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EXPLORING THE TRANSITION FROM A PRE-MODERN TO MODERN
CONCEPTUALIZATION OF THE NATURAL WORLD: IMPLICATIONS FOR A
MORE CONNECTED APPROACH TO CONTEMPORARY EDUCATION

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in partial fulfillment of the requirements for the

degree of

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By

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MORE CONNECTED APPROACH TO CONTEMPORARY EDUCATION

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF INSTRUCTIONAL LEADERSHIP
AND ACADEMIC CURRICULUM

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ABSTRACT

Modernist science is a discourse that separates us externally from our environment, socially from one another, and internally within ourselves. This study not only examines the role education plays in developing our perceptions of meaning, but it also explores the cognitive, linguistic, and cultural-historical aspects of why humans began separating themselves from the organic processes of the natural world over 300 years ago.

This study incorporates a two-pronged methodological approach similar to that developed by French historian Michel Foucault. The *archeological* portion of the study examines how discourses from both the sciences and arts operating during the period surrounding the Scientific Revolution began shifting away from an earlier medieval conceptual framework of *integration with nature* toward our own modernist framework of a *separation from nature*.

The *genealogical* portion of the study examines the cultural-historical context surrounding the Scientific Revolution and suggests four main areas of social change that may have subtly influenced a conceptual shift toward the *externalization*, *depersonalization*, and *dichotomization* of humans and the natural world. These four areas include Humanism, Puritanism, political discussions regarding the Divine Right of Kings, and Mystical Science.

The study then shifts focus to a discussion of how the modernist curriculum operates as a primary form of discourse dividing us conceptually from our world today. The study concludes by recommending three broad conceptual approaches for expanding modernist curricular discourses. These conceptual approaches encourage

seeing meaning more comprehensively, developing historical consciousness, and approaching nature as a “living discourse” to be read holistically with the analytical intellect and the synthetic imagination.

CHAPTER 1

INTRODUCTION

*The woods of Arcady are dead. And over is their antique joy;
Of old the world on dreaming fed; Grey Truth is now her painted toy.*
(W.B. Yeats, 1889, *The Song of the Shepherd*)

Modern science appears to be a discourse that perceptually divides us from our natural world on many different levels. In his book *Transformative Learning* (1999) Edmund O'Sullivan writes that:

For well over three centuries we have been, as humans, attempting to separate ourselves from the organic processes of the natural world. With the Cartesian turn, the mind was elevated over nature and it was the work of the human mind to wrest secrets and powers from the natural world. By separating the human self from a larger inclusion in nature and the universe we have proceeded to deepen the chasm of alienation of the human from the natural world. (O'Sullivan, 1999, p. 95)

But why, it might be asked, did humans begin separating themselves from the organic processes of the natural world in the first place, and, more importantly, how does this separation continue to influence our lives today? One way that modern science appears to influence our lives is in how it fragments our perceptions and understandings of the world in which we live. This, as Capra suggests, can especially be seen in the way that modern science promotes a conceptual outlook that ultimately envisions our world:

...as a mechanical system composed of elementary building blocks...the human body as a machine...life in society as a competitive struggle for

existence, the belief in unlimited material progress to be achieved through economic and technological growth, and last, but not least, the belief that a society in which the female is everywhere subsumed under the male as one that follows a basic law of nature. (Capra, 1996, p. 6)

Some writers (Quinn, 1997; Miller, 2000) have suggested that such a reductive-mechanistic conceptual outlook encourages a perception of reality that “alienates us spatially and psychologically from the ecosystems that sustain us” (Wackernagel & Rees, 1996, p. 132). This conceptual “alienation” has led others to suggest that this fragmented outlook could lead us to an even more pernicious outcome, since, as the poet Gary Snyder explains: “a culture who alienates itself from the very ground of its own being...is doomed to a very destructive behavior, ultimately perhaps self-destructive behavior” (Snyder, 1989, p. 184).

Some postmodern writers (Merchant, 1992; Moore, 1992; Orr, 2001) believe that the evidence of this “self-destructive behavior” can already be seen manifested in many areas of our lives today. For instance, we can see it in our relationship with our external environment, where many of our leading environmental organizations such as the *U.S. Environmental Protection Agency*, the *United Nations Environmental Programme*, and the *Worldwatch Institute* continue to warn us regarding the impact our relationship with the environment appears to be having on our planet’s overall ecological balance and sustainability. Thus Lester explains:

...our tropical forests are shrinking by 11 million hectares per year; 31 million hectares in industrial countries are damaged due to acid rain and air pollution...an estimated 26 billion tons of topsoil is lost annually...there is an

estimated 6 million hectares of new desert formed each year...underground water tables are falling globally...extinction of plant and animal species together are now estimated at several thousand per year; one-fifth of all species may disappear over the next twenty years...mean temperature is projected to rise between 1.5 and 4.5 degrees Celsius between now and 2050...carbon dioxide levels in the atmosphere have increased about 30 percent from 1850 to 1980 and are projected to leap a further 75% by 2060...the upper earth's atmosphere indicates numerous growing holes in the ozone layer suggesting gradual global depletion could be starting and escalating risks of skin cancer on a level never before experienced. (as cited in O'Sullivan, 1999, p. 2)

Unfortunately, these are just a few of the serious ecological challenges currently facing our planet today. And as controversial as these issues continue to be, many of our modern scientists would not only agree, but many have openly expressed their acceptance of the fact that we modern humans appear to be altering our planet's global ecology in ways never before thought possible. In fact, Harvard ecologist Edward O. Wilson believes that modern humans may be responsible for unleashing one of the single most devastating "spasm of extinction" to life on this planet since those evidenced in the fossil record toward the end of the Paleozoic and Mesozoic eras. He also believes that if we continue in our present abusive relationship with our natural environment that we may soon witness a magnitude of change in our planet's biodiversity as never before seen or "experienced in our planet's geological past" (Wilson, 1992, p. 12).

This growing prospect of such sweeping ecological changes may also explain why 1,700 of our world's leading natural and physical scientists felt it incumbent upon themselves to unite together for the purpose of issuing a formal "statement of concern" regarding what they believe to be the tenuous state of our planet's ecological future:

Human beings and the natural world are on a collision course...If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about. (Union of Concerned Scientists, 2003, p. 1)

Many modern ecologists and educators alike (Capra, 1996; Doll, 1996; Fleener, 2002) not only fully concur with this prognosis of impending ecological doom, but some have even commented on the strange irony that seems connected with the ecological collision course described above. If we truly are racing toward an ultimate "crash" with our natural environment in the near future, it would seem that we are doing so only because of an even deeper conceptual separation that already exists between humans and their natural world.

In other words, it is largely due to our modernist conceptual outlook that "we are able to abstract a world of separate objects, including a separate self, and then to believe that those objects belong to an objective, independently existing reality" (Capra, 1996, p. 293). It is precisely this perceived "independence" from our natural environment that not only allows us to approach our world as a dead, inert, raw

material to be used and exploited without regard, but unfortunately it is also what makes the likelihood of a future “ecological crash” such a viable possibility in the first place. As a result, the more we allow our modernist outlook to permeate our perceptions and relationships with our natural world, the more “womb-like nature vanishes” and, with it, “the gradual emancipation of humans from an embeddedness in nature” (Toolan, 2001, p. 47).

Another area where I believe we can observe the self-destructive effects of our modernist outlook working in our lives is in how it divides us socially from one another. Once again, by conceptually reducing our natural world to the level of an “independent existing reality,” we unfortunately encourage our social relationships to be perceived and interpreted from a similar materialistic framework of meaning. Instead of approaching our fellow humans from an integrated context of cooperation, empathy, compassion, and mutual respect, our modernist conceptual outlook encourages a social context based on such principles as competition, self-aggrandizement, manipulation, and, of course, survival of the fittest.

Such a materialistic and reductive social framework not only diminishes the intrinsically “human aspect” from our social interactions, but I believe it also encourages an extreme materialistic tendency for reducing:

...our quality to quantity, our value to veneer, our interior to exterior, our depth to surface, our dignity to disaster...our compassion to serotonin, our joy to dopamine, our cultural values to modes of techno-economic production, our moral wisdom to technical steering problems, and our contemplation to brain waves. (Wilber, 1997, p. 177)

This leads us to perhaps one of the most subtle and pernicious self-destructive effects of all regarding our modernist scientific outlook, and that is in how it divides us internally within our very selves. This, I believe, is especially evident when we consider how our modernist outlook metaphysically divides the rational from the emotional, the spiritual from the physical, and the intellectual from the imaginative. Such an internal subdividing may do more than just mitigate our capacity for experiencing nature as an interconnected whole. It may also be one of the primary motivators behind many of our current feelings of detachment, isolation, loneliness, and general despair: feelings that cultural historian Thomas Berry believes to be the direct result of the fact that:

We cannot live within ourselves. For our inner world is a response to the outer world. Without the wonder and majesty and beauty of the outer world we would have no developed inner world. As all living beings around us perish, then we perish within. In a sense we lose our souls, our imagination, our emotional range, we even lose our intellectual development. (Berry, 1999, p. 1)

And the more we continue to “perish within,” the more we seem to perish without. This can be seen by the dramatic increase in modern times of such negative behaviors as suicide, depression, mass neurosis, skepticism, hopelessness, and nihilism: behaviors that Quinn believes to be the outward symptoms of an “amorphous, spontaneous, and direct response of despair and surrender to the confusion of an exclusively mechanistic, materialistic, secular worldview” (Quinn, 1995, p. 269).

Problem Statement and Research Questions

How then are we to begin addressing the various problems associated with our modernist scientific discourse? Capra suggests that the first step might be in realizing that the concerns described above may not necessarily be separate problems, but rather:

...different facets of one single problem, which is largely a *crisis of perception* arising from the fact that most of us, and especially our large social institutions, subscribe to the concepts of an outdated worldview. (Capra, 1996, p. 3-4)

Many postmodern educators (Sterling, 2001; Orr, 1994; Berry, 1988) would agree with Capra's conclusion, in that, they too believe that one of the primary problems with our modernist outlook is essentially an institutional problem in how modern humans have learned to think and feel about their world in general. In fact, Orr believes that our present external, social and internal crisis of perception is ultimately the result of a "crisis of values, ideas, perspectives, and knowledge, which makes it a crisis *of* education, and not one merely *in* education" (Orr, 1994, p.126).

Educator Stephen Sterling (2001) also believes that our current perceptual crisis is one ultimately based in an outdated educational system that remains deeply entrenched in "a mechanistic paradigm and overlaid by utilitarian market philosophies" (p. 17). Moreover, he is convinced that as long as our modern educational system continues to endorse a conceptual framework that promotes such ideas as human dominance over the natural world, unmitigated economic consumption, and the deification of the analytical sciences as an exclusive way of

knowing the world, we will likewise continue to languish in our present external, social and existential crisis of perception. Thus Orr writes:

The fact that we see things as disconnected events today or fail to see them at all is, I believe, evidence of a considerable failure that we have yet to acknowledge as an *educational failure*. It is a failure to educate people to think broadly, to perceive systems and patterns and to live as whole persons. (Orr, 1994, p. 2)

It would seem, then, that unless we can begin addressing how we are educated to think and feel about our world from a conceptual point of view, it is doubtful that we will be able to begin reconnecting our fragmented lives and begin empowering those we teach to “fulfill their proper role in the larger pattern of meaning” (Berry, 1988, p. 256). In other words, unless we change how our world is conceptualized from an educational perspective, it is doubtful that we will be able to establish the conceptual foundation we need for perceiving our world less like a dead, external, raw material to be dominated and exploited, and more like an “intimate web of communal relationships that can be known only by being in community with it” (Palmer; 1998, p. 95).

How then are we to begin changing our modernist scientific outlook through education into one that encourages not only a more integrated perception of the world from without, but also a deeper sense of unity and belongingness from within? The goal of this study will be to explore the conceptual basis of our modernist scientific discourse with the natural world. Specifically, it will seek to better understand why humans began separating themselves from the organic processes of the natural world

over 300 years ago in the first place. It will also seek to explore how such interrelated factors as concepts, language, culture and history may have influenced a transition from an earlier pre-modern conceptual outlook of the natural world to our own modernist scientific outlook.

By examining these interrelated factors, not to mention their possible influence on our perceptions of the world in general, I will endeavor to create a broader context of meaning for not only critiquing our current “crisis of perception,” but also for encouraging a more complex understanding as to why we perceive and approach our world as we do today. Such a context, I believe, could afford us a new “condition of possibility” for considering how we might begin changing our current modernist outlook through education into one that is less fragmented and divided as a whole. As such, this study will be guided by the following research questions:

- 1) Why have modern humans become so divided in their perceptions of the world today, and what major factors may have influenced this division?
- 2) What are the educational implications?

Dissertation Outline

In this chapter I have briefly introduced some of the problems associated with our modernist scientific discourse, especially regarding how this discourse as it is often promoted through education today encourages a conceptual framework that divides and fragments our perceptions of meaning. I also outlined the primary research questions that this study will seek to address.

In chapter two I will develop a theoretical lens for exploring these research questions. This chapter will primarily examine how our perceptions of meaning are

influenced by concepts as those concepts are expressed within a linguistic framework of discourse. It will also briefly examine how language, in the form of discourse, might itself be influenced by such interrelated factors as culture and history.

In chapter three I will introduce and describe the methodological approach that I will use for exploring the research questions outlined for this study. This chapter will focus primarily on Michael Foucault's archeological and genealogical techniques for examining changes in discourse as they occur within a given cultural-historical context of meaning.

In chapter four I will utilize Foucault's archeological and genealogical techniques to explore how various forms of social discourse may have changed and evolved during the historical period surrounding the Scientific Revolution (1450-1630): a period that many historians (Boaz, 1962; Lindberg, 1992) believe to mark the very beginning of our own modernist scientific outlook. This chapter will also explore some of the cultural-historical factors surrounding this historical period that may have subtly, even unconsciously, influenced a transition from an earlier pre-modern conceptual outlook to our own modernist scientific outlook.

Finally, in chapter five I will discuss the possible educational implications of this study. This will include a brief examination of how our modernist outlook is actively promoted and sustained through primary discourses in education today. It will also explore how those primary discourses might be expanded into a more comprehensive framework of meaning.

CHAPTER 2

THEORETICAL LENS

O Lady! We receive but what we give, and in our life alone does Nature live.
(Coleridge, 1801, Dejection: an Ode)

In chapter one I briefly described how our modernist scientific discourse with nature appears to promote a conceptual framework that divides us externally from our environment, socially from one another, and internally within ourselves. I also suggested that this “crisis of perception” might be an educational problem in how we have learned to conceptualize our world from a modernist framework of meaning. Finally, it was concluded that one possible way that we might begin encouraging a more interconnected discourse with our natural world is through a broader understanding of why modern humans may have become so divided in their perceptions in the first place.

