentence meaning.” Searle identifies metaphor with the speaker’s utterance meaning. (I take this as showing that people often say one thing to mean another may indicate that sometimes we do not have the language or capability to explain what something is; thus, we have to come up with metaphors.)

Next, Searle discusses the differences between the literal meaning of an utterance versus the metaphorical meaning of an utterance. Using examples of “Sally is tall,” “The cat is on the mat,” and “It’s getting hot in here,” Searle establishes that literal meaning determines truth conditions *relative to a particular context*. “Sally is tall” only in relationship to other people or objects of comparison. If Sally is 5’11”, then she may be “tall” when walking in the mall, but “short” when on a basketball team. To understand “The cat is on the mat” requires knowing the particular special orientation of the cat and the mat (Compare a cat on a mat in the space station versus a cat on a mat in a downtown

⁴¹ Reprinted in: Martinich, A.P. The Philosophy of Language. 408-429

house). “It’s getting hot in here” could refer to actual air temperature change or emotional responses, possibly embarrassment or excitement.

Searle identifies three key features of literal statements: First, “The speaker means what he says⁴²” meaning that the speaker’s meaning is the same as the literal meaning of the statement; second, “The literal meaning of a sentence only determines a set of truth conditions relative to a set of background assumptions that are not part of the semantic content of the sentence⁴³” context and understanding are part of the evaluation; third, “The notion of similarity plays an essential role in any account of literal predication.⁴⁴” because it helps in interpreting the metaphor. Identifiable aspects of metaphor are opposed to these three conditions. In a metaphor the speaker’s meaning is different from the sentence meaning, this causes differing truth conditions, and allows for interpretation.

Searle points out that metaphors often have a related paraphrased sentence. We have already seen the metaphor “Richard is a Gorilla” with its paraphrase “Richard is fierce, nasty, prone to violence, and so forth.” Yet, when we make this paraphrase, some people feel a sense of loss, a psychological difference between uttering one or the other phrase. At the very least, this suggests an emotive force behind metaphor; a sense of “ah yes!” It is not always an easy task to paraphrase a metaphor, such as (from Searle) “The ship ploughed the sea” or “Juliet is the sun.” The exercise in paraphrasing is supposed to demonstrate two things. First, to get any kind of truth-value of a metaphor we have to understand some of the background context of the statement (this is the same with so called literal statements). Second, paraphrasing can help us understand part of the meaning of a metaphor.

⁴² Searle, John R. *Metaphor*. 411

⁴³ Searle, John R. *Metaphor*. 411

⁴⁴ Searle, John R. *Metaphor*. 411

We have already seen Searle's objections to CTM and ITM. It is not clear, however, that STM radically differs from the previous theories. STM gives metaphor theory a more precise method of identifying and working with metaphoric interpretation. Searle extracts nine principles for identifying and working with metaphoric interpretation. These principles rely on Searle's claim that metaphors are fundamentally restricted and systematic. Metaphors are restrictive in the sense that not all of the properties of the target and descriptor are shared. (Black identified this as the focusing aspect of metaphor.) Metaphors are systematic in the sense that the hearer and speaker must share a system of principles that make it possible to identify the meaning. (Black called this the *system of associated commonplaces*.) The three most basic principles are: (1) Decide if we need to look for metaphorical meaning, "Where the utterance is defective if taken literally, look for an utterance meaning that differs from sentence meaning."⁴⁵ (2) Use a set of strategies for finding meaning, "When you hear 'S is P,' to find possible values of R look for ways in which S might be like P, and to fill in the respect in which S might be like P, look for salient, well-known, and distinctive features of P things."⁴⁶ And (3) use strategies for restricting the range of meaning, "Go back to the S term and see which of the many candidates for the values of R are likely or even possible for properties of S."⁴⁷

For now we will not look at specific objections to STM except to note that (1) it relies on basic comparison theory to achieve meaning of metaphorical statements, (2) it does not seem to reject CTM and ITM so much as supplement them.

Before moving on to the next chapter, let us review the key progression of metaphor from CTM, ITM, and STM. At its heart, many metaphors are comparisons. This

⁴⁵ Searle, John R. *Metaphor*. 422

⁴⁶ Searle, John R. *Metaphor*. 423

⁴⁷ Searle, John R. *Metaphor*. 423

comparison is flawed in two fundamental ways: (1) metaphor is possibly meaningless when one takes metaphor to be a metaphysical theory comparing real objects, and (2) it does not offer a method of identification or interpretation of metaphors. Interaction theory solves the first problem by breaking up the sentence into both a literal and a figurative interpretation. This distinction creates a better method of identifying a “truth-condition” when considered metaphysically. Furthermore, the interaction theory identifies the focusing and cognitive nature of metaphors as an epistemological theory of understanding. STM addresses CTM’s second problem by creating tools to identify and interpret metaphor. STM further draws out the importance of context.

Thus, we may extract the following information from these views: (1) Metaphor may be viewed as either a metaphysical or an epistemological theory. (2) Metaphors are often identified based on an incongruity between two or more elements in a statement. (3) Metaphors may involve creating new meaning and focusing attention onto particular meaning. (4) It may now be easier to interpret metaphors. (5) Context matters. It seems each theory helps us understand metaphor. We now turn to two competing contemporary metaphor theories.

Chapter III: Colorful Linguistic Expression vs. Cognitive Role

Metaphor is for most people a device of the poetic imagination and the rhetorical flourish – a matter of extraordinary rather than ordinary language. Moreover, metaphor is typically viewed as characteristic of language alone, a matter of words rather than thought or action. For this reason, most people think they can get along perfectly well without metaphor. We have found, on the contrary, that metaphor is pervasive in everyday life, not just in language, but in thought and action. Our ordinary conceptual system, in terms of which we both think and act is fundamentally metaphorical in nature.⁴⁸

This opening paragraph proposes two differing views of metaphor. In one view, metaphor is no more than a colorful linguistic expression. Metaphor means no more or less than what the words mean in a literal “traditional” (or objective) interpretation. In the other view, metaphor plays a cognitive role, affecting or even producing understanding. Metaphor, in part, creates and shapes our understanding of the world in which we live. In this chapter, we explore these views.

Numerous books and articles have already attempted to develop a completely robust theory of metaphor. Likewise, many authors have attempted to bolster or discredit these theories. That is the nature of the game. In light of this, this chapter is not attempting to fully develop, nor defend, a completely robust theory of metaphor. On the contrary, it will focus on the two areas relating to a literal versus a cognitive view of metaphor. In order to do this we first examine Donald Davidson’s position that metaphors do not have a cognitive content but are merely literally interpreted phrases. Then, using Lakoff,

⁴⁸ Lakoff and Johnson. *Conceptual Metaphor in Everyday Language*. 453

Johnson, and Recker's works, we will extract some of the more interesting features of a cognitive approach to metaphor.

Davidson

One of the more thought-provoking individuals to work on metaphor is Donald Davidson. What concerns us, in this chapter, is part of Davidson's analysis of metaphor in his work, *What Metaphors Mean*.⁴⁹ In this work, Davidson's thesis is that, "Metaphors mean what the words, in their most literal interpretation, mean, and nothing more."⁵⁰ His thesis involves three related claims: (1) "[metaphor] conveys truths or falsehoods about the world much as plainer language does, though the message may be more exotic, profound, or cunningly garbled."⁵¹ (2) "Literal meaning and literal truth-conditions can be assigned to words and sentences apart from particular contexts of use."⁵² (3) Metaphor does not have cognitive content. To support his claims, Davidson reviews various interpretations of metaphors: metaphor as simile, the truth-conditions of metaphor, and the interaction theory of metaphor.

The second claim—"Literal meaning and literal truth-conditions can be assigned to words and sentences apart from particular contexts of use" sounds straightforward. Unfortunately, Davidson neither offers examples of what he means by this claim nor any reasons why this would be desirable.⁵³ Davidson might be dealing with the idea that metaphors can have truth-conditions (or values under a logical positivism's notion of objective absolute truth). A basic argument could thus follow: If metaphors have truth-conditions, then we should be able to get at the "truth" of a metaphor. If we can get at the "truth" of a metaphor, then it makes sense to talk about metaphors being true or false. Under Davidson's view, the truth-conditions will be found by appealing to a metaphor's

⁴⁹ Reprinted in: Martinich, A.P. *The Philosophy of Language*. 430-441

⁵⁰ Davidson, Donald. *What Metaphors Mean*. 430

⁵¹ Davidson, Donald. *What Metaphors Mean*. 430

⁵² Davidson, Donald. *What Metaphors Mean*. 431

⁵³ Although it is possible that in other of his works he does this.

potential literal interpretation. There are however a few problems with the idea that metaphors have a “truth” because of literal truth-conditions.

The first problem stems from Davidson’s claim that literal meaning and truth can be assigned to a metaphor independent of the metaphor’s context. Although it is certainly true that we can assign truth conditions unrelated to contextual usage, this seems to apply to limited cases. In fact, beyond simple definitions or categorical claims (which rely on oft times arbitrary definitions) it does not seem possible to get away from contextual usage.⁵⁴ If we do not look at context to help assign a truth-value, then the assignment of a truth-value seems arbitrary. For example, within mathematics we can give the following statements, “ $12+1 = 13$ is true,” and “ $12+1 = 1$ is true.” It would seem appropriate to say that the first statement is true while the second statement is false. Nevertheless, why should we claim this? Without context there is no reason to accept the given truth-values. If we are dealing with base-10 arithmetic (with all the “typical” assumptions), then the first statement is true and the second statement is false. Yet, if dealing with “clock” math, the first statement is true for military time, and the second statement is true for civilian time. (The time starts at 12-noon and in each case an hour is added.) If context is crucial to understanding mathematical claims, then it seems as if context would be crucial when dealing with natural language. In fact, when interpreting or analyzing metaphor, context is crucial! For example, consider the metaphor “Humans are Machines.” This simple metaphor will change interpretation based on whether using (a) a rationalist or empiricist approach or (b) the technological state of machines. For rationalists there does not seem to be any *a priori* reason to suspect that humans are

⁵⁴ See Kittay, Eva Feder. Metaphor Its Cognitive Force and Linguistic Structure. (97-139) for more analysis of Davidson and context issues.

machines. While for the empiricists the current level of technology can influence the belief in humans being machines. For example, if a person had the limited technology of the ancient Greeks, then humans would probably not be thought of as machines.⁵⁵ Yet, a person with a 21st century computer might be more inclined to believe that humans are machines. As Artificial Intelligence, Artificial Behavior, and Artificial Life become closer to approximating “Human,” we may see this more clearly. Hence, if it is necessary to assign a truth-value to metaphor, then it is necessary to account for the particular context. In what sense, however, is it deemed “necessary” or desirable for a metaphor to have a truth-value?

A possible motivation for Davidson’s view is that it arises from a *logical positivist* tradition in the philosophy of language. Part of this tradition concerns itself with understanding how language “hooks” up with the world or “reflects” reality. Under this view meaningful language is restricted to empirical sentences that are either true or false for given verifiable conditions that are directly related to the world. Thus, for metaphors to have meaning, they must have truth-conditions. There is, however, an opposing viewpoint concerning the necessity (or desirability) of assigning truth-value to metaphors.

Perhaps it would be more desirable (fruitful) to distance ourselves from a strict notion of truth-value when dealing with metaphors. This deals with a second problem with insisting that metaphors have truth-values. The problem arises when considering the consequences of accepting a truth-value view of metaphor. For example, take a popular metaphor in science (which is also used in some ethical discourse), “Animals are

⁵⁵ In the next chapter, we will examine what kind of belief structure one may have that would lead to the conclusion that animals and/or humans are machines.

Machines.” The way the metaphor is used involves (1) translation by taking the literal meaning of “animals” and the literal meaning of “machines” (whatever they are), (2) creating an appropriate relationship between the two terms (whatever that means), and (3) agreeing or disagreeing with the relationship. If there is agreement with the metaphor, then it is labeled as true. If there is not agreement with the metaphor, then it is called false. What are the consequences of demanding a literal truth-value of true or false with this metaphor? If people are allowed to hold with either truth-value, then within science people who agree with the metaphor proceed to conduct research and generate scientific knowledge related to animals, e.g., in the lab. Yet, at the same time, scientists who disagree with the metaphor proceed to conduct research and generate scientific knowledge related to animals, e.g., in the wild. In either case, we gain information because the metaphor structures the way in which we research a problem. Consider, however, the information that would be lost if we were not allowed to conduct research on so-called “false metaphors.” If it is false that animals are machines, then we lose the information gained in lab experiments. Likewise, if we interpret the metaphor as strictly true, then research would be hindered in field studies. Therefore, even if we could assign truth-values to metaphor, we may not want to. Thinking of metaphors as “good” or “bad” would be more appropriate—”good” when they promote scientific research, “bad” when they hinder it.

Be that as it may, Davidson insists on using a literal interpretation of metaphors. Davidson uses this idea of literalness in a complaint that the creative aspect of metaphor (that aspect that links the unconnected concepts together into a new/unique relationship) leads to conclusions about the meaning of metaphor. Davidson’s objection is that we

naturally categorize similar objects, thus there is no need to posit a non-literal meaning to metaphor. For example, flowers with characteristics x, y, z... are similar enough to classify them under one family as roses. Under this view ordinary similarity (like in the roses), not some sort of extraordinary similarity is used. Thus, if one were to say, “My lover is a red, red rose,” then the similarities are literal and natural with no extra meaning given by a metaphor. Again, there are two problems with this view.⁵⁶ First, it is still not clear how we can get literal truth or falsehood on context-free bases. The phrase, “My lover is a red, red rose” could have any of the following meanings:

1. My lover is beautiful, much as a freshly blooming very red rose is beautiful.
2. My lover has sharp wit, much like the sharp thorns on a red rose.
3. My lover is dangerous, like an extremely red rose; she draws you in with her beauty...but if you are not careful, her sharp thorns will leave you bleeding.
4. My lover is like a rose. She attracts annoying little insects. (This is still context dependent...try to decide if the little insects are literally those annoying insects that must be dealt with, or if the insects are those annoying people that tend to be drawn to beauty.)

We should see that given, “My lover is a red, red rose” there is no way to literally interpret the appropriate meaning without either the speaker directly elucidating the meaning or for the listener to have the appropriate contextual background. There is no doubt that there is some element of literalness necessary to understand metaphor; this is what helps us in deciphering the metaphor. It however does seem (as Searle maintained) that something is lost in translation, much like a literal translation of “Ich bin kalt” from German into the English; “I am cold” loses meaning in translation.⁵⁷

⁵⁶ There are actually more problems with this, e.g., people tend to actually classify based on prototypes not categories—however I will not address this.

⁵⁷ The German is a statement of sexual frigidity; the English is a statement of subjective comfort.

The second problem with the view of “ordinary similarity” is that it seems to imply that the connection, or similarity, between two objects is already there. By what objective standards, however, do we judge a connection or similarity? Michel Foucault asks

When we establish a considered classification, when we say that a cat and a dog resemble each other less than two greyhounds do, even if both have just broken the water pitcher, what is the ground on which we are able to establish the validity of this classification with complete certainty? On what ‘table,’ according to what grid of identities, similitudes, analogies, have we become accustomed to sort out so many different and similar things?⁵⁸

Consider the simile, “There are some days that the happy ocean lies like an unfingered harp below the hand.⁵⁹” The question, relating to the problem of similarity, is “In what way is there already a similarity between the ocean and a harp?” The similarity is created in the mind of a poet and passed on to her audience. Now, within a metaphor, is the connection already there, waiting to be discovered, or is it created? It seems plausible that, like similes, there are cases in metaphor in which there is already a connection. Perhaps this follows Davidson’s notion of “ordinary similarity.” For example, upon watching a ship at full steam at sea, a person who is familiar with plowing a field could naturally associate the two events together to conclude, “The ship is plowing through the sea.” However, it also seems the case that not every metaphor is discovered, but that some are created—the sun is the heart of the universe; the heart is an engine; the heart is a pump; darkness is ignorance; light is truth; the mind is a computer; DNA is a code; the earth is a spaceship; the earth is a lifeboat, etc. The metaphors do not display a special “truth” about the world. They structure our understanding and analysis of the world. In

⁵⁸ Foucault, Michel. *The Order of Things: An Archaeology of the Human Sciences*.

⁵⁹ My thanks to Dr. Recker for pointing out this example from Eavan Boland’s Poem, “White Hawthorne in the West of Ireland.” And suggesting the following question.

the next section the cognitive view of metaphor will further develop this idea. For now, we turn to Davidson's treatment of metaphor as simile.

Davidson objects to the view that metaphors are similes in which "the figurative meaning of a metaphor is the literal meaning of the corresponding simile."⁶⁰ To use Davidson's example, the figurative meaning of "he was burned up" is the literal meaning of "he was like someone who was burning up." Although Davidson talks about the differing truth-values between a metaphor and its associated simile, he does not appear to rely exclusively on Searle's objection relating to differing truth-values. However, he does have two interesting objections. Davidson first objects that it can be very difficult to identify a simile with its corresponding metaphor. Davidson's example is "Virginia Woolf said that a highbrow is 'a man or woman of thoroughbred intelligence who rides his mind at a gallop across country in pursuit of an idea.'⁶¹" With this metaphor it is rather hard to imagine or create a comparable simile. Nevertheless, I question the effectiveness of this objection. It certainly implies that we may have limits to overcome when interpreting metaphor as simile. It could also imply that there needs to be some addition to the simile theory of metaphor. However, it is a long step to saying that a simile theory is false. I suggest that if the mere difficulty in finding a solution is enough to rule out a theory, then this would rule out most, if not all, struggles in math and science, e.g., Fermat's Last Theorem, GUT, Kepler working twenty years for his 3rd law of planetary motion, etc. I think that this objection of Davidson's merely demonstrates the need that if someone claims that all metaphors are similes, then that person also has the task of making STM more robust.

⁶⁰ Davidson, Donald. *What Metaphors Mean*. 435

⁶¹ Davidson, Donald. *What Metaphors Mean*. 435

Another objection from Davidson, which he considers a “fatal defect” of the metaphor as simile view, is that metaphors “make the hidden meaning of the metaphor all too obvious and accessible. In each case the hidden meaning is to be found simply by looking at the literal meaning of what is usually a painfully trivial simile.⁶²” Surely only a philosopher can complain about and take objection to a theory that it is too simple. Well, this is not fair to Davidson; scientists will do the same, e.g., trying to determine if the genetic material is a protein or acid. In fact, I imagine (despite Occam’s Razor) that many of us have rejected a hypothesis because it is seen as too simple. Arguing against the metaphor as simile view, Davidson writes that, “It is trivial because everything is like everything, and in endless ways.” This is rather strange considering that previously Davidson was arguing for “ordinary similarity” in categorizing objects. It would seem that if Davidson insists on literal interpretation using literal language translations then he would favor a simile view of metaphor. It further seems that, under this view of the trivialness of simile, Davidson presupposes that metaphors cannot be evaluated as “good” or “bad” based on the cognitive ability to combine or amalgamate relevant relationships in a new or productive way. Since this is a basic position of ITM, let us see how Davidson analyzes that theory.

Davidson criticizes the aspect of the interaction theory that claims there is some meaning beyond that given by a literal interpretation.⁶³ Davidson’s main point of contention is in Black’s claim that metaphor

selects, emphasizes, suppresses, and organizes features of the principal subject by implying statements about it that normally apply to the subsidiary subject...[paraphrases] will not have the same power to inform and enlighten as the original... One of the points I most wish to stress is that the loss in such cases

⁶² Davidson, Donald. *What Metaphors Mean*. 435

⁶³ From *The Philosophy of Language*, A.P. Martinich, ed.

is a loss in cognitive content...[the paraphrase] fails to give the insight that the metaphor did⁶⁴

Davidson argues

There is, then, a tension in the usual view of metaphor. For on the one hand, the usual view wants to hold that a metaphor does something no plain prose can possibly do and, on the other hand, it wants to explain what a metaphor does by appealing to a cognitive content – just the sort of thing plain prose is designed to express.⁶⁵

This strikes to the heart of Davidson's rejection of cognition in metaphor. To reach this conclusion Davidson poses three questions: (1) dealing with the difficulty of setting out the cognitive content of a metaphor "If a metaphor has a special cognitive content, why should it be so difficult or impossible to set it out?"⁶⁶ (2) dealing with special meaning with simile "How is it that simile gets along without a special intermediate meaning?"⁶⁷ (3) dealing with dead metaphors "If words in metaphor bear a coded meaning, how can this meaning differ from the meaning those same words bear in the case where the metaphor dies – that is, when it comes to be part of the language?"⁶⁸

In response to the first question, the difficulty or impossibility of setting out the special cognitive content, there are several responses. First, there are numerous cases where it is difficult or impossible to set out the meaning of a concept. Some cases would involve cases where a person lacks a faculty; for example, trying to explain color to the blind, or sound to the deaf. Other cases might involve concepts in science or mathematics. Imagine dropping chalk in the classroom or balls off a tower to demonstrate "gravity" to Aristotelians who persist in seeing "natural motion." Or

⁶⁴ Davidson, Donald. *What Metaphors Mean*. 438

⁶⁵ Davidson, Donald. *What Metaphors Mean*. 439

⁶⁶ Davidson, Donald. *What Metaphors Mean*. 438

⁶⁷ Davidson, Donald. *What Metaphors Mean*. 439

⁶⁸ Davidson, Donald. *What Metaphors Mean*. 439

working through a complex proof to show that “A map into a product space is continuous iff its composite with each projection is continuous.”⁶⁹ In the case of *gravity* there is certainly some kind of understanding (or cognitive content) associated with that term. Yet, many people who use the term are challenged to simply explain its literal identity without using the metaphor “an attractive force.” In the case of mapping product spaces, a person could review informal proofs or formal proofs, yet still not know what is being said (as many graduate students unfortunately experience at one time or another). In both cases there is usually a moment of “Ah ha! I understand it!”. Yet, the understanding is difficult to express beyond this knowing or as a phrase beyond the original utterance.⁷⁰ It is suddenly as obvious as $1+1 = 2$ (without Russell’s two page proof). A person sees it or does not. This is also similar to gestalt optical illusions involving a figure / ground distinction, e.g., old woman / young maid. We can help people see them, but they must see it themselves to reach understanding. Alternatively, it is like “dot” posters that some people claim have pictures in them. People can guide us to seeing it, saying “Focus far away.” Yet, we have to see it for ourselves. Nevertheless, in all these cases, after we see it, or experience it, that becomes the cognitive concept, or the way we understand it. Difficulty in expressing the cognitive content is not a valid

⁶⁹ McCluskey and McMaster. *Topology Course Lecture Notes*.

⁷⁰ This brings up the trick notion of what is meant by “Understanding.” Some people will claim that a person does not really understand something until she can explain it to others. I myself do not take the ability to explain as a necessary or sufficient condition for understanding. For example, I may have a Cartesian moment where I am going through a math proof and can hold with my minds eye all the lines so that the whole forms a ‘clear and distinct’ image to me so that I ‘Understand’ it. However, once I am distracted by the evil deceiver, I no longer understand it with a sufficiency to explain it to others. This implies that understanding as an ability to explain ignores potential problems with memory. I can also imagine a case where a lecturer reads a speech, the audience understands the speech, yet the lecturer was merely parroting what was printed before her. Understanding seems to come in degrees, not some kind of absolute vs. complete lack of (like Meno’s Paradox). Also, a common background or language may be missing, in which case, metaphor may be the only way to communicate. I also think that understanding can be a function of language, e.g., having a coming vocabulary...metaphor seems to be a bridge here.

complaint against a cognitive view. There could be other reasons that it is difficult to express or impossible to set out the special cognitive content of metaphor.

Perhaps it is difficult to set out a particular cognitive context because metaphors are working on many levels or dealing with many concepts. A cognitive notion of metaphor involves, “understanding and experiencing one kind of thing or experience in terms of another.⁷¹” This is why we claim that metaphor has a cognitive role. For example, Lakoff and Johnson compare the metaphors “Argument is war” and “Argument is dance.” They claim that the “special cognitive content” arises because “metaphors have entailments.⁷²” For example, “Argument is war” entails: An argument is defensible; an argument can be attacked; objections to an argument can be right on target; an argument can be demolished; people win (or lose) arguments, etc. Thus, the “Special Cognitive Content” is the belief or experiential system created by metaphors and their entailments. Moreover, because metaphors have many entailments and other entailments yet to be created, it is a distinctive feature of many metaphors that the “meaning” is hard to unpack.

The second question of Davidson’s, regarding similes and their lack of “special intermediate meaning,” poses less of a problem. Davidson points out that not many critics suggest that simile also has a special cognitive content. If, as my previous analysis of simile and metaphor suggests, metaphor and simile may not be so different, then simile might also have a cognitive content. However, in this case, and in the case that simile and metaphor are substantially different, maybe similes are just boring. As many people point out, including Davidson, everything is “like” everything (or “as” everything) in

⁷¹ Lakoff and Johnson. *Conceptual Metaphor in Everyday Language*. 455

⁷² Lakoff and Johnson. *Conceptual Metaphor in Everyday Language*. 481

many trivial (and not so trivial) ways. However, metaphor can be a much more powerful claim; one thing “is” another thing. There is a different feeling towards metaphor. Even if this feeling were only emotive, instead of having cognitive significance, it would explain why more attention is given to metaphor than simile.