The primary focus of this chapter will be to develop a theoretical lens for exploring the conceptual, linguistic, and cultural basis of why we have become so divided in our perceptions of the world today. This, I believe, is important because although there has been much written about the nature of modernist science (Kuhn, 1962; Bateson, 1972; Bortoft, 1996), as well as many critiques of modernist science from a postmodern perspective (Fleener, 2002; Capra, 1996; Merchant, 1996), less has been done regarding the factors that may have actually influenced the transition from a pre-modern to modernist conceptualization of the natural world. Such an understanding is important because of its unique potential for helping us to not only develop a more complex understanding as to why we have become so divided in our perceptions today, but also for helping us consider how we might begin reconnecting ourselves

perceptually back to our world before it is ecologically, socially and existentially too late.

As such, this chapter will explore the role that concepts, language, culture and history play in structuring our knowledge and influencing our perceptions of meaning. In developing this theoretical lens, I will specifically explore the relationship that appears to exist between our perceptions of meaning and our own cognitive participation in the process of knowing. This chapter will also briefly examine the relationship that exists between concepts and perceptions of meaning as those concepts are developed and expressed within a linguistic framework of discourse. Finally, this chapter will conclude with a brief examination of the relationship that appears to exist between language and the unique cultural-historical context that ultimately influences its development as a form of discourse.

Perceptions and Meaning

According to the philosophy of empiricism there is an intrinsic division between our conscious minds and the physical world of which those minds are conscious. This philosophy assumes that our individual sense organs function as a kind of nexus or bridge that connects our internal minds with the external world of objective reality. As such, empirical discourses maintain that any true or valid knowledge of the world must begin with our sensory experiences, since it is primarily through those experiences that we are able to become aware of the external reality that is assumed to already exist outside and apart from our sensory perceptions.

The origins of this empirical perspective can be seen perhaps most clearly in the writings of the French philosopher Rene Descartes (1596-1650). According to

Descartes, only reason could be trusted as a reliable guide for discerning any true and lasting knowledge of the world. This assumption eventually led Descartes to begin doubting the credibility of his own sensory experiences, including his ability for distinguishing between what he thought to be “real” and what might only be a dream or illusion created within his own mind. This led Descartes to eventually begin questioning the epistemological basis for his knowledge of the world, not to mention the rational grounds for supposing that an external reality existed at all, including the external world he perceived in the form of his own physical body.

Eventually Descartes resolved this deadlock of skepticism by reaching a point that he describes as a feeling of “I think therefore I am.” In other words, in the brute act of thinking itself, Descartes began to identify himself as a rational, thinking being: one that seemed to be distinct and separated from the phenomenal world that appeared to exist outside and apart from his own rational mind. Therefore, by doubting the fundamental basis of all reality, Descartes eventually began to conclude that only one thing could be known to exist with certainty, and that was the existence of his own rational ability for doubting and questioning the validity of reality. So what began in Descartes’ skepticism regarding the existence of an externalized world of objectified matter eventually became the epistemological foundation for his assurance regarding the reality of a divided, self-contained, and independent world of the rational mind. Thus writes Descartes:

From reason I knew that I was a substance, the whole essence or nature of which is to think, and that for its existence there is no need of any place, nor does it depend on any material thing; so that this “me” that is to say, the soul

by which I am what I am is entirely distinct from body and even more easy to know than is the latter...I am a thinking thing...and although the things which I perceive or imagine are perhaps nothing at all apart from me and in themselves, I am nevertheless assured that those modes of consciousness which I call perceptions and imaginations, in as far only as they are modes of consciousness, exist in me. (as cited in Damasio, 1996, p. 249)

This proposed independence of the mind from “any material thing” eventually led Descartes to construct a metaphysical division between the *un-extended* world of the non-spatial mind and the *extended* world of the spatial physical body. This metaphysical division between the extended and the un-extended, between the spatial and the non-spatial, and between the rational and sensory ultimately led to the now famous Cartesian dualism between mind and body.

But what this Cartesian separation of mind and body fails to acknowledge is that every empirical observation also presupposes a certain conceptual stance on the part of the observer. And although our knowledge of the world may certainly *begin* with our sensory perceptions, it does not necessarily follow that our knowledge of the world is *tantamount* to those sensory perceptions. That is because we do not perceive our world with our sense organs alone, but rather with our entire intellectual, emotional and spiritual beings, including our mental habits, personal biases, imagination, and, of course, our memory of past events.

A simple example of this can be demonstrated through the visual puzzles and optical illusions often used in the field of Gestalt psychology. For instance, many of us have witnessed how two people can observe the exact same image of a cube, and

yet one person will perceive it as a cube from below and the other as a cube from above. Moreover, when two people look at the exact same image on a card, one person will perceive an older lady and the other a young woman.

In his book *The Structure of Scientific Revolutions* (1962), cultural historian Thomas Kuhn (1922-1996) describes this same sort of “gestalt shift” when he suggests how scientists working under different conceptual frameworks, or *paradigms*, will actually perceive the same natural phenomena in very different ways:

...the proponents of competing paradigms practice their trades in different worlds... the two groups of scientists see different things when they look from the same point in the same direction. Again, that is not to say that they can see anything they please. Both are looking at the world, and what they look at has not changed. But in some areas they see different things, and they see them in different relations one to the other. (p. 150)

This perceptual difference appears to be less about the content of what is actually seen by the individual percipients, and more the result of each percipient’s own peculiar *way of seeing*. In other words, each of the observers in the examples above experienced the same set of sensory stimuli on their physical sense organs, and yet those same sensory stimuli appear to have produced very different perceptions of meaning. It would appear, then, that there is more to our seeing than merely meets the eye of our sensory perception.

Perhaps one of the first modern philosophers to begin addressing the anomaly described above was Baruch Spinoza (1632-1677). Spinoza challenged the Cartesian dualism between mind and body by showing that if two substances are divided in

their “spatial orientation,” there could be no common ground or “space” in which they could meet for the purpose of interaction. Since, according to Spinoza, “of two substances which have nothing in common between them, one cannot be said to be the cause of the other” (Spinoza, 1952, Prop. III). Simply stated, if the mind was not an “extended” material substance, Spinoza could not see how it could possibly have any relationship whatsoever to the physical body. And if the physical body was strictly prohibited from any participation in the “unextended” realm of the mind, Spinoza could not understand how there could be any kind of mutual influence between the two.

As a result, Spinoza was convinced that the mind and body were not a division of substances as Descartes had presumed, but rather an integrated *unity of substances*; like two threads coming together to make one cloth:

The body is the object of the mind... And the object of the idea constituting the human mind is the body, or a certain mode of extension actually existing and nothing else... and we have ideas of the affections of a body; therefore, the object of the idea constituting the human mind is a body and that too actually existing. (Spinoza, 1952, Prop. III)

As a result, Spinoza believed that the mind and the body not only worked together in forming our perceptions of reality, but that each actually came together as a single unity in the dynamic process of thinking itself. That is because without the mind we could not “know” of the body’s existence, since the body can be known only insofar as it is represented as an actual idea within our conscious minds. And without the

various sensations provided by our physical bodies, there would simply be nothing for our minds to be “conscious of.” Damasio expresses a similar belief when writing:

...body and mind are manifestations of a single organism. Although we can dissect them under the microscope, for scientific purposes they are in effect inseparable under normal operating circumstances. (Damasio, 2003, p. 223)

The German philosopher Immanuel Kant (1724-1804) also described the unifying relationship that appears to exist between our conscious minds and the physical world of which those minds are conscious. Like Spinoza, Kant did not believe that our knowledge of the world was merely the sum total of our sensory perceptions. Rather, he believed that all meaning was the result of an intimate synthesis between our sensory perceptions and how those perceptions are cognitively structured and organized into a particular figuration of meaning, or “*form of knowledge*,” as Gaarder describes:

Kant agreed with Hume and the empiricists that all our knowledge of the world comes from sensations. But, and here Kant stretches his hand out to the rationalists, in our reason there are also decisive factors that determine *how* we perceive the world around us. (Gaarder, 1996, p. 325)

Kant was therefore convinced that *how we perceive* and *what we perceive* was an inseparable unity. In other words, the meanings we actually perceive in the form of a phenomenal world was for Kant less like a transmission of information from the physical to the mental, and much more like a complex dance between “*things as they exist-in-themselves*” (Kant’s *noumena*), and things as they are ultimately organized, figured and represented into different forms of knowledge by our own cognitive

participation (Kant's *phenomena*). As a result, Kant believed that there was basically one world. However, the categories of thought that ultimately structured the appearances of that world into a particular perception of meaning, he believed, varied not only between different individuals, but between entire cultures as well.

So instead of assuming like the empiricists that our knowledge of the world was but a mere reflection of a pre-given external reality independent and divided from our cognitive involvement in the process of knowing, Kant believed that our world could be known and understood in a meaningful way only insofar as it first conformed to the cognitive structures of our own individual "knowing minds:"

Without sensibility no object would be given to us, without understanding no object would be thought. Thoughts without content are empty, intuitions without concepts are blind. It is therefore just as necessary to make our concepts sensible, that is, to add the object to them in intuition, as to make our intuitions intelligible, that is, to bring them under concepts. These two powers or capacities cannot exchange their functions; the understanding can intuit nothing, the senses can think nothing. Only through their union can knowledge arise. (Kant, 1964, B 79)

The German poet and philosopher Johann Wolfgang von Goethe (1749-1832) also recognized the inseparable unity that appears to exist between our sensory perceptions and our cognitive participation in organizing those perceptions into a particular expression of meaning. For Goethe, the manifestation of the phenomenal world was not something independent of the individual observer, but rather was "caught up and entangled in the observer's own individuality" (as cited in Naydler,

1996, p. 72). Goethe was therefore convinced that the actual “meanings” we perceive in the form of the phenomenal world required not only sensory inputs from the external world, but also the active involvement of our own conscious minds in the process of organizing those sensory inputs into a particular “mode of illumination” or *Vorstellungsart*” (as cited in Steiner, 1950, p. 48).

Goethe also believed that it was possible for different conceptual “modes of illumination” to produce entirely different ways of experiencing the world, not to mention theorizing and practicing science in the world. In short, what Goethe recognized was that what we perceive is not necessarily the fixed, immutable objects of a pre-given external world, but rather sensations that have been cognitively structured and organized into expressed “meanings.”

This belief directly challenges many of the underlying assumptions of the philosophy of empiricism, which holds that insofar as our thinking and perceiving are regarded as separate events, the process of “empirical observation” becomes more or less the absolute arbiter of our knowledge of the world. But if our empirical observations are themselves influenced and adjudicated by an inextricable conceptual element in our cognitive processes, then those observations can no longer be regarded as having any kind of absolute authority.

Edmund Husserl (1859-1938) was another modern philosopher who believed that “what we experience” (the *nomadic*) and the “way we experience” (the *noetic*) were not two separate events, but rather different aspects of the same unified process of cognition. As such, Husserl believed that no meaning could be conceived apart from the act of conceiving, nor could there be any acts of conceiving that could exist apart

from something in which to conceive. Cerbone alludes to this cognitive unity when describing Husserl's phenomenological approach:

Noetic description describes acts of consciousness, but in so doing will make reference to objects of consciousness...*nomatic* description describes the objects of consciousness, but in so doing will make reference to acts of consciousness. (as cited in Prado, 2003, p. 49)

Therefore, like Spinoza, Kant and Goethe before him, Husserl emphasized the indivisible link that appears to exist between our conscious minds and the phenomenal world of which those minds are conscious. But as Husserl explains, it is because our minds are continually engaged in the act of organizing sensations into perceptions of meaning that their involvement in the process tends to become obscured. As a result, we forget our cognitive participation in the process of knowing the world because it is only through this cognitive participation that we are able to perceive things in a meaningful way in the first place.

This failure to remember our own cognitive participation in knowing the world; something Bortoft (1996) refers to as "cognitive amnesia," unfortunately leads us to the erroneous belief that what we perceive through our sensory experiences is in fact just a transmitted copy of an independent, pre-given world of meaning that already exists outside and apart from any involvement on our part as the knowing percipients. Which of course, is what many empiricists do believe and have believed ever since the time of Descartes. For as Doll explains, "this categorical separation between the external and the personal...is part of Descartes' legacy to modernism (Doll, 1993, p. 31).

Finally, the cognitive scientists Humberto Maturana and Francisco Varela extend the idea of our cognitive participation into perhaps its most comprehensive framework of all; one involving our language, emotions, intellect, imagination and willed actions. As such, it is under their *Santiago Theory* of cognition that the mind is no longer seen as a mere divided spectator in the process of our knowing, but rather becomes an involved participant in the twofold process of “living and knowing.” Hence it is under this theory that the body in the form of the brain becomes the physical *structure* through which the *process* of mind operates, thus forming the very nexus through which living things cognitively “couple” with their physical environment for the purpose of “bringing forth” a phenomenal world of meaning:

Cognition, then, is not a representation of an independently existing world, but rather a continual *bringing forth of a world* through the process of living. The interactions of a living system with its environment are cognitive interactions, and the process of living itself is a process of cognition. (Capra, 1996, p. 266)

Under the Santiago Theory, then, it is only within the dynamic processes of living itself—in change and permanence, in autonomy and openness, in ebb and flow—that our knowing freely participates in our living and our living becomes fulfilled in our knowing. This would explain Maturana’s comments that “to live is to know” (as cited in Capra, 1996, p.174), since it is only as we live, and move, and have our being that we can ever really hope to understand our world, our neighbors, or even ourselves in a meaningful way.

Meaning and Language

I have described how the philosophy of empiricism assumes that our knowledge of the world is derived directly from our sensory experiences and that the meanings we “discover” from those experiences are themselves already present “ready made,” so to speak, in the world *before* we actually perceive them. However, I also suggested that what this empirical framework fails to acknowledge is the cognitive role our minds appear to play in organizing our sensory inputs into actual perceptions of meaning. The main purpose of this section will be to explore the role that concepts play, as they are expressed through language, in organizing our perceptions into meanings.

This is important since the empirical perspective also assumes that after objective meanings have been directly apprehended by the senses, they are arranged and organized into the basic “concepts of meaning” that are ultimately transmitted and expressed through the various forms of discourse used to describe our world. In other words, instead of seeing concepts as coming *before* our perceptions, and therefore serving an essential cognitive role in structuring and organizing our perceptions into a particular expression of meaning, the philosophy of empiricism sees concepts as coming *after* our perceptions. But the question becomes, how can concepts be derived *from* our perceptions of meaning when it appears that it is largely by means of these concepts that we are able to organize and “bring forth” a phenomenal world of meaning in the first place?

Austrian philosopher and mathematician Ludwig Wittgenstein (1889-1951) was perhaps one of the first modern philosophers to begin addressing this dilemma. He did so by showing the intimate relationship that appears to exist between our

perceptions of meaning and language. Like many of the philosophers already mentioned above, Wittgenstein did not believe that meaning was something intrinsic to the natural world apart from a knowing percipient. Rather, Wittgenstein was convinced that meaning could exist and develop only within a framework of language since, in his view, all thought was but a flow of linguistic associations made possible as we “operate with words” (as cited in Fleener, 2002, p.131). The German psychologist Wilhelm Wundt (1832-1920) communicated a similar belief when writing:

Human speech and human thought are everywhere coincident. The development of human consciousness includes in itself the development of modes of expression. Language then is an essential element of the function of thinking. (as cited in Barfield, 1967, p. 86)

According to Wittgenstein, then, the production of meaning was an intimate “structure of relationships revealed through the language we use” (Fleener, 2002, p.134). He was also convinced that it was only within a context of language that our thoughts, feelings and ideas about our world could be understood and expressed in a meaningful way; something Gadamer recognized when concluding that “being that can be understood *is* language” (Gadamer, 1989, p. 474). Wittgenstein was convinced that the kind of “being” that can be understood as a legitimate perception of meaning was largely dependent upon the kinds of “language games” we played in describing and expressing our world through discourse. It is through these language games that Wittgenstein believed our world is ultimately conceptualized into a particular framework of meaning. This would explain Wittgenstein’s comment that,

“the limits of language mean the limits of my world” (as cited in Fleener, 2002, p 135). So instead of concepts giving meaning to language, Wittgenstein was convinced that it was actually language that gave meaning to concepts, as Bortoft explains:

It is recognized now that it is language which gives us concepts. The origin of concepts is in the dawning of language, and we would never acquire concepts if language did not dawn in us...So the commonsense view that we see and know something before we apply words to it, which are therefore merely labels clearly does not take into account the role of language in giving the concept which enables us to see and know something *as* something in the first place. (Bortoft, 1996, p. 311)

The German philosopher Martin Heidegger (1889-1976) also recognized the intimate relationship that appears to exist between concepts, language, and our perceptions of meaning. Simply stated, Heidegger believed that there was an inextricable link between the concepts that one could “say” through language, and the meanings that one could actually “show” and “see” perceptually. This would explain Heidegger’s comment that “the essential being of language is *Saying as Showing*” (Heidegger, 1971, p.127), since it is ultimately through language that different modes of reality can be conceptually “shown” and revealed to us. Or as Gadamer would say, “reality does not happen behind the back of language; reality happens only within language” (Gadamer, 1976, p. 35).

As a result, Heidegger believed that the concepts shown to us through language not only structure and organize our perceptions of the world into a particular expression

of meaning, but also that these same concepts are themselves constituted and revealed only within a linguistic framework of discourse:

Language is the house of Being; in its home man dwells. Those who think and those who create with words are the guardians of this home. Their guardianship accomplishes the manifestation of Being insofar as they bring the manifestation to language and maintain it in language through their speech. (Heidegger, 1993, p. 217)

Another way that language appears to influence our perceptions of meaning is through the dynamic use of metaphor. In his *Defense of Poetry* (1819) the English poet Percy Shelley (1792-1822) describes metaphors as having the unique ability for showing us “before unapprehended relations between things” (Shelley, 1996, p 322). In his book *Poetic Diction*, Barfield also describes how metaphors can “expand our consciousness of meaning” by suggesting relationships between things that our analytical intellects have since divided and fragmented into isolation. As such, metaphors can show us a larger and fuller world of meaning by helping us to reconnect through the imagination what the intellect has disconnected through discursive reasoning:

...in the development of our modern consciousness, we have lost the power to see unity. Our sophistication, like Odin’s, has cost us an eye: and now it is the language of poets, insofar as they create true metaphors, which can *restore* this unity conceptually after it has been lost perceptually. (Barfield, 1973, p. 86-87)

It would seem then that metaphors represent a kind of linguistic bridge between our synthetic imaginations and analytical intellects. It is therefore through metaphor that new relationships of meaning can be realized and that “poetry,” as Novalis (1772-1801) writes, can begin healing “the wounds inflicted by reason” (Novalis, 1997, p. 12). By helping us to reconnect through the imagination what has been divided and fragmented by the intellect, metaphors can actually help to enhance our *figuration* of meaning. This would explain Doll’s comments that “metaphors are open, heuristic, dialogue-engendering...and it is through the interplay of metaphor and logic that life is lived, experienced, and developed” (Doll, 1993, p. 168).

Finally, Maturana and Varela’s *Santiago Theory* of cognition also describes how all living things, especially humans, utilize a “semantic domain” of language as a primary means for organizing their world into a context of meaning:

According to Maturana, the uniqueness of being human lies in our ability to continually weave the linguistic network in which we are embedded. To be human is to exist in language. In language we coordinate our behavior, and together in language we bring forth our world. (Capra, 1996, p. 290)

By representing the source of our concepts, language becomes the very dawning of our perceptions of meaning, since to live in a world of *things* means to first live in a world of *words*. That is because “it is ultimately language and the concepts it provides that structures our inner and outer worlds into objects, phenomena, and meanings” (Kuhlewind, 1992, p. 30). Thus Barfield concludes:

For the most elementary distinctions of form and color are only apprehended by us with the help of the concepts which we have come to unite with the pure

sense-datum. And these concepts we acquire and fix, as we grow up, with the help of words. On the basis of past perceptions, using language as a kind of storehouse, we gradually build up our ideas, and it is only these, which enable us to become conscious as human beings, of the world around us. (Barfield, 1973, pp. 56-57)

Language and Culture

A final aspect of our perceptions of meaning that needs to be considered is their unique relationship to the cultural-historical context in which they are ultimately constituted. A good example of this can once again be seen in the writings of Wittgenstein, who believed that it was only within a social-cultural framework, or “*form of life*,” that a particular language game could acquire a context of meaning. That is because Wittgenstein believed that all language required agreement, “not only in definitions but also in judgments” (Wittgenstein, 1953, p. 242). For Wittgenstein, these definitions and judgments could only be determined and negotiated within a social domain:

According to the later Wittgenstein, the meaning of words could not be found by looking for their association with particular objects. Instead, the meaning of words should be understood by the way in which they are used within their social context. (Trigg, 1999, p.151)

French philosopher and historian Michael Foucault (1961-1984) also recognized the important role that a social-cultural context plays in structuring the kinds of meanings that a particular language game or “form of discourse” could ultimately express. However, Foucault believed that these social forces actually extended to

include both cultural and historical influences. As such, Foucault was convinced that all knowledge, regardless of its form, was culturally and historically constituted through discourse. He also believed that the conceptual framework that ultimately organized sensations into perceptions of meaning did not necessarily arise intrinsically from within the conceptual framework itself, but rather emerged out of a complex network of cultural-historical influences. This implies that the emergence and development of a given conceptual framework of meaning is based less on empirical proof and more “on choices and decisions which are essentially cultural and historical” (Bortoft, 1996, p. 189).

This would explain why Foucault believed that a careful critique of the various forms of discourse operating during a particular historical period could reveal the underlying conceptual domains that actually made a particular perception of meaning possible in the first place. Foucault was convinced that it was precisely at this cultural-historical level that the fundamental concepts that “unobtrusively govern” how we think and feel about our world function at their most subtle and pervasive levels of influence. As Barfield explains:

It is obvious that the outlook of every individual will be slightly different from that of every other, also that there will be great difference between the average outlook of broad contemporary classes, such, for instance, as learned and ignorant, artist and scientist, agnostic and Roman Catholic. The widest gulf of all is likely to be that between the average outlooks of different historical periods, and this will be increased if we are dealing with different races; such as, for example, ancient Egyptians and modern Americans; for in this case the

dissimilarity will extend over nearly every experience of which the human outlook is composed. (Barfield, 1967, p. 87)

Thomas Kuhn also recognized the cultural-historical aspects of our knowledge of the world when he described the role that *paradigms* play in shaping our perceptions of meaning. For Kuhn, paradigms represented more than just formalized bodies of information about the world; they were the very conceptual boundaries of a culture's mode of thinking, feeling, and ultimately discoursing about their world. Kuhn was convinced that paradigms not only influenced what kind of scientific questions could be legitimately asked, but also what sorts of answers would be ultimately accepted as appropriate, cogent, or even possible at all. As Kuhn explains:

No part of the aim of a paradigm is to call forth new sorts of phenomena; indeed those that will not fit are often not seen at all. Nor do scientists normally aim to invent new theories, and they are often intolerant of those invented by others. Instead, normal-scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies. (Kuhn, 1962, p. 24)

Paradigms then, represent “our fly-bottle; our trap; the limits of what we can see” (Fleener, 2002, p.136). They are the conceptual boundaries that limit the sort of individuals we are willing to become as well as kinds of realities that we are willing to accept as a legitimate “condition of possibility.” But, like Foucault, Kuhn did not believe that the presuppositions of a particular paradigmatic perspective could conceptually produce itself by its own intrinsic “normal scientific” methodology. In other words, both believed that the epistemological assumptions that ultimately

influenced a paradigms conceptual context were themselves deeply influenced by a host of subtle, random, and even unconscious cultural-historical factors that Hubner (1983) referred to as the “spontaneous acts” of history (p. 114). Thus concludes Kuhn:

An apparently arbitrary element compounded of personal and historical accident is always a formative ingredient of the beliefs espoused by a given scientific community at any given time. (Kuhn, 1962, p. 4)

In conclusion, the purpose of this chapter has been to develop a theoretical lens for exploring why modern humans have become so divided in their perceptions of the world, as well as some of the factors that may have influenced this division in the first place. The literature reviewed in this chapter suggests that our modern discourse of empiricism is a discourse that divides us in our perceptions of the world by denying or obscuring our cognitive participation in structuring and organizing our sensory perceptions into a particular expression of meaning. The literature also suggests that our perceptions of meaning are themselves deeply influenced by the different kinds of concepts implied through the various forms of discourse we use to describe and express our world. The literature also indicates that these same discourses are themselves strongly influenced by the unique cultural-historical context in which they operate as a “language game” of meaning. In the next chapter I will briefly identify, describe and justify the methodological approach that I will use in exploring the research questions outlined in chapter one.

CHAPTER 3

METHODOLOGY

To the extent that conceptual domains have been constructed through a work of thought, thought could reveal their contingency and fragility, and hence the possibility of their transformation.

(Foucault, 1994, So Is It Important To Think?)

In chapter one I briefly described some of the various problems associated with our modernist scientific outlook and outlined the basic research questions that this study will attempt to address. In chapter two I developed a theoretical lens for exploring not only why modern humans have become so fragmented in their perceptions of meaning, but also for considering some of the major factors that may have influenced a transition from a pre-modern to modern conceptual outlook. This lens was constructed from a body of literature suggesting an interrelationship between our perceptions of meaning and concepts, between concepts and language, and between language and the unique cultural-historical context in which it operates as a form of discourse.

The main focus of this chapter will be to briefly identify, describe and justify the methodological approach that I will use in exploring the research questions outlined in chapter one. These questions include: (1) why have modern humans become so divided in their perceptions of the world and what are some of the major factors that may have influenced this division? (2) what are the educational implications?

Identification of Methodology

There are many different approaches that one could pursue in exploring these questions. However, one possible approach might be seen in the writings of the English poet William Wordsworth (1770-1850) who once commented that any lasting

change in our understanding of the world could never be fully accomplished without first:

...pointing out in what manner language and the human mind act and react on each other, and without retracing the revolutions, not of literature alone, but likewise of society itself. (Wordsworth, 1996, p. ii)

The primary goal of this study is to examine how the forces of language, culture and history may have influenced the emergence of our own modernist conceptual outlook. Toward this endeavor, I will incorporate an approach similar to the Historical Analytical methodology developed by French philosopher and historian Michael Foucault. This methodological approach, I believe, is conducive to this study mainly because of its unique ability for accentuating the complex role that history, culture and language play in shaping our knowledge and perceptions of the world. It is therefore an approach:

...whose aim is to rediscover on what basis knowledge and theory became possible; within what space of order knowledge is constituted; on the basis of what historical a priori and in the element of what positivity, ideas could appear, science be established, experiences be reflected in philosophies, and rationalities be formed. (Foucault, 1970, p. xxii)

Foucault's approach is primarily an attempt to examine and describe the various linguistic and cultural-historical conditions that influence the emergence and subsequent development of a particular conceptual outlook or "knowledge of the world." By examining the primary forms of discourse operating within a given cultural-historical context, Foucault's method attempts to understand how the

conceptual themes suggested through these discourses may subtly govern and “discipline” how a particular society thinks and feels about the world in general.

It is therefore an approach that emphasizes the contingent and contextual nature of our beliefs and assumptions about the world, including the subjective, accidental, and even unconscious manner by which many of our beliefs emerge and develop into an accepted body of knowledge. Such an approach, I believe, is important to this study since it can provide us with a unique opportunity for letting history and language become “a gateway by which meanings derived from the past can find their way into the present [thus encouraging] a conscious adjustment of both new and old” (Dewey, 1980, p. 272). As Foucault explains:

There are times in life when the question of knowing if one can think differently than one thinks, and perceive differently than one sees, is absolutely necessary if one is to go on looking and reflecting at all. (Foucault, 1985, p. 8)

By carefully examining how a particular conceptual outlook has developed as a function of discourse, culture and history, I believe Foucault’s Historical Analytical approach can help us better understand *when* and *how* our modernist scientific discourse began to emerge and evolve within a specific intellectual tradition as well as *why* it began emerging as it did in the first place. I believe this sort of understanding is essential if we are ever to begin resisting:

...the progressive degeneration which so often accompanies the acceptance of scientific positions; a degeneration which moves first to the level where the position is accepted uncritically, then to a level where it is thought to be

somehow self-evident, ending finally in a stage where all questionability has disappeared completely. In this way historical awareness possesses a critical function. Over and over it tracks down origins that have only contingent meanings, and thus lack necessity or compelling grounds. And it is precisely for this reason that historical consciousness can reject such positions. (Hubner, 1983, p. 48)

Description of Methodology

As described above, Foucault's Historical Analytical approach begins with a careful examination of the primary literature productions for a specific historical period. The focus of this linguistic examination begins with an attempt to identify what Foucault describes as the "*proliferation of discontinuities*" in the normal flow of discourse. This is because Foucault believed that it was precisely at these "rupture points" or "breaks" in the smooth flow of discourse that one could begin observing the underlying conceptual limits or "rules of formation" that unobtrusively govern how a particular intellectual tradition understands and perceives its world in a meaningful way.