Davidson’s third question, “If words in metaphor bear a coded meaning, how can this meaning differ from the meaning those same words bear in the case where the metaphor dies – that is, when it comes to be part of the language?” is much more difficult to grapple with. Davidson elaborates with the following: “Why doesn’t ‘He was burned up’ as now used and meant mean exactly what the fresh metaphor once meant? Yet all that the dead metaphor once means is that he was very angry – a notion not very difficult to make explicit.⁷³” We deal with dead metaphors in the next section.

Recall Davidson’s goal with these questions. He claims that there is a tension in the interaction theory because, on one hand, metaphor does what plain prose cannot do, and on the other hand, metaphor has a special cognitive content (the sort of thing plain prose is supposed to have). Davidson then claims that to get out of this tension we must abandon the notion that metaphor carries meaning, i.e., abandon a cognitive view of metaphor. This is a mistake. In the next section, we will examine what is really meant by a cognitive view of metaphor. In it we find that Davidson’s tension is a misunderstanding of the fact that metaphors do what plain prose cannot do because of the way they structure cognitive content in a manner plain prose does not. Under a cognitive view, there is not the idea of a “hidden cognitive content” or “hidden meaning.”

Davidson concludes his critiques by reasserting that “As much of metaphor as can be explained in terms of meaning may, and indeed must, be explained by appeal to the literal

⁷³ Davidson, Donald. *What Metaphors Mean*. 439

meanings of words.” Where does this leave us? Davidson’s view that metaphor must take meaning from what the literalness of the components of the metaphor seems correct as far as trying to explain or interpret meaning behind a metaphor. However, as we have seen, two problems present themselves. First, there is a problem of establishing what “literalness” means without an account of the context of a statement. Second, his case for the non-cognitive nature of metaphor seems weak. He tries to tie together the claims (a) that metaphor conveys truth much like plainer prose, and (b) literal meaning and truth-conditions can be independent from context. From here he jumps to the conclusion that there is no cognitive content in metaphors. This jump is based on a misunderstanding that a cognitive view of metaphor demands a “hidden meaning” of metaphor. The rest of this chapter will draw out (or explore, depending upon your metaphor of choice) the cognitive view of metaphor.

Lakoff and Johnson

In the first chapter of this paper, we briefly examined three influential views on how metaphors work. In this chapter, we extend how metaphor works to the role of metaphors as understood by two opposing views. One view, in this paper represented by Davidson, holds that although metaphor is useful, it does not serve a cognitive function of understanding; metaphor merely substitutes words or phrases in colorful manners to mean what plainer prose is designed to mean. This suggests that under Davidson's view the role of metaphor is an extension of either the comparison view of metaphor or the speech-act theory of metaphor. The other view, here represented primarily by George Lakoff and Mark Johnson, appear to represent the role of metaphor as an extension of the interaction theory. However, Lakoff and Johnson propose an *experiential* view of metaphor in which metaphor is the primary way we structure our understanding of our world and our relationship in it. This is the claim that metaphor serves a cognitive function in understanding. This is not a view of secret or hidden meaning. Rather, it is a claim that metaphors are an integral part of our conceptual system (web of belief). It is because of this metaphorical structuring that I claim it is plausible that metaphors provide a conceptual link between ideas in science and ideas in ethics. Three areas influenced by Lakoff and Johnson's will be reviewed to show the cognitive view of metaphor: (1) Four aspects of metaphor; (2) metaphors as dead or alive; and (3) implications for meaning and truth.

Four Aspects of Metaphor: Irreducibility, Focusing, Creative, and Experiential.

As previously mentioned, one of Doren Recker's interest is the use of metaphor in science. He maintains, as others do, that metaphors help shape what scientists are doing in science. This is accomplished because metaphors influence the organization of data, the understanding of data, what counts as data, what kinds of experiments are performed, etc. In short, metaphors influence the whole field of scientific thought. There are at least four aspects of metaphor that contribute to the influencing power within science: Irreducibility, Focusing, Creative, and Experiential

The *Irreducibility* aspect of metaphor refers to the fact that metaphor does not play a "truth-functional" role. By this, I mean that metaphor usage has abandoned *logical positivism* or the idea of the *correspondence theory of truth*. We are now looking at metaphors as they contain epistemic significance, not as they bear relation to a metaphysical existence or claims about an *objective* reality. We have already seen the consequences, within science, of assuming metaphors have truth-value. If metaphor had a truth-value, then research is necessarily limited to "true" metaphors, e.g., "Animals are Machines." We would also encounter strange arguments like the following: The sun is the heart of the universe⁷⁴; the heart is a pump⁷⁵; therefore, the sun is a pump. Alternatively: the sun is the heart of the universe⁷⁶; the heart is a furnace⁷⁷; therefore, the sun is a furnace. Even with truth-values and formal logic, how do we evaluate the arguments? Do they give truth with respect to an underlying reality, or just a truth of how we understand reality? We have to consider truth relative to context. The bottom

⁷⁴ Copernicus, Fludd

⁷⁵ Harvey

⁷⁶ Copernicus, Fludd

⁷⁷ Descartes

line is that a metaphor does not necessarily have a truth-value in an objective logical positivist sense. Thus, metaphor is better described as being useful or not useful. This would nicely fit in with a more modern notion of scientific “truth” versus a past notion of “TRUTH.”

Examining the metaphor “Time is Money” further shows the irreducible nature of metaphor. Recker asks the question, “Is time money?” From here he points out that there are aspects in which time is like money; for example we trade our time for money; yet there are important ways in which time is not money; you cannot put time in a bank to spend later; you cannot carry time around in your wallet, etc. In this circumstance it seems more useful to view the metaphor as useful (or not) rather than true (or false).

The next aspect of metaphor is its focusing nature. *Focusing* is simply the realization that in a metaphor the interaction of the elements in the metaphor “focuses” on some properties while drawing attention away from other properties. This follows directly from the fact that metaphors are not, strictly speaking, identity statements, i.e., metaphors are not metaphysical claims but epistemic in nature. As we have seen, it is not the case that “time=money”, but we can understand time in a relation to money. This relation is focusing because it highlights some aspects of the relationship and simultaneously downplays other aspects. For example—once again using “Time is Money”—with either time or money it is possible to spend wisely, waste, rob, or otherwise use both in a conceptually similar manner. Yet while it makes sense to utter something to the effect that “Time seemed to drag on forever as I waited in the dentist’s chair” it makes less sense to talk about “Money seemed to drag on forever.” Notice that while “Time is money” focuses on spending wisely, “Time is a River” focuses on different aspects. The

river can invoke the ideas that: time flows on from the past to the future; time has a direction; we can get stuck in time (like being stuck on a some rocks in a river); we can be pushed along against our will; we can go fast or slow; we can be caught in the eddies, etc. Different metaphors capture differing aspects of the relationship.

An interesting claim relating to the focusing aspect of metaphors, from Lakoff and Johnson, states that to fully understand a concept it is necessary that we have various metaphors to focus on differing aspects of the concept. Lakoff and Johnson argue

There is good reason why our conceptual systems have inconsistent metaphors for a single concept. The reason is that there is no one metaphor that will do. Each one gives a certain comprehension of one aspect of the concept and hides others...The use of many metaphors that are inconsistent with one another seems necessary for us if we are to comprehend the details of our daily existence.⁷⁸

Thus, for example, to understand “Love” we may use one or more of the following metaphors: “Love is a Journey,” “Love is War,” “Love is an Adventure.” Towards the end of their book (page 236), Lakoff and Johnson give an example of the danger of utilizing just one metaphor, e.g., “Labor is a Resource.” This focuses the following relations: labor is equivalent to raw materials; cheap labor is good just like cheap resources are good. This metaphor hides the fact that cheap labor is often dehumanizing labor; that is, poor wages and working conditions resulting in slave-like conditions of oppression.

The third aspect of metaphors is their creative nature. The *Creative* nature of metaphors refers to the fact that metaphors can create new similarities and that metaphors do more than point out existing connections between objects. They bring about new connections. This creative nature restructures how we conceive of things; for example,

⁷⁸ Lakoff and Johnson. Metaphors We Live By. 221

“Love is a collaborative work of art.⁷⁹” This metaphor entails, “Love is work...Love requires compromise...Love demands sacrifice...Love is aesthetic experience...Love involves creativity...Love reflects how you see the world.⁸⁰” Another example of restructuring views would be the idea that “The world is a machine” as opposed to “The world is an organism.” Once people start thinking about the world as a machine, then it makes sense to talk about “Who built the world?” “Can we modify the world?” “Can we build one?”

Lakoff and Johnson’s book consistently reiterates how metaphors change our conceptions of reality. They point out that part of the Westernization of other cultures is introducing new concepts through metaphors, for example “Time is Money.⁸¹” We also see that part of Westernizing a culture involves introducing them to the concept that “The World is a Machine.” The creation and introduction of new metaphors also affect our experiences of the world. This is the final aspect of metaphor that we consider. Metaphors change our *Experience* of the world. If all they did was point out trivially obvious connections, then it seems hard to account for the “ah ha!” felt whenever we encounter a particularly strong metaphor. For example, many students remember an English or Theater class where they first experienced Shakespeare’s famous line “The world is a stage.” That metaphor, potentially, changed the way many of people viewed the world. We certainly experience the world differently when we feel that “Time is money.” As Recker points out, I get mad when you waste my time!

⁷⁹ Lakoff and Johnson, “Metaphors We Live By.” 139

⁸⁰ Lakoff and Johnson. Metaphors We Live By. 140

⁸¹ Lakoff and Johnson. Metaphors We Live By. 145

This experience underlies the cognitive view idea that “The essence of metaphor is understanding and experiencing one kind of thing in terms of another.⁸²” For example, we can consider various cases relating to the idea that “Higher status is up, lower status is down.” The physical arrangements of meetings can signal the power structure felt by those participating. Traditionally, a King would sit on a throne while his subjects always had to remain physically below their liege’s head and shoulders. Legend has it that King Arthur and his knights sat around a round table to show that Arthur was merely “first among equals.” (Given the disastrous ending, was this tale a metaphor against the idea of democracy?) A modern CEO from a Fortune 500 company may show status by using a rectangular table with him (or her) at the head of the table, while the power structure diminishes the farther down the table one sits, much like with the Kings of old. The same CEO can create a more relaxed atmosphere with his employees by having a “round table discussion,” thus signaling the workers are more equal with the head of the company.

This experiential nature is also seen in our actions. For example, say that a person accepts the metaphor “Animals are Machines.” Further, suppose this person lives in a throwaway society where products, especially machines, are used, abused, and thrown away to get a new one. Such a person might not take care of his equipment because he can always get a new one. It seems reasonable to suppose that his treatment of animals will be similar. We can see this with animal experiments. In a lab a scientist is not concerned with causing pain to his microscope or the table or the computer because they are all tools or machines. Thus, if animals are machines, then they can be treated similarly.

⁸² Lakoff and Johnson. Metaphors We Live By. 5

Before moving onto the next topic, I would like to give a quick example of these four aspects as seen through the metaphor “A Thesis Defense.” It may not be obvious that this is a metaphor; after all, it is supposed to be a rational argument in support of a particular position. However, rational argument itself falls within what Lakoff and Johnson call the conceptual metaphor “Argument is War.” The irreducibility of “a thesis defense” refers to the non-literal nature of it being a defense. By this, I mean that a student cannot carry around her thesis defense for protection against a mugging. For this metaphor to be taken literally would require further metaphors. War is usually in the context of acquiring material objects like land, water, or other resources. Thus, there can be a defense against possession. What is the material object of a thesis? It has to be more than the laser ink and special watermarked OSU paper; it is the ideas expressed either verbally or written down on the paper. Thus, with a new metaphor, the ideas become objects; the thesis becomes a container for the objects. The “Thesis Defense” metaphor is focusing certain aspects of a presentation into war-like concepts. The thesis defense will involve claims that are defended; some of the faculty will attack weak points; some of the faculty will help come to the rescue of contested points; arguments will be demolished; arguments will be bolstered; skirmishes will be won or lost; strategy will be planned; there will be attacks and counterattacks, etc. The metaphor is creative because it is not necessary that a thesis be presented in an adversarial climate. It could be any of the following: “A thesis presentation,” “A thesis building,” or “A thesis project.” The second one sounds particularly pleasing. Instead of focusing on war, we could focus more on building knowledge and understanding about a particular topic. It would be an interesting project to compare a student’s thesis defense with a faculty’s colloquium

presentation. Finally, for anyone who has gone through a thesis defense it should be obvious that the metaphor is experiential. Months planning and preparing for an onslaught from a group who has years of experience beyond the few months spent on working on the thesis. Thus, we see how “A Thesis Defense” fits into a cognitive view of metaphor. The structure and format of the whole defense is in terms of war. It is irreducible, focusing, creative, and experiential.

Yet, it almost seems preposterous to claim that an argument can be anything but a kind of war. This brings to light two issues that Lakoff and Johnson discuss. The first issue is a reiteration that metaphorical concepts structure our lives. They mention that it is conceivable that a culture could view argument as a dance: “the participants are seen as performers, and the goal is to perform in a balanced and aesthetically pleasing way.”⁸³ Under this view the argument could focus more on working together for harmony, covering your partner’s weaknesses, and helping your partner achieve her goals. However, for us, understanding meaning under the western tradition, it is hard to see argument as dance. “Argument is War” is a dead metaphor, which takes us to the next issue. In what ways are metaphors dead and alive?

⁸³ Lakoff and Johnson. Metaphors We Live By. 5

Dead or Alive

When examining Davidson's three questions that challenge an interactive view of metaphor, his third question was "If words in metaphor bear a coded meaning, how can this meaning differ from the meaning those same words bear in the case where the metaphor dies – that is, when it comes to be part of the language?" Because we have already discussed how metaphor does not have a coded message, we will dismiss the first part of the question to focus on the latter part claiming that when a metaphor dies it has become part of the language. The standard view, which sounds like Davidson's position, is summarized by George Orwell, "A newly invented metaphor assists thought by evoking a visual image, while on the other hand a metaphor which is technically 'dead' (e.g. *iron resolution*) has in effect reverted to being an ordinary word.⁸⁴" Hence, it appears that the standard view of dead and alive metaphors goes something like this: Metaphors are alive as long as they are seen as metaphors; we do not view them as literal language. Metaphors die when they become so inculcated into our language that they no longer seem figurative. (Reminiscent of Hume's theory that impressions fade into ideas as they become less vivid.) Thus, "Richard is a Gorilla," "Socrates is a Midwife," and "Time is a Frisbee" are all alive, while, "Time is Money," "The World is a Machine," and "I'm feeling blue today" are all dead. Oddly enough, a continuation of Orwell's comment responds to Davidson's question about the change in meaning, "But in between these two classes [alive and dead] there is a huge dump of worn-out metaphors which have lost all evocative power and are merely used because they save people the trouble of

⁸⁴ Orwell, George. *Politics and the English Language*.

inventing phrases for themselves.⁸⁵” Thus, one response to Davidson is that it is not the case of a meaning change, just a general non-attention by people who use the metaphors.

Lakoff and Johnson suggest another response to Davidson when they simply deny the idea that this is the proper way to classify metaphor as being dead or alive. In chapter 10 of their book, Metaphors We Live By, they give a list of examples where metaphors help structure our conceptual schemes: Theories are buildings; ideas are food; ideas are people; ideas are plants; ideas are products; ideas are commodities; ideas are resources; ideas are money; ideas are cutting instruments; ideas are fashions; understanding is seeing; ideas are light-source; discourse is a light-medium; love is a physical force; love is patient; love is madness; love is magic; love is war; wealth is a hidden object; significant is big; seeing is touching; eyes are limbs; the eyes are containers for the emotions; emotional effect is physical contact; physical and emotional states are entities within a person; vitality is a substance; life is a container; life is a gambling game. Lakoff and Johnson will say that these metaphors are alive because, “they are metaphors that we live by. The fact that they are conventionally fixed within the lexicon of English makes them no less alive.”⁸⁶

Dead metaphors, on the contrary, are simply metaphors that “are understood partly in terms of marginal metaphorical concepts like A MOUNTAIN IS A PERSON.”⁸⁷ There are several things going on here. First, we have the metaphorical concept of a mountain is a person because within our culture we speak of the “foot of the mountain.” However, the metaphor is marginal because it is only within subcultures that we extend the metaphor to, e.g., the shoulder of the mountain, conquering, fighting, or being killed by a

⁸⁵ Orwell, George. *Politics and the English Language*.

⁸⁶ Lakoff and Johnson. *Conceptual Metaphor in Everyday Language*. 473

⁸⁷ Lakoff and Johnson. *Conceptual Metaphor in Everyday Language*. 473

mountain.⁸⁸ Thus, within Lakoff and Johnson's theory, *alive* metaphors are those that have been assimilated within the culture and are the ones we "live by." Dead metaphors, have not been taken up by the culture, or are so limited that they do not produce many entailments.

Another response to Davidson, in how meaning changes from alive to dead, relies on the changing nature of language. With few exceptions, language is itself dynamic and alive, not static and dead. Words and phrases change meaning over the years. There is no reason that metaphors should be an exception to this.

The final aspect of the cognitive view of metaphor we will review is the problem of truth and objectivity.

⁸⁸ Lakoff and Johnson. *Conceptual Metaphor in Everyday Language*. 472

Problems with Truth and Objectivity?

If a person were to study a brief history of science, she might develop the following story of scientific development: There is a dividing line in scientific methodology that could be made with the introduction of the mathematization or mechanization of science, e.g., Descartes' works. In a pre-Descartes world, natural philosophy (science) followed many systems of thought. People were trying magic, mysticism, and prayer, thought experiments, and any other type of activity claiming knowledge about the world and how we should interact with it for results. Language was poetical and metaphorical. Although Descartes himself uses many metaphors in his treatise, he also proposes a mathematical-mechanical approach to scientific enquiry. Natural philosophers who focused on this mathematical-mechanical approach tended to get results more often than their competitors did. Thus, there is almost a Darwinian elimination of science lacking mathematical language; slowly, mathematics becomes a critical part of science. Unlike the previous language used in science, mathematics appears objectively true, real, and unambiguous. The language of mathematics became the primary model of science. Thus, within science we might find a push for changing the language to be more precise and mathematical. With the obvious success of mathematics in science, science begins to have more status and becomes almost a standard of academic thought. Thus, within other disciplines, to regain status there will need to be some sense of rigor within the language. Now, for example, philosophers would be motivated to utilize language that is objectively true, real, and unambiguous. Since it is difficult to see metaphor as any of these things, metaphor is seen as not being important within a project of objective truth.

I do not suggest that this is the actual stage of events that led to the rejection of metaphor within science or the humanities as a part of our quest for Truth and Understanding. However, I submit that it is plausible that a motivation for ridding metaphor as serious discourse within science or science-like inquiry is because of a desire to make language more like what mathematics appears to be. (I later look more at metaphor and mathematics in chapter six.) However, this story does bring up an important problem when first exposed with a cognitive view of metaphor: What about truth and objectivity?

In the latter part of Metaphors We Live By, Lakoff and Johnson neatly lay out the importance of a truth theory, and the dangers of buying into the objectivism or subjectivism theories of truth. Truth is important because of the survival value that we derive from thinking things are true.⁸⁹ For example, most people are not killed by stepping out in front of a fast moving truck because they act on a belief that “If you want to stay alive, then do not step in front of a fast moving truck.” Likewise, there are “truths” about social interactions, which foods are eatable, and what are friends are like.⁹⁰ The dangers arise because, “truth is always relative to a conceptual system that is defined in large part by metaphor.⁹¹” For example, the truth of the claim “The fog is in front of the mountain” depends upon our cultural understanding of an orientation metaphor that gives mountains a front/back. The danger of buying into the objectivism account is because “Most of our metaphors have evolved in our culture over a long period, but many are imposed upon us by people in power...the people who get to impose their

⁸⁹ Lakoff & Johnson. Metaphors We Live By. 160

⁹⁰ Lakoff & Johnson. Metaphors We Live By. 160

⁹¹ Lakoff & Johnson. Metaphors We Live By. 159

metaphors on the culture get to define what we consider to be true.⁹²” For example, the “War on Drugs” or “Special Treatment.”

Lakoff and Johnson note, it is rather difficult for people in the western tradition of philosophy to accept this cognitive view of metaphor. The primary reason for this is that a cognitive view of metaphor denies the traditional “objectivism” worldview that western philosophy has primarily adopted. For example, this cognitive view denies: We can have knowledge of a world independent of experience; We understand the objects of the world in terms of categories and concepts that objects have independent of our experience; Words have fixed meanings; Objectivity is good because it is the only route to what is really real; Subjectivity is dangerous.⁹³ Since objectivism is typically contrasted with subjectivism, when most people hear a claim that metaphor is not objective, metaphor is then thrust into the subjective realm. However, Lakoff and Johnson’s cognitive view also denies many of the principles of subjectivism: We can trust intuitions and feelings; These intuitions and feelings are more important than objectivity; Objectivity is dangerous.

They deny objectivism’s claim that truth is absolute and unconditional while also denying subjectivism’s claim that truth is individually obtained without regard to the outside world stating

What objectivism misses is the fact that understanding, and therefore truth, is necessarily relative to our cultural systems and that it cannot be framed in any absolute or neutral conceptual system. Objectivism also misses the fact that human conceptual systems are metaphorical in nature and involve an imaginative understanding of one kind of thing in terms of another. What subjectivism specifically misses is that our understanding, even our most imaginative understanding, is given in terms of a conceptual system that is grounded in our successful functioning in our physical and cultural

⁹² Lakoff & Johnson. Metaphors We Live By. 159-160

⁹³ Lakoff & Johnson. Metaphors We Live By. 1187-188

environments. It also misses the fact that metaphorical understanding involves metaphorical entailment, which is an imaginative form of rationality.⁹⁴

Lakoff and Johnson suggest here that there is a third option, a middle ground between objectivism and subjectivism called “An Experientialist Synthesis.”

The experientialist synthesis acknowledges that we all have situations where it is more or less appropriate to use reason or imagination. For example, we should probably exercise reason when buying a car, yet a romantic dinner should probably involve a bit more imagination. Likewise, evaluating a new scientific theory should involve reason, yet discovering scientific theories often involves a great deal of imagination. Thus, the experientialist synthesis unites different areas. In particular, metaphor is a link between rational and subjective thought. Thus, they call metaphor “Imaginative Rationality” because “Reason, at the very least, involves categorization, entailment, and inference. Imagination, in one of its many aspects, involves seeing one kind of thing in terms of another kind of thing – what we have called metaphorical thought.⁹⁵” Metaphor is the bridge between rationality and emotion, reason and imagination, the known and the unknown. Metaphor does this by creating new meaning and new understandings—new reality.

In summary: This chapter considers various issues relating to whether metaphor is merely a colorful linguistic expression or whether it plays some type of cognitive role. In the Davidson section, we see that (1) literal meaning and literal truth conditions are not independent of context, (2) that it may not be desirable for metaphors to have truth conditions, and (3) that Davidson does not offer a clear argument against a cognitive

⁹⁴ Lakoff and Johnson. Metaphors We Live By. 194

⁹⁵ Lakoff and Johnson. Metaphors We Live By. 193

view of metaphor. Lakoff and Johnson analyze some of the commitments of a cognitive view of metaphor: (1) metaphors have at least four aspects (irreducibility, focusing, creative, and experiential), (2) the notion of dead and alive metaphors, and (3) that the cognitive (experiential) view denies objective and subjective truth. In the next chapter, we will review some metaphors in science and ethics.

Chapter IV: The World Is?

Introduction

Metaphor involves understanding one thing in terms of another. It is because of the cognitive nature of metaphor that I suggest metaphor as a possible link between science and ethics. Some responses to two questions—“What is the world?” and “How do we understand the world?”—demonstrate the possibility of a metaphoric connection between science and ethics. Two competing answers typically given to these questions are “The world is a machine” and “The world is an organism.” We usually hear this in the phrases people use to describe the Universe or the Earth, for example, by referencing Kepler’s “Clockwork universe,” or the ancient notion of “Mother Earth.” For modern western civilization, and for most science, the preferred operational metaphor is “The world is a machine.” However, “The world is an organism” is much older, and is finding renewed interests within both science and ethics. Consistent with a cognitive view of metaphor, neither metaphor is “True” or “False.” The metaphor chosen is useful or not based on how it captures our experience and understanding of the world. Further, the metaphor we use will affect our world-view.

In this chapter, we will briefly examine these two foundational metaphors within science and ethics. With each metaphor we will see an intuitive account of the appeal for using the metaphor (kind of a comparison of similarity used as a description). Furthermore, by using the four cognitive aspects of metaphor, we see a more detailed interactive view generating meaning by understanding one system in terms of another.

While examining these metaphors, we will see how science and ethics are intertwined by the cognitive structure of metaphor. To show how metaphorical thought is crucial to some scientific/ethical arguments, the chapter will end with a section on Descartes' and Hume's use of the mechanical metaphor to analyze the "Reason" of animals.