In other words, as long as we remain embedded within a particular linguistic framework, our ability to analyze how that framework actually influences our beliefs and assumptions about the world is impaired. We cannot evaluate its impact on our perceptions of meaning as long as we remain embedded within the linguistic tradition. But once the regularity of that discourse has been broken and its normal flow has shifted toward a new linguistic formation, we now have something to compare our original discourse against. In that comparison we can begin seeing,

perhaps for the first time, how deep and subtle a role that original discourse played in “disciplining” our perceptions of reality. In short, by examining the discontinuities of discourse, Foucault believed one could begin revealing the conceptual boundaries that ultimately constrain and limit how we perceive and understand our world:

Beneath the great continuities of thought, beneath the solid, homogenous manifestations of a single mind or of a collective mentality, beneath the stubborn development of a science striving to exist and to reach completion at the very outset...one is now trying to detect the *incidence of interruptions*. Interruptions whose status and nature vary considerably...they suspend the continuous accumulation of knowledge, interrupt its slow development, and force it to enter a new time...they direct historical analysis away from the search for silent beginnings, and the never-ending tracing back to the original precursors, towards the search for a new type of rationality and its various affects. (Foucault, 1972, p. 4)

This may also explain why Foucault referred to this aspect of his methodology as a kind of *archeology*, in that its primary purpose as a research technique was to “uncover” and “exhume” the conceptual boundaries buried within a particular formation of discourse. It is therefore an approach that seeks to understand not merely what was consciously said and recorded at a given place and time in history, but rather why something may have been unconsciously thought in the first place. By identifying the historical shifts in the production of discourse and analyzing those shifts with an eye toward understanding the conceptual boundaries that “unobtrusively” influence our perceptions of reality, Foucault’s Historical Analytical

approach is a methodology that seeks to identify how different “types of rationality” as expressed through discourse define and limit how we think and feel about our world in a meaningful way.

Another feature of Foucault’s Historical Analytical approach is its *genealogy*. Foucault’s genealogy compliments his archeology in that it endeavors to describe and explain what his archeology merely uncovers. As his archeology attempts to uncover the underlying *rules of formation* and conceptual boundaries that govern the production of a particular mode of discourse, Foucault’s genealogy strives to reveal how various cultural movements of thought unconsciously influence a discourse to break from its linguistic origins and begin developing in another direction.

Where Foucault’s archeology seeks to identify an underlying conceptual framework or *episteme* buried within a particular form of discourse, his genealogy explains why a new form of discourse, and with it a new epistemological outlook, began emerging in the first place. Archeology therefore digs into language to uncover a change in rationality, whereas genealogy explores the various revolutions and “movements of thought” within a cultural-historical context and, in turn, reveals a subtle network of dynamic social interactions. As such, Foucault’s genealogy endeavors to understand:

...the older forms of intellectual discourse and systems of knowledge and their related products of power without looking for causality or regulating principles. Thus, Foucault’s genealogy does not pretend to search for essences behind historical developments or to demonstrate continuity or evolutionary progress. It does, instead, search out re-descriptions of past

events and forms of discourse, without asking which ones are right and without claiming to find a new essence of things. The point is to offer other possible explanations or scenarios that include the obscure or forgotten events, so that a more complex, a more relative reality can be brought forth. (Prado, 2000, p. 2)

Justification of Methodology

If in fact the evolution of human consciousness carries within itself the development of certain modes for expressing that consciousness, then language becomes an essential element to the function of our thinking:

We think by means of words, and we have to use the same ones for so many different thoughts that, as soon as new meanings have entered into one set, they creep into all our theories and begin to mould our whole cosmos; and from theories they pass into more words, and so into our lives and institutions. (Barfield, 1973, p. 189)

The primary purpose of this study is to explore how language, culture and history may have interacted to influence how we think and feel about our world today. Specifically it will examine how changes in discourse may have created a new “condition of possibility” for a transition from a pre-modern to modern conceptual outlook of the natural world. In addressing the first research question of this study, I will use Foucault’s archeological and genealogical approaches in an attempt to examine some of the various factors that may have influenced why humans began separating themselves from the organic processes of their natural world over three centuries ago.

The archeological portion of this examination will explore samples from the primary literary productions operating just before and after the historical period known as the Scientific Revolution (1450-1630). Literary samples will be selected based upon past experience with the discourses of the period and their perceived overall appropriateness for capturing the “true spirit” of the conceptual outlook of the periods in question. This archeological examination will also seek to include samples of discourses from both the sciences and the arts. The inclusion of discourses from the arts, I believe to be especially important since, as Elliott Eisner points out, the arts can provide us with an emphatic understanding of the human condition that cannot be adequately communicated through more scientific or didactic means:

Different forms of representations provide different kinds of meaning. What one is able to convey about a society through a literal or quantitative form of sociology is not the same as what is sayable through a novel...What all of the arts have in common is their capacity to generate emotion, to stimulate and to express the “feel” of a situation, individual, or object...Feeling is a part of all humans encounters and all situations and objects. When the feeling tone is incongruous with the content described, understanding is diminished (Eisner, 1991, p. 552, 554).

The primary purpose of this archeological examination will be to identify some of the possible “*proliferation of discontinuities*” in the primary forms of discourses operating during the period surrounding the Scientific Revolution. This examination will also include a discussion of how possible disruptions in the smooth flow of

discourse may have encouraged a conceptual shift toward our own modernist outlook of division and separation from nature.

Once I have investigated these potential changes in the smooth flow of discourse, I will use Foucault's genealogical approach to explore the cultural context surrounding the Scientific Revolution. The primary goal of this exploration will be to identify and describe how certain movements of thought during this period may have unobtrusively, accidentally, or even unconsciously influenced a shift in discourse toward our own modernist discourse of separation and division. This information will then be used to create a broader context for understanding the basis of our own fragmented conceptual outlook and to help us consider how to change that outlook through education toward a more interconnected whole.

In this chapter I briefly identified and described Michael Foucault's Historical Analytical approach. I also provided a justification for using this methodology to explore how language, cultural and history may have influenced a transition from a pre-modern to a modern mode of conceptualizing our natural world. In the next chapter I will use this methodological approach to identify and describe how certain cultural historical forces operating during the 16th century may have influenced a shift in discourse, and with it, our perceptions of the natural world in general.

CHAPTER 4

FINDINGS

*Worlds on worlds are rolling ever, from creation to decay,
Like the bubbles on a river, sparkling, bursting, borne away.*
(Shelley, 1821, Hellas)

In chapter one I briefly described how our modernist scientific discourse perceptually divides us externally from our environment, socially from one another and internally within ourselves. I also suggested that this perceptual division might be related to how modern humans have learned to conceptualize our world through education today. Finally, it was proposed that a better understanding of some of the factors that may have influenced the development of our modernist scientific discourse could help us not only better understand why we perceive our world as we do, but also how we might begin changing that perception through education.

In chapter two I introduced a theoretical lens for considering the linguistic, conceptual and cultural implications regarding how we perceive and understand our world in a meaningful way. This theoretical lens was based on the general assumption that our perceptions of meaning are influenced by concepts, and that these same concepts are themselves influenced by such interconnected factors as language, culture and history.

The primary focus of this chapter will be to explore why we have become so divided in our perceptions of the world and to examine some of the major factors that may have influenced this perceptual division in the first place. The first section of the chapter will consist of an archeological examination of discourse. This will involve a comparison of some of the underlying concepts and epistemological themes embodied within a wide variety of discourses from the sciences and arts as they were

operating just before and after the historical period surrounding the Scientific Revolution. This examination will conclude with a discussion regarding how changes in discourse may have influenced the development of our own modernist mode of perceiving and understanding the world.

The second section of this chapter will consist of a genealogical examination of the cultural context surrounding the Scientific Revolution. The purpose of this examination will be to explore how certain “movements of thought” operating within the cultural context during this period may have subtly, even unconsciously, created a new “condition of possibility” for a shift in discourse toward our own modernist scientific discourse of separation and division.

Archeology

Those who wish to succeed must ask the right preliminary questions.
(Aristotle, 323 BC, Metaphysics)

Why have we become so divided in our perceptions of the natural world, and what may have been some of the factors that influenced this division? If, as discussed in chapter two, our perceptions of meaning are influenced by concepts as they are expressed through discourse, then this question becomes at least in part a question of how discourse has changed over time. In other words, before we can begin answering the question of why we *perceive* our world as we do, I believe we need to first consider why we *discourse* about our world as we do. And this, at least in my mind, is a question directly related to how our perceptions of meaning change and develop over time as a function of the *evolution of discourse*.

How have modes of discourse expressing our relationship with the natural world evolved over time, especially during the historical period surrounding the Scientific

Revolution? In exploring this question, I will begin with a brief examination of the general character of discourse as it operated just prior to the 16th century. I will then explore how these pre-modern forms of discourse may have begun changing toward the end of the 16th century.

Discourse Before the Scientific Revolution

*Not Chaos-like together crush'd and bruis'd, But, as the world harmoniously
confus'd: Where order in variety we see, And where, tho' all things differ all agree.*

(Pope, 1736, Windsor Forest)

One of the first things that might come to a modern person's mind when studying the literary archive just prior to the 16th century is the singular strangeness with which our late medieval ancestors seemed to describe themselves in relation to their natural world. In fact, if we were to sample some of the primary forms of discourse leading to the period surrounding the Scientific Revolution including, for instance, its alchemy, herb-lore, bestiaries, medicine, magic and astrology, we would undoubtedly be surprised at the many strange and even startling examples of a world that appears to have been experienced very differently from our own today. And perhaps nowhere would this difference be more palpable than in what can only be described as one of the most distinguishing characteristics of the discourses predominating this pre-modern period: the conception of the natural world as "a unified, organic cosmos, ruled by a world soul and bound together by a macrocosm-microcosm relationship" (Lindberg, 1992, p. 246).

The pervasiveness of this "macrocosm-microcosm relationship" is in fact so central to pre-modern discourse that Barfield describes it as representing the "very texture" of the medieval way of thinking and feeling about the world:

Our medieval ancestors did not feel themselves to be either physically or psychically isolated from their surroundings in the way that we do today. Conversely their mind and soul were not felt to be imprisoned within, and dependent upon their bodies. Intellectual classifications were accordingly less dry and clear, and science: that general speculative activity which a later age has split up into such categories as astronomy, physics, chemistry, physiology, psychology, was as yet almost an undivided whole. (Barfield, 1967, p.141)

It would appear from these early discourses that our late medieval ancestors experienced their world far less from the outside and more from the inside, almost like a coat or garment they felt themselves wrapped in as opposed to a kind of external environment or stage upon which they merely lived and acted. This would explain Barfield's comment that "regarding his relationship to his environment, the man of the Middle Ages was less like an island, and far more like an embryo" (Barfield, 1988, p. 78). Simply stated, it was a world experienced as an integral whole: where the earth and elements, plants and animals, men and women were all perceived as being united together into a kind of "cosmic dance" of mutual influence. As Sir John Davies (1569-1626) poetically refers to when writing:

Dancing (bright Lady) then began to be,
When the first seeds whereof the world did spring,
The Fire, Air, Earth, and Water did agree,
By Loves persuasion, Natures mighty King
And, in a dance such measure to observe,

As all the world their motion should preserve.

(Davies, 1966, Orchestra)

Other expressions of this integrated macrocosm microcosm relationship can be found throughout many of the discourses surrounding this pre-modern period. For instance, in the discourses of medicine we find these same four terrestrial elements of “Fire, Air, Earth and Water” blending together to form both the material universe and the outer and inner constituents of the human body. This would explain Lindberg’s (1992) comments that just as the cosmos were widely believed to be comprised of the “four terrestrial elements animated by a living World Soul, so too was the human body thought to be comprised of these same four elements animated by a living soul” (p. 202).

Another related aspect of these early medical discourses was the belief that the four terrestrial elements were also directly responsible for maintaining the health and balance of the individual by producing what the physicians of the period referred to as the four *humours* of the body. These four interrelated humours were believed to control the biological functions of the body as well as the overall emotional and spiritual “temperaments” of the individual. As such, an individual might either be good *humoured* or bad *humoured*; even-tempered or high tempered, all depending on the balance of these four humours in the physical body:

The human body contains the four humours of blood, phlegm, yellow bile and black bile. These are the things that make up its constitutions and cause its pains and health. Health is primarily that state in which these constituent

substances are in the correct proportions to each other, both in strength and quantity, and are well mixed. (as cited in Boaz, 1962, p. 116)

Another feature of these medieval medical discourses was the belief that the arteries of the body flowed not with blood but rather with three interrelated spirits, or *ethers* (meaning upper air). Hence, there was the *animal* spirit, the *vital* spirit and the *natural* spirit, each one being intimately connected not only to the universe as a whole, but also to a particular organ in the human body that endowed it with its own peculiar power of influence over the individual's physical, mental and spiritual wellbeing:

Just as the substance of the heart is endowed with the force of the vital soul, and the unique flesh of the liver with the faculty of the natural soul, in order that the liver may make the thicker blood and natural spirit and the heart, the blood which rushes through the body with the vital spirit, and thus these organs may bring materials to all parts of the body through channels reserved for them, so...the brain...prepares the animal spirit. (as cited in Boaz, 1962, p. 305)

In addition to these innumerable internal influences there were also many potent external forces that were believed to subtly connect the individual to the universe. For instance, it was generally accepted that celestial influences that began at a person's embryonic conception, "continued after birth...ultimately affecting such things as temperament, health and disease" (Lindberg, 1992, p. 339). Moreover, each symbol within of the great heavenly zodiac was felt to share an intimate relationship, "or sympathy" with each of the four terrestrial elements. It was also widely believed

that the celestial realm was composed of an even more perfect “fifth element” (known widely during this period as the *quintessence*), felt to exhibit a unique power of influence over all material things dwelling in the imperfect terrestrial realm below.

Therefore, if Jupiter, Saturn, or Mercury happened to be dominant in the general “*disposition of the stars*” during an individual’s time of birth, it was generally taken for granted that the individual would likewise develop a *jovial*, *saturnine* or *mercurial* spiritual disposition. Ptolemy (90-168 BC) alludes to this fact in his *Tetrabiblos*:

...a certain power emanating from the eternal ethereal substance...permeates the whole region about the earth. If, then, a man knows accurately the movements of all the stars, sun, and the moon...and is capable of determining in view of all these data...that it will be warmer or wetter? Why can he not, too, with respect to an individual man, perceive the general quality of his temperament from the atmosphere at the time of his birth, as for instance, that he is such and such in body and such and such in soul. (as cited in Lindberg, 1992, pp. 275-276)

In addition to influencing the physical and psychical harmony of the individual, this same celestial realm with its great zodiacal belt and many wandering planets was also believed to be arranged in perfect harmonious proportion and embedded within its own revolving crystalline sphere. It was even widely professed in many pre-modern astronomical discourses that the motion of the heavenly spheres produced their own symphony of heavenly music. Astronomer Johannes Kepler (1571-1630) believed all heavenly objects participated in this symphony with resolute harmony while raying down their complex influences upon the earth and its many inhabitants.