The World is a Machine

Within the western sciences and analytic philosophy traditions it should not be surprising that “The world is a machine” has gained dominance in use. In fact, it has gained so much support that it is often difficult to conceive how the world could be anything different from a highly complex machine. This tradition developed in the sixteenth century when “geared mechanical clocks served as symbols of cosmic order; God was the supreme clockmaker⁹⁶”; and when “Eventually, God was reduced to a minimal role in the clock model of the universe – he wound up the mechanical cosmos and left it to tick away into eternity.⁹⁷” From here, we see two main influences in the acceptance of the view expressed in this metaphor. First, we directly experience the results, or successes, of a science that has embraced this view, e.g., antibiotics, DNA as the genetic code, and email. Second, this view may start to develop at a young age through religious commitments. This arises from an “intellectual” tradition within the Judeo-Christian-Islam religions of a world created by a “Perfect/Rational God.” Within this tradition many people associate God with a Designer, a Blacksmith, a Builder, or an Architect. These, in turn, are often associated as aspects of an Engineer. Because the prototypical engineer is someone who uses reason to build machines, God must build machines. Thus, the world is a machine. Now, considering that both scientists and religious leaders occasionally bombard the average person with the idea that “the world is

⁹⁶ Merchant, Carolyn. The Death of Nature. 225

⁹⁷ Merchant, Carolyn. The Death of Nature. 225

a machine,” the average person would have a hard time rejecting this particular world-view.⁹⁸

It is by studying the above tradition that we begin to see the complex connections between God-math-machines-world-ethics. First, take a belief in a world created by God. Then, add to this belief an understanding that God is rational and follows rules or laws of reason. The primary model of rationality and reason is mathematics (or some type of formal system). Thus, the world is created with mathematical precision and math is the language used to describe the universe. A well-made machine works with the same precision and certainty as a mathematical formula. Thus, the world constructed with mathematical precision will behave as if it were a machine. Hence, the world is a machine. We can also see this with the pioneers of the mechanical view

For the mechanists, God became a clockmaker and an engineer constructing and directing the world from outside. It was Mersenne’s hope and intention to replace *The Imitation of Jesus Christ* by *The Imitation of the Divine Engineer*. The engineer’s art gave humanity not only the opportunity to imitate God ‘in external productions’ but also the possibility of dominion over the earth. For Gassendi, God was the external governor and director of the world. For Descartes, the corpuscular world and natural bodies, including the human body, operated according to the same mechanical laws as clocks and other machines.⁹⁹

We will see this view, especially the ethical claims, further developed as we look at the cognitive aspects of this metaphor.

Once again, the four aspects of metaphor we will consider are: irreducibility, focusing, creative, and experiential. “The world is a machine” is irreducible because, as has been previously argued, metaphors need not be viewed as either true or false. If

⁹⁸ I take it as fairly obvious that scientists use this metaphor in world descriptions. As for the religious use, I base this on the popularity of the Design Argument for God’s existence.

⁹⁹ Merchant, Carolyn. *The Death of Nature*. 226

scientists only use this metaphor, then “Without an awareness of the oneness of things, science can give us at most only nature-in-pieces; more often it gives us only pieces of nature.¹⁰⁰” Furthermore, according to Barbara McClintock, people mistake models for reality and make tacit assumptions, “an implicit adherence to models that prevents people from looking at data with a fresh mind. These tacit assumptions impose unconscious boundaries between what is thinkable and what is not.¹⁰¹” One may see this, for example, in the differences in ape studies when men or women carry out the research program. While the mechanical metaphor should not be viewed as True/False, the history of science has shown that it has been very useful. (Recent history however shows a challenge to the successful mechanical model, e.g., Einstein’s Relativity Theory and modern Quantum Mechanics.) This usefulness is a direct result of the way the metaphor focuses attention onto specific aspects of understanding the world.

This focus, according to Carolyn Merchant, began when Francis Bacon changed our understanding of the world by moving from the idea of *mother earth* to *earth the servant*: bound into service, made a slave in constraints, molded by the arts, in which we discover hidden plots and secrets.¹⁰² Bacon further developed modern scientific investigation by making it mechanical: breaking down a problem into its component parts, isolating from the environment, solving each portion independently, creating new things, and removing ethical constraints against manipulative magic.¹⁰³ A True/False distinction was not originally part of this understanding. As Mersenne thought, we

use mechanism not as an absolute truth but as a useful way of ordering knowledge about the practical everyday world. Ultimate knowledge was not

¹⁰⁰ Keller, Evelyn Fox. *A Feeling for the Organism*. 118

¹⁰¹ Keller, Evelyn Fox. *A Feeling for the Organism*. 178-179

¹⁰² Merchant, Carolyn. *The Death of Nature*. 169

¹⁰³ Merchant, Carolyn. *The Death of Nature*. 184

possible, but a pragmatic knowledge based on everyday experience and the appearances of the senses could be attained. Viewing the world as a machine was the most practical and useful way to organize information derived from the appearances.¹⁰⁴

Thus, we have, under the mechanical metaphor, the primary focus as a “stress on analysis, or taking things apart to understand them.¹⁰⁵” This follows both a mechanical and mathematical approach. From a mechanical perspective, this follows from the experiences of working with machines and the practice of taking apart machines to understand how the parts interact with each other. From a mathematical perspective, this follows from simplifying equations, or breaking down a problem into smaller parts and solving each part independently. This mechanical-mathematical understanding follows a reductionist-materialist approach of understanding the whole in terms of the parts. Thus, to understand the world, a scientist may break up a compound into its constituent parts, dissect an animal to see how it is connected, break up rock formations to study the layers of fossils, isolate chemical compounds in an herbal remedy to produce medication.

A secondary focus is “stress on passive matter...physical things change their behavior only when pushed or pulled by other material things or when acted upon by external forces.¹⁰⁶” Again, at its most basic level, a machine only changes or operates by a contact force—e.g., gears turning chains to spin wheels. Once an outside force starts it, a machine may operate for a while, but there must be an initial start. In addition, a machine left unattended will eventually run down. This fits in nicely with the experience of a world that has material objects that do not move unless acted on. This idea of “passive matter” gives rise to a new ethics of treating nature as humans learn to control aspects of

¹⁰⁴ Merchant, Carolyn. *The Death of Nature*. 196

¹⁰⁵ Recker, Doren. *Philosophy of Science Course Book*. 56

¹⁰⁶ Recker, Doren. *Philosophy of Science Course Book*. 56

the environment. More control of the environment makes the world seem more machine like. As a result, “Because nature was now viewed as a system of dead, inert particles moved by external, rather than inherent forces, the mechanical framework itself could legitimate the manipulation of nature.¹⁰⁷” After all, most people do not object that, in itself, the manipulation of mathematical equations or machines is in any way “unethical.”

Another focusing aspect is “stress on matter in motion as basis for physical explanations.¹⁰⁸” Change bases itself on motion or contact between physical parts. For example, Descartes describes a flame when it “burns wood or some other similar material, we can see with the naked eye that it sets the minute parts of the wood in motion and separates them from one another, thus transforming the finer parts into fire, air and smoke and leaving the courser parts as ashes.¹⁰⁹” There is no Aristotelian *essence* or Platonic *form* of heat that makes a flame independent of the burning, changing material. The flame and heat occur because fast moving particles bounce around in contact with each other and other objects. More currently, an earthquake does not happen because Zeus was angry, but because of stress along fault-lines.

The last focusing element we consider is a restatement of the metaphor itself with “stress on engineering models...explicitly w/ appeals to ‘God as Engineer,’ or implicitly w/ frequent appeals to factory, blueprint, or computer models.¹¹⁰” This focusing element leads to the creative and experiential nature of this metaphor.

¹⁰⁷ Merchant, Carolyn. The Death of Nature. 193

¹⁰⁸ Recker, Doren. Philosophy of Science Course Book. 56

¹⁰⁹ Descartes. The World or Treatise on Light. AT XI 7 Reprint in: CSM 83

¹¹⁰ Recker, Doren. Philosophy of Science Course Book. 56

Many of the creative and experiential aspect of the metaphor are outlined in Eugene Russo's comments in "The Scientist"¹¹¹ This article outlines a panel session at a *History of Science Society* meeting in Pittsburgh. The panel's discussion centered on scientific mechanisms in the past and present, and traced *modern* mechanistic ideas to the 17th century. Russo reports Peter Machamer's claim that Galileo Galilei was the first to popularize the mechanical world-view because

Much of Galileo's mathematics related to the nature of matter and motion can be elegantly illustrated and realized via simple machines. Soon after, Rene Descartes' collision laws, Dutch mathematician Christian Huygens' laws of motion, and, most notably, Sir Isaac Newton's introduction of forces all influenced how mathematical laws lend themselves to actual mechanisms in theory and practice.¹¹²

Thus, simple machines (lever, pulley, wedge, inclined plane, wheel, and screw) provide a conceptual link between math and the world. As machines become more complex and mathematics becomes more advanced to describe the mechanics, there is a stronger tie between machines-math-world. This provides a cognitive view as, according to Machamer, "It's not just having the mathematics. It's saying here's a problem in the physical world, now think about it this way.... It sets the way in which you think, and how you have to structure problems, and gives you the canon for solution."¹¹³ Once physical sciences began to have success with mechanical models, others sciences, according to Machamer, began to try out mechanistic models. This exemplifies the creative and experiential aspects because, as Ramsey says, mechanisms are "one of the ways we have made things intelligible to ourselves."¹¹⁴ Machamer agrees, "Part of the

¹¹¹ *The Scientists* 13[24]: 14, Dec. 6, 1999

¹¹² *The Scientists* 13[24]: 14, Dec. 6, 1999

¹¹³ *The Scientists* 13[24]: 14, Dec. 6, 1999

¹¹⁴ *The Scientists* 13[24]: 14, Dec. 6, 1999

appeal for mechanisms is that you have this way of literally showing how the damn thing works.¹¹⁵”

Carolyn Merchant gives further experiential and focusing aspects of the mechanical metaphor:

The brilliant achievement of mechanism as a world view was its reordering of reality around two fundamental constituents of human experience – order and power. Order was attained through an emphasis on the motion of indivisible parts subject to mathematical laws and the rejection of unpredictable animistic sources of change. Power was achieved through immediate active intervention in a secularized world. The Baconian method advocated power over nature through manual manipulation, technology, and experiment.¹¹⁶

This new focus provided many payoffs within science. The success of the metaphor seems clear, although success, in this case, is in getting results, not in a claim to finding truth. Because of the cognitive influence of the metaphor, it psychologically affects people. We begin to see the transition from science to ethics by way of metaphor.

Merchant sums up this tie in several parts of her book: “Between the sixteenth and seventeenth centuries the image of an organic cosmos with a living female earth at its center gave way to a mechanistic world view in which nature was reconstructed as dead and passive, to be dominated and controlled by humans.¹¹⁷” The world is a machine. We control machines. Suddenly the world is controllable by us! We take apart machines to tinker with, fix, break, etc. Therefore, the world can be taken apart and tinkered with, fixed, broken, and is basically now opened up to our use.

All this change from a conceptual shift partly facilitated by a metaphor change:

The philosophy that the world was a vast machine made of inert particles in ceaseless motion appeared at a time when new and more efficient kinds of

¹¹⁵ *The Scientists* 13[24]: 14, Dec. 6, 1999

¹¹⁶ Merchant, Carolyn. *The Death of Nature*. 216

¹¹⁷ Merchant, Carolyn. *The Death of Nature*. xvi

machinery were enabling the acceleration of trade and commerce...the death of the world soul and the removal of nature's spirits helped to support increasing environmental destruction by removing any scruples that might be associated with the view that nature was a living organism. Mechanism substituted a picture of the natural world, which seemed to make it more rational, predictable, and thereby manipulable.¹¹⁸

If we add this manipulative view with the reductionist mindframe, then we get problems with the environment like at Love Canal or the acidification of the Adirondacks Lakes:

'We've been spoiling the environment just dreadfully and thinking we were fine, because we were using the techniques of science. Then it turns into technology, and it's slapping us back because we didn't think it through. We were making assumptions we had no right to make. From the point of view of how the whole thing actually worked, we knew how part of it worked....We didn't even inquire, didn't even see how the rest was going on. All these other things were happening and we didn't even see it.'¹¹⁹

We still have the subtle tie between God-Math-Machines-World,

Mechanism, which superseded the organic framework, was based on the logic that knowledge of the world could be certain and consistent, and that the laws of nature were imposed on creation by God. The primacy of organic process gave way to the stability of mathematical laws and identities. Force was external to matter rather than immanent within it. Matter was corpuscular, passive, and inert; change was simply the rearrangement of particles as motion was transmitted from one part to another in causal nexus. Because it viewed nature as dead and matter as passive, mechanism could function as a subtle sanction for the exploitation and manipulation of nature and its resources.¹²⁰

¹¹⁸ Merchant, Carolyn. The Death of Nature. 227

¹¹⁹ Keller, Evelyn Fox. A Feeling for the Organism. Quoting Barbara McClintock. 206

¹²⁰ Merchant, Carolyn. The Death of Nature. 103

The World is an Organism

Despite both the success of the mechanical metaphor and the difficulty of seeing the world as anything but a machine (because it is so ingrained in our western teaching), there is the competing metaphor to consider, which is older than “The world is a machine” metaphor and is regaining use—“the world is an organism.” Like the previous mechanical metaphor, the organism metaphor gains initial plausibility because of its appeal to religious belief or life experiences. For an example of the older version of the organism metaphor, we can refer to creation myths similar to some versions of Greek mythology. One such myth, in a Greek context, goes something like this: In the beginning, the universe was fire and Chaos; Out of Chaos, Ge (Greek) or Gaia (Roman) arose; Gaia gave birth to the Earth and to the human race. Thus she was worshiped as the Mother Goddess or Mother Earth. Although the names and details change, many ancient or “primitive” cultures have this shared view of “Earth as Mother” or shorter “Mother Earth.” Thus, we see that “nature was traditionally feminine.¹²¹” This view ties together with an ethics: “As long as the earth was considered to be alive and sensitive, it could be considered a breach of human ethical behavior to carry out destructive acts against it.¹²²”

Merchant relates an example of this:

Smohalla of the Columbia Basin Tribes voiced the Indian objections to European attitudes in the mid-1800s: You ask me to plow the ground! Shall I take a knife and tear my mother’s breast?...You ask me to dig for stone! Shall I dig under her skin for her bones?...You ask me to cut grass and make hay and sell it, and be rich like white men! But how dare I cut off my mother’s hair.¹²³

¹²¹ Merchant, Carolyn. The Death of Nature. xxiii

¹²² Merchant, Carolyn. The Death of Nature. 3

¹²³ Merchant, Carolyn. The Death of Nature. 28

This follows directly from the idea that the earth is a nurturing mother, not some cold-lifeless inanimate mass.

Even in non-religious experience, the world can be understood as an organism. Certain aspects of the world seem to correspond to biological systems: The wind is the breath, rivers and streams are the circulatory system, the rainforests are lungs, rocks are bones, etc. Not only can we understand the world in these terms, but experience shows us a world of birth, growth, death, decay, and rebirth...and it appears that this happens for all types of matter, both organic and inorganic. The claim that inorganic matter behaves this way could be controversial, yet scientists use language consistent with this idea, e.g., the birth of mountains, the growing mountains; earthquakes, meteors, and rivers can wear mountains down—thus implying death and decay. Cyclic views of nature are very compatible with the idea that the world is an organism. This particular view is variously classified as classical, primitive, ancient view, or earth-centered.

As we have seen, beginning in the seventeenth century, this organic world-view was largely replaced by the mechanical view. As the mechanical models proved successful, the organic models gave way, although they never completely disappeared.¹²⁴ Scientists and philosophers continue to hold (and use) the organism metaphor, yet for various reasons this view declined. There, however, has been a reemergence of organic models:

Books on ancient goddesses that became the basis for a renewed earth-rooted spirituality. They revived interest in statues, images, poetry, and rituals surrounding prehistoric earth goddesses, the Mesopotamian Innana, the Egyptian Isis, the Greek goddesses Demeter and Gaia, the Roman Ceres, the European paganism, as well as Asian, Latin American, and African female symbols and myths.¹²⁵

¹²⁴ Merchant also relates how social views of women influenced the decline of the metaphor, e.g., *woman as nurturer* to *woman as witch* allowed for an idea of 'controlling women' → 'controlling earth.'

¹²⁵ Merchant, Carolyn. The Death of Nature. xvi

This seems to be the case because to many, like James Lovelock, the mechanical view was cold and hard, it took the heart and soul out of science.¹²⁶ Furthermore, this could be a reaction to how science is applied or a reaction to the implications of humanity's place in the world. (More evidence that the cognitive aspect of metaphor links science and ethics.) The organism view also gained acceptance from researchers, as there is an increasing realization that the mechanical view limits progress or advances in scientific knowledge. For these reasons, the organic model is making a comeback. To better contrast this view from the mechanical view, the four cognitive aspects of this metaphor will help clarify its meaning.

“The world is an organism” is irreducible in much the same way that “the world is a machine” is irreducible. From a scientific standpoint it is not clear that anything is gained by viewing the metaphor as true or false; that is, the metaphor is best viewed as useful or not. The usefulness of this metaphor, like that of many metaphors in science, rests on its ability to focus attention to particular aspects or areas of research. It however does rely on a holistic philosophy: everything is connected to everything else; emphases are on interactive processes; the whole has primacy over the parts; and we focus on unity/structure and function.¹²⁷ This holistic aspect, as we will see, heavily carries into ethical grounds, which makes some scientists (and philosophers) question the motive of using this metaphor. Yet, as scientists try to grasp with the non-mechanical nature of quantum mechanics, the organic metaphor does become more appealing, as opposed to a reductionist approach.

¹²⁶ Lovelock, James. *What is Gaia?* net source

¹²⁷ Merchant, Carolyn. *The Death of Nature*. 99+

The primary focus of this organic view is a “Stress on interconnections between things, or understanding things only in proper context.¹²⁸” This follows from understanding that, when conditions are not “as in nature,” the observations or experiments could be flawed because the researchers influence the tests. (As we see with studies into light or quantum mechanics.) Rather than following a view of reductionism, the organic view stresses a holistic, non-reductionist approach to understanding or a view that the whole can be more than the sum of the parts. Thus, to understand the world, a scientist may see what compounds naturally occur in nature, observe animals in their natural habitat, or try to reproduce (rather than dissect) nature in a lab.

A second focus is a “Stress on active matter...[in which] physical things have their own internal motive forces, principles of self motion, or are ‘Centers of Activity’ within an otherwise continuous field, etc.¹²⁹” That is, matter is active, as opposed to passive inert material. Matter displays principles of self-motion and self-expression rather than merely reacting to external influence. This may go back to one of Aristotle’s Causes, in particular, everything moving toward some natural end because all of nature has a “natural place” where it will end up when not interfered with.

A third focusing element is a “Stress on interactions between different centers of activity,” or “similarities between things that are not obviously connected as a basis for physical explanations.¹³⁰” For people who grew up with George Lucas’s *Star Wars*, this sounds similar to the idea of the *Force*—something that connects all things, like an energy field. These interactions stressed by the organic view are similar to old style magical thinking or a micro/macro view of the world.

¹²⁸ Recker, Doren. Philosophy of Science Course Book. 56

¹²⁹ Recker, Doren. Philosophy of Science Course Book. 56

¹³⁰ Recker, Doren. Philosophy of Science Course Book. 56

A fourth and final focus of the organic view is pretty much a restatement of the metaphor with a “Stress on biological models...interconnection of organ systems within a living animal.¹³¹” This last focusing element is part of the creative and experiential nature of this metaphor.

The creative and experiential elements are seen in examples, which range, for example, from an entire *species population* to the world. Recker writes

interpretations of the behavior of social insects have long been informed by the organic metaphor of populations as ‘superorganisms’ [e.g., Wheeler]. That is, interpreting an ‘organism’ as ‘a self-sustaining biological unit,’ which must acquire and metabolize energy, protect its individual integrity, reproduce itself, etc., social insect populations can be fruitfully described as organisms.¹³²

Another example of this is James Lovelock’s “Gaia Hypothesis.” This is, “a scientific claim that the earth’s ‘biota’, tightly coupled with its environment, acts (and has acted since life on earth developed any complexity) as a single, self regulating living system in such a way as to maintain the conditions that are suitable for life.¹³³” That this is a cognitive view of metaphor is further shown by Lovelock’s description of *alive*, “I recognize that to view the Earth as if it were alive is just a convenient, but different, way of organizing the facts of the Earth...the thought that Earth may be alive: not as the ancients saw her—a sentient Goddess with a purpose and foresight—but alive like a tree.¹³⁴” As we can see in the environmentalists’ movement, this view aims at changing the understanding of humanity’s relationships to the Earth. They give up the “cold

¹³¹ Recker, Doren. *Philosophy of Science Course Book*. 56

¹³² Recker, Doren. *Dualism and The Genetic Code: Machine Metaphors in Biology*. 9

¹³³ Charlton, Noel. *Gaia Theory*. net source

¹³⁴ Charlton, Noel. *Gaia Theory*. net source

lifeless” mechanical view where we tinker with nature. In its place humanity becomes active co-participants in the world.

We can really see this experiential nature when observing radical environmentalists who claim that humanity has become a plague or cancer on mother earth. Other environmentally concerned individuals express this a bit more mildly

Today, a global crisis...threatens the health of the entire planet. Ozone depletion, carbon dioxide buildup, chlorofluorocarbon emissions, and acid rain upset the respiration and clog the pores and lungs of the ancient Earth Mother...Toxic wastes, pesticides, and herbicides seep into ground water, marshes, bays, and oceans, polluting Gaia’s circulatory system...A new partnership between humans and the earth is urgently needed.¹³⁵

The metaphor itself helps in shaping belief, and it is this cognitive nature of metaphor that provides the link between science and ethics.

The creative aspect of the organism metaphor is slightly different depending on whether we are considering the primitive or modern view. As we have already seen, the primitive view arose more from religious belief and observations of the natural world. Its view is more “Natural” in the sense that in more primitive cultures machines and mathematics were not complex enough even to be considered as a model for the world. The creation of the modern organism metaphor is more complex. It appears that the modern view is more of a reaction to the apparent inhumanity of the mechanical view as well as a growing understanding that the mechanical view is not the only option in science, i.e., a growing realization that other views can produce results in the scientific enterprise. The experiential nature of the organic metaphor is most evident by studying how scientific exploration is conducted within this view, for example in ape studies.

¹³⁵ Merchant, Carolyn. The Death of Nature. xv

Under a mechanical model, the following types of activities would be appropriate: Go out to the field and capture a bunch of apes; take them back to the lab and start experiments. Kill a bunch of them for dissection (anatomical studies, morphology, etc.) and take fluid samples to analyze. Map the genetic sequence. Poke, prod, shake, shave, and do other experiments on them. Gather number crunching data and see what is there. Under an organic model, the following study would be appropriate: Go out to the field and secretly watch apes in their natural habitat. Observe them with little or no direct interactions. See how they interact with each other and the environment. At a fundamental level, this is seen in the contest between scientists relying on field experience versus scientists working primarily with lab experiments. It is important, however, to keep in mind that a more complete understanding of apes comes about by using both metaphors. The machine metaphor is likely to omit such issues as ape social structure and communication, while the organism metaphor is likely to lose understanding of medical treatment of primates and genetic characteristics of the apes. Since both metaphors capture particular aspects of our experiences, both are needed to understand those experiences more adequately. It is not just a matter of gathering more information or new data, but a new way of understanding nature. This is evidence that progress is not made by only gathering more or newer data: “Revolutionary thinkers are not, primarily, gatherers of facts, but weavers of new intellectual structures.¹³⁶” Progress is made with metaphors.

It may be important to note that making a claim, while using a particular metaphor, will not result in a standard set of conclusions. That is, people using the same metaphor are not bound to conceptualize the same interpretations or conclusions within scientific or

¹³⁶ Gould, Stephen J. The Flamingo's Smile. 151

philosophic debate. The metaphors, however, are prevalent as a major influence in philosophical discourse. As an example, we can look at the mechanical metaphor used in Descartes' and Hume's work regarding reason in humans and animals. I choose this example because many traditional and popular ethical (mis)treatments of animals rely on a notion of animal intelligence or reasoning power. Although some people—like Utilitarian Peter Singer, prefer to challenge this notion from “outside”—this analysis will allow challenges from “inside”—if so desired or appropriate.

The World is a Machine: Descartes and Hume, Animal Reason

Do animals and humans have the same reasoning faculties? There seem to be two basic views when it comes to answering this. In one view, which is advocated by René Descartes, animal and human reasoning is a difference in kind, not degree. The other view, which is advocated by David Hume, claims that animal and human reasoning is a difference not in kind, but in degree. Both philosophers rely on the mechanical metaphor; yet attain different results because of the different approaches used (a rationalists / an empiricists view of knowledge). Rationalism =_{def} the epistemological theory that significant knowledge of the world can best be achieved by a priori means.¹³⁷ For example, Descartes' arm-chair-philosophy takes a person from the certainty that "I exist" to the certainty of the existence of God and an external world. Empiricism's =_{def} the epistemological theory that genuine information about the world must be acquired by a posteriori means, so that nothing can be thought without first being sensed.¹³⁸ For all the claims that Descartes and Hume are diametrically opposed, they are in many ways similar. For example, Hume and Descartes' bodies of work are very similar in goals: both seek the limits of human reason by utilizing skepticism and an analytic "mechanical" method for inquiry. One of the most striking similarities between these two philosophers is their reliance on a mechanical view of nature. This mechanical view permeates the works of both Hume and Descartes. However, they each arrived at the metaphor in slightly different manners.

During his time in the military, Descartes met Isaac Beeckman, an engineer with a medical degree. Beeckman developed a micro-mechanical view of nature while working

¹³⁷ *A Dictionary of Philosophy Terms and Names*

¹³⁸ *A Dictionary of Philosophy Terms and Names*

with mechanics. In his micro-mechanical view, all physical phenomena were explainable by the shape, size, and position of small corpuscular objects of which visible bodies are composed. Under the view, causes (the particles) are not directly observable, but the effects are observable. This is a departure from traditional views of objects in nature with qualities, essences, or magical powers. In fact, “magic” was simply dismissed as empty words or superstitious nonsense.¹³⁹

Descartes maintained and further developed this mechanical view of nature. He used the “world is machine” metaphor (or variants of) as the underlying model of the world, crucial in the pursuit of natural philosophy. Adding to many of Beeckman’s ideas, Descartes held that the observed nature is explainable mathematically by uncovering the underlying parts. Hence, from Beeckman, Descartes develops a coherent mathematical-mechanical view of the world. It was this education, plus the success in using the model, that influenced Descartes to adopt the mechanical view.

Hume’s acceptance of the mechanical view of nature might also be a product of his circumstances.¹⁴⁰ In his younger years, Hume went to the University of Edinburgh. While at the university, Hume studied many of the same subjects as Descartes: a classical education of Greek, logic, metaphysics, and natural philosophy. Hume also took elective courses in ethics and mathematics, while becoming familiar with the works of John Locke and Isaac Newton. This conditioned Hume to the acceptance of a mechanical view, that is, by the time Hume needed *conceptual tools* to build his own theories, the mechanical view was commonly accepted. There was a good precedent for accepting the view. The mechanical view had not only been developed by Descartes, who had some

¹³⁹ Alternatively, to paraphrase a later scientist, magic is just science/technology we do not understand.

¹⁴⁰ The following is a synthesis of class notes from a Hume seminar and A.J. Ayer’s book Hume A Very Short Introduction.

success in science and mathematics by using it, but also was further developed and successfully used in natural philosophy (physics) by Isaac Newton. Because of this, the mechanical view would be much more prevailing and acceptable during Hume's time.

Both Descartes and Hume relied on the mechanical view of analysis, where understanding comes from first dissecting complex objects to their *simple components* and then using various types of deduction to arrive at truth. They differ, though, in what they considered the simple components to be. For Descartes the simple components are objects that are *clear and distinct* to the mind. For Hume, the simple components are *simple perceptions*. Hume held that the difference in human and animal reason is one of degree, that is, humans and animals have similar reasoning faculties. On the other hand, Descartes held that the difference in human and animal reason is one of kind, that is, there is a fundamental difference between humans and animals.

Hume deals with animal reason in *Section IX (Of the Reason of animals)* of his Enquiry. As already noted, Hume relies on the idea that all animals (including man) are machines: "Every thing is conducted by springs and principles, which are not peculiar to man, or any one species of animals."¹⁴¹ Hume's argument relies on a strict analogy between humans and animals. Whenever we observe anatomical similarities in animals (including humans), we judge similar functions. Likewise, it is reasoned, similar behavior comes from similar motivation. With respect to reasoning ability, humans are similar to animals not only in anatomical structures (in some cases) but also in that both learn primarily through experience. Thus, human and animal reasoning is understood (from Hume's position) as a difference in degree, not kind.

¹⁴¹ Hume, David. A Treatise of Human Nature: Being An Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects. 2.2.12 *Of the love and hatred of animals*

Hume begins his section on the reason of animals by reminding the reader that, “All our reasoning concerning matters of fact are founded on a species of ANALOGY, which leads us to expect from any cause the same events, which we have observed to result from similar causes.¹⁴²” Hume then states the standard evaluative criteria when using arguments from analogy

Where the causes are entirely similar, the analogy is perfect, and the inference, drawn from it, is regarded as certain and conclusive...but where the objects have not so exact a similarity, the analogy is less perfect, and the inference is less conclusive; though still it has some force, in proportion to the degree of similarity and resemblance.¹⁴³

This part of the argument may serve at least two purposes. First, because he deals with the reasoning ability of animals, Hume establishes the basics of his philosophy regarding human understanding. Hume’s goal in the *Enquiry* concerns itself with building a *science* of human understanding. Hume thinks that his theory explains how humans reason. He wants to show that his theory is even more compelling because it also explains reasoning in animals, adding to its explanatory power. The second purpose of this reminder is that one can take it as an indirect argument against Descartes’ claim that humans and animals are fundamentally different. We will see a possible application of this used against Descartes later. Since Hume and Descartes rely on the idea that “animals are machines” one consideration in deciding which philosopher has the better argument is discovering which philosopher has the stronger analogy.

Hume claims that “First, it seems evident, that animals, as well as men learn many things from experience, and infer, that the same events will always follow from the same

¹⁴² Hume, David. *An Enquiry Concerning Human Understanding*. 69

¹⁴³ Hume, David. *An Enquiry Concerning Human Understanding*. 69

causes.¹⁴⁴” Hume follows this claim with examples with which most people can identify. We learn about properties of external objects best by experience. For example, tell a child not to play by a fire and the child might listen or not, but most of the time someone has to keep reminding the child. The same child burned once will probably remember and learn from the experience. Animals behave similarly to this—pleasure and pain are fast teachers. Experience is also evident when examining the differences in the abilities of young and old members of a species. The older members, again both in human and animal society, seem to act with more knowledge gained from experience while the younger members are not as skilled.

Hume continues by reminding how we educate animals: “This is still more evident [learning from experience] from the effects of discipline and education on animals, who, by the proper application of rewards and punishments, may be taught any course of action, the most contrary to their natural instincts and propensities.¹⁴⁵” A common example is training a dog to sit or to not urinate in the house. A dog is praised, patted on the head, talked to in a funny way, etc. when he does what he is told. When the dog is “bad,” he is swatted with a paper, yelled at, and banished to the back yard. It is not hard to see the same type of training with children. A child eats his vegetables and its, “oh look at that...how *nice*, how *good*, you’re a *big* boy now, now you can play Nintendo.” However, the poor kid who does not eat his greens is punished by not getting dessert, washing dishes or exile to his bedroom. We never seem to refrain from training animals or humans by positive and negative feedback.¹⁴⁶

¹⁴⁴ Hume, David. An Enquiry Concerning Human Understanding. 70

¹⁴⁵ Hume, David. An Enquiry Concerning Human Understanding. 70

¹⁴⁶ We do this even in school: stickers, A’s, and scolding.

Now Descartes, as we will see in more detail later, claims that animals are merely reacting to stimulus: like machines react to input. Nevertheless, Hume's position challenges Descartes' analogy. Hume denies that animals are merely reacting to stimulus but are engaged in reasoning similar to human reason, "The animal infers some fact beyond what immediately strikes his senses; and that this inference is altogether founded on past experience, while the creature expects from the present object the same consequences, which it has always found in its observation to result from similar objects." If animals are machines, then they are complex enough to learn from experience. Hume could also point out that Descartes agrees that the human body is also a machine. Yet, Descartes tries to pull human learning into a mental realm. Hume would deny that Descartes has grounds to make this move.

One of the consequences of Hume's philosophy is the realization that human reason is often not "rational" when it comes to *matters-of-fact*. Hume points out that a large part of human "reasoning" is devoted to the relationship of *cause-and-effect*. Hume made famous the "Problem of Induction"—Cause-and-effect requires that the present (or future) will resemble the past. We have past experiences of effects that were always proceeded by something we call a cause; yet, there is no guarantee that this relationship must always hold true. One of Hume's examples involves playing a game of billiards. If knowledge of cause-and-effect is based on reason, then people should be able to infer, without experience, the exact motions of the balls as one strikes another. However, people must have experience to make inferences. Thus, belief in cause-and-effect is not formed by "reason." Hume says that this is also true with animals

Secondly, It is impossible, that this inference of the animal can be founded on any process of argument or reasoning, by which he concludes, that like events

must follow like objects, and that the course of nature will always be regular in its operations....[it takes philosophical geniuses to figure out the arguments]...Animals, therefore, are not guided in these inferences by reasoning: Neither are children: Neither are the generality of mankind, in their ordinary actions and conclusions: Neither are philosophers themselves, who, in all the active parts of life, and, in the main, the same with the vulgar, and are governed by the same maxims.¹⁴⁷

Hume ends with one more similarity between humans and animals, animals learn by experience, yet also have instincts. Our “experimental reasoning” is nothing but “a species of instinct or mechanical power.”¹⁴⁸

To summarize Hume’s position: Animals and humans are both highly complex machines. As machines, animals make inferences in the same manner as humans. Both humans and animals learn from experience; that is, experience is the basis of all knowledge. Humans and animals both believe that the future will be like the past. This induction is not by reason but custom. Animals may have fewer capabilities than humans may e.g., not able to use much abstract reasoning. Yet, the difference is a matter of degree, not kind. Humans are merely more complex machines than other animals. Although Descartes also holds to the mechanical view, he believes that humans and animals differ in kind, not degree.

We now turn to Descartes’ arguments. Descartes’ basic argument is that animals are machines. As machines, animals are capable of reacting to the environment (much as a thermometer reacts to temperature change) but are unable to use reason because they do not have a mind. Humans, on the other hand, are more than machines. Descartes believes it is obvious (with a little introspection) that humans have a mind capable of

¹⁴⁷ Hume, David. An Enquiry Concerning Human Understanding. 70

¹⁴⁸ Hume, David. An Enquiry Concerning Human Understanding. 72

reasoning power. All that is required to test whether one is dealing with human reasoning or animalistic reaction is from the use of two criteria. First, humans are capable of meaningful language. In this case, language conveys abstract and concrete information. Second, humans have a general use of reason capable of dealing with new problems or situations. In other words, humans are generally not specialized for one task, but capable of accomplishing or learning many tasks. Let us look at some of the specifics of Descartes' argument.

As we have already seen, Descartes is also committed to a mechanical view of nature. However, interestingly enough, Descartes is not committed to materialism. He is, rather, a *dualist*. In both the Discourse and Meditations Descartes commits himself to the idea that humans are composed of both mental and physical substance. Since we can imagine thinking without a body, the essence of the self is thinking. Thus, the body is distinct from the mind and we do not (strictly speaking) need the body for personal identification. The human being is composed of some sort of blend of non-material thinking substance and material physical substance.

The body, in and of itself, is a machine. Descartes states, "I suppose that the body to be nothing but a statue or machine made of earth, which God forms with the explicit intention of making it as much as possible like us."¹⁴⁹ Within this body is a rational soul that interacts with the brain. Descartes establishes the idea of the body as machine by comparing bodies with mechanical objects popular in his time:

You may have observed in the grottos and fountains in the royal gardens that the mere force with which the water is driven as it emerges from its source is sufficient to move various machines, and even to make them play certain instruments or utter certain works depending on the various arrangements of the pipes through which the water is conducted. One may compare the nerves

¹⁴⁹ Descartes. Treatise on Man. AT XI 120 Reprint in: CSM I 99

of the machine I am describing with the pipes in the works of these fountains, its muscles and tendons with the various devices and springs which serve to set them in motion, its animal spirits with the water which drives them, the heart with the source of the water, and the cavities of the brain with the storage tanks.¹⁵⁰

Thus, we can see how Descartes establishes a correspondence between pipes and blood vessels, water flow and blood, springs and pulleys with tendons and muscles. The body, under this view, is merely a very complex machine, while the mind is an immaterial mental substance.

At this stage, Hume is capable of responding to Descartes in various ways. Hume would agree, as we have seen, with Descartes that the body is a machine. However, Hume would object to the notion that there are two separate substances of mind and body. Hume's attack works, in this case, by testing the idea of either "substance" or "self." Hume has a fairly good empirical test for concepts, "When we entertain, therefore, any suspicion, that a philosophical term is employed without any meaning or idea (as is but too frequent), we need but enquire, from what impression is that supposed idea derived."¹⁵¹ Now, Locke had already claimed that substance was, "A something we know not what" that props up and supports the *primary* and *secondary qualities* of objects. Hume pushes this further and says that we have no experience of substance; we only perceive the qualities of objects. Thus, under Hume's empiricism, since there are no simple impressions of "substance," it makes no sense to claim that there is some type of physical or mental substance that composes the underlying object. Hence, if we do not know of substance, we cannot claim that animals are strictly physical substance while humans are a combination of mental-physical substances. Because of Hume's analysis of

¹⁵⁰ Descartes. *Treatise on Man*. AT XI 131 Reprint in: CSM 100

¹⁵¹ Hume, David. *An Enquiry Concerning Human Understanding*. 13

substance, it seems that Descartes' distinction of mental and physical substance is unclear or controversial enough to weaken Descartes' claim that human reasoning is of a different kind than animal reason.

A weak objection to both Descartes and Hume is that it is unreasonable to suppose that a body is a machine. Yet, it is easy to find cases where the body is merely reacting to the environment much like a machine. For example, when a hand comes too close to a flame, the body will reflexively gasp and pull the hand away; when a person falls, her arm usually shoots out to catch her. Descartes could claim that this is no different from a complex mechanical machine in which when a pipe is filled with air a sound comes out, or when a machine starts to tip over counter-weights swing to keep it in balance. Hume would agree that we react with principles and springs.

Despite the previous objections regarding substance and false analogy, Descartes still has a claim that humans are more than automatons (animals or machines), because humans have a reasoning capability that machines and animals do not have, and presumably never will. In other words, if both animals and human bodies are machines, but humans are different in kind, then Descartes must account for a relevant difference (or way to distinguish) between humans and automatons. Descartes summarizes this problem: "if any such machines bore a resemblance to our bodies and imitated our actions as closely as possible for all practical purposes; we should still have two very certain means of recognizing that they were not real men."¹⁵² Here, Descartes describes his criteria, or tests

The first is that they could never use words, or put together other signs, as we do in order to declare our thoughts to others...[it may be possible to have a machine that gives outputs for certain inputs]...but it is not conceivable that

¹⁵² Descartes. The Discourse. AT VI 56-57 Reprint in: CSM I 140

such a machine should produce different arrangements of words so as to give an appropriately meaningful answer to whatever is said in its presence, as the dullest of men can do.¹⁵³

This first test is much like the *Turing Test* for computers that will come up later. The second test deals with a notion of being able to perform multiple tasks. Descartes says

Secondly, even though such machines might do some things as well as we do them, or perhaps even better, they would inevitably fail in others, which would reveal that they were acting not through understanding but only from the disposition of their organs. For whereas reason is a universal instrument which can be used in all kinds of situations, these organs need some particular disposition for each particular action; hence it is for all practical purposes impossible for a machine to have enough different organs to make it act in all the contingencies of life in the way in which our reason makes us act.¹⁵⁴

Later in this essay, we will see how Hume may respond, as well as explore some problems with these two criteria.

Descartes further develops these two tests in the same section of the Discourse. First, he points out that humans learn how to communicate with each other in all types of situations. Given time, “there are no men so dull-witted or stupid – and this includes even madmen – that they are incapable of arranging various words together and forming an utterance from them in order to make their thoughts understood.¹⁵⁵” Descartes states that animals are unable to communicate similarly. Some people would claim that animals would be capable of meaningful communication except that they cannot communicate because of missing organs, like vocal cords. Descartes counters:

we see that magpies and parrots can utter words as we do, and yet they cannot speak as we do: That is, they cannot show that they are thinking what they are saying. On the other hand, men born deaf and dumb, and thus deprived of speech-organs as much as the beasts or even more so, normally invent their

¹⁵³ Descartes. The Discourse. AT VI 56-57 Reprint in: CSM I 140

¹⁵⁴ Descartes. The Discourse. AT VI 56-57 Reprint in: CSM I 140

¹⁵⁵ Descartes. The Discourse. AT VI 56-57 Reprint in: CSM I 140

own signs to make themselves understood by those who, being regularly in their company, have the time to learn their language.¹⁵⁶

Thus, Descartes reaches his conclusion that

This shows not merely that the beasts have less reason than men, but that they have no reason at all. For it patently requires very little reason to be able to speak; and since as much inequality can be observed among the animals of a given species as among human beings, and some animals are more easily trained than others, it would be incredible that a superior specimen of the monkey or parrot species should not be able to speak as well as the stupidest child – or at least as well as a child with a defective brain – if their souls were not completely different in nature from ours.¹⁵⁷

One counter-argument against the language criteria is very Humean in nature. Experience shows that there is communication among animals. Dogs and cats will let their owners know when they need feeding or letting outside. Hunters know that deer or birds can warn others of dangerous predators. Descartes, like many contemporary thinkers, dismisses these as not representing significant communications:

And we must not confuse speech with the natural movements which express passions and which can be imitated by machines as well as by animals. Nor should we think, like some of the ancients, that the beasts speak, although we do not understand their language. For if that were true, then since they have many organs that correspond to ours, they could make themselves understood by us as well as by their fellows.¹⁵⁸

This could mean that animals must have some kind of direct experience to get the full content of the communication, but are unable to transfer abstract information. For example, for animals to teach each other about the dangers of a snake, it appears that there has to be a snake around and other animals exhibiting behavior that shows that the

¹⁵⁶ Descartes. The Discourse. AT VI 58 Reprint in: CSM I 140

¹⁵⁷ Descartes. The Discourse. AT VI 58 Reprint in: CSM I 140

¹⁵⁸ Descartes. The Discourse. AT VI 58 Reprint in: CSM I 140

snake is dangerous. With humans, we can tell each other to be aware of things that look like garden hoses that hiss. Humans can go beyond the immediate situation.

Hume, being an empiricist, would tell us we need to look at the evidence and study the situation, that we could not just sit in our rooms and make up *a priori* arguments. (A sarcastic Hume would also be able to point out that the “rationalist” Descartes is playing the empiricism game.) There are studies that seem to indicate that apes can teach each other sign language, tool use, and fun tasks such as how to unwrap candy wrappers. If these stories are true, then it seems that they weaken Descartes’ position on the reasoning capabilities of animals.

Descartes finishes with statements on the second test that relate to the adaptability of humans. He says

It is also a very remarkable fact that although many animals show more skill than we do in some of their actions, yet the same animals show none at all in many others; so what they do better does not prove that they have any intelligence, for if it did then they would have more intelligence than any of us and would excel us in everything. It proves rather that they have no intelligence at all, and that it is nature that acts in them according to the disposition of their organs. In the same way a clock, consisting only of wheels and springs, can count the hours and measure time more accurately than we can with all our wisdom.¹⁵⁹

One might misrepresent this statement by claiming that if an animal is better than humans in one skill than we are, and if an animal has intelligence, then the animal would be better than humans would at everything. This strawman is quickly knocked down by quick counter-example. Many people that excel in one activity, basketball or physics or music, seem to have intelligence, but are not better than everyone at everything. Another way in which this could be false is that humans just may not have found the animals or machines

¹⁵⁹ Descartes. The Discourse. AT VI 56-59 Reprint in: CSM I 140-141

that are superior in skill. However, Descartes' point is that machines, as animals, are specialized. Humans, however, are more general. To this real point, I think there are two responses. One, humans may be specialized in mental power, thus they are more machine-animal like (especially if compared to computers). Second, as Carl Sagan would say, "Absence of evidence is not evidence of absence."¹⁶⁰

Ultimately, Descartes' argument relies on the strength of the analogies between (1) animals and machines and (2) humans and machines. The dissimilar treatment between the two cases makes Descartes' conclusions weak. As we have seen, problems first arise when Descartes utilizes the idea of two substances. In this, Hume argued, we really do not have an idea of what a "substance" is. Another problem that Hume had with Descartes was Descartes' use of two substances, yet with no account for the interaction between the "rational soul" and the body. Suppose that we accept the analogy that animals are machines, but dismiss substance talk and arbitrary considerations. We then have Hume's basic position.¹⁶¹

Therefore, we can see that both philosophers were relying on two fundamental similarities. Both rely on a mechanistic worldview and both are arguing by analogy. Hume's analogy is that humans and animals are similar in many ways. Humans and (some) animals share physical structures, behavior, and learning methods. These similarities, according to Hume, are enough to establish that humans and animals have similar reasoning powers, thus the difference is only in degree. Descartes' analogy is close. Descartes would agree with Hume about shared physical structure, behavior, and (to a limited extent) learning methods. However, Descartes will add mental substance to

¹⁶⁰ Sagan, Carl. The Demon Haunted World

¹⁶¹ Given Hume's rejection of his Treatise, I am focusing on his Enquiry.

humans. Thus, while the human body is mechanistic, the mind is distinct. In this manner, Descartes concludes that humans have reason and animals have reactions to the environment, thus the difference is one of kind. On a cursory inspection, it might appear that Descartes has the stronger argument. After all, arguments by analogy require that there must be a good fit between the two objects of comparison. Moreover, it looks as if Descartes shows that there are relevant differences between animals and humans. Nevertheless, this conclusion is misleading. When Hume takes away the force of Descartes' use of "substance," the distinction that Descartes makes with mental and physical substance falls apart. Descartes' analogy collapses into Hume's analogy. Yet I hesitate to conclude that—even though Hume's arguments are stronger than Descartes' arguments—they are necessarily correct.

I hesitate because Hume and Descartes' arguments both rely on a strictly mechanical view of nature. Descartes thought of animal and human bodies as machines. He then added that humans have a mind as a non-material substance. When Descartes adds on mental substance, this seems to add on more complexity than needed to explain the phenomena. This results in less of a fit in his analogy, which weakens his argument. Hume's arguments seem to provide a better fit in the analogy, making Hume's arguments the stronger.

For the rest of this section, I would like to outline why Hume's arguments are not necessarily conclusive because of the looseness of the metaphor that animals are machines.

One minor problem is that it can be very difficult, if not impossible, to delineate exact (or literal) meaning when using a metaphor, thus it is possible to smuggle in extra-

unwanted aspects of meaning. The analogy relies on the idea that animals (or bodies) are machines. As a metaphor, “animals are machines” could have many meanings. Both Descartes and Hume would agree that a part of this meaning is that, like mathematics, when machines are functioning properly, the behavior is consistent and necessary. That is, if everything is working properly, machines react in a precise manner. For example, in mathematics, when the conditions are right, the sum of two and three will always be five. Likewise, when dealing with machines, pulling a lever will set a spring and the machine will operate. Yet, what kind of other meaning is each philosopher bringing into the analogy? Since Descartes was a devout Catholic and Hume was, in all likelihood, an agnostic (if not an atheist), it is entirely possible that they both incorporated their own personal beliefs into their philosophy. Descartes may have felt the need to rationalize the religious view that humans are naturally superior to animals. Hume may have thought that the belief in human superiority was one more area where religion used dogmatic practices to control people. As this hypothesis is, for the most part, untested, I leave it as beyond the scope of this paper.

The second problem with using a metaphor (and I take it that this is a potentially serious problem) is that the meaning can change radically over the years. This is especially true when dealing with the “animals are machines” metaphor, because we must consider what kind of machines Descartes and Hume had to use as examples. Descartes had Church Organs, waterworks in gardens, and pumps. I am not sure what Hume had to use as his primary examples of machines, but it seems reasonable to assume that he had similar machines. The types of machines become a crucial point when one considers the complexity of machinery in contemporary times. We now have more complex feedback

systems in, for example, refrigerators and heaters that automatically regulate temperature. We also have airplanes and spaceships that can fly themselves¹⁶² and computers that can beat chess masters. The order of complexity in modern machines is astounding when compared with machines of the 17th and 18th centuries. This problem is compounded as people realize the benefit of using both machine and organic metaphors and in turn use machine models for organisms and organic models for machines. In Refiguring Life, Keller says

Can it be any surprise, then, that in the bootstrap process of modeling organisms and machines, each upon the other, not only do organisms and machines come increasingly to resemble each other but that, as they do, the meaning of both terms undergoes some rather critical changes?¹⁶³

This is also another example of Gould's idea that progress and understanding change as we develop and have access to new metaphors.¹⁶⁴

Perhaps Descartes' tests could help in this situation. After all, Descartes has his test to determine whether dealing with a mindless automaton or a human intelligence, the two tests of language and adaptability. These two tests are still one common standard for reasoning and intelligence. For example, Alan Turing uses a form of the language test as a pre-requisite for believing that a computer has artificial intelligence. The Turing Test examines a computer's ability to mimic human intelligence. According to the test, a machine can mimic human intelligence when it can indefinitely fool a person into thinking that the person is having a conversation with another person, rather than a machine. A further example is in developing computers that not only beat master chess players but also can write poetry.

¹⁶² At one time, the only human function in landing the Space Shuttle was to pull a handle when landing.

¹⁶³ Keller, Evelyn Fox. Refiguring Life. 108

¹⁶⁴ Gould, Stephen J. For Want of a Metaphor.

Nevertheless, from a humane standpoint, these tests cannot *a priori* rule out the eventual intelligence (or reasoning powers similar in kind) of evolving animals or machines. The soundness of either position's arguments must rely on empirical tests. There are many sophisticated arguments about why computers or animals can never become intelligent. This may be a straw-man argument, but it seems that most arguments of this type boil down to the following: We have not seen animal intelligence and computer intelligence has not been achieved, therefore it cannot be done. There is now no computer/animal/etc. that can pass the Cartesian tests, therefore there are none and will never be any. This seems like the worst type of armchair philosophy and arrogance. The history of science has shown that unless there are theoretical limitations, like going faster than the speed of light, scientists often show the naysayers wrong.