Even Shakespeare (1564-1616) makes reference to this widely held belief in his *Merchant of Venice* (1598):

Look how the floor of heaven
Is thick inlaid with patinas of bright gold:
There's not the smallest orb which thou behold'st
But in his motion like an angel sings,
Still quiring to the young -ey'd cherubim.

(Shakespeare, 1974, act v, scene I)

And what of the wandering planets? There was Earth at the center, dignified and surrounded by its multitude of heavenly hosts. There was the moon with its power over all growing things, responsible for giving the element silver its luminous sheen and capable of impelling that strange kind of human madness called *lunacy*. There was the planet Mercury who was believed to imbue the terrestrial element of mercury so full of fire that the alchemist Paracelsus (1493-1541) claims “no fire can destroy it, nor change its essence...it flees from the fire, and resolves itself spiritually into an incombustible oil” (as cited in Boaz, 1962, p. 75). There was also Venus who shared its spiritual essence with the terrestrial element of copper, and Mars who gave its “spiritual virtue” to the element of iron, just as the “heaviness” of lead received its spiritual essence from the somber influences of brooding Saturn.

In addition to being connected physically and structurally, this same heavenly realm was also understood as being deeply infused with its own spiritual essence, or *anima mundi*. In fact, many of these pre-modern discourses maintain that it was precisely this great “World Soul” that tightly bound the microcosm and macrocosm

together into its intimate relationship of unity and oneness. The Greek philosopher Plato (427-347 BC), perhaps one of earliest and most eloquent proponents of this pre-modern conception of a universal soul, wrote that “the world is a living being endowed with a soul and intelligence ... a single visible living entity containing all other living entities, which by their nature are all related” (Plato, 1956, 29/30).

The deep spiritual interrelatedness between all things appears to have been such a seminal part of the medieval experience that the entire universe was often described as if it were alive and “tingling with anthropomorphic life, dancing, ceremonial, a festival not a machine” (Lewis, 1954, p. 4). Even Kepler, one of the founding fathers of our modernist scientific outlook, often described the earth as if it were a great breathing animal:

For here the sun-spots and little flames are brought forward as evidence of their being exhalations from the sun which are analogous to the exhalations from the Earth. (Kepler, 1952, p. 84)

Just as the flesh of the physical body was believed to be filled with a spiritual blood proceeding from a living heart, so too was this great spiritually connected universe often described as being filled with an ethereal light proceeding from a living sun that was “so full of mirth and life that its happy face could be clearly seen by all” (as cited in Lewis, 1954, p. 4). As for the sky surrounding this living sun, it too appears to have been experienced very differently than the prosaic “atmosphere” that stretches over our own heads today:

...if we are to judge from language, we must assume that when our ancestors looked up to the blue vault they felt that they saw not merely a place, whether

heavenly or earthly, but the bodily vesture, as it were, of a living Being. And this fact is still extant in the formal resemblance between such words as *diary* [day] and *divine*. (Barfield, 1967, p. 89)

I have attempted to sketch a general image of the natural world expressed in many of the primary forms of discourse prevalent just before the beginning of the 16th century. Obviously, much more could have been written regarding this late medieval conception. But suffice it to say that if anybody seriously doubts that our medieval ancestors experienced their world very differently than we do today, they need only to spend some time looking into the literary productions of the period. There, in the rich medieval doctrines of allegory and symbolism, signs and signatures, sympathy and antipathy, actuality and potentiality, form and matter, they will find evidence of a world perceived not merely as a spectator from without but rather as a participant deeply embedded from within. That is because it was essentially a universe already perceived as being within the percipients themselves:

Frequently the point was made through the macrocosm-microcosm analogy: that humans not only belonged to the cosmos but were actually miniatures of it. It followed that the cosmos and the individual person were linked by structural and functional similarities, which bound them into a tight unity. (Lindberg, 1992, p. 202)

I have described the general image of what the character of discourse was like just prior to the Scientific Revolution. In the next section I will explore some of the ways that this pre-modern form of discourse appears to have begun changing toward the close of the 16th century.

Discourse After the Scientific Revolution

Nature stood alone and lifeless. Dry number and rigid measure bound it with iron chains. Into dust and air the priceless blossoms of life fell away in words obscure.

(Novalis, 1800, Hymns to the Night)

In his book *English Literature in the Sixteenth Century* (1954), the medieval scholar C. S. Lewis (1896-1963) briefly summarizes the literary history of the sixteenth century:

At the beginning of the century we find a literature still medieval in form and spirit...the prose is clumsy, monotonous, garrulous; the verse...astonishingly tame. Nothing is light, or tender, or fresh. All the authors write like elderly men. The mid-century is an earnest, heavy-handed, commonplace age: a drab age. Then, in the last quarter of the century, the unpredictable happens. With startling suddenness we ascend. Fantasy, conceit, paradox, color, incantation return: Youth returns...Sidney, Spenser, Shakespeare, Hooker display what is almost a new culture... Nothing in the earlier history of our period would have enabled even the sharpest observer to foresee this transformation.

(Lewis, 1954, p. 1)

There are two important points to make regarding the outline above. The first is that a sudden and dramatic change in the literary culture began occurring toward the end of the 16th century. The second is the unforeseen direction this cultural transformation actually followed. I begin this section with this general outline because I believe it is fairly indicative of how discourse evolved during the 16th century in general, especially those discourses expressing relationship with the natural world. We've already seen, for instance, how the primary discourse describing the natural world was still largely medieval in form and spirit prior to the

16th century. However, as the century progresses, especially toward its close, we see this rich medieval form of discourse beginning to change.

The break that began emerging toward the end of the 16th century in the smooth flow of the medieval forms of discourse was rather extraordinary from an historical perspective, especially when we consider the fact that these integrated discourses had more or less persisted in their original form since before the time of Plato. Although this initial shift in discourse would still be many years away from its ultimate culmination in the 17th and 18th centuries, the alteration that began toward the end of the 16th century seems to have carried with it the beginnings of a conceptual revolution of such magnitude that the cultural historian Alexander Koyre (1892-1962) described it as a point in history in which:

...man lost his place in the world, or, more correctly perhaps, lost the very world in which he was living and about which he was thinking, and had to transform and replace not only his fundamental concepts and attributes, but even the framework of his thought. (Koyre, 1957, p. 4)

Simply stated, this late 16th century period was a time of great change in how humans perceived and understood their natural world. It was a time in which brave new scientists like Copernicus, Bacon, Galileo, Descartes, Boyle, as well as many others began to challenge and rethink many of the long held doctrines of the medieval intellectual tradition. This break in the smooth flow of discourse toward the end of the 16th century produced “a radical conceptual shift that eventually destroyed the foundations of natural philosophy as it was practiced for nearly two thousand years” (Lindberg, 1992, p. 361).

What then was the nature of this break in discourse, and more importantly how did it begin influencing the conceptual outlook of the period surrounding the Scientific Revolution and beyond? There are of course many different points of departure, but I believe one of the most insightful and perhaps poignant expressions of how this change in discourse actually began altering the conceptual landscape of the pre-modern natural world can be seen in a sonnet written by Edgar Allan Poe (1809-1849) many years after the beginnings of the Scientific Revolution.

Science! True daughter of Old Time thou art!
Who alterest all things with thy peering eyes.
Why preyest thou thus upon the poet's heart,
Vulture, whose wings are dull realities,...
Hast thou not dragged Diana from her car?
And driven the Hamadryad from the wood
To seek a shelter in some happier star...

(Poe, 1996, Sonnet to Science)

This sonnet suggests that the new “scientific” forms of discourse that began emerging toward the end of the 16th century involved a new way of “peering” at the world that essentially “altered” all that was seen. This I believe is an insightful observation by Poe, especially when we consider the fact that some of the original root meanings for the word “*peer*” (from the word “*appear*”) include such definitions as, “to cause to emerge,” “to free oneself from,” “to bring into sharp distinction,” “to break away from,” and “to materialize.” It would seem, then, that this new scientific

way of “peering” at the world not only “materialized” all that was seen but encouraged a “breaking away from” the natural world in a brand new way.

This brings us to perhaps one of the most distinguishing characteristics between the discourses operating before the 16th century and those that began emerging toward its close, and that is in how the latter began to place a new emphasis on seeing the world from a perspective of *quantity* (from the Greek word *posotes* meaning “how-much-ness”) as opposed to one of *quality* (from the Greek word *poiotes* meaning “what-kind-ness”). For to materialize anything means to essentially endow it with a set of quantitative attributes that can be weighed and measured such as mass, volume and density. I believe Aristotle captures one of the most salient aspects of this new form of discourse when he describes quantity as a unique perspective that ultimately emphasizes:

...parts external to one another. It is an instance of what Aristotle calls a category, which is really to be understood as a mode of illumination by virtue of which the world becomes visible in a particular way. In other words, for Aristotle, quantity does not refer to a specific content of the world, which is given materially, but a way of seeing which constitutes the world in the form of *parts external to one another*. (Bortoft, 1996, p. 173)

This quantitative mode of illuminating the world as distinct parts external to one another is a sharp departure from the more qualitative medieval outlook that strongly emphasized the interconnectedness and intrinsic “belongingness” of all things. As a result, the new scientific “peering” described by Poe appears to have become the primary means by which the natural world began to be “predicated on the rational

justification for a universal, mathematical, quantitative understanding of nature” (Burnham & Fieser, 2001, p. 6). In fact, this new proclivity for describing the world from a context of mathematics was another striking feature of these scientific discourses that began emerging toward the end of the 16th century. Lewis refers to this new preoccupation with mathematical quantification when describing the overall influence of the Copernican heliocentric theory in astronomy:

It must be remembered that the *De Revolutionibus* (1543) of Copernicus put forward only a theory: verification, at the hands of Kepler and Galileo, came only at the end of the 16th century, and general acceptance later still...What proved important about the new astronomy was not the mere alteration in our map of space but the methodological revolution which verified it...What was fruitful in the thought of the new scientists was the bold new use of mathematics in the construction of hypothesis tested not by observation simply but by controlled observation of phenomena that could be precisely measured. (Lewis, 1954, p. 3)

Therefore, as important as this “bold new use of mathematics” appears to have been to the new scientific forms of discourse, one need only, for instance, look into the works of Plato, Aristotle, Ptolemy and a host of medieval Scholars to see that plenty of mathematical analysis and scientific hypothesizing occurred under the medieval intellectual tradition as well. What emerged toward the end of the 16th century was not so much a new emphasis on the *use* of mathematics in forming testable hypotheses, but a completely new *interpretation of meaning* regarding the role of mathematics in relation to the purpose of a scientific hypothesis. In order to

understand this change in meaning it might be helpful to consider the relationship between mathematics and the purpose of a scientific hypothesis prior to the end of the 16th century.

Three levels of knowledge regarding the natural universe were normally assumed under the medieval intellectual tradition. The first and lowest level was knowledge gleaned simply from the *senses*. This sensory knowledge of the world was considered the lowest because it was always in a state of flux, and was therefore incapable of grasping anything in the way of permanent truth. The highest level of knowledge, on the other hand, was considered to be an exclusively *extrasensory* knowledge. It was thought to be obtainable only through reflection, meditation and contemplation of perfect divine ideas and immutable truths.

There was, however, an intermediate level of knowledge, one that arose from the interplay between the *apparent knowledge* gleaned from the senses and the *actual knowledge* contemplated by the mind. This intermediate level of knowledge was mathematics. The importance of this fact is that it shows the position that mathematics was afforded under the medieval intellectual tradition. Plato, for instance, described mathematics as a kind of “bastard knowledge,” since it was neither completely sensory nor completely rational, but rather a kind of “illegitimate” offspring of the two.

A good example of the unique status of mathematics in the medieval tradition can be seen in its incorporation in the practice of pre-modern astronomy. The *actual* movements of the heavenly bodies under the medieval tradition were rationally understood as perfect circles at constant speeds. However, the *apparent* movements

of these heavenly bodies as actually observed by astronomers were something very different. Hence, rather than explaining and representing perfect truths of the universe, mathematics became a tool for “*saving the appearances*” by devising hypothetical explanations that could account for discrepancies between what the senses *apparently* observed and what the mind *actually* “knew” to be true through reason. The English poet John Milton (1608-1674) refers to this unique role of mathematics in the practice of ancient science when writing in *Paradise Lost* (1667):

Hereafter, when they come to model heaven,
And calculate the stars; how they will wield
The mighty frame; how build, unbuild, contrive,
To *save the appearances*; how gird the sphere
With centric and eccentric scribbled o'er,
Cycle and epicycle, orb in orb.

(Milton, 1996, Book VII)

The role of a mathematical scientific hypothesis, then, at least under the medieval tradition, was to serve as a kind of *ad hoc* explanation or theoretical contrivance that incorporated geometrical models to help explain why a particular phenomenon appeared as it did to the senses:

The geometrical paths and movement devised for the planets were, in the minds of those who invented them, *hypotheses*...They were arrangements; devices for saving the appearances; and the Greek and medieval astronomers were not at all disturbed by the fact that the same appearances could be saved by two or more quite different hypotheses...All that mattered was, which was

the simplest and the most convenient for practical purposes; for none of them had any essential part in truth and knowledge (Barfield, 1988, p. 49).

Toward the end of the 16th century all this begins to change. Instead of representing a mere model of the cosmos or theoretical contrivance for “saving the appearances,” the idea of a mathematical hypothesis suddenly begins to take on a new life of “*literalness*” of its own. This change in the meaning of a mathematical hypothesis appears to have been solidified conceptually when astronomers like Copernicus, Kepler, Brahe and Galileo began to suggest that mathematical hypotheses that succeeded in saving all the appearances should be accepted not only as hypothetical models for explaining the *appearances* but also as a true physical representations of the *actual*.

This shift in the meaning toward a kind of mathematical validation of the rational through direct observation was, as Sir Herbert Butterfield (1900-1979) explains, “enough to outshine everything since the rise of Christianity and reduce the Renaissance and Reformation to the rank of mere episodes” (as cited in Barfield, 1988, p. 51). This shift represented not merely a new theoretical approach to practicing science in general, but rather an entirely “new theory *on the nature of theory*; namely that, if a hypothesis saves all the physical appearances, it is essentially identical to the truth” (Barfield, 1988, p. 51).

This new conceptual framework for understanding the role of mathematics in forming testable hypotheses was a sharp departure from the Platonic framework celebrated under the medieval tradition. It appears that one of the primary results of this shift was a new proclivity for describing and representing the natural world no

longer as an integrated living organism, but rather as a dead, detached, mechanical system.

This was another striking difference between the discourses operating before the beginning of the 16th century and those that began to emerge toward its close. Perhaps nowhere was this difference more obvious than in the discourses surrounding the philosophical idea of “self-movement.” Under the medieval philosophies of Plato and Aristotle, the distinction between that which was “self-moved” and that which was moved by something outside of itself had always represented the very dividing line between the spiritual and the material.

However, toward the end of the 16th century we see an almost complete reversal of this long held philosophical distinction beginning to unfold. Instead of describing the intrinsic qualities of the organic and spiritual, the meaning of “self-moved” performs an almost complete “semantic *volte face*” (Barfield, 1967, p. 187) and begins to be applied to dead, inanimate, material things such as clocks and machines. This shift in the meaning of language used to describe the idea of self-movement was another sharp departure from the earlier medieval microcosm macrocosm conception of the universe. Instead of emphasizing the dependence and interconnectedness of all things, this new interpretation suggested that mechanical things needed no assistance from an outside mover in order to function since they were seen as self-contained, independent entities that essentially functioned *automatically* (from the Greek word *automatus* meaning self-moved):

The machine is geometry in motion, and the new picture of the universe was made possible by parallel developments in physics, where the new theory of

inertia assumed, for the first time in the history of the world, that bodies can go on moving indefinitely without an animate or psychic mover. It was soon to be stamped indelibly on men's imaginations by the circumstance of their being ever more and more surrounded by actual artificial machinery on the earth. The whole point of a machine is, that, for as long as it goes on moving, it goes on by itself without man's participation. (Barfield, 1988, p. 51)

So instead of perceiving the world as a great living organism imbued with a pervasive World Soul, what we find in the discourses toward the end of 16th century is an increasing number of references describing the world and body from a non-participatory, mechanical framework of meaning. Thus, in the works of William Harvey (1578-1657), we find the human heart and its valves described for the first time as "the mechanism, which Nature has devised ...strangely like that which artificial means have produced in the machinery of mills." (as cited in Boaz, 1962, p. 53). Likewise, throughout the writings of Tycho Brahe (1546-1601), the heavenly realms are repeatedly described as the great "machine of Heaven" (as cited in Boaz, 1963, p. 115). An unknown 16th century writer even seems to have even anticipated the "clockwork universe" of William Paley (1743-1805):

God's the main spring, that maketh every way,

All the small wheels of this great Engin play.

(as cited in Barfield, 1988, p. 45)

It would appear, then, that this new scientific discourse not only relegated the natural world to a level of objectified material with its *quantitative* peering gaze, but also systematically abolished the spiritual qualities from the world of experiences by

reducing that world to a level of mere mechanistic cause and effect. Thus we find in Poe's sonnet the moon goddess Diana being "dragged from her car" and the Hamadryads being forcibly driven from the woods. As Davy (1985) explains:

The thoughts we embody in measurement are only applicable to dead phenomena; for measurement means dividing up into units, which can be counted, and no living thing can be thus fragmented without dying. Hence, it is a form of thought entirely appropriate to an inanimate world. (p. 8)

By reducing the natural world to the level of dead mechanical objects that can be quantified, validated, and constituted mathematically, the new scientific discourse appears to have promoted a conceptual framework of independence, division and *separation from nature* as opposed to a framework of unity, participation and *integration with nature*. As a result, that which was once experienced as a microcosm macrocosm "Thou" began to be conceived as a material mechanical "It." This conception is still promoted and sustained today in many of our modernist discourses continuing to survive as one of the:

...guiding principles of our modern scientific method of inquiry...this principle of mechanism, or, the belief that the world operates like a machine and that supernatural causes have no place in modern science. (Rothman, 1995, p. 6)

In this section I have described examples of how the primary forms of discourse regarding the natural world began to change toward the end of the 16th century. While many different aspects of this change could have been discussed, for the

purpose of this study I focused primarily on those surrounding the discourses of *mathematics* and those surrounding the discourses of *mechanism*.

It is difficult to know just how deeply these shifts in the linguistic meanings actually impacted the thoughts and feelings of the 16th century Elizabethans. However, at a minimum they appear to have enhanced their capacity for conceptualizing the natural world as a thing distinct and divided from themselves. By “peering” at the natural world from a new conceptual framework of separation and division, the universe of our medieval ancestors seems to have been transformed from a world of unity and integration to one emphasizing quantity, extrinsic material relationships and mechanical independence.

Genealogy

He who sets to work on a different strand destroys the whole fabric.
(Confucius, 500 BC, The Analects)

Having identified and described some of the general aspects of how discourse appears to have shifted in its smooth flow from one of integration with nature to one of separation from nature, I will now explore some of the cultural-historical factors that may have influenced these long held concepts of mathematics, hypothesis, and self-movement to begin changing their context of meaning toward the end of the 16th century.

As noted in chapter two, Thomas Kuhn asserted that no part of the aim of an existing paradigm is to call forth new sorts of phenomena. Those that do not conform to a society’s existing conceptual framework are usually “not seen at all.” Moreover, Kuhn believed that the cultural context of a particular community was directed not at displacing the existing cultural framework of meaning but rather at increasing the

scope and “articulation of those phenomena and theories that the paradigm *already* supplies” (Kuhn, 1962, p. 24).

This suggests that the forces that ultimately influence a culturally based framework of meaning, or paradigm, to begin shifting in its overall context may not come in the form of a direct attack or challenge from without, since those external forces would either not be seen at all or else would be assimilated into the existing paradigms conceptual framework. Therefore, if the elements of change do not necessarily assail a paradigm *consciously from without*, perhaps they emerge *unconsciously from within*. In other words, it is possible that the change in discourse described above was not so much the result of an all out epistemological attack by empiricism from without as much as it may have been the result of a subtle alteration of the pre-modern framework from within.

How might have movements occurring within the cultural context surrounding the Scientific Revolution influenced a change in discourse? This question, as discussed in chapter three, will represent the genealogical focus of this study. While archeology was used to identify and describe the manner in which discourse evolved and changed during the Scientific Revolution, a genealogical examination will be used to reveal how movements within the cultural context surrounding this period may have influenced this shift in discourse. Before beginning this exploration, however, it might be helpful to begin with a short description of how our modernist perspective often represents the role culture and history play in the development of our knowledge of the world.

According to empiricism, our knowledge of the world is essentially a body of facts and theories discovered and articulated by various men and women (usually scientists) skilled in the methods of empirical observation. Sometimes the process of discovery is influenced by cultural-historical factors such as the persistence of old superstitions, political persecutions, wars, technical advances, or even serendipity. Examples like Galileo's telescopic discoveries and the church's persecution of Copernicus are usually cited as good examples of how cultural and historical forces can influence the "progress" of knowledge.

What this empirical explanation fails to acknowledge is the conceptual and linguistic elements involved in the formation of our knowledge of the world. Another problem is that empiricism not only assumes but presupposes a non-participatory framework of meaning by representing itself as a kind of intrinsically objective methodology. One of the major goals of this study is to examine factors that may have influenced the development of our own modernist discourse with nature, which is essentially the discourse of empiricism.

What factors, then, may have influenced the emergence of the discourse of empiricism? Since the mere existence of empiricism is not sufficient to explain its emergence, it is reasonable to turn elsewhere, perhaps to what Hubner calls the "spontaneous acts" of history, or to what Kuhn refers to as the "arbitrary element" of "personal and historical accidents." But this would imply an alternative explanation regarding why modern humans began separating themselves from the organic processes of their natural world in the first place. It would require an explanation that does not merely negate our cognitive participation or presuppose the very thing it

attempts to explain, but rather one that embraces the dynamic relationship between discourse, culture and our perceptions of meaning.

What, then, were some of the major cultural-historical factors that may have subtly, even unconsciously, influenced a shift away from a pre-modern integrated conception of the natural world and toward our own modernist scientific conception of separation and division? While there are many cultural factors that could be considered, for this study I will focus primarily on the movements of Humanism, Puritanism, The Divine Right of Kings, and Mystical Science.

Humanism and the Externalization of Language
And priests in black gowns were walking their rounds,
And binding with briars my joys and desires.
(William Blake, 1789, The Garden of Love)

It is difficult to arrange the cultural context of the 16th century into distinct categories for comparison. There are few hard lines that can be drawn between the various cultural revolutions and movements of thought that flourished during this period. As Lewis explains, it was a dynamic period when “a humanist could be a papist, a scientist could be a magician, and a skeptic could be an astrologer” (Lewis, 1954, p. 63). However, at least one point of general agreement is that the cultural context surrounding the 16th century was a period of great change regarding how humans perceived themselves in relation to their natural world.

A good example involves one of the most influential and wide-sweeping social movements of the period: the intellectual revolution that began to take shape in the world of education. During this period two distinct things were beginning to happen to the discourses of learning. One was the dying out of an older medieval tradition of Aristotelian metaphysics known as Scholasticism, and the other was the emergence of

a new learning tradition called Humanism based on the rediscovery of many ancient Greek, Roman and Hebrew texts. This new intellectual tradition was important not only because it represented a sharp departure from the doctrines and teachings of the Middle-Ages, but because it began establishing an entirely new intellectual “intercourse with the ancient literatures of Greece and Rome, and with it, a positive stream of new literary borrowings from that literature” (Barfield, 1967, p. 64).

The rediscovery of these ancient manuscripts brought with it an entirely new range of intellectual, emotional and imaginative concepts that could now be expressed through discourse. Even now it is difficult to appreciate the magnitude of the impact of this new influx of Greek and Latin words in producing the language and concepts currently used to think and speak about our world. However, it seems this Humanist movement influenced the shift from a medieval discourse of unity and integration with nature in at least two important ways.

The first was a shifting of the focus of language outward and upon itself. In other words, it appears that it was the Humanist scholars of the 16th century who first began to preoccupy themselves with the external structures of language. They were not only some of the first scholars to contribute to such linguistic studies as grammar and philology, but also some of the first to begin standardizing the way that language “ought” to look and sound from a structural point of view. This new preoccupation with the external structures of language appears to have been partly based in a kind of linguistic infatuation with a “non-medieval” form of Latin based largely on writings of the ancient Roman politician Cicero (106-43 BC).

There arose in the 16th century a kind of “purist” movement against the linguistic formations of the Middle-Ages. It was therefore not uncommon during this period to find the very same Humanist scholars who were ready to sell all their possessions to acquire a copy of an ancient manuscript of Cicero just as ready to commit the text of some obscure medieval Schoolman to the fire. In fact, such censorships were not uncommon, as was the case in 1550 when Humanist scholars from Oxford formally banished certain medieval texts from the libraries due to their “barbaric and ignorant” content.

This strong bias against the grammatical forms of the Medieval Latin appears to have encouraged an over-emphasis on the external and structural aspects of language and to have placed a new emphasis on conforming genuine expressions of emotion into a prescribed grammatical format:

Whatever else Humanism was, it was emphatically *not* a movement towards freedom and expansion. It was the impulse of men who feel themselves simple, rustic, and immature, towards sophistication, urbanity, and ripeness.

In a word, it was the most complete opposite of what we find in the Romantic desire for the primitive and spontaneous...The desire was for order, and

discipline, weight, and decorum. (Lewis, 1954, p. 24)

This Humanist movement, then, appears to have produced a simultaneous shift away from linguistic spontaneity and freedom of expression toward one of control, discipline, and conformity of expression. Even to the point, as Lewis (1954) explains, that some Humanists scholars thought it better “to omit a beauty than to leave in anything that might have shadow of offence” (p. 24). As a result, the

freedom, depth and even mystical quality of words as they were experienced and expressed in the language of the Middle-Ages began to take on a new veneer of unnaturalness and external artificiality under the pedantic gaze of these 16th century Humanists.

The linguistic relegation of expression to structure helps explain some of the disgust the Humanist felt toward all things medieval, especially things like chivalrous romance. Of all literary forms the romance, or fairy tale, is not only one of the most expressive, it is also one of the most dynamic and flexible in grammatical structure. This is because the first purpose of a romance is to express a felt meaning. As such, the form of expression is always secondary to the feelings, desires and longings that the author wishes to express.

For the Humanists, however, the external form and the overall “style” of the language was of primary import, even if it meant compromising feeling and depth. To express oneself without regard for proper grammatical form was to display ones ignorance and barbarism. This helps explain why ardent humanists like Juan Luis Vive (1492-1540) warned women and children that “it would be better to have ones eyes put out than use them to read such stuff as Lancelot and the Round Table” (as cited in Lewis, 1954, p. 29).

Even the newly discovered poetry of Virgil and Homer was valued by Humanist scholars only insofar as it could be used as a kind of encyclopedia of ancient knowledge to acquire such practical life skills as medicine, astrology, battle strategy and cooking. As Lewis explains:

The humanists could not really bring themselves to believe that the poets really cared about the shepherds, lovers, warriors, voyages and battles. They must be a disguise for something more adult. (Lewis, 1954, p. 28)

In addition to emphasizing grammatical structure over genuine expression, Humanism influenced the kind of concepts that were actually promoted through the newly adopted ancient form of Latin. As already described, the Humanist scholars were largely responsible for shifting the linguistic framework away from Medieval Latin and toward a “purer,” more ancient form of Latin based in the writings of Cicero. This, I believe, is an extremely important point since it is often assumed that the Humanist movement was actually a return to a more organic “Greek spirit” of thinking and feeling about the world in general. However, as Lewis points out, “it would be quite a mistake to think of the 16th century as a period influenced by the Greek spirit of literature:”

The humanist culture was overwhelmingly Latin. Greek was given abundance of ‘mouth honor,’ but only the minor Greek authors were really relished.