However this comes out, we now have evidence of the persuasiveness of the machine metaphor, and its prevailing influences on modern philosophy/science. These examples show the necessity (and danger) of metaphor in developing thought and connecting areas.

There are two themes that we must keep in mind. First, the metaphors in science determine the questions and answers we get. Second, because we use metaphors in science, we should not be surprised that the cognitive structure is also used in ethics. We now turn to this as we examine evolutionary metaphors.

Chapter V: Evolutionary Metaphor

Introduction

One of the more obvious connections between science and ethics involves the biological metaphors that Charles Darwin used in his theory of evolution. From science we have Darwin's "Natural Selection" and "Struggle for Existence," Spencer's "Survival of the Fittest," and Alfred Tennyson's "Nature Red in Tooth and Claw." From these, we get politicians and business leaders practicing cutthroat tactics to get ahead. For example, Teddy Roosevelt said "In this world the nation that has trained itself to a career of unwarlike & isolated ease is bound, in the end, to go down before other nations which have not lost the manly and adventurous qualities,"¹⁶⁵ while a quote from John D. Rockefeller states

The growth of a large business is merely a survival of the fittest....The American Beauty Rose can be produced in the splendor and fragrance which bring cheer to its beholder only by sacrificing the early buds which grow up around it. This is not an evil tendency in business. It is merely the working out of a law of nature and a law of God.¹⁶⁶

In this chapter, we see how evolutionary metaphor provides a cognitive link between science and pseudoscientific ethics. This involves (1) a case study, Darwin's Theory of Evolution, in the applicability and acceptability in the use of metaphors in science; and (2) a case study, Galton and Spencer's use of these metaphors in ethics, showing the transfer of understanding from science to ethics.

¹⁶⁵ Theodore Roosevelt. *The Strenuous Life*.

¹⁶⁶ John D. Rockefeller. *Speech to a Sunday school class?*

Evolutionary Metaphor: Science

Charles Darwin wrote of his book, “This whole volume is one long argument.”¹⁶⁷ At one time it may have been common knowledge what the long argument stated, but at this time, we can only narrow down the possibilities as follows: (a) The argument is against special creation or design; (b) The argument is for history and accidents in the evolution of species; or (c) The argument is for Natural Selection. Whatever the case may be, Darwin made extensive use of metaphor in his theory of evolution. In fact, his main theory of descent with modification by means of natural selection is a metaphor. In this section we examine the role of metaphor as used by Darwin. We will see that Darwin’s use of metaphor is not only a pedagogic tool introducing his theory, but a crucial component in understanding his theory.

As I have already argued, one of the uses for metaphor is to help organize and connect ideas by giving new perspectives, thus playing a cognitive role in understanding. Metaphor accomplishes this by means of the four aspects associated with the use of metaphor: Irreducibility, Focusing, Creation, and Experiential. A heavily metaphorical theory such as Darwin’s should provide an excellent case study for determining how applicable these aspects are to scientific examples.

The practitioners of science in the 19th century were primarily following *induction* or *Newton’s Four Rules of Scientific Reasoning*.¹⁶⁸ Newton’s rules state:

Rule One: We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances. *Rule Two:* Therefore to the same natural effects we must, as far as possible, assign the same causes. *Rule Three:* The qualities of bodies, which admit neither intensification nor remission of degrees, and which are found to belong to all bodies within the

¹⁶⁷ Darwin, Charles. *On The Origin of Species: A Facsimile of the First Edition*. 450

¹⁶⁸ Recker, Doren. *Causal Efficacy: The Structure of Darwin’s Argument Strategy In The Origin Of Species*. 161

reach of our experiments, are to be esteemed the universal qualities of all bodies whatsoever. *Rule Four*: In experimental philosophy we are to look upon propositions inferred by general induction from phenomena as accurately or very nearly true, notwithstanding any contrary hypotheses that may be imagined, till such time as other phenomena occur, by which they may either be made more accurate, or liable to exceptions.¹⁶⁹

These rules were based on the belief that the role of science is to discover *verae causae* (true causes) in nature. The methodological task of the scientist is to show (a) if an alleged scientific explanation is “True,” then it would account for the relevant phenomena, and (b) determine that the alleged explanation is “True.” Depending upon philosophical positions, this was interpreted to mean that the proper practice of science is: *Naïve Empiricist*, *Positivist Vera Cause*, *Empiricist Vera Cause*, or *Rationalist Vera Causa*.¹⁷⁰

The *naïve (strict) empiricist* view was not a view endorsed by many scientists, although historians and philosophers sometimes promote it. A good example of this view would be Hume’s extreme empiricism. According to this view there are no hypotheses, only knowledge gained by pure experience. Empirical generalizations would be suspect, and every experiment would have to be exactly reproducible, e.g., in a lab. So, for example, to show that bacteria are responsible for disease, it must be directly observed, not inferred. Under the *naïve empiricist* view, science is limited to observed experimental results and/or establishing laws that describe (but do not hypothesize) events in the world. Under such a view the *Wave Theory of Light* would not be acceptable science because the actual wave is not observed, only inferred from

¹⁶⁹ <http://www.bun.kyoto-u.ac.jp/~suchii/newton's-rules.html>

¹⁷⁰ Recker, Doren. Philosophy of Biology handout. *Methodological Issues*. 2-22-99

experiments. Because of the severe limitations imposed by this view, many scientists want a broader view of scientific methodology.

The *positivist vera causa* position allows the use of hypothesizing, but the justification involves empirical generalizations that are reproducible. This typically involved the use of *Mill's Method* (1843) of experimentation. This method is basically the ancestor of *control* and *blind* experiments in science. Although this view is broader than the *naïve empiricist* view, it is limiting. Hypotheses and theories are not allowed as explanations unless there is some sort of directly observable test. Thus, for example, science is restricted to lab work, like chemistry and some physics. Yet astronomy, meteorology, and some areas of biology are almost impossible to work on as “science” in this sense.

The next position, *empiricist vera causa*, allows hypotheses with constraint. A hypothesis might be accepted if it was (a) analogous to known causes, (b) has explanatory power, and (c) has predictive power of covering future events. For example, Newton's *theory of gravity* relied on (a) a known analogy of twirling something on a string, (b) explained orbits, motion, and tides, and (c) predicted comets. Thus, Newton's *theory of gravity* is scientific under this view. The *Wave Theory of Light* is also “Scientific” under this view because (a) it is analogous to water and sound waves, (b) it explains known phenomena, and (c) it makes predictions about future events. The previous three methodological views do rely on, to various extents, the empiricist belief that there must be some notion of experience in the forming of scientific knowledge. The last methodological view drops this idea.

Under the *rationalist vera causa* position, it does not matter from where the idea comes. What matters is that at least the following conditions are met: (a) The hypothesis or theory must have explanatory power to cover the current data, (b) the hypothesis must make accurate predictions about future data, and (c) there must be consilience (does not have to be revised each time new data comes in).

Two recognized scientists at this time, who influenced Darwin, were John F.W. Herschel and William Whewell. Herschel seems to lean towards the *empiricist vera causa* position emphasizing analogy and explanatory power, while Whewell leans towards the *rationalist vera causa* position emphasizing consilience (explaining more data than originally designed to) and assumed hypotheses (not necessarily analogous) that cover data.¹⁷¹ Therefore, by following either of these positions, Darwin is firmly within the scientific guidelines of the time. We can see that if one follows *the empiricist vera causa* or *rationalist vera causa* position of scientific practice, then metaphor can be used as a valid part of scientific reasoning. Metaphor can be used as a pedagogical tool for introducing concepts in the *rationalist vera causa* position, or it can be crucial for understanding through use of analogy under the *empiricist vera causa* view. Further, metaphor can have explanatory power and show verifiable commitments (based on its entailments). So it is not out of line for scientists, like Darwin, to use metaphors in their scientific work, according to the last, less restrictive (Naïve!) methodological views.

Darwin's theory claims that evolution can be explained by "Descent with modification through means of natural selection." According to Recker, the first four chapters of Darwin's *Origin* make use primarily of the *empiricist vera causa*

¹⁷¹ Recker, Doren. *Causal Efficacy: The Structure of Darwin's Argument Strategy In The Origin Of Species* 163-164

methodology.¹⁷² We see this in Darwin's strategy (a) he makes use of analogy, (b) the explanatory power of his theory is superb, (c) his theory makes predictions that are true, and (d) his theory links together and solves problems in many fields of science. His project makes extensive use of metaphors that are necessary for understanding his theory, for example, "Natural Selection," "Struggle for Existence," "The Wedge," "The Entangled Bank," and "The Tree of Life." We see these metaphors in the development of Darwin's work.

While on a voyage with the HMS Beagle, Charles Darwin became convinced that the answer to the "New Forms Debate" involved the evolution of one species into another. Yet, he did not know how to explain the problem of the adaptation or functional integrity of species. To Darwin, adaptation and functional integrity were the main stumbling blocks of the current competing theories of evolution. As a result, his theory focuses on explaining adaptation and functional integrity. He first looks at the possibilities of the mechanism of change. Chamber's theory had no explanation for adaptation. Lamarck explains adaptation with the use and disuse of organs, yet is committed to no extinctions and necessary progress (in a positive sense) of evolution. However, as had been shown by Cuvier, there is extinction. In addition, data from paleontology provided evidence that there is no necessary progress in species development. The religious view of special creation did not have a story to explain the phenomena, and was not "science" according to a growing number of scientists. Thus, after much thought, Darwin came upon the first new metaphor "Natural Selection."

¹⁷² Recker, Doren. *Causal Efficacy: The Structure of Darwin's Argument Strategy In The Origin Of Species*. 165

In true *empiricist vera causa* fashion Darwin builds his case for natural selection by starting with an analogy of artificial selection. Being a scientist that actually got his hands dirty with research, Darwin used experiments with pigeons and correspondences with professional breeders to come up with the idea of artificial selection for domestic animals. Through artificial selection, people breed fast horses, strong horses, milk cows, marbled meat cows, racing dogs, hunting dogs, and pigeons of all kinds. Selected traits are bred more distinct and pronounced in each generation. Thus, people can artificially select and enhance the traits of animals. Now, Darwin suggests

Seeing what blind capricious man has actually affected by selection during the last few years...he will be a bold person who positively put limits to what the supposed Being [God] could effect during whole geologic periods....let us consider whether there exist any secondary (natural) means in the economy of nature by which the process of selection could go on adapting, nicely and wonderfully, organisms, if in ever so small degree plastic.¹⁷³

Darwin found that artificial selection needs three conditions to work: (a) variability in individuals, (b) a large population, and (c) prevention of interbreeding with “bad / undesirable” elements (or insurance of breeding between individuals with desirable traits).¹⁷⁴ To get natural selection, Darwin needed to show that the same three conditions for artificial selection could occur in nature. Variation in nature was easily observable. This is seen, for example, in problems with taxonomy in distinguishing between species. It turns out, for a large part, that the distinctions between species and varieties are arbitrary. The simple “Order” in nature is not found; rather classification is made by people. These people tend to be either lumpers (throw varieties together) or splitters (make varieties into separate species). We also can observe that populations, if

¹⁷³ Darwin, Charles. *Essay of 1844*. 85-86

¹⁷⁴ Recker, Doren. *Causal Efficacy: The Structure of Darwin's Argument Strategy In The Origin Of Species*. 167

unchecked, increase at a geometric rate. Thus, large population numbers are not a problem. The only element left to check is with restrictive breeding. The key to solving this issue is in, another metaphor, “The Struggle for Existence.”

In 1798, Thomas Malthus published an anonymous paper “An Essay on the Principle of Population, as it affects the Future Improvement of Society with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and Other Writers.” In the essay Malthus shows that, “Population, when unchecked, increases in a geometric ratio. Subsistence only in an arithmetical ratio.¹⁷⁵” This seemed to solve Darwin’s question of restrictive breeding in nature:

As many more individuals of each species are born than can possible survive; and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be naturally selected.¹⁷⁶

This ultimately leads to the *principle of natural selection*, which is the “preservation of favourable variations and the rejection of injurious variations.¹⁷⁷”

Natural selection, and only natural selection, provides scientific explanations for a wide variety of known phenomena. Natural selection overshadows the theory of organ change through use and disuse. Organs that are helpful to survival will not degenerate into useless limbs, but will maintain or increase their usefulness. Natural selection explains why we find that, “in North America there are woodpeckers which feed largely on fruit, and others with elongated wings which chase insects on the wing...Upland geese

¹⁷⁵ Malthus, Thomas. *Essay on Population*. <http://www.fordham.edu/halsall/mod/1798malthus.html>

¹⁷⁶ Darwin, Charles. *On The Origin of Species: A Facsimile of the First Edition*. 5

¹⁷⁷ Darwin, Charles. *On The Origin of Species: A Facsimile of the First Edition*. 81

with webbed feet which rarely or never go near the water.¹⁷⁸” Natural selection explains the instincts of Cuckoo’s laying eggs in other bird’s nest and the slave making instinct of ants. In both cases, there is more energy available for reproduction. Another phenomenon accounted for is similarity in morphology and embryology between species because organisms that descend from one another (or have a common ancestor) are bound to be similar in structure. Common ancestry provides the only “known cause” of crucial similarities among organisms.

Natural selection and the struggle for existence also solved a number of problems (questions) that evolutionists needed to address. Where are all the transitional forms between one species and another? How can intermediate forms survive during the change from land to water, like an ungulate (land based wolf-sized cow-like mammal) evolving into a whale? How can bees engineer the most perfect storage structure desirable (hexagonal honeycomb)? How can the eye become so perfect? How can the classifications of animals work so well?

Often transitional forms die out by selection against the mean of the population. The “average” population, without any natural adaptations, may slowly die out, although it is also possible for co-existence between the extremes of the population and the average. Thus, it is unlikely to find living transitional forms between very distinct species. Intermediate forms (from land to air, land to water, or water to land) are able to survive by slow gradual changes facilitated by natural selection. Accumulated changes that allow better survivability in a new environment can combine into a complete change in which ecological niche a species inhabits. The hexagon making hive bees can be explained by natural selection and adaptation of instincts allowing energy efficient traits to be passed

¹⁷⁸ Darwin, Charles. On The Origin of Species: A Facsimile of the First Edition. 184-185

on to future generations. The eye can evolve from a simple light sensing nerve because being able to sense light is a tremendous advantage for survival. Thus, any change toward better light sensitivity would tend to accumulate. Taxonomy can work so well because of the descent link that follows from natural selection. In effect, the challenges against evolution can be answered through natural selection, a metaphor.

There are several more metaphors that play secondary roles in the Origin of Species, all of them are contained in, and explained by, natural selection. Each metaphor is a further focusing element within the theory. The “Wedge Analogy” is much like the struggle for existence. Imagine a circle made up of many wedges. As one wedge is pushed in, another must go out. Therefore, as one species becomes better adapted to an ecological niche, another species will be edged out. This stresses that it is a “Dog eat Dog World” (a metaphor within a metaphor!). The struggle against nature also involves cooperation between species. The “Entangled Bank” visualizes the co-adaptation that must go on between changing members of the ecosystem. All species must live together, and thus evolve together (but cannot adapt a specific trait for the exclusive benefit of another species).

An implied metaphor not given by Darwin is that, for lack of a better phrase, “shit happens.” This focuses natural selection onto why species are not perfectly adapted for the environment they are in; natural selection works only good enough for species to get by, not necessarily thrive. For example, perfectly adapted species would include pandas with thumbs, rabbits that could digest food the first time around, and apes that can talk instead of relying on sign-language. As Darwin says, “Natural selection will not produce absolute perfection, nor do we always meet, as far as we can judge, with this high

standard under nature.¹⁷⁹” Another metaphor hinted at by Darwin is a “Division of Labor.” Division of an organism’s limbs to more specialized parts makes for a better-adapted organism.

A metaphor used by other scientists, but downplayed by Darwin, is “Sexual selection.” Sexual selection, while not as strong as natural selection, is important because organisms must pass on their traits (the gene theory advanced by Mendal was not used in Darwin’s time). Darwin includes sexual selection in the struggle for existence and natural selection metaphors. Finally, the only picture in Darwin’s book, The Origin of Species, is the “Tree of Life.” The tree of life pictures horizontal (temporal link) and vertical (descent link) aspects between developments in animals, both of which are explained by descent with modification by means of natural selection. The tree shows how natural selection is not committed to necessary progress; shows order based on descent; and explains extinction in animals. Again, all of this is contained within natural selection, and is summarized (explained!) by these images.

The use of metaphor was not without consequence, especially natural selection. Adam Sedgwick (a contemporary scientist with Darwin) said that, “You [Darwin] write of ‘natural selection’ as if it were done consciously by the selecting agent.¹⁸⁰” Darwin responds

The term ‘natural selection’ is in some respects a bad one, as it seems to imply conscious choice; ...No one objects to chemist speaking of ‘elective affinity,’ ...the term is good so far as it brings into connection the production of domestic races by man’s power of selection, and the natural preservation of varieties and species in a state of nature. For brevity I sometimes speak of natural selection as an intelligent power, --- in the same way as astronomers speak of the attraction of gravity as ruling the movements of the planets, or as

¹⁷⁹ Darwin, Charles. On The Origin of Species: A Facsimile of the First Edition. 202

¹⁸⁰ Sedgwick, Adam. Life and Letters of Charles Darwin, Vol. II. 44

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¹⁷⁹ Darwin, Charles. On The Origin of Species: A Facsimile of the First Edition. 202

¹⁸⁰ Sedgwick, Adam. Life and Letters of Charles Darwin, Vol. II. 44

agriculturists speak of man making domestic races by his power of selection.¹⁸¹

This alludes to a problem with using metaphor; sometimes we focus on the wrong element; for example, although I cannot recall the source, I remember a discussion involving religious metaphors. The metaphor “The Lord is my Shepard” came up. While one of us focused on the idea of a guide and protector, the other immediately made the following comment, “So, the lord watches over us so that in the winter months we can be slaughtered and eaten? Are humans really batteries, ala *The Matrix*?”

Despite the controversy of which aspects the metaphor focuses on, Darwin never gave up his metaphors, especially *natural selection*. Herbert Spencer suggested the metaphor “Survival of the Fittest.” Nevertheless, for whatever reason, Darwin thought that he should stick with *natural selection*. Perhaps *survival of the fittest* suggested too much of the competitive nature of natural selection and not enough of cooperation. Now, given the various positions of the methodology used in science, the metaphor may be rejected, but it seems to have stood the test of time. The other metaphors seem to also be appropriate. The “struggle for existence” likewise has the necessary picture associated with it, as compared with the “Sunday stroll for existence.” It has been suggested that the “Tree of Life” might be better thought of as the “Coral of Life.” Yet, the latter option would seem to lose the focus on descent or species linkage because the *Tree* gives application to space *and* time. *The Wedge* and *Entangled Bank* might be eliminated, but then new (probably longer) explanations would have to be substituted to get the message across, and the cognitive element might be lost.

¹⁸¹ Darwin, Charles. Variation of Animals and Plants Under Domestication, Vol. I (1868). 6-7

Thus, we see that Darwin's main theory; "Descent with modification by means of natural selection" makes use of and requires the use of metaphors. These metaphors cover a wide range of data: Structural similarity between organisms, paleontological findings, embryology studies, taxonomy classification, morphological similarities, geological connections, psychology, artificial selection, ecological systems, etc. The view is committed to a history of every living thing coming from another living thing (every living species coming from another species), and no tinkering by God; it shows how we get transitional forms; it shows that intermediate forms can survive; and shows how instincts can build up. Natural selection is a powerful metaphor that is fundamental to understanding Darwin's work. Moreover, not surprisingly, metaphors associated with it have crossed over into ethics.

Evolutionary Metaphor: Ethics

Since metaphor involves understanding one area (target) in terms of another area (descriptor), the cognitive view of metaphor helps explain how people take ideas in science and transfer them to ethics. In the case of evolutionary metaphors, a basic reasoning could be as follows: “Evolution operates on living things, e.g., animals. Humans are social animals. Thus, evolution will operate on humans in a social manner.¹⁸²” It is this basic kind of thinking that leads to what has become known as *Social Darwinism*. Given that many scientists object to Darwinism being applied to areas of ethics (usually relating to social, political, or economic areas), it is slightly ironic that some of the metaphors that Darwin used came from political and economic areas. For example, the metaphor of natural selection incorporates metaphors used by Adam Smith dealing with “struggle” and “Division of Labor.” It was Adam Smith who originally popularized the idea of the “Division of Labor” and the idea that supply/demand are interrelated by an “Invisible Hand” so that the best prices occur naturally. This implied that the market was following “blind” law. From here, Darwin borrowed a notion of law with no designer, yet ending up with order. This further gave example of competition’s influence on selection since open competition allows more chances of variety, the filling of niches by the best product, etc. Thus, metaphorical thinking seems to “bounce” back

¹⁸² Sticklers for logic will note that there is a bit of a jump from the premises to the conclusion. This is an example of how metaphors bridge the gap between science and ethics. It may not be logically valid, yet it is how some people reason. I suspect that any number of logicians could turn this into a valid argument, and then evaluate its soundness. However, I consider that as getting away from this project of understanding how, or why, people make this jump. Thus, I leave it for discussion or later developments.

and forth between science and ethics. In this section, we will review how Francis Galton and Herbert Spencer (mis)used evolutionary metaphors in ethical applications.¹⁸³

Francis Galton¹⁸⁴ (1822-1911) founded the modern eugenics movement and was, ironically, a cousin of Darwin. Eugenics is a pseudoscience that focuses on the improvement of the human race by means of heredity. The name derives from the Greek words *eu* (good) and *genesis* (beginnings). Sometimes eugenics is further demarcated as *positive eugenics* and *negative eugenics*. Positive eugenics involves such practices as rewarding favorable unions between men and women or encouraging genetic engineering of favorable traits. For example, a family with an intelligent hardworking man who married a similar woman would receive a tax break. Negative eugenics involves preventing the birth of offspring from unfavorable unions between men and women, for example, the sterilization of people deemed feeble-minded or criminal, aborting fetuses with certain characteristics, or genetically altering a fetus that naturally has “negative traits.”

Darwin’s *Origin of Species* was first published in 1859. Reading this text influenced Galton into focusing on two areas. He first became a critic of religion, skeptical of clerics, the church, and its contribution to the social good. (He went so far as to conduct a statistical analysis of the efficiency of prayer.) Second, Galton asked the question, How are human societies shaped by evolutionary processes? This question, and a glimpse of the eugenics movement, is seen in his essay “Influences That Affect the Natural Ability of Nations,” to which we turn now.

¹⁸³ Its like a double metaphor. Metaphors allow thinking about one thing in terms of another. So it is used once to understand science, then used again to understand ethics...thus, the ethical metaphors are twice removed from the original meaning. “Metaphoric separation.” ?

¹⁸⁴ Much of the background information concerning Galton was found at:
<http://www.maps.jcu.edu.au/hist/stats/galton/index.htm>

Galton makes use of the commonly held belief that humanity occupies a unique position on this world. His position is that as humanity developed and grew in intelligence, humans began to consciously modify the environment to make survival easier for our species. This happens because humans have the ability to look after our own interests by using knowledge of the past to prepare for the future. Another aspect of this position is that humanity has distanced itself from nature by forming complex civilizations and applying technology to us (specifically in the areas of health standards and care). Galton further claims that recent human history has shown that society has developed social institutions that are detrimental to human development and subvert the workings of natural selection. His main argument, and the beginnings of eugenics, is “the wisest policy is that which results in retarding the average age of marriage among the weak, and in hastening it among the vigorous classes.¹⁸⁵” He develops this idea by using a sustained example to show the harm in not following this program.

This example involves the use of two groups X and Y. Members of group X consist of people who marry young (say 22 years old), while group Y consists of people who marry later in life (say 33 years old). Galton claims that: (1) those in group X tend to have larger families; (2) as a result of this, population X will produce more generations in a given period, thus after an extended time, population X will vastly outnumber population Y; and (3) more generations are alive at the same time among population X than Y. From these assumptions, Galton shows how the number of members of each group changes over time.

¹⁸⁵ Galton, Francis. Hereditary Genius. 406

First, we consider the first two claims, but ignore the third. Given that group X has larger families, X will produce more people and generations in a given time, thus outnumbering group Y. We can see this in the following chart:

Generation	Population of Group x	Population of Group y
1	100	100
2	150	125
3	225	156
4	337	195
5	506	244
:	:	:
n	(starting population)(growth factor) ^(generation - 1)	
Group X increases at 1.5 per generation		
Group Y increases at 1.25 per generation		

Table I: Comparing Population Increases

For this chart we assume, as did Galton, that for each generation, group X grows by 1.5 and group Y by 1.25. Thus, all other things being equal, we see that the group, which consistently chooses to delay marriage, will rapidly become a minority. Now we add in the third claim, where at any given time there are more generations alive of group X than of group Y. For example, there could be three living generations of a family in group X (grandfather, father, and son), while a family in group Y would only have two living generations (mother, daughter). Thus, Galton concludes, “I trust the reader will realize the heavy doom which these figures pronounce against all sub-sections of prolific races in which it is the custom to put off the period of marriage until middle age.¹⁸⁶” After laying out this empirical groundwork, Galton moves into applying these results to ethics.