Greek will not take the hard, high polish, which was what the humanist principally cared for: it is too supple, sensitive, and intimate. (Lewis, 1954, p. 27)

Again, the main thrust of the Humanist discourse was a rebellion against the medieval form of Latin and a return to an older more original Latin. But it was the medieval form of Latin, the form hated and rejected by the Humanist scholars, that actually came closer to capturing the true organic spirit of the Greek language:

In the later days of the empire...when Rome had absorbed the myths of Greece and Egypt and sterilized them both, the soul of Europe was stirring afresh in the north. Contact between the Roman tongue and that of their subjects, the Celtic 'Galli' in north Italy and beyond the Alps, had grown more and more intimate. Gradually there came into being a sort of hybrid Low Latin, the father of modern French and the other Romance languages, which in many cases expressed Celtic notions and feelings in Latin forms. So it was that new life came to be breathed into some of the dead abstractions of Roman mythology; but it was a very different life from the old one. (Barfield, 1967, pp. 93-94)

This more romantic, expressive *Low Latin* was the “barbaric” Medieval Latin against which the Humanist scholars ultimately rebelled. Therefore, by promoting a return to a purer form of Latin, the Humanist scholars of the 16th century encouraged an influx of original Latin words, as well as, a new kind of discourse saturated in these same Latin concepts. This is important because it is the Greek influences in our language, not the Latin, that tend to be more expressive of the inner world of thoughts, feelings and spiritual relationships. As Barfield explains, the conceptual influences of the original Latin language tend to focus more on the physical, concrete and material aspects of the external world:

Greek and Latin form a very large and very important part of the English language. All through the history of our nation the two threads can be seen running together...for words which are genuinely of Latin origin are very

often concerned with the material outer world, but words of Greek origin are more likely to be landmarks in the world of thought and feeling. (1967, p. 58)

An example of this can be seen in the strong Latin influence on the language surrounding our modern legal system, especially regarding words describing concepts of authority, law and the external social relationships between humans and the material world. In fact, Francis Bacon (1561-1626) borrowed from this linguistic repository to describe the external processes of the natural world as early as the beginning of the 17th century.

Latin is also the language from which we derive many of our modern concepts of physical science, including such words as *experiment*, *investigate*, *distinguish*, *matter*, and even the word *science* itself (from *scientia* meaning “to know”). The Greek language, on the other hand, is more intuitive, organic and fluid in its overall form and structure. It is therefore capable of expressing many different colors, depths and textures of feeling and meaning:

There is a strong tendency in the Greek language with its reckless profusion of double epithets, its looser word order, and its nervous, restless twitching of grammatical particles, to make itself felt as a living, muscular organism rather than as a structure. (Barfield, 1973, p. 98)

By emphasizing the external structures of language and the conceptual framework of original Latin discourse, the Humanist movement that began emerging during the Scientific Revolution appears to have created a subtle tension between the emotional, spiritual and spontaneous world of genuine Greek expression and the artificial, rational and materialistic world of a more ancient Latin linguistic formation.

Although the “Greek spirit” of language eventually regained its voice in the Romantic poetry of the 18th and 19th centuries, the heavy Latin influences of the 16th century clearly displaced both the Greek-inspired spirit of language and the organic conception of the natural world in general.

This was only one of the cultural changes that began to unfold and influence the organic medieval outlook. As we shall see, even more subtle changes were beginning to take place not only in minds of the 16th century Elizabethans, but in their hearts and souls as well.

The Reformation and “Conquering” the Natural Self
To her fair works did nature link: The human soul that through me ran;
And much it grieved my heart to think: What man has made of man.
(Wordsworth, 1798, Lines Written in Early Spring)

In addition to Humanist influences on medieval traditions of learning, the 16th century was also a time of cultural change in the world of religion. It was during this period that Martin Luther (1483-1546) posted his Ninety-Five Theses attacking the Roman Catholic Church, thus beginning what is now referred to as the great Reformation. It was also during this period that King Henry VIII (1491-1547), wanting his marriage annulled, quarreled with the Pope and declared himself Supreme Headship of the Church of England. Acts like these sowed the seeds of the Puritan movement. The Reformation and Counter-Reformation were to result in the bloody persecution of Catholics and Protestants for centuries to come. It was therefore a time of great cultural change in how the Elizabethans thought and felt about their God, their world, their neighbors, and of course themselves. It was also a time of religious persecution and martyrdom when many were called not only to die for their religious beliefs, but also to take up their swords and kill for them.

A close affinity appears to have existed between the new Puritan Movement in religion and the new Humanist Movement in learning already described. Both the Puritans and the Humanists shared a common hatred of all things medieval. Both groups saw themselves at the forefront of the war against the ignorance of the Middle-Ages, and both wanted to accomplish the same central mission: to make a clean sweep of the medieval Greek influences. For the Humanist, this took the form of an attempt to fortify the mind against the Greek spirit manifested in the medieval linguistic barbarism. For the Puritan, it consisted primarily of an attempt to purge the human heart of the last vestiges of Greek paganism. As a result, both groups subtly endorsed a kind of resistance to the freedom and spontaneity characteristic of the more Greek inspired medieval outlook. For the Humanist, this resistance manifested itself by a return to a more ancient form of Latin language. But for the Puritan, it took the form of a return to the harsh moral asceticism of the ancient Roman Stoics.

The Stoic philosophy of ancient Greece and Rome formed an important part of the newly discovered corpus of ancient manuscripts contemplated by Humanist scholars during this period. The Stoics believed a good life meant first and foremost a virtuous life. They therefore refused to be ruled by their natural passions, since they believed strong emotions obscured one's ability for making sound moral judgments. Under this school of thought, the individual was instructed to control, restrain and ultimately conquer the natural passions in order to obtain wisdom, happiness, and even salvation itself. However, this Stoical subjugation of the natural passions represented a sharp departure from an older medieval outlook that maintained that

genuine emotional responses were not contrary to reason, but rather a central part of it.

The view that genuine emotion is *part* of reason can be seen in the writings of Augustine (354-430) who defined virtue as *ordo amoris*, or the ordinate condition of the passions, in which every object is to be accorded the unique kind and degree of love that was appropriate to it. Aristotle was also convinced that the true aim of education was ultimately to teach the pupil to make the right emotional response by learning to “like and dislike” what was natural and appropriate. Similarly, in Plato’s *Republic* we find that young students who are not in harmony with reason and nature must be trained to feel pleasure, liking, disgust and hatred for those things that really are pleasant, likeable, disgusting and hateful. In this way, the student who has been rightly trained in “just sentiments” and “ordinate affections” would be prepared to:

...see what was amiss in the ill-made works of man or the ill-grown works of nature, and with a just distaste blame and hate the ugly...while giving delighted praise to beauty, receiving it into their soul and being nourished by it, so that they can become a person of gentle heart. (as cited in Lewis, 1974, 1956, p. 27)

Plato’s “rational emotional response” to nature appears to have been as much a part of the medieval ethical tradition as his “World Soul” was a part of the medieval conception of the natural universe. Indeed, this view was central to the organic conception of an integrated universe in which all things, including the passions, were endowed with an appropriate place in the natural order. This helps explain the heavy

emotional content of medieval literature, especially medieval literary discourses expressing heroes, heroines and paragons of virtue:

Achilles wept, Aeneas wept, the Roman legionaries wept, Hrothgar wept, Roland wept, and Lancelot, to his lasting glory, wept like a beaten child at the healing of Sir Urre. (Lewis, 1954, p. 52)

In the 16th century this begins to change. It was this kind of “pagan” indulgence of the passions that especially disgusted the 16th century Puritans. This can be seen in the sharp change of tone of the 16th century literature where male characters are seldom seen crying, at least not without first apologizing or expressing a sense of shame, as Shakespeare wrote: “he had not so much of man in him as to restrain his tears.” Thus, rather than seeing human passions as a occupying an ordinate place in the overall natural scheme of things, the Puritans regarded the passions as a kind of unnatural obstacle, a weakness that ought to be resisted by the rational soul. As a result, the Puritan’s overall desire was not for integration, acquiescence or participation in the microcosm-macrocosm relationship, but to rise above and conquer the natural. They wanted order, self-control, and most of all an outward appearance of stoical indifference toward the natural passions. In this they were not unlike the Humanist scholars who also wanted order, decorum, and eloquence in speech as opposed to genuine and natural expression of feeling.

Therefore, just as we observed in the Humanistic prejudices against the freedom and spontaneity of expression in language, this new Puritanical Stoicism appears to have promoted a similar kind of prejudice against natural, spontaneous, and impulsive tendencies within the Elizabethans themselves. As a result, the medieval longing to

be natural to participate in the great “cosmic dance” of the natural order, was no longer encouraged under the new Puritan perspective. This Stoical indifference toward the natural passions ultimately produced a new kind of cultural idol in the literary productions of the late 16th century:

The Stoic *sapien* is the image really potent in Elizabethan literature. He is (like Chapman’s Clermont) ‘gladly obedient’ to anything ‘the high and general cause’ may lay on him; he regards the world (like more than one Shakespeare character) merely as a stage; he is content (like Gyon) with what Nature needs; a king over himself (like Miltons’ Christ and Dryden’s Almanzor); indifferent (like Addison’s Cato) to the success or failure of his own actions. His mind (like Milton’s Satan) is its own place. All these attitudes...yield an image that influenced the English poetic mind very deeply: this image of an unmoved, unconquerable, mortal god. (Lewis, 1954, p. 54)

Once again, what is unique about each of these literary characters is their expression of stoical independence, emotional indifference, and self-control over the influences of the natural passions. These images move away from the earlier medieval conception of a deep integration and unity with the natural world. They shift toward a schism between the *natural* and the *spiritual* (a schism not unlike that of Descartes’ dualism between mind and body), promoting a kind of “mind over matter” approach to the universe as a whole.

Although there was certainly plenty of asceticism in the medieval periods leading up to the 16th century, it is important to note the difference in the kind of asceticism expressed by the medieval writers and that averred by the Puritan Stoics. One needs

only, for instance, to look into a medieval work like that of St. Francis of Assisi (1182-1226) and his *Canticles of the Sun* (1224) to see the sharp contrast between these different ideas of asceticism. There in the mirth and youth of Assisi's poetic appellations describing his "brother fire," and "sister water" we see the bold difference between the kind of asceticism that denies the world in order to receive it on a deeper level of participation, and the kind of asceticism that merely denies the world for the sake of self-denial. G. K. Chesterton (1874-1936) communicates this unique spirit of the medieval ascetics:

There was nothing negative about it; it was not a regimen or a stoical simplicity of life. It was not self-denial merely in the sense of self-control. It was as positive as a passion; it had all the air of being as positive as a pleasure. (Chesterton, 1989, p. 81)

In other words, the medieval asceticism was based in a desire for finding a deeper integration into the natural order of things. This would explain why many medieval ascetics could write such beautiful poetry regarding the pleasures and beauties of the physical body and natural world, whereas Puritan ascetics like John Fisher (1459-1535) could only see the natural world as a place of "dyrtie corruption," and the physical body as a detestable "sachell full of dung" (as cited in Lewis, 1954, p. 163). That is because, for the 16th century Puritans, the natural world was but a place of sin and death, a battleground where the wars between reason and passion were to be waged as for eternity. If the human soul were ever to be saved from the bondage of "flesh," it would happen only through the slow arduous process of the rational-self

conquering the natural-self and aspiring to the level of an “unmoved, unconquerable, mortal god.”

This Puritanical idea of an individual rising to the level of a spiritual sovereign over the natural passions points to another area of cultural change that began to unfold during this period. This is the area of sovereignty and its relationship to the political idea of the “Divine Right of Kings.”

The Divine Right of Kings and the Natural Law
And he wore a kingly crown; and in his grasp a scepter shone;
On his brow this mark I saw; I AM GOD AND KING AND LAW.
(Shelley, 1819, The Mask of Anarchy)

It has been noted how the period surrounding the Scientific Revolution was a time when King Henry VIII assumed the Headship of the Church of England. This political usurpation of the Pope’s spiritual authority seems to have created a new conceptual context for understanding the king’s role as a political and spiritual sovereign over the people. To understand this change it might be helpful to briefly discuss how the idea of monarchical sovereignty was conceived during the medieval period.

Under Aristotelian philosophy we are told that the highest civic ruling power does not legislate at all, but merely administers and enforces an already preexisting “natural law.” Unfortunately, Aristotle does not tell us the source of this natural law, but the early Christian theologians instinctively ascribed it to God himself. It was therefore understood under this medieval conception that the king was not the originator of the law since his civil laws were only microcosmic participations in God’s universal natural laws.

As a result, if the king's civil laws did not conform to God's natural laws they were to be deemed "unjust" and the king "a tyrant" who has rebelled against God and rules only by his own selfish lusts. Therefore, under the Aristotelian political framework, the tyrant's laws were understood to be without basis, and as such had no rightful claim on the people's civil obedience. It was not only the duty of the people to ignore these unjust laws, but their moral responsibility to resist them, even through outward rebellion if necessary.

As such, the king was given no absolute, intrinsic authority under the medieval perspective of sovereignty. Whatever political authority he had, he received or "borrowed" from the absolute authority of God himself. This is just another example of the medieval microcosm-macrocosm relationship, in that the king's earthly authority was seen as an integrated participation in God's universal authority, just as the people's obedience to the king was likewise understood as a natural extension of their obedience to God. But in the 16th century all this begins to change.

For instance, we find as early as 1445 the Cortes of Olmedo announcing that it is contrary to Divine Law to even touch the king, and in 1446 Aenes Sylvius (1405-1464) proclaims that "the emperor is independent and above the laws of the land" (as cited in Lewis, 1954, p. 48). However, it is not until the political writings of William Tyndale (1494-1536) that we begin to see a major movement away from the medieval political outlook. We can see this movement of thought beginning in earnest when Tyndale, who wanted to justify Henry's political and spiritual authority, especially his right to divorce, began challenging the medieval idea that the king's office is ultimately derived from the people and for the people. Instead, Tyndale suggests that

it is actually God and not the common people who select the king (although God may select the king *through* the people). This eventually led Tyndale to the conclusion that since God ordains the king, “the king’s right is divine” and he is therefore answerable only to God and not to the people. This idea can be clearly seen in Tyndale’s *Obedience of a Christian Man* (1528). He writes: “The King is in this world without law and may at his own lust do right and wrong and shall give accounts to God only” (as cited in Lewis, 1954, p. 49).

In other words, insurrection even against a tyrannical king is forbidden under Tyndale, since any rebellion (be it just or unjust) is ultimately a rebellion against “God’s very chosen one,” and therefore against God himself. As a result, if the people found themselves ruled by an unjust king (whose civil laws rebelled against God’s Natural Laws) under this new political idea of sovereignty suggested by Tyndale, there was but one road left open to the righteous man and that was not rebellion, but rather martyrdom at the hands of an unjust king.

At first sight it would seem that this new political idea of the divine right of kings (one that appears to liberate the king not only from the censure of the people, but also from the natural law of the universe) promotes an outlook that actually works against our own modernist scientific outlook of an impersonal universal law over-arching all things and immutably controlling the processes of the natural world. However, the final stroke of this new movement of thought was yet to come. Just when the transition appears complete, it suddenly takes an unsuspecting turn in the political and theological writings of Richard Hooker (1554-1600). In his *Laws of Ecclesiastical Polity* (1593) we find for the first time the idea that just as the king is under the law

(for it is ultimately the law that makes him a king), God himself, although still the creator of the natural law, also freely subjects himself under the requirements of the natural law in order to be God. Thus, as Hooker explains, “They err who think that the will of God to do this or that there is no reason besides his own perfect will” (as cited in Lewis, 1954, p. 48). In other words, not even God acts above and apart from the natural law that he creates. For it is only by means of this universal law of righteousness, justice and goodness that God can be defined and understood as a righteous, fair and loving being in the first place.

However, there is still one final step to take in this new political movement of thought, and it was officially taken by the Humanist scholar Hugo Grotius (1583-1645). He suggests, “the Law of Nature, actually derived from God, would be equally binding even if we supposed that no God existed” (as cited in Lewis, 1954, p. 49). Hence, we have for the first time the idea that even if God had no power to enforce the natural law, the law would still have sovereign authority over all things. This suggestion, though subtle as it may be, I believe opens the door to the idea of an *intrinsic universal law* that can exist and operate without the necessity of a universal “Law Giver.” This introduces the conceptual possibility of the existence of an independent and impersonal natural law that overarches and controls all things. In fact, we can find this idea already well developed as early as the next century in Paley’s conception of a clockwork universe that is initially created by God, but then left to “unwind” mechanically of its own accord.

In summary, if we consider the movements in learning, religion and politics that have been discussed so far, I believe we can see at least three shifts leading away

from an organic *integration with nature* and toward a conceptual framework of *separation from nature*. The first was the Humanist shift in language toward an *externalization* of the natural world through a subtle but persistent emphasis on the structural over the spontaneous, the formal over the functional, and the orderly over the organic. It can also be seen in their aggressive promotion of a language structure replete with words and concepts expressing the external “materialness” of the natural world.

The second was a Puritanical shift toward *dichotomization* of the natural and the rational, the spiritual and the physical, and the mind and the body. Also, this movement strongly emphasized a kind of “mind over matter” approach to the universe. The natural was to be no longer regarded as something to participate in, but rather something to resist, rise above, and to be conquered by the spiritual and the rational. Finally, the third was a shift toward a *depersonalization* of the natural world through a political movement that emphasized an intrinsic natural law, one that not only exercised an absolute authority over all things, but that existed not by order of king or even by God himself, but as a distinct, impersonal part of the universe itself.

All of these forces, none of which were consciously directed at replacing the pre-modern conception of the natural world, began to produce unconscious tension between individuals and their perceived relationships with the natural world. Some of these cultural forces of tension pushed inward; others pulled outward. The overall effect appears to have been not the outright rejection of the older medieval framework of unity and integration, but rather the emergence of new “condition of possibility” for perceiving that organic world from a different conceptual point of view. In other

words, each of these movements influenced the development of a new cultural “form of life” for thinking, feeling and ultimately perceiving the pre-modern organic world from a more disconnected framework of meaning. There is, however, one more area of change where I believe we can see the influences of this new cultural form of life influencing the Elizabethan’s perceptions of meaning. That is in the area of 16th century science.

Mystical Science and the Loss of Hierarchy

*Philosophy is odious and dark; Both Law and Physick for petty wits;
Divinity is the basest of the three..., Tis magic that hath ravished me*
(Marlow, 1604, The Tragic History of Dr. Faustus)

Before describing some of the cultural movements that emerged in 16th century science, it is important to note that, when I use the word *science* in this 16th century context, I am referring to something very different from today’s definition of that word. To be a scientist in the 16th century meant one of two things: either one was a Naturalistic Philosopher or a Mystical Scientist. In our modern vernacular that means either an Astrologer or a Magician.

The discourse of astrology during the 16th century needs little explanation. It is practiced today in a form recognizable to the 16th century practitioner. The discourse of magic however, is different. By the word *magic*, I do not mean anything like the modern ideas of witchcraft, sorcery or rabbits in hats. I am referring rather to what the 16th century Humanists called *magia divina*. This kind of “high magic” was studied widely during this period and was publicly “avowed and vindicated by eloquent scholars who drew much of their strength from the New Learning of the Humanist” (Lewis, 1954, p. 7).

This 16th century natural magic was therefore a serious endeavor practiced by learned Humanist scholars who styled themselves as the heroic “revivers” of an ancient and noble learning since lost to the barbaric and ignorant Schoolmen of the Middle-Ages. In many ways, this ancient *magia divina* had been lost to the medieval mind. There was certainly plenty of magic in the discourses of the medieval period. But the tone of medieval magic (like the tone of the medieval asceticism already described) was distinctly different from that pursued and practiced by 16th century scientist. As Lewis explains:

In medieval stories there is, in one sense, plenty of magic. Merlin does this or that by his subtlety, Bercilak resumes his severed head. But all these passages have an unmistakable note of ‘faerie’ about them...But in Spenser, Marlow, Chapman and Shakespeare the subject is treated quite differently: books are opened, terrible words pronounced, souls imperiled. (Lewis, 1954, p. 8)

This new mystical science was a serious discipline that attempted to comprehend and explain “the very frontiers of knowledge...concerning itself with a variety of almost unimaginable problems of organization, complexity and harmony of nature” (Boaz, 1962, p. 167). It was even considered by many to be a kind of *holy work* by affording its initiates a unique and powerful glimpse into the deep mysteries of the natural world. The humanist scholar Agrippa (1486-1535) refers to this in his *De Occulta Philosophia* (1510):

Once by the judgment of all old philosophers Magic held the highest place of honor, but from the first days of the Church it has been forbidden and

denounced: most unjustly for it is a high holy learning. (as cited in Lewis 1954, p. 9)

The study of astrology, on the other hand, was another scientific pursuit that flourished during this 16th century period. This tremendous resurgence of interest in the astrological arts, much like the new interest in *magia divina*, appears to have been motivated by the same rediscovery and interest in the ancient manuscripts of Greece and Rome. In fact, this new interest was so strong during this period that many astrologers not only lost entire family fortunes procuring new equipment and building elaborate observatories, but some, in less enlightened segments of the continent, even lost their lives pursuing their “subtle science” of the stars. Many of the founding fathers of our own modern astronomy, including Copernicus, Brahe, Kepler and even Galileo, were known to cast astrological horoscopes and predict calamities for their patrons. Thus writes Fernel (1497-1558) regarding the strong allure that this interest in astrology incited:

Contemplation of the stars and heavenly bodies excites such wonder and charm in the human mind that, once fascinated by it, we are caught in the toils of an enduring and delighted slavery, which holds us in bondage and serfdom.

(as cited in Boaz, 1962, p. 168)

This metaphor of “bondage and serfdom” is an appropriate description of the new interest in astrology that emerged during this period. It highlights not only its primary theoretical framework, but also how it differed philosophically from the magical sciences. The contrast between the astrologer and the magician may seem to be insignificant, especially to a modern observer who would be tempted to merely

group both under the common heading of ancient superstitions. But for the 16th century observer, the study of astrology and the study of magic actually represented two scientific approaches that were diametrically opposed in their conceptual outlooks.

That is because astrology is essentially *deterministic* in its outlook. Its main emphasis is on *nature's power over the individual*. It is therefore an approach that emphasizes the individual's integration and complete dependence on the stellar movements of the heavenly bodies. The study of magic, on the other hand, is conceptually *nondeterministic*. It strongly emphasizes the individual's power over nature and subsequent freedom to create and determine his or her own destiny. The important point is that, like astrology, the study of magic was a scientific approach strongly grounded in the medieval microcosm-macrocosm intellectual tradition. The main difference is that the study of magic primarily emphasized the *macrocosms embeddedness within the individual*, whereas the new cultural movements in astrology tended to emphasize the *individual's embeddedness within the macrocosm*.

Examples of this conceptual difference between magic and astrology can be seen in many of the writings from both groups. For instance, Pomponatius (1462-1524), an ardent astrologer, believed that all things in the universe were ultimately determined by "Constellation" and that man himself was only "related to the world as an image in a mirror is related to a real object...and can know himself no more than a mirror image can know itself" (as cited from Lewis, 1954, p. 14). However, in the mystical writings of the Neo-Platonist Giovanni Mirandola (1463-1494) we find:

To thee, oh Adam, we have given thee no certain habitation nor countenance of thine own neither any peculiar office, so that what habitation or countenance or office you so ever choose for thyself, the same thou shalt enjoy and posses at thine own proper will and election. Thy was made neither a thing celestial nor a thing terrestrial, neither mortal nor immortal, so that being thine own fashioner and artificer of thyself, thou may make thyself after what likeness thou dost most affect. (Mirandola, 1996, p. 3)

This is important because, in both cases, we find a sharp departure from the earlier medieval conception of *hierarchy*. Under this medieval outlook, it was generally believed that degrees of order and value were not only objectively present in the universe, but also that all things (except God himself) had a natural superior as well as a natural inferior. It was also believed that the happiness of all created beings consisted chiefly in fulfilling their proper position in the “natural order” of things by submitting in obedience to their natural superiors and ruling justly their natural inferiors.

To overlook this medieval conception of hierarchy is to almost overlook the Middle-Ages itself. It was part of the very life-blood that flowed through the medieval perspective. It also explains much of our modern confusion regarding the medieval period in general. For instance, when Henry VII ordered the death of his dogs that had baited a lion, or when he had his own hawk decapitated for fighting with an eagle, we must not forget that he was acting in strict accord with the medieval conception of hierarchy. However, these two new scientific cultural movements were about to change this medieval conception.

Under the medieval hierarchy every individual was bequeathed a limited degree of power to rule and serve within the framework of the natural order. However, under the new emphasis of astrology, the stellar movements of the heavens were now seen to control the individual completely. In an equal and opposite direction, the new emphasis of magic afforded the individual with an almost unlimited power over all things in the natural universe. This movement away from hierarchy, natural order and a balance of power within the universe, I believe, created a new dynamic within the medieval microcosm-macrocosm relationship.

By rebelling against the framework of hierarchy, the conceptually *antagonistic* cultural forces of astrology and magic created, not a rift, but rather a subtle new tension within the medieval framework of integration. The overall effect appears to have been one that created an extreme push of the medieval universe inward toward the *omnipotence* of the individual through magic, and an equal and opposite pull outward toward the *impotence* of the individual through astrology. This sort of simultaneous contraction and expansion was not strong enough to consciously rip the medieval universe apart, since neither of the new sciences actually violated the microcosm-macrocosm relationship. Rather, they garnered their individual strengths from the relationship. However, I do believe that this conceptual push/pull tension was persistent enough to begin unconsciously undermining the conceptual foundations of the medieval organic perspective.

Finally, the subtle, even unconscious shift in the medieval outlook that may have been influenced by these cultural-historical movements might also explain the relatively surprising and unforeseen historical direction this shift appears to have

taken. Unlike the empirical explanation that merely presupposes itself, this more genealogical explanation actually supports the historical evidence as we find it toward the end of the 16th century. It would also help explain why the kind of scientific discourse that actually emerged out of the cultural-historical context of the 16th century was in many respects unlike the kind of science consciously pursued during the period.

The strongly Neo-Platonic flavor of the Humanistic movement was not only largely hostile toward the practice of science in general, but was also expected to promote an increase in the mystical aspects of natural science. This is precisely what we do find during this period with the sudden burst of new interest in the magical and astrological sciences. If we consider the overall tone and tenor of this historical period then, especially given the Humanistic infatuation with the rediscovered ancient manuscripts, one would have expected to see a deeper and more profound entrance into the medieval conceptual framework of unity, participation and integration with nature.

However, what we find emerging toward the end of this period is something altogether different. What we see is more of a movement away from the integrated microcosm-macrocosm framework of meaning and the beginnings of our own modernist context of separation and division from nature. Moreover, there is little evidence in the discourses of the period to suggest that a rational, conscious decision was made to suddenly abandon the 2000-year-old microcosm-macrocosm framework of meaning and to begin pursuing a more mechanistic-mathematical approach. What we do find, however, is a kind of oblique, even unconscious shifting of the entire

social framework of language surrounding certain words and ideas that had previously been used to describe the world from a context of integration.

This change from a context of integration with nature to one emphasizing a separation from nature, I believe, supports the idea that the conceptual change that emerged during the Scientific Revolution was less a *conscious empirical decision* and more an *unconscious cultural persuasion* for people to begin thinking and feeling about the world from a new context of meaning. In other words, what emerged toward the end of the 16th century, at least as evidenced from the discourses, appears to have been a shift in meaning that was less like a *conscious scientific revolution* and more like an *unconscious cultural evolution*.

So, instead of assuming, as our modernist empirical discourses would have us believe, that the rich intellectual tradition of Plato, Aristotle, Augustine, Aquinas was finally challenged, exposed and proven wrong by the *enlightened* empirical minds of the Scientific Revolution, this genealogical explanation suggests that this conceptual shift may have been less of a *reformation* and more of a *re-conceptualization* of the medieval integrated outlook into a new modernist framework of separation and division. This would help explain Barfield's comments that:

Astrology has changed into astronomy, alchemy to chemistry, today the cold stars glitter unapproachable overhead, and with a naïve detachment mind watches matter moving incomprehensibly in the void. At last, after four centuries, thought has shaken herself free. (Barfield, 1973, p. 143)

Therefore, by encouraging a delicate shift in the social context toward an externalization, dichotomization, and depersonalization of the natural world, the new

educational, religious, political and scientific cultural movements of the Scientific Revolution, I believe, created a new “condition of possibility” for the production of a new scientific form of discourse. With it, a new conceptual framework of meaning was created that continues to divide us from our own rational, emotional and spiritual participation in the natural world.

This chapter examined some of the aspects related to why modern humans have become so divided in their perceptions of the natural world. It also explored some of the major factors that may have influenced this division. An archeological examination of how discourse evolved and changed during the historical period surrounding the Scientific Revolution was presented. This examination began with a brief overview of the literary archive just prior to the beginning of the 16th century. It was concluded through this investigation that the primary emphasis of the discourses during this late medieval period was one that essentially expressed an intrinsic microcosm-macrocosm relationship between humans and their natural world.

The focus then shifted to an exploration of the literary archive toward the end of the 16th century. Attention was especially given to how such concepts as mathematics, scientific hypotheses and mechanism began shifting away from their earlier medieval meanings of *integration with nature* and toward a more modernist framework of division and *separation from nature*.

Then, a genealogical examination of the cultural-historical context surrounding the Scientific Revolution was discussed. The focus of this examination was to identify and describe how certain cultural movements operating during this period might have influenced a shift from an earlier microcosm-macrocosm context of meaning to a

more modern material mechanistic context of meaning. Four primary cultural movements were identified and discussed