As we may recall, Thomas Malthus had argued that unchecked population growth results in a geometric increase in population, while food resources only increase

¹⁸⁶ Galton, Francis. *Influences That Affect the Natural Ability of Nations*.

arithmetically. Galton adds to this: “It is a maxim of Malthus that the period of marriage ought to be delayed in order that the earth may not be overcrowded by a population for whom there is no place at the great table of nature.¹⁸⁷” From his own suppositions and Malthus’s hypotheses, Galton moves into his ethical claims regarding population control. Galton draws out the specific differences between groups X and Y. Members of group X are “imprudent” and feel free to disregard Malthus’s maxim, while membership in group Y consists of the prudent who will attempt to follow Malthus’s maxim. Galton further supposes that group X will be the poor, uneducated, unmotivated, riffraff of society; while group Y will be the better off, educated, motivated, contributors of society. Thus, with each successive generation, group Y will become fewer and fewer until group X overpopulates them. This will result in a destruction of civilization and a return to barbarianism, with the possibility of the eventual extinction of the species. Thus, any country that allowed such actions would be destroying itself. Galton says

I protest against the abler races being encouraged to withdraw in this way from the struggle for existence. It may seem monstrous that the weak should be crowded out by the strong, but it is still more monstrous that the races best fitted to play their part on the stage of life, should be crowded out by the incompetent, the ailing, and the desponding.¹⁸⁸

Galton then suggests that, in the future, society may control populations just like sheep are controlled in a well-ordered moor, or like plants are cultivated in an orchard-house. But in the meantime, “Let us do what we can to encourage the multiplication of the races best fitted to invent and conform to a high and generous civilization, and not, out of a mistaken instinct of giving support to the weak, prevent the incoming of strong and

¹⁸⁷ Galton, Francis. *Influences That Affect the Natural Ability of Nations*.

¹⁸⁸ Galton, Francis. *Influences That Affect the Natural Ability of Nations*.

hearty individuals.¹⁸⁹” From here, Galton offers what he takes as examples of society thwarting natural selection.

Galton’s first example is the dark ages of medieval Europe. He attributes many problems to the fact that people that were gentle, or possessed a nature of charity, meditation, literature, or art had to associate themselves with the Church. The Church strongly encouraged (in some cases demanded) celibacy from its followers. Thus, the people who possessed the “good” characteristics were unable to pass on those traits. This is just like breeders of dogs who cut out individuals with traits that they do not want passed. Eventually those traits may disappear from the breed. Unfortunately, the Church was cutting out traits that were considered virtuous and civilizing. Galton’s second example shows how this is still a danger. During his time, University Instructors would receive free rent, a paycheck, and other amenities as long as they did not marry. (We also see this in early American education with women schoolteachers not being allowed to marry.¹⁹⁰) His third example further shows the Church eliminating traits. The Inquisition culled the population by persecutions of intelligent freethinkers and radicals. Intellectuals who questioned nature (and the church) were either outright killed or forced to emigrate to other places. This further lead to inbreeding of a population that is considered “inferior.” Thus, Galton claims, “we lead a dual life of barren religious sentimentalism and gross materialistic habitudes.¹⁹¹”

¹⁸⁹ Galton, Francis. *Influences That Affect the Natural Ability of Nations*.

¹⁹⁰ Really early American (US) education did not allow women to teach, and the male teachers were sometimes allowed to marry. When women were allowed to teach, they were often required to remain single and not date. The decisions were all locally controlled. However there were teachers who were missionary couples (married) who were encouraged to have families.

¹⁹¹ Galton, Francis. *Influences That Affect the Natural Ability of Nations*.

Nevertheless, it is important to note, that emigration has positive effects on the nation that allows the people to enter:

It is very remarkable how large a proportion of the eminent men of all countries bear foreign names, and are the children of political refugees, -- men well qualified to introduce a valuable strain of blood. We cannot fail to reflect on the glorious destiny of a country that should maintain, during many generations, the policy of attracting eminently desirable refugees, but no others, and of encouraging their settlement and the naturalization of their children.¹⁹²

Galton felt that in the present state of England, it was not clear which direction society was going. He pointed out that England did have many immigrants; however, the “ablest” men are discouraged from emigrating because they would feel safest at home. In addition, the emigrants tend to be less intellectual, more adventurous, and Bohemian in nature.

This leads us to his conclusions regarding eugenics. In a new colony, many desirable traits are reinforced. Men must be strong and intelligent to survive. Since there are few women, the women may choose to marry the most fit man (strong and intelligent). This leads to a few generations of increasingly “better” individuals. Yet, as the colony grows in size and population, these strengthening factors are lessened, like our group Y in the last few pages. These groups then encounters the conditions brought up with the first part of Galton’s essay, for example other people move in and take advantage of the hard work of the previous generations. Eventually, this new group starts having families at younger ages, breed faster, and have more generations alive at a time. The race is then in danger of loosing itself back into forms of barbarianism. Thus, to prevent this, the following programs should be instituted: Most income should come from work, not inheritance;

¹⁹² Galton, Francis. *Influences That Affect the Natural Ability of Nations*.

highly gifted people should get an education; marriage is honored; pride of race is encouraged; the weak are encouraged to become celibate; and successful immigrants and refugees are encouraged to settle.

For many reasons, Galton's essay is an interesting, albeit disturbing, read. For the purpose of this chapter, we focus on how Galton misused the metaphors used in Darwin's theory. These problems arise from the experiential and focusing nature of metaphors. One problem is in the term "Natural Selection." This has really focused people to look at how "Natural" the whole project is. *Struggle is Natural*. Thus, the problem with Galton is in his choice of guiding metaphors of natural selection. Although his essay does not mention them, it seems that he is relying on a literal view of struggling for existence, rather than a cooperative view. Yet, Darwin said of his theory, "I use the term Struggle for Existence in a large and metaphorical sense, including dependence of one being on another."¹⁹³ Galton (and many others) forgot this and have turned metaphor into alleged fact. Since he does this, Galton must take a stance: *us vs. them*. Under this mistaken view, there is no cooperation so that both groups can survive and flourish. *Struggle is Natural*; the elimination of the weak is *natural*; the survival of the strong is *natural*. Galton compounds the problem by smuggling in prejudiced notions. He wants the uneducated to stop having children because they (presumably) breed like rabbits and threaten the educated way of life. Yet Galton has no way to establish that the rich, educated, and affluent are the better members of society because Darwinian evolution is not committed to an idea of progress, merely surviving good enough to reproduce. Survival involves reproductive strategies that insure that the species survives. Under this model, if the uneducated do manage to outbreed and force the educated into extinction,

¹⁹³ Darwin, Charles. On the Origin of Species. 62

then that shows that a high level of intelligence is not necessarily a good survival strategy, like, e.g., cockroaches.

The final mistake Galton, and many others make, is in trying to ascribe morality from evolutionary theory. Granted, Darwin and many other scientists use evolution to explain the development of moral thought. However, they do not suggest that evolution answers how things should be, i.e., nature gives laws, not values. Whenever social or political philosophers use Darwin's metaphor, the struggle for existence, they tend to forget that it is a metaphor. Darwin gave this as a literal meaning of a fight for resources and used at least two metaphorical meanings to clarify what he means by "fight." On one hand, the fight is a competition between two (or more) species for limited resources. On the other hand, the fight is cooperation between two (or more) species for limited resources. In the *Origins*, it is ambiguous as to how "Red in Tooth and Claw" Darwin takes his metaphor. There are more examples of fighting, yet Darwin still stresses cooperation. *This shows a concrete example where it is the use of metaphors that bridge the gap between science and ethics.* Another example of this bridging is seen in Herbert Spencer's notions of *superorganic evolution* and *survival of the fittest*.

Much as the modern eugenics movement can be traced back to Francis Galton, the ideas of *Superorganic Evolution* a.k.a. *Social Darwinism* and "Survival of the Fittest" can be traced to Herbert Spencer. Social Darwinism is the pseudoscientific claim that not only is society governed by evolution, but also that laws and institutions should be implemented that further human progress by eliminating the "weak or inferior" members of the society. It is unfortunate that the term Social Darwinism is used because the claim is more consistent with the evolutionary views of Robert Chambers or Jean-Baptiste

Lamarck. Under these views, the evolution of species is associated with a notion of “progress” which is inherently “good.” Further, this progress is necessarily (1) simple to complex, (2) general to particular, or (3) homogeneous (similar structures) to heterogeneous (diversified structure). Spencer uses an analogy, reminiscent of Plato’s Republic, with the relationship between the ideal individual with the ideal state, to apply evolution to society. It seems that Spencer claims species evolution includes (1) a growth in size, (2) increasing complexity, and (3) differentiation in functions.¹⁹⁴ In a similar manner, Spencer claims that society evolves. For example, early societies are arranged like barbarian tribes. As the society increases in size, it will also become more complex. As society becomes more complex, there will be more differentiation in functions within the city. Thus, society evolves as species evolve.

Now, under Lamarckian evolution, a surviving and thriving species will necessarily evolve into more complex and more advanced species. Humans, with our language and intelligence, are considered the pinnacle of evolution. The modern ideal, according to Spencer, of a member in society is a person who is self-sufficient, individuated from society, and able to flourish by seeking happiness. This is a result of the natural forces of evolution. Thus, for society to remain advanced and good, we must get rid of artificial restrictions of evolution; that is, we must eliminate artificial laws that do not promote self-sufficiency, individual growth, or overall prospects for happiness. We see many of these ideas in Spencer’s essay, “Poor-Laws” from his book Social Statics.¹⁹⁵

Spencer immediately jumps into ethics by starting out his essay with a brief attack on Cobbett’s notion that everyone has a “right to a maintenance out of the soil.” This right

¹⁹⁴ Spencer, Herbert. *Progress: Its Law and Cause*.

¹⁹⁵ Spencer, Herbert. Social Statics. 1896, 2nd ed.

seems to be a claim that since everyone has a right to the necessities of life, the government (or society at large) has a duty to provide for these necessities. Spencer's concern is that there is no way to decide between which two extremes, starvation or luxury, this maintenance lays. There are two ways in which a maintenance can be provided, either through direct aid (money, food, etc.) or by giving jobs. With regard to direct aid Spencer asks, "Is it potatoes and salt, with rags and a mud cabin? Or is it bread and bacon, in a two-roomed cottage? Will a joint on Sundays suffice? Or does the demand include meat and malt liquor daily? Will tea, coffee, and tobacco be expected? And if so, how many ounces of each?"¹⁹⁶ With regard to having work provided for an individual, Spencer points out that the government (or society) is the people. Thus, if the government is responsible for finding people work, that is just saying that people should find work for other people. Spencer claims that as a result of this, an individual should just take responsibility to find work for himself. The rest of his essay is an argument that if a person desires to contribute to charity, then the decision should be voluntary and should contribute to the overall social good. This is because genuine charity benefits both the giver and receiver, while forced charity harms both. Spencer spends a significant amount of the essay concentrating on showing the harm realized from forced charity.

First, Spencer notes that, in general, people do not like paying a tax for welfare. For people who are not by nature inclined to give charity, they feel that they are forced to give to a project in which they do not believe. Spencer points out that people are not normally required to give to causes that they do not agree to; for example, people are not usually forced to give money to a church that they are not a member of. Spencer further

¹⁹⁶ Spencer, Herbert. Social Statics. 144

claims that even if people want to give charity, they should not be forced to give money. For people that are inclined to charity, the tax collectors represent a middleman that gives charity by proxy. For this group the problems can include not receiving satisfaction of personally helping people, not having a choice as to which charity the money will benefit, or knowledge that government waste will lessen the effect of the donation. For both groups of people (the willing and unwilling), Spencer claims this creates hostility and a retards peoples' sympathy. Yet, it is feelings of sympathy that usually give rise to giving charity. Thus, forced charity is counterproductive to the underlying motive for charity. Therefore, there must be a problem with forced welfare if the welfare itself contradicts the basic reason for beginning it.

The second harm caused to society from welfare (or poor laws) is that the act goes against nature. This is where we see metaphorical thinking taken as biological-sociological fact within Spencer's thought. For Spencer, natural selection is a struggle and a fight in which nature is "red in tooth and claw." Further, the helpless and weak are systematically eliminated by the strong in a struggle for the "survival of the fittest." Because the weak members of a species or society are eliminated, the remaining strong members are more able to be independent and thus are more likely to attain Spencer's ideal of human happiness. Spencer sees in nature a tendency to eliminate the weak in favor of the strong. This is the *natural* state of nature. From here, Spencer derives the idea that poor-laws are unnatural, and thus we should eliminate them. Spencer admits that at first glance this seems like a hard course of action. After all, it does seem harsh that the unskilled laborers, the starving artists, and the widows and orphans should be left to struggle or die without government assistance. Yet, he argues, "under the natural order

of things society is constantly excreting its unhealthy, imbecile, slow, vacillating, faithless members.¹⁹⁷” Further, people who advocate poor-laws

advocate an interference which not only stops the purifying process, but even increases the vitiation – absolutely encourages the multiplication of the reckless and incompetent by offering them an unfailing provision, and discourages the multiplication of the competent and provident by heightening the difficulty of maintaining a family.¹⁹⁸

Since we have a choice of some suffering now or a lot of suffering later, Spencer advocates we adapt a policy that strives for long term planning and happiness rather than short-term assistance and future misery.

The third harm to society, also relating to Spencer’s idea of what is natural, is that poor-laws will eliminate an important trait from civilized society. Spencer believes that as species evolve into more complex organisms, the more evolved species learn through struggle and self-sacrifice. Likewise, Spencer conjectures, civilizations evolve from a savage existence of instant gratification to a civilized form by struggling and learning self-sacrifice. Strong individuals may form a society, but there is a danger that others will take it over (possibly by swamping). As long as natural forces are acting upon the society, then the civilization should continually advance or stabilize. Forced charity, however, eliminates the advance or stability. The charity takes resources from the strong members of the society—the workers and people whose skills and talents helped form it—and redistributes the resources to weaker members of the society. Thus, the weaker individuals no longer have to compete as the stronger individuals. The weaker individuals no longer have to learn self-reliance or sacrifice for long-term goals. As a result, people that benefit from poor-laws do not learn the lessons necessary to survive in

¹⁹⁷ Spencer, Herbert. Social Statics. 1896, 2nd ed. 151

¹⁹⁸ Spencer, Herbert. Social Statics. 1896, 2nd ed. 151

a modern society. Add this to Galton's work, and we see that the "ignorant poor" will outgrow the "educated well-off." Thus, there will be more people living on the charity of fewer people. This will increase the total distress of society.

The redistribution of money, by forced charity, does not result in a net increase of social stability or utility. Consider two individuals, John₁ and John₂, who live in relatively identical worlds with only one major difference, the requirement of spending earnings on a tax for charity. Both of our Johns have jobs, a family to support, and certain life fulfilling hobbies. As with most families, the Johns have to budget for the necessities of life (taxes, food, clothing, and shelter). After paying for these, they both have some leftover money. Now, this is where the differences come into play: consider that John₁ lives in a world where he is free to spend his money, while John₂ must pay more taxes to fund charities. John₁ has several options. He can save the money, invest the money, or spend the money on luxury items. Presumably, if John₁ saves or invests the money, that money will eventually be used for either buying more necessary items or eventually used as a luxury. Either way, eventually John₁ will buy a service or a product. The person who John₁ bought from will have the same options (and results) of John₁. Thus, in the case of John₁, money/services/products are continually in circulation. Therefore, if John₁ buys a DVD, many people benefit—The people who made the DVD, the people who sold the DVD, and all the middlemen. Now, consider John₂. His money goes to someone who is not providing any service or producing a product. Thus, the people who benefited by John₁ are not benefiting. We see that in these types of forced charity, all that happens is a redistribution of money from someone directly working in

society to someone not working—money is going from laborers and producers to non-workers.

These three harms to society lead Spencer to conclude that forced charity results in a worse society. Thus, according to him, we should eliminate programs that result in forced charity. He does not claim that all charity is bad. He believes that people should give charity that result in helping people to help themselves to become contributing members of society. This will advance society and, when voluntary, help advance peoples sense of well being through helping others. However, forced charity loses the benefits by artificially getting in the way of progress towards the ideal society.

Spencer, like Galton or other Social Darwinists, is guilty of misusing metaphors. Once again, we see the experiential and focusing nature of metaphor. In particular, Spencer is guilty of exclusively using one focusing metaphor while ignoring others. Spencer concentrates on the idea that evolution is a struggle between fighting species where only the strong survive. He ignores the cooperative aspect of evolution where strength can be measured as cooperation against nature (or cooperation with nature). Spencer also suffers from inserting the ideas of “progress” and “good” into evolution. He sees western culture as “progress” and “good.” However, it should be noted, Spencer is far from alone in the belief that “ours is the best, most progressive, civilized nation.” Finally, Spencer’s own metaphor, Evolution is the “Survival of the fittest” is rather poor. It is not clear how to interpret this metaphor. Who or what is surviving the fittest, the group or the individuals? How do we measure fitness? If by the group, then Spencer must admit that if the poor and weak can beat out the well off and strong, then the former are the fittest to survive. Thus, they are the more advanced.

We started this chapter looking at metaphors that Darwin used in his theory of evolution: Artificial and Natural Selection, Struggle for Existence, The Wedge, The Tree of Life, The Entangled Bank, Division of Labor (borrowed from Adam Smith), and The Invisible Hand (borrowed from Adam Smith). We saw how Darwin created these metaphors to explain and understand his theory. Further, we know that each metaphor acts as a focus to a particular area of the theory. These metaphors are irreducible and have influenced people's understanding and experiences. These metaphors were so powerful that they helped bridge the gap between science and ethics, as we saw with Galton and Spencer. The ethical theories tended to use metaphors focusing on one limited area of the theory: struggle and competition, e.g., survival of the fittest. These examples show a plausible connection between science and ethics. Metaphors structure our thinking. Metaphors allow us to understand one area in terms of another. Thus, it should be no surprise that metaphors cross over from science to ethics. The next chapter will examine some more contemporary uses of metaphors that combine world metaphors with evolutionary metaphors.

Chapter VI: Miscellaneous Metaphors: Nazi, Lifeboat, Math

Introduction

I take it that the previous chapters have adequately sustained my thesis that it is plausible that the cognitive view of metaphor accounts for the ease in which people combine science and ethics; metaphor is a bridge between science and ethics. In the second chapter we saw various aspects of metaphor theory representing three main views: CTM, ITM, and STM. In that chapter, we saw how metaphors involve either metaphysical claims regarding existence or epistemological claims regarding understanding. Chapter three explored the ideas of metaphor as colorful linguistic expressions or as containing cognitive meaning. Although some metaphors may be colorful expressions, it was established that metaphor can (and often does) provide for cognitive understanding. In chapter four, the “World” metaphors give the first sustained examples of the interaction of science and ethics by means of metaphor. The previous chapter, number five, used “Evolutionary” metaphors as another example of the connection between science and ethics. In this chapter, I finish this thesis with three more examples of the prevalence of metaphor within ethics and science, although with less emphasis on the connection between the two. The first example, metaphors within Nazi Germany, I use as an example of the consequence of taking metaphor as True/False within science, pseudo-science, and politics. The second example, Garrett Hardin’s “Lifeboat Ethics” I use as an example of relatively contemporary use of metaphor in

ethical arguments. Finally, I finish with some thoughts on mathematics / ethics and metaphor.

Nazi Metaphors

“The people who get to impose their metaphors on the culture get to define what we consider to be true—absolutely and objectively true.¹⁹⁹”

Robert Jay Lifton’s The Nazi Doctors: Medical Killing and the Psychology of Genocide provides a look into how Nazi Germany used biological and medical metaphor to institute and justify a policy that most people agree is highly unethical—Genocide. In this section we review some of the metaphors used by the Nazis as seen in Lifton’s book. In this review we will see how biological ideology and metaphor structured the role of the physician and the Nazis’ view toward the Jewish people. We will further see how the Nazis made use both of organic and mechanical metaphors in their reign.

What is the role of a physician and what is the physician’s relationship to her patient? People typically see physicians as the healers and caretakers of their patients. James F. Childress and Mark Siegler discuss five contemporary metaphors used to understand the relationship between patients and physicians:²⁰⁰ (1) Parental – the physician takes on the active role of a parent, while the patient is either a passive infant or a guided adolescent. This metaphor stresses that the physician knows best, while the patient has few rights and little to no autonomy in determining appropriate treatments. The parental model assumes ignorance on the part of the patient and does not consider that the physician and patient may have differing views (or values) when it comes to health care. (2) Partnership – both physician and patient are partners in a shared value of health. This adult-to-adult model highlights the equal power between patient and physician and downplays the assumed ignorance of the parental metaphor. There is not an automatic assumption that

¹⁹⁹ Lakoff & Johnson. Metaphors We Live By. 160

²⁰⁰ Childress & Siegler. Metaphors and Models of Doctor-Patient Relationships: Their Implications for Autonomy. Reprint in: Mappes and DeGrazia. Biomedical Ethics. 64-72

the physician initially knows what is best for the patient. However, it presupposes a trust that may be unjustified. (3) Rational contracts – a compromise between the ideal partnership and the realization that trust is not immediately possible between a physician and a patient. It highlights two possible misleading ideas: (a) sick people view health care as an exchange in goods and services; (b) sick people are always able to make rational choices. The rational contract downplays the ideas of physician benevolence, care and compassion. (4) Friendship – a model like the “good old country doctor / friend.” Friendship stresses how one person (the doctor) assumes the interest of the other (the patient). Although a common metaphor for areas with low population, the metaphor becomes strained in areas with high populations, HMOs, and doctors with conflicting interest. It can also be hard to accept a friendship based on payment for services. (5) Technician – the doctor as a plumber, engineer, or body mechanic, merely fixing what is broken or contracted for. This model highlights the new advanced technology that medicine depends upon, yet downplays the social status traditionally given to a physician.

These five metaphors seem to capture the most common views of the relationship of a physician to his or her patients. It is interesting to note that each of these metaphors highlights a relationship between a doctor and individual patients, but downplays the relationship of a physician to the general-public or society-at-large. The Nazi metaphor is radically different from the above five common metaphors (although it has elements of the parent and technician metaphor.) The Nazi doctors worked under biological and medical metaphors that (1) changed the relationship of the physician from his patients to the society and that (2) systematically made acceptable a different metaphor for the physician—From the Physician Healer/Caretaker to The Physician Healer/Killer. This

changing role of the physician is partially the result of misguided biological ideology and medical metaphor.

The biological ideology the Nazis used is a combination of pseudoscientific genetics and eugenics. From genetics, the Nazi leaders instilled the ideas of “Racial Purity” and inherent Aryan virtue. These ideas allowed a rationalization to adopt a program of eugenics in which the Nazis hoped to achieve direct control over human progress. Lifton speaks of this Nazi state as a “biocracy” which models itself from “theocracy, a system of rule by priests of a sacred order under the claim of divine prerogative...of cure through purification and revitalization of the Aryan race.²⁰¹” The Nazi program appealed to both a divine mission (part of an inherited anti-Semitism) and misguided (although scientific sounding) biological ideals.

The Eugenics program in Germany began much as eugenics programs in Western Europe and the United States. For example, negative eugenics was practiced by prohibiting marriage between individuals with mental illness or retardation, and between members of different races.²⁰² Many States within the U.S. had also instituted forced sterilization laws for the criminal or insane. Germany similarly adopted positive and negative eugenics programs as well as sterilization. This eugenics program eventually turned into a 5-step progression to mass murder. Lifton identifies the following major steps that this program underwent: (1) Sterilization, (2) Child Euthanasia, (3) Adult Euthanasia, (4) Direct Medical Killing, and (5) Mass Murder. The justification for most of this process relied, in a large part, on biological metaphor.

²⁰¹ Lifton, Robert Jay. The Nazi Doctors. 17

²⁰² Lifton, Robert Jay. The Nazi Doctors. 23

The first step in justifying mass murder in a biological context is to destroy the distinction between healing and killing, that is (1) destroy the notion that healing (for a physician) is automatically morally praiseworthy while (2) also establishing that killing (again by a physician) is not morally blameworthy. To make this change, *medicalized killing* needed to be understood as (1) a surgery and (2) a therapeutic imperative.²⁰³ The Nazi command became aware that the Einsatzgruppen troops (soldiers responsible for face to face killing of Jews in Eastern Europe) suffered from psychological problems due to the nature of the killing. For example, the troops suffered anxiety, nightmares, and tremors. Thus, the Nazis needed to find a “surgical” means of mass killing. This “surgical” distinction allowed the soldiers in the trenches to distance themselves psychologically from the horror of murder.

The main justification, however, for mass murder came from the idea that killing was a therapeutic imperative for the German (Aryan) people. The Nazis dichotomized humans into either the racially pure Aryan *Volk* or the impure others. Then, by means of metaphor, they re-conceptualized the Aryan race into a biological organism. Then they metaphorised other groups into other biological identities, for example as a potential disease to the Aryan organism. Thus, when a doctor is confronted with the apparent contradiction between healing and killing, he can say, “Of course I am a doctor and I want to preserve life. And out of respect for human life, I would remove a gangrenous appendix from a diseased body. The Jew is the gangrenous appendix in the body of mankind.”²⁰⁴ Thus the physicians’ transformation from serving a patient, to serving society—a transformation from a healer to a killer.

²⁰³ Lifton, Robert Jay. The Nazi Doctors. 15

²⁰⁴ Lifton, Robert Jay. The Nazi Doctors. 16

The Nazis were masters in using metaphors to describe the groups that they wanted to eliminate. For example, there were many metaphors that the Nazi used to describe the Jewish people. One group of metaphors focused on the organism metaphor and the medical notions we have about treating illness and disease: The Jews are agents of racial pollution and racial tuberculosis; the Jews are parasites and bacteria causing sickness, deterioration, and death; the Jews are eternal bloodsuckers, vampires; they are germ carriers; maggots in a rotting corpse. Thus, it is of biological importance to eliminate the Jews. Another group of metaphors focus on the Nazi perception that the Jewish People are less than human: The Jews are ants – thus we must exterminate them before they overrun the country; the Jews are wild dogs – thus (for anyone who has visited a European country without animal control) they are dangerous and should be put down. (Also, since it is medically justified to experiment on dogs, it is by extension permissible to experiment on the Jew.) Thus, for anyone believed the metaphors that the leadership imposed, there were reasons to allow what we now consider atrocities. In the case of Nazi Germany, many people became convinced that there was a need for a national cure. Thus, the Nazis really pushed the idea of the Regime as a Healing Movement, or as Rudolf Hess declared, “National Socialism is nothing but applied biology.”²⁰⁵

Thus, the underlying ideology of the mass killing relied on pseudoscientific ideas of racial purity, genetics, and eugenics.²⁰⁶ The justification further built up a picture of the German *Volk* as a biological organism that is threatened by disease. This conception invites the idea of a medical solution, which justifies mass murder (killing off the cancer of humanity), and changes the role of a physician from a healer to a killer. Within the

²⁰⁵ Lifton, Robert Jay. *The Nazi Doctors*. 129

²⁰⁶ Genetics itself is a science; the Nazi application of it was not. The Nazi taught that the Aryan race was descended from Atlantis while non-Aryans were descended from monkeys and apes.

medical community, there are many metaphors the doctors used to justify their participation in murder.

The underlying metaphor justifying sterilization and medical killing is “Life unworthy of life.” This phrase permeates the entire five-step-program to genocide: Sterilization→child euthanasia→adult euthanasia→Direct Killing→Mass Murder. The changing classification of what qualifies as *life unworthy of life* is seen in the progress of the 5-step program.

Sterilization started out with cases of the criminally insane and then included the *hereditary sick*: congenital feeble-mindedness, schizophrenia, epilepsy, manic depressive insanity, Huntington’s chorea, hereditary blindness, hereditary deafness, grave bodily malformation, hereditary alcoholism, etc. The sterilization was justified because these people represented a current threat to the organic body of the pure German *Volk*. They represented the threat of spreading more of their kind like a cancer, sucking nourishment from society, until they kill off the organism. Under this metaphor, the idea quickly spread that this group of people were using up limited public resources. For many Germans this seemed unfair. After all, “the best young men died in war, causing a loss to the *Volk* of the best available genes. The genes of those who did not fight then proliferated freely, accelerating biological and cultural degeneration.²⁰⁷” These *hereditary sick* were also made less human by the use of metaphors, e.g., this person is mentally dead, that person is merely human ballast, that group represents empty shells.²⁰⁸

Thus, there are at least three levels of metaphor at work here. First, there is the ever-present biological assumption of an organism (the German *Volk*) protecting itself from a

²⁰⁷ Lifton, Robert Jay. *The Nazi Doctors*. 47

²⁰⁸ Lifton, Robert Jay. *The Nazi Doctors*. 47

biological harm, e.g., the spread of cancer. Thus giving rise to the idea that we must stop the cancer from spreading. Second, we have the idea of the organism (the German *Volk*) as being crowded in its environment and unable to continue its genetic heritage, i.e., there is a direct threat to its genetic future; and Third (I imagine that this is rather important to those people who must work directly with the *hereditary sick*) the dehumanizing metaphors. The metaphorical beliefs contributed to feelings of resentment and the changing attitude towards non-Aryans. The metaphors further represent the cognitive transition to the next level of the Nazi eugenics program—euthanasia.

There were actually two distinct programs of euthanasia—one for children and the other for adults. Once more playing to the influence of the organic metaphors and the biological threat to the body, to the Nazi mindset people with *hereditary sickness* were already using valuable resources, and sterilization was not doing enough to combat the problem. Not only must we stop cancer from spreading, but we must try to remove the cancer from the body. Thus, the next step in the eugenics program involved killing children (newborns to about five-year olds) with these hereditary conditions. We hear doctors using the biological justification when they say, “These creatures [the children] naturally represent for me as a National Socialist only a burden for the healthy body of our *Volk*.²⁰⁹” Although a person would think that the systematic killing of children would be a difficult and horrifying task for a doctor, many Nazi used the organic and health metaphors to lessen the difficulty. The psychological burden was further lessened as doctors used metaphors as euphemisms for killing—“putting-to-sleep,” or “the slow withdrawal of rations.”

²⁰⁹ Lifton, Robert Jay. *The Nazi Doctors*. 62. The speaker is Dr. Hermann Pfannmuller, one of the Nazi doctors who developed various “Special Diets” that starved patients to death.

The adult euthanasia program followed similar reasoning and justification—protect the race, and put sick people out of their misery. The adult program, named T4, extended the medical oversight of killing to include (1) patients suffering from specific disease, (2) patients institutionalized for more than 5 years, (3) the criminally insane, and (4) non-German citizens.²¹⁰ The doctors' role, changing from healer to killer, in this program participated in any or all of the following: (1) identifying people to be given “Special Treatment;” (2) performing the actual killing (injecting of medication, ordering a special diet, or experimenting with gasses to come up with a more humane way of killing); (3) calming the patients who were to be killed; (4) disguising the killing process, (5) falsifying the death-certificate, and (6) developing new technology to increase the killing process.

The T4 program officially ended around 24 August 1941. The Nazi regime, however, made it clear to the doctors that medical killing was to continue. Since there was now no official policy of medical killing, selections were now based on the individual doctor's discretion. Doctors continued to use metaphors to justify their actions, e.g., calling mental patients “Useless eaters.” The doctors also had more freedom to experiment with death; e.g., the *useless eaters* were given *special diets* to ensure the patients dead—a totally fat free diet! As new technology was developed to kill patients, the T4 idea extended to the concentration camps under the code 14f13. In the camps, death selection (although still carrying on the medical myth and metaphors of health) was based more on crimes, political views, and race. The importance of the 14f13 program is that it “provided two crucial bridges between existing concepts and policies and unrestrained

²¹⁰ Lifton, Robert Jay. The Nazi Doctors. 65-66

genocide.²¹¹” The first bridge was “the ideological bridge from the killing of those considered physiologically unworthy of life to the elimination, under the direction of doctors, of virtually anyone the regime considered undesirable or useless: that is, from direct medical to medicalized killing.²¹²” The second bridge was “the institutional bridge from the T4 project to the concentration camps.²¹³” The camps themselves provide more examples of metaphors in action.

The camps represent the “final solution to the Jewish question.” Very powerful metaphors operate here. I take it that the “Jewish question,” from the Nazi point of view, is something like: Given that the German *Volk* is a body and the Jews are a disease that threatens the *Volk*, how do we protect our body? The answer, in typical medical fashion, gets rid of the disease. Thus, Genocide is now a medical procedure, “A image of curing a deadly disease, so that genocide may become an absolute form of killing in the name of healing.²¹⁴” Within the camp, selections for death were seen as connected to medical triage in war.²¹⁵ Inhumane medical experiments were viewed as “hobbies²¹⁶”; the gas chambers were sometimes referred to as “The Central Hospital²¹⁷”; the prisoners were often seen as “The living dead.²¹⁸”

Lifton’s book provides a good source to see how the Nazi utilized extensive medical metaphor. In fact, with a quick glance through the book I identified about 45 metaphors that are consistently used by the Nazi Doctors. One pattern I think I’ve found, but leave for another paper is that the Nazis tend to use Organic (Organism) metaphors to justify

²¹¹ Lifton, Robert Jay. *The Nazi Doctors*. 138

²¹² Lifton, Robert Jay. *The Nazi Doctors*. 138

²¹³ Lifton, Robert Jay. *The Nazi Doctors*. 138

²¹⁴ Lifton, Robert Jay. *The Nazi Doctors*. 467

²¹⁵ Lifton, Robert Jay. *The Nazi Doctors*. 173

²¹⁶ Lifton, Robert Jay. *The Nazi Doctors*. 203

²¹⁷ Lifton, Robert Jay. *The Nazi Doctors*. 244

²¹⁸ Lifton, Robert Jay. *The Nazi Doctors*. 425

what they did; yet they use mechanical metaphors to carry out the killing and as part of their defense as to why they did not try to stop the killing. For example, the procedure at the camps was very mechanical: selections and killing were constantly pushed to be faster; the Nazi Killing Machine was cold and lifeless; the camps were run like manufacturing plants—with assembly line precision. Even if a person thought that something was immoral about the process, they felt helpless to change the process. They were not just following orders, many describe the helplessness as being mere cogs in the machine; or they felt like tools, with no idea what the rest of the machine was doing.

The Nazi use of metaphor shows one potential problem when metaphor is considered as true/false. “The people who get to impose their metaphors on the culture get to define what we consider to be true—absolutely and objectively true.²¹⁹” History is full of the (mis)deeds of those working under science or morality that is “absolutely and objectively true.” We now turn to Garrett Hardin as an example of using metaphor in ethics under the cognitive view of metaphor, i.e., where metaphors are not taken as true / false.

²¹⁹ Lakoff & Johnson. Metaphors We Live By. 160

Lifeboat Ethics

We have seen how the Nazis used metaphors as truly defining the nature of reality. Contrary to the belief that the Nazi Doctors were inherently evil, many of the atrocities committed by doctors can be attributed, in part, to the physicians' belief in the metaphorical reality in which they were a part. They believed that the metaphors accurately described the state of affairs of an objective world. However, not everyone involved in ethical discourse and activism use metaphors as being true or false with respect to reality. Some of them, like Garrett Hardin, use metaphors in science and ethics as tools of understanding. Furthermore, they do not take the metaphors as true or false, but as useful or not in trying to reach some sort of ethical truth (whatever that is). I suggest that under the cognitive model of metaphor, Garrett Hardin's use of metaphor is a decent representation of the "proper" role of metaphor within ethical discourse. His uses of metaphors also show metaphor in bridging the gap between science and ethics. In this section, we review some of the dominant metaphors Garrett Hardin uses.

Garrett Hardin is professor emeritus of biology at UC Santa Barbara.²²⁰ He received his training and education at the University of Chicago and Stanford University. As a scientist, Garrett Hardin practiced ecology, microbiology, and human ecology. As an ethicist, Hardin advocates consequentialism (non-utilitarian) and eugenics. For Hardin, science (in particular ecology and economy) and ethics are intimately bound because, "We are not the Man from Mars....We are living here on this planet....If we make a mess of the Earth, we still have to live on it."²²¹ Furthermore, bioethics is not the application of ethics to biological questions, but, "'toughlove ethics,' built on a biological

²²⁰ Biographical information was attained at: <http://www.id.uscf/VERITAS/SPEAKERS/Hardin.html>

²²¹ Meile Frank. Interview in *Skeptic*.

foundation.²²²” Within his pursuit of toughlove ethics, Hardin is probably most famous (or infamous) for his metaphors derived in his articles “The Tragedy of the Commons” and “Living on a Lifeboat.” As an example of the use of metaphors, Hardin’s Lifeboat ethics is the better of the two examples, however, since the lifeboat ethics metaphor uses the “commons” metaphor, we briefly look at the commons first.

Garrett Hardin made popular the metaphor of the commons in his 1986 *Science* article, “The Tragedy of the commons.” His thesis is that the “Population Problem” is a member of the class of problems that have no technical solutions, where “A technical solution may be defined as one that requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality.²²³” The population problem, as he understands it, is that many countries in the world face overpopulation problems and that this overpopulation causes evils, e.g., starvation, suffering, and painful death. Furthermore, he claims that many people “who anguish over the population problem are trying to find a way to avoid the evils of overpopulation without relinquishing any of the privileges they now enjoy.²²⁴” Because people do not, traditionally, want to give up their goodies, they tend to look for technical solutions to ease their conscience, e.g., fish farms, golden rice, or monetary aid.

That there is a problem cannot be in doubt. We are finding that Malthus’ prediction—that in a finite world, as populations increase geometrically, there is a danger that the population will eventually outgrow the resources—is coming true. Hardin’s first metaphorical argument is for the conclusion that we must curtail the individual freedom for reproduction. In this argument, Hardin believes that Adam Smith’s metaphor of the

²²² Meile Frank. Interview in *Skeptic*.

²²³ Hardin, Garrett. *The Tragedy of the Commons*.

²²⁴ Hardin, Garrett. *The Tragedy of the Commons*.

“Invisible Hand” must be shown to describe how inadequately the public benefits from individual selfishness. Recall that one aspect of the *Invisible Hand* is that as an individual works to his own gain, an “Invisible Hand” will lead people to actually promote the public interest; i.e., when individuals make rational decisions for their own well being, the public will benefit. *The Tragedy of the Commons* is an exercise in game theory (developed by mathematician William Forster Lloyd) that Hardin uses to refute Smith’s *Invisible Hand*:

Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility *to me* of adding one more animal to my herd?" This utility has one negative and one positive component.

1. The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly + 1.
2. The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision making herdsman is only a fraction of - 1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another.... But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit -- in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.²²⁵

²²⁵ Hardin, Garrett. *The Tragedy of the Commons*

The problem is relatively easy to see: whenever people share property, they feel less inclined to take care of that property; e.g., public parks and rivers are often messy because “My little amount of trash doesn’t really hurt the area.” This story becomes a metaphor for many areas of our world: the air we breath, the water we use, and the land we occupy. It becomes a *tragedy of the commons* because of the careless manner in which we care for these resources, e.g., the disposal of waste (sewage, chemical, radioactive, pollution, etc.) Moreover, the commons apply, according to Hardin, with the “Freedom to Breed.” In the rest of the article, Hardin argues that public interests should be regulated by the notion of the commons. This is because if we do not take care of the commons, then it will be destroyed. Hardin’s arguments are reminiscent of Galton (the poor outbreed the rich and destroy the world). However, for the purposes of this thesis, we are done with Hardin’s first essay. One reason is that it does not seem like Hardin ever really defends his position that there are no technical solutions to the breeding problem; he seems to only establish the nature of *the commons*. The other reason we move on is that this essay represents Hardin’s first major example of using one metaphor (the commons) to replace another (the invisible hand). Garrett Hardin’s next metaphor “Living on a Lifeboat” is a more explicit use of metaphoric argument.

“Lifeboat Ethics” is a metaphor developed in Garrett Hardin’s 1974 essay “Living on a Lifeboat.” This is another attempt to displace one metaphor (spaceship earth) with another metaphor (lifeboat ethics) to argue for population control. According to this article the spaceship metaphor was developed by Kenneth Boulding to replace the “cowboy economy” with a metaphor acknowledging that we live on a world with limited resources.

The spaceship metaphor, as developed by Boulding, has many focusing elements. Earth is now understood as a tiny sphere, closed, limited, crowded, and hurtling through space to unknown destinations. Because of the limited resources of this closed system, we cannot pollute or otherwise waste the limited resources. Like in a spaceship, it is no longer possible to use up resources in one location and move to another for more resources. Furthermore, resources are limited, and in many cases currently nonrenewable, thus to survive we have to move to renewable resources. Because of larger populations and less living room, social interactions will have to change to avoid conflict. We will have to change our relationships with animals; e.g., animals will have to be domesticated. Also, there will be a need for central leadership.²²⁶ Hardin sees that there are a few problems with this metaphor. Primarily, the spaceship metaphor encourages technical solutions, which results in what Hardin considers a suicidal policy of sharing resources without regard for how individuals care for the resources. Thus, we have a *tragedy of the commons*. Another problem with the spaceship metaphor is that the spaceship earth has no captain or executive committee to run the show. Hardin suggest that we consider a new metaphor, that of a *lifeboat*, to more closely matches how we understand the world.

To understand the lifeboat metaphor, we start by defining nations as either being rich or poor. According to Hardin, 1/3 of the nations in the world are “rich” while the remaining nations are “poor.” Metaphorically speaking, each rich nation of the world amounts to a “lifeboat,” while each poor country is a “swimmer.” The question is, what do we do about the swimmers? Do we save the swimmers or let them fend for themselves? If we opt to save them, then how? We have to look at the situation. Each

²²⁶ The list was generated from: Boulding, Kenneth. *Earth as a Spaceship*.

lifeboat is limited in space and resources. If we look at one lifeboat, we may find the following situation. There are 50 people in the lifeboat, the lifeboat has a safety factor built in which, if ignored, can allow an additional 10 people on the lifeboat. The 50 people in the boat see 100 people swimming around and wonder what they should do. Option 1: Complete Justice requires that everyone deserves to live, so the 50 people let the 100 on the lifeboat. The boat is swamped, everyone dies. Option 2: Admit 10 people. There is no longer any safety factor, and there is an additional problem of how to decide which ten people should be saved. Option 3: Admit no one and watch for boarding parties. Hardin concludes that this is the operational metaphor we must consider to survive in the real world. He uses this metaphor, along with additional metaphors to argue that we should not provide “technological” aid to poor countries, e.g., food or money, i.e., he argues for the third option.

First, in another move reminiscent to Galton’s work, Hardin calculates the rates of reproduction within the lifeboat and with the swimmers. The doubling time of the U.S. lifeboat is every 87 years, while the doubling time of the swimmers is 35 years. If it is required that the people in the lifeboats take care of the people swimming, then within a few generations, the swimmers would quickly outstrip the lifeboats. Thus, Hardin argues that a sharing ethics results in the tragedy of the commons. If the gain of each individual is not proportional to his responsibility, then the system collapses. To show this, Hardin discusses another metaphor, “The World Food Bank.”

The *New Commons*, in international affairs, is the proposal for a *World Food Bank*. In the *World Food Bank*, the rich nations contribute their surplus goods, while the poor countries are allowed to withdraw and use the goods. Hardin gives two problems with

this idea. First, an analogy with businesses: Organizations that do not budget for emergencies fall by the wayside. By struggling, people learn lessons. Organizations with foresight will survive and maybe even thrive. If a business (or a family) is always bailed out of financial ruin, money is wasted. Hardin claims that this applies to countries also, “If it is open to every country every time a need develops, slovenly rulers will not be motivated to take Joseph’s advice...others will bail them out whenever they are in trouble.” A dependency cycle will result where the rulers never learn proper management. The second problem with the world food bank is that “Some countries will make deposits in the world food bank and others will withdraw from it; there will be almost no overlap. Calling such a depository transfer unit a ‘bank’ is stretching the metaphor of bank beyond its elastic limits.²²⁷” The disaster of mismanagement and no overlap is argued for in another metaphor, the “The Ratchet Effect.”

According to Hardin, a country that has responsible populations would become stable through the following process. The population will live within the carrying capacity of the land with safety factors. As the safety factors are used up and the carrying capacity is transgressed, overpopulation occurs. In the natural course of affairs the lack of resources causes part of the population to die off. Eventually the population will re-stabilize with the natural resources. Without outside interference, this cycle repeats until either the population dies out because they didn’t learn the lessons, or the population stabilizes because of population control. Hardin admits that this seems cruel. After all, it does entail periods of suffering and death. It also seems like the “Right” thing to do, if we want to save the swimmers, is to set up a food bank so that the people do not starve and die. However, these intuitions are false, according to Hardin (and Galton and Spencer).

²²⁷ Hardin, Garrett. *Living on a Lifeboat*. 563

In reality, a country that has access to a food bank will experience more suffering and death in the long run. A food bank acts as the pawl of a ratchet. Whenever a country reaches overpopulation, it has used up its resources. The country turns to a food bank, and people start eating and reproducing more. Yet the natural resources never have a chance to regenerate. In other words, the food bank allows a country to systematically overrun the carrying capacity of the area. Population sizes continue to increase without hope of stabilizing. The process only stops when the system collapses. Since people used the food bank, there are more people than normally allowed. Consequently, there is now even more suffering and death than if there was no aid. Hardin concludes, “Under the guidance of this ratchet, wealth can be steadily moved in one direction only, from the slowly breeding rich to the rapidly breeding poor, the process finally coming to a halt only when all countries are equally and miserably poor.”²²⁸

The rest of the article uses these metaphors as a foundation to try to show how the population problem will not be solved by giving out money or food or allowing immigration. For example, by increasing the population, or giving aid that increases the population in 3rd world countries (the swimmers) we transgress on the commons: food, air, water, unspoiled scenery, solitude, beaches, fishing, hunting, etc. Immigration creates a commons by speeding up the destruction of the rich countries. Interestingly, Hardin identifies the metaphor that usually justifies allowing immigration, the Statue of Liberty. The Statue presents an image of “an infinitively generous earth-mother, passively opening her arms to hordes of immigrants who come here on their own

²²⁸ Hardin, Garrett. *Living on a Lifeboat*. 565

initiative.²²⁹ Hardin ultimately concludes that no aid should be given to the 3rd world countries unless we want lots of suffering in the future.

I am not arguing for or against Garrett Hardin's conclusion. (Although, I think that Peter Singer has a much better argument for famine relief that can respond to many of the criticisms Hardin makes about the consequences of giving aid.) My interest is in seeing how Hardin conceives of using metaphors in argument. Hardin is as an example of a person who is using metaphor and acknowledging that he is using it. In fact, Hardin has the following to say about metaphor

It is probably impossible to approach an unsolved problem save through the door of metaphor...since metaphorical thinking is inescapable it is pointless merely to weep about our human limitations...to avoid conscious suicide we are well advised to pit one metaphor against another...we may come closer to metaphor-free solutions to our problems.²³⁰

Hardin actually uses an ethical analysis consistent with the cognitive view of metaphor. Lifeboat ethics are irreducible, experiential, focusing, and creative. Hardin does a good job of laying out the metaphors and using them in arguments. However, contrary to his last claim, Hardin never drops the lifeboat metaphor, "For the foreseeable future survival demands that we govern our actions by the ethics of a lifeboat. Posterity will be ill served if we do not."²³¹ Although he never does abandon metaphor for a "metaphor-free solution", he shows just how entangled understanding is with metaphor.

A natural question would be in what way is Hardin's use of metaphor any better than the Nazi doctors? After all, they each result in practices that some people find intuitively repulsive. In one case we have active genocide; in the other case we are letting people starve to death because they are poor. First, Hardin's use of metaphor follows the

²²⁹ Hardin, Garrett. *Living on a Lifeboat*. 566

²³⁰ Hardin, Garrett. *Living on a Lifeboat*. 561

²³¹ Hardin, Garrett. *Living on a Lifeboat*. 568

cognitive view of metaphor developed in the first part of this thesis, the metaphors not being true or false, but useful or not in gaining understanding about what we think about the world. Second, by acknowledging the fact that he is using metaphor, he allows (whether or not he wants to) for the possibility of not having a claim to “Truth.” In this respect, I think he is trying to model ethics more on experience and understanding (and maybe even on the scientific method). I think that the distinction between the uses of metaphor as the Nazi used them and as Hardin used them display an important move within ethical discourse, where ethicists need to evaluate the role metaphors are playing within their arguments. Now, we turn away from ethics to the realm of mathematics.

Mathematics

This thesis originally started out as an exploration of metaphors used in science and an exploration of metaphors used in ethics. The original goal was to explore metaphor and the possibility of a connection between science and ethics. During the research for this project, I have discovered a virtual web of connections between science, math, ethics, and metaphor. In this final section, I would like to use some connections between math and metaphor to suggest an implication regarding ethical arguments.

If we look within the history of science, we can see two movements. One movement tries to put math into science, the other tries to get metaphor out of science. The math movement was successful. Mathematics and science are now intimately connected. In fact, math is now seen as a logically necessary (although not necessarily sufficient) condition of science. We see this as people argue that their field of interest is a science because it uses math, e.g., psychology, sociology, astrology, and acupuncture. Ridding science of metaphor, however, did not happen. As we have seen, metaphor permeates science. In this case metaphor is necessary (not in a logically sense) as a component of understanding. Part of the resistance to the idea of metaphors in science is based on the interpretation of metaphors as lying in the realm of the subjective imagination. Part of the acceptance of mathematics within science is based on the interpretation of mathematics as lying in the realm of objective rationality. I suggest that it is impossible to both (1) put math into science and (2) rid science of metaphor. I base this on the finding of George Lakoff and Rafael E. Núñez's book Where Mathematics Comes From: How the Embodied Mind Brings Mathematics into Being.

There is something seen as special about mathematics. Love it or hate it, mathematics has a special status within peoples' beliefs. Lakoff and Núñez identify this belief as "The Romance of Mathematics." Some beliefs associated with this romance are

- Mathematics is an objective feature of the universe; mathematical objects are real; mathematical truth is universal, absolute, and certain.
- Mathematics would be the same even if there were no human beings, or beings of any sort. Though mathematics is abstract and disembodied, it is real.
- Since logic itself can be formalized as mathematical logic, mathematics characterizes the very nature of rationality.
- The mathematics of physics resides in physical phenomena themselves... 'the book of nature is written in mathematics'...the language of mathematics is the language of nature and that only those who know mathematics can truly understand nature.
- Mathematics is the queen of sciences. It defines what precision is. The ability to make mathematical models and do mathematical calculations is what makes science what it is.²³²

What Lakoff and Núñez discover is that many of the above claims are either false or misleading. They do this by showing that a large portion of mathematics is based on metaphorical concepts. If they are correct about the metaphorical nature of mathematics, then it follows that it is impossible to both (1) put math into science and (2) rid science of metaphor. Rather than completely summarize their arguments (about 450 pages worth of argumentation) I will highlight the metaphorical structures they discovered in math and logic.

Modern mathematics (as taught to us in school) arises from a combination of innate number discrimination, subitizing, the use of symbols, calculation, the memorization of short tables, and 4 grounding metaphors + one convention. Various forms of innate number discrimination within babies have been found in recent studies: Babies can distinguish between collections of two and three objects (3 or 4 days old); babies can

²³²²³² Lakoff and Núñez. Where Mathematics Comes From. 339-340

recognize “that one plus one is two and that two minus one is one” (by 4 ½ months); babies can recognize “that two plus one is three and that three minus one is two” (a little later); babies can “recognize the numerical equivalence between arrays of objects and drumbeats of the same number.”²³³ Thus, we have a limited innate ability to group objects. All humans can also subitize, or at a glance identify up to about four objects.²³⁴ The four metaphors come into play because metaphors provide a cognitive understanding of one area in terms of another. Thus, mathematics (in this case arithmetic) is understood by use of ordinary, nonmathematical domains.

The most basic operational metaphor within arithmetic is that “Arithmetic As Object Collection.” Numbers are understood as the size of the collection. Operations are changes in the size of the collections. We learn this at an early age, “If John has 3 apples and Susie has 2 apples, then how many apples do they have?” This metaphor is limited as seen in the following example, “If John has 3 apples and Susie takes away 5 apples, how many apples does John have?” There are several problems. How do we deal with a “Negative Collection,” what are fractions, and what does it mean to have a collection of “No Items?” We may get fractions, but we must define “0” and “Negatives.”

Another metaphor used in arithmetic is “Arithmetic As Object Construction.” In this case, numbers are whole objects made up of parts; the parts are also (in some cases) whole objects made up of other parts. Thus, five is made up of three and two. Since numbers are objects, there is no number zero under this conceptual scheme. We now have a more intuitive notion of fractions. We also have the “Measuring Stick Metaphor” where a length is representing a unit. Thus, length = number. Without this metaphor,

²³³ Lakoff and Núñez. Where Mathematics Comes From. 15-19

²³⁴ Lakoff and Núñez. Where Mathematics Comes From. 19-21

irrational numbers, like $\sqrt{2}$, cannot exist. This is because $\sqrt{2}$ represents the non-rational length of the hypotenuse of a right triangle with legs of length one. If you assume that only rational numbers exist (which you have to with the first two metaphors) then, $\sqrt{2}$ cannot exist. (This shows directly how mathematical objects, like π , i , and e , cannot exist apart from mental construction, i.e., they are only ‘out there’ in the sense that we developed our understanding that way.) The final grounding metaphor is “Arithmetic As Motion Along a Path.” This is very similar to the measuring stick metaphor, yet zero is automatically defined as a point-location. This metaphor also provides for a natural way to conceive of negative numbers and of numbers lying between other numbers.

Lakoff and Núñez show how the above four metaphors take us from the innate mathematical ability to complex mathematics. The book has many metaphors that show how logic, mathematics (and by extension science) relies on metaphorical thinking: Many people who teach Venn Diagrams are using the metaphor that “Classes Are Containers.”²³⁵ College Algebra and Trigonometry students daily make use of Descartes’ metaphor “Numbers are Points on a Line” to combine geometry and algebra. Calculus students use the Cartesian Coordinate System to combine Euclidean Space with Changing Motion. “Space” has two different metaphorical interpretations depending on whether sets of points define space or space contains sets of points. “Point” is either a disc of zero diameter or an infinitely shrinking disc. Numbers can be real, granular, imaginary, hyperreal, etc.

Math is full of metaphor. I suggest that because of the metaphorical nature of mathematics it is impossible to both (1) put math into science and (2) rid science of

²³⁵ Lakoff and Núñez. Where Mathematics Comes From. 123

metaphor. Ethical implications? I have heard some people disparage ethical study because it makes use of metaphor and that this is not modeled on “science.” Well, they cannot have it both ways. Most ethical arguments are grounded in logical reasoning. Logical reasoning is grounded in mathematical reasoning. Mathematical reasoning is grounded on metaphorical reasoning. Thus, even the structure of ethical arguments cannot avoid some type of metaphorical reasoning, which is one more way that metaphor provides a link between science and ethics.

This chapter thus shows us the consequences of taking metaphors as true when they are imposed upon us by our leaders, how to argue with metaphors in a manner more consistent with the cognitive view of metaphor, and how we can’t get metaphor out of math, science, or ethics.

Chapter VII: Metaphor: A Bridge Between Science and Ethics

Summary

Chapter One: Introduction

Science and ethics are often considered disjoint areas where science is a description of the way things are, while ethics concerns itself with the evaluation of human action and how we ought to be. However, it is common to accept the injection of ethics into science, e.g., genetic engineering or artificial womb technology (although ethics and the law are usually playing catch-up). It is also usually considered not acceptable to use science to justify ethics, e.g., deriving morality from evolutionary theory (sometimes this relates to the naturalistic fallacy). Rather than tackle either one of these issues, this thesis starts with the observation that people do combine science with ethics. Then, we step back from these issues and ask some questions: What, if anything, is the underlying connection between science and ethics? Alternatively, how do people so naturally make the connections? One possible answer is with metaphor. I arrived at this idea after seeing Dr. Doren Recker's work concerning metaphor in science. His work shows how we can conceive metaphor as a cognitive tool that unintentionally links the gap between science and pseudoscience, e.g., evolution and creationism.

This paper explores the route to a cognitive theory of metaphor and examines metaphors used in science and ethics. This exploration shows that: (1) Metaphorical structures provide a mechanism of understanding one domain in terms of another. (2) When people use metaphors to understand the world we live in, the same metaphors can

be used within science and ethics. (3) Therefore, it is plausible that metaphors provide a cognitive connection between science and ethics; i.e., metaphors bridge the gap between science and ethics.

Chapter Two: Traditional Theories: The Big Three

Comparison Theory

The comparison theory, one of the oldest theories of metaphor tracing its roots to Aristotle, states that metaphorical objects involve a comparison of similarity between two or more objects. The CTM is most often interpreted as a metaphysical theory, meaning metaphors describe an underlying objective reality in which common similarity exists between the metaphorical elements. CTM is also often associated with the idea that metaphors are similes, with the “like” or “as” taken out. Using examples like—Sally is a block of ice and Richard is a Gorilla—Searle shows how Metaphors may fail to be metaphysically based. In the first example, the common elements do not exist between the objects; in the second example, the characteristics exist, yet are based on a misunderstanding of the nature of gorillas.

With respect to the simile theory, Searle argues that the theory does not give us an account for computing the meaning of metaphors and that metaphors and similes have differing truth-values, thus they cannot be the same. I argue that the first complaint merely establishes that more work is needed within the theory and that metaphors and similes do not necessarily have differing truth-values. By using math examples ($12+1=1$, $.999\dots=1$) I show how truth is context dependent. Thus, similes and metaphors may really be evaluated similarly because similes are really metaphors; however, it is not

The speech act theory completes this chapter and our exploration of the three most common metaphor theories that get us to a cognitive view of metaphor. In this theory, Searle was concerned with how people can say one thing and mean another. He claims that a statement may be interpreted in one of two ways. The Speakers Meaning is what the person is trying to communicate. The Sentence Meaning is what the sentence means by itself. Searle further draws out that context counts. For example, “she is tall,” “the cat is on the mat,” or “it’s getting hot in here.” Searle further gives a method for identifying and partially understanding a metaphor.

Chapter two brings out the following issues: Theory may be metaphysically based (describing underlying reality independent of human interaction) or the theory may be epistemological based (describing the way humans understand and experience the world); These theories provide a basis for identifying metaphors and partially deciphering them; furthermore, metaphors may be creative and focusing; finally context matters.

Chapter Three: Colorful Linguistic Expression vs. Cognitive Role

Donald Davidson argues that metaphors mean what the words, in their most literal interpretation, mean—nothing more. He arrives at this conclusion from at least three related claims: (1) Metaphor conveys truth about the world much as plainer prose. (2) Literal meaning and truth conditions can be assigned to words and sentences apart from contextual usage. (3) Metaphor does not have cognitive content. I respond with: (1) Maybe, (2) I do not think so, and (3) no.

I do not specifically respond to the notion of how we arrive at truth with respect to plainer prose because that could be a thesis in itself! However, it seems that Davidson arrives at the truth of plainer prose by a logical positive method. Thus, truth (and

meaning) is built up from verifiable empirical claims, much like Cartesian Foundationalism. I do not think that meaningful understanding arises this way. For example, if a person asks me “What is love?” Under Davidson’s understanding, I would give a definition—intense affection, sexual desire, or a zero score in tennis. However, I am not sure that would give understanding. Taking the cognitive approach of Lakoff and Johnson, I would say that to understand the meaning of love, you would use a combination of metaphors, “Love is a journey,” “Love is a collaborative work of art,” “Love is war,” etc. I am guessing that for Davidson, truth leads to meaning and understanding, while for Lakoff and Johnson, understanding leads to meaning and truth.

I am not sure what to think about literal meaning and truth conditions independent from contextual usage. Context certainly counts in math, “ $12+1=1$,” “ $12+1=13$,” “.999...=1,” “ $2+3=5$ is equivalent to $5=3+2$.” I am not sure where to find context free truth statements that when combined give meaning and understanding of the world and my relationship with it. Even if we can find a collection of true statements, there does not seem to be a way to combine them together to get meaning and understanding. For example, I can put together a collection of true math statements, yet if I gave the collection to someone, I am not convinced that the person could derive an understanding of mathematics. Truth seems to be a component to survivability, meaning, and understanding, but it does not seem to be independent of them.

Finally, Davidson does not establish, in the essay I reviewed, that metaphor has no cognitive content. He claims that a literal interpretation implies that there is no creative component to metaphor, to which I reply that metaphors are often created—the similarity is not there until the author or audience of the metaphor, e.g. forges the relationship,

gravity is super-percolated coffee grounds. Davidson further argues that metaphor must not have a cognitive content because people have a difficult time laying out the cognitive content. I respond that there are many areas where it is difficult to describe something, yet we do not deny the existence, e.g., explaining color to the blind, working on understanding a math concept, or seeing a picture. I argue for an “Ah Ha” account of understanding that does not require the ability to express the concepts. Furthermore, the special cognitive content of metaphor arises because metaphors structure our belief systems by allowing us to understand one area in terms of another.

Lakoff and Johnson argue that metaphor is the primary way in which we structure and understand the world. Under this idea there are four aspects of metaphor. Metaphor is irreducible because it has no truth-value with respect to an objective realm independent of human understanding; metaphor is better understood as good or bad. Metaphor is focusing because it highlights some areas while downplaying others. Metaphor is creative because it connects previously disjoint areas. Finally, metaphor is experiential because it changes the way we experience life and our relationship / understanding of the world. We can see these aspects if we take the time to evaluate the following: time is money vs. time is a frisbee, man is a wolf vs. man is a rabbit, love is a collaborative work of art vs. love is hell, the world is a machine vs. the world is an organism, a thesis defense vs. a thesis construction.

Lakoff and Johnson also bring up the fact that their theory gives neither an objective theory of truth or a subjective theory of truth. A traditional view of metaphor is that if it is not objective, it must be subjective. Moreover, subjectivity is dangerous because truth is important to survivability. This cognitive theory of metaphor (as developed by Lakoff

and Johnson) denies objectivism's claims to absolute and unconditional truth. They hold that truth is relative to understanding; understanding is based in part by our culture and metaphorical system. However, they also deny subjectivist's claims to individual truth and intuition because understanding is based on successful functioning in our physical and cultural environment. Lakoff and Johnson propose an experiential synthesis that combines two systems, e.g., rationality and emotion, reason and imagination, the known and unknown.

From this chapter, I conclude the following: Context matters, It is not necessarily desirable to structure metaphors as T/F, there are four aspects of metaphorical understanding; Objective and subjective truth systems are not the only game in town. Because of this understanding of metaphor, I conclude that: For some people, metaphors provide a method of understanding and experiencing the world. Thus, it is possible that metaphor provides a cognitive link between science and ethics.

Chapter 4: The World Is?

This chapter highlights that throughout history there is an interconnection between science and ethics. The nature of the interconnection depends, in a large part, on the metaphors chosen to describe the world. In this chapter we looked at "The world is a machine" and "The world is an organism"

The World is a Machine was largely developed in the 16th century. From an intellectual religious view, it was pushed with the belief of a rational / perfect God as Engineer. From a secular view, we have many people working with new machines and mathematics. As the machines and math became more complex, the model began to be pushed to describe the world. The four aspects of metaphor helped us see how this

metaphor shaped understanding: Irreducibility—the metaphor was not taken (originally) as true or false, but as a pragmatic view of understanding. Focusing—the metaphor stressed analysis, taking things apart, passive matter, change based on matter in motion, and engineering models. Creative—the metaphor was created and gave a new way to understand the world. Experiential—the metaphor provided a new way to treat the world and offered new questions to ask. The competing metaphor is the world is an organism.

The World is an Organism has two different views, a primitive (mother earth) and modern (Gaia) view. This metaphor is evident in environmental ethics and our behavior or treatment towards the Earth, e.g., Smohalla of the Columbia Basin Tribes talking about cutting the mother. The four aspects of metaphor also helped us understand this view. Irreducible—the metaphor provides a model of understanding that is so powerful, people often fight as if it were true. Focus—the metaphor provides a holistic view; it stresses the interconnections between things in proper context; matter is active; different centers of activity have interconnections between them; it stresses biological models. Creative—both primitive and modern views were created based on observations of the world. We also saw new entailments, e.g., Superorganisms. Experiential—the metaphor certainly changes the way people act: radical environmentalists, humanity as a cancer, and some experience this as a “Natural” reaction to the inhumanity of the mechanical view.

We saw the different ways these metaphors guide science by looking at ape studies: kill, dissect, poke, prod, inject, etc. verses passively watching, learning, etc. Finally, we looked at how the machine metaphor shaped the debate between Descartes and Hume regarding the reasoning ability in animals. Hume relied on a strict analogy between humans and animals through their anatomy and behavior. We saw his claims that

humans and animals learn from experience in the same manner, induction. Induction is not based on reason but custom and habit, both of which are used to train humans and animals. Descartes holds that animals are machines that react to the environment; humans have a mechanical body but a mental thinking substance. He further claims that humans have a mental substance that distinguishes our difference from animals because (1) Humans have complex language and (2) Reason is a universal instrument, not like specific organs of the animals (that can only provide one function)

From this chapter we see the pervasive nature of metaphor in science and ethics. When we allow multiple metaphors to understand one subject, we allow for greater understanding of the world. Furthermore, metaphor is pervasive in philosophical argument.

Chapter 5: Evolutionary Metaphors

Evolutionary Metaphor: Science

Darwin's use of metaphor is a case study in the applicability (and acceptability) of metaphors used in science. Induction and Newton's Four Rules largely defined Science, at his time. However, these gave various methodologies: Naïve (strict) empiricist, Positivist Vera Causa, Empiricist Vera Causa, Rationalist Vera Causa. We saw how metaphor fit into both the 3rd and 4th position, as does Darwin's methodology. Darwin was concerned with the new forms debate. His response, evolutionary theory, involved the extensive use of metaphors.

Natural Selection is a metaphor that relies on the concept of artificial selection. For artificial selection to work, we need variability of individuals, a large population, and selection of characteristics. By the use of the metaphor the struggle for existence, and

Malthus' studies on population growth and subsistence growth, Darwin is able to establish that natural selection meets the same three criteria as artificial selection. He describes selection as a struggle for existence. This struggle is further described by two metaphors, The Wedge Analogy—the competitive nature of evolution; The Entangled Bank—the cooperative nature of evolution. Although there was some question as to what exactly the metaphors implied—a creator, and some question about using other metaphors, e.g., the Sunday stroll for existence—Darwin never gave up the metaphors. Furthermore, they appear necessary to understanding his theory.

Evolutionary Metaphor: Ethics

Next, we turned to Galton and Spencer's use of metaphors. This is a case study in the metaphorical transfer of understanding from science into ethics. Galton was the founder of the modern eugenics movement. His main concern was with how human societies are shaped by evolution. He builds his case by trying to show the harm of not following eugenics: the ignorant poor will swamp the educated rich; population growth studies show how the educated may be pushed out of existence; civilized culture will be destroyed. He uses example from the dark ages in Europe, prohibitions of marriage with university instructors, and how the church eliminated people to show that the civilized human race is in danger of being destroyed.

We saw how Galton's claims were faulty. His selection of metaphors is poor and thus ignores the full theory of evolution. Spencer fared little better. Spencer was the founder of social Darwinism and argued against poor laws. He claimed that laws and institutions should be implemented that further human progress by eliminating the weak or inferior members of society. He believed that evolution applies to society and species,

e.g., they both move from simple to complex, general to particular, and homogeneous to heterogeneous structures. He argued that forced charity (poor laws) harms society: forced charity subverts the natural inclinations for charity, adds ineffective middleman, gives to random charity, is against nature because struggle is natural; short term suffering is better than long term suffering; poor laws halt learning through struggle and self-sacrifice and do not result in a net increase of social stability or utility.

Spencer suffered from similar problems as Galton. He exclusively used one focusing metaphor while ignoring others, inserted ideas of “Progress” and “Good” into evolutionary theory, and his own metaphor “Survival of the fittest” is rather poor.

From chapter five we learn that metaphor can be successfully used in science, that metaphor is necessary in some sciences, and that Darwin’s metaphors are necessary for his theory. We see metaphors going from one area to the other, and Darwin’s metaphors helped bridge the gap between science and ethics.

Chapter 6: Miscellaneous Metaphors: Nazi, Lifeboat, Math

The Nazi Doctors

The people who get to impose their metaphors on the culture get to define what we consider true—absolutely and objectively true—L&J. The Nazis used both organic and mechanical metaphors in their project. One thing they did was to change the role of a physician. Traditionally, a physician would have one of the following relationships with his or her patients: Parental, Partnership, Rational Contract, Friendship, or Technician. The Nazis changed the role of a physician to a Social Healer / Killer. We saw this in such statements as, “I would remove a gangrenous appendix...”

The Nazis made use of many metaphors. For example, based on superorganic metaphors, the *Volk* is an organism, and must be protected (not killed, allowed to pass on genetic material). Moreover, The Jew is a disease, which must be cut out. Many metaphors were adopted to describe the Jews as either a biological danger or as sub-human: Racial pollution and tuberculosis; Parasites and bacteria; Vampires; Maggots; Ants; Dogs.

The Nazi made an entire medical killing machine based on the simple idea of “Life Unworthy of Life.” They justified sterilization of the criminally insane & hereditary sick based on the metaphors that they were a cancer on society, taking up resources, threatening racial purity, mentally dead, human ballast, and empty shells. Child euthanasia was justified to stop the cancer from growing in society, saving the body of the Volk. They were not murdered or killed, but “Put to sleep” or given a “Special diet.” Adult euthanasia was similarly justified as cutting out the cancer. It was merely special treatment of useless eaters. They also got special diets—totally fat free meals. Direct Killing (14f13) and mass murder then began in the camps. It to was justified under metaphorical grounds. It was merely the final solution to the Jewish question. It involved medical triage, the central hospital, and getting rid of the living dead.

Lifeboat Ethics

Garret Hardin understands metaphor as not true or false, but as providing understanding that may get to truth. His first metaphor “The Tragedy of the Commons” attempts to answer the population problem. His conclusion is that there are no technical solutions. He bases the population problem on an understanding that Malthus’ predictions are coming true and Adam Smith’s Invisible Hand is not working. He uses

Conclusion:

- (1) Metaphor structures thought by providing a mechanism of understanding one domain in terms of another.
- (2) When people use metaphors to understand the world we live in, the same metaphors can be used within science and ethics.
- (3) Therefore, it is plausible that metaphors provide a cognitive connection between science and ethics, i.e., metaphors bridge the gap between science and ethics.

Future-Projects

There are several assumptions, implications and questions left unanswered. Can we answer “We Should” before we know “We are”? Agreement in ethics is based on agreement on our metaphors. We get many of our metaphors based on their success in science. The success of science is based, in large part, on its success of mathematics. Nevertheless, metaphors in science are not true or false, they relate to understanding. Therefore, what is the status of ethics using metaphor? How does science reach agreement on the metaphors it uses? Success. What is success? What is success in ethics? How can ethics ever reach success with their metaphorical argument without resorting to who has the biggest sword?

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Appendix

Appendix 1: Fragments

This is simply a list of metaphors and thoughts regarding metaphors I have chanced upon during the research phase of this paper.

Fragments:

- Some fun metaphors
 - A sea of troubles
 - The solution of my problem
 - Argument is war.
 - Biology...Struggle for survival, survival of the fittest, natural selection
 - The allegory of the cave
 - In mathematical linguistics and formal language theory...node, branch, root node, leaf nodes, path...all using aspects of metaphor.
 - Statistics...stem and leaf diagrams
 - Physics...force of a field, flow of heat
 - Toricelli...Air as a “sea of air.”
 - Harvey...“Heart is a pump.”
 - Wave Theory of Light
 - Continental Drift
 - Ben Franklin... “electricity is a fluid.”
 - He also stressed, “Time is Money.”
 - Metaphor is a filter.
 - Chomsky...colorless green ideas sleep furiously.
 - Metaphor is the picture of our reality.
 - The world is a 56 Ford Truck.
 - The world is a balding rubber tire.
 - The World is a Vampire.
 - Bentham... “Rights are non-sense on stilts.”
 - Kafka... “A good book is an axe in the frozen sea.”
 - Leibnitz... “We are infinite machines all the way down.”
 - We are software rewriting itself.
 - Some of us are still running DOS.
 - Some of us are running Windows.
 - Sodium Chloride is 6, Cesium is 8, there is no 7.
 - DNA: Blueprint, Archive, Instructions, Library, Cipher, Code
 - Biologist fight over which term to use, so how can it only be colorful language?

- The bloody food chain.
 - The deadly feast of life.
 - Buckminster Fuller...man is “A self-balancing, 28-jointed adapter-base biped; an electrochemical reduction plant, integral with segregated stowages of special energy extracts in storage batteries for subsequent actuation of thousands of hydraulic and pneumatic pumps with motors attached....The whole, extraordinary complex mechanism guided with exquisite precision from a turret in which are located telescopic and microscopic self-registering and recording range finders, a spectroscope, etc.; the turret control being closely allied with an air-conditioning intake-and-exhaust, and a main fuel intake....”
 - Plato...“Man is a biped without feathers.”
 - Not eugenics but biological solidarity
 - The Mad Scientist.
 - Bio-prospecting
 - Brute-force testing
 - Genetic material as products.
 - Industry Actors
 - Research opportunities appear as lottery tickets...price, probability, and jackpots.
 - The Blind Watchmaker
 - Earth as a nurse.
 - Earth as the wicked step-mother.
 - The mind is a calculating machine.
 - A calculator is a living bank clerk.
 - The bootstrap model of nuclear physics.
 - The mind is a computer.
 - You see the problem?
 - DNA, the stupid molecule.
 - War is Peace
 - Freedom is Slavery
 - Ignorance is Strength
 - Real vs. Abstract metaphors in computer interfacing.
 - Order of discovery is rock-climbing; order of presentation is swimming.
 - Metaphors of light...
 - Third world countries as children.
 - Computers are toys, calculators, or ???
 - Ethics is Superman.
- Metaphors only have an illusion of truth-value.

- Metaphor + intuition of knowledge (rationalist or empiricist) = influencing condition in belief of a theory/hypothesis.
- More problems with the literal...e.g., What is the difference between (1) He was caught red handed, (2) he was literally caught red handed (a) caught murdering, (b) with paint on hands, (3) this book is black, (4) this book is literally black...I think that I know what we mean by $2+3=5$ in a literal meaning, but what about the literal meaning of her mood is blue?
- Non-literal = emotive force?
- Look at all the projects for understanding and manipulating nature (pre-Descartes)...Look at science after Descartes method. What works? Science. What makes it work? Mathematics. So, lets make language more like mathematics (with definite truth values)...they forgot that math is a model, so too is language...much like computer programs (machine language, translator, programming language, natural language...much like the line?)
- Test for AI: Can it use and understand metaphor?
- How do we shape our own world? By the metaphors we choose to live by.
- Bridge terms?
- Science uses models and models are a type of metaphor...or metaphor is a type of model?
- Implications of mechanical and organic models?
 - As mechanical view gains complexity...can it push out organic view?
 - Time line – organic, mechanic, organic, mechanic...
- The mechanical metaphor will seem most intuitive (in science) to people with knowledge of math.
- Similes are metaphors; we just use a simile when we are afraid that our metaphor will be rejected.
- Metaphors gone wrong, see the Flat Earth Society
- The Journey is now complete, now I am a Master!

VITA 2

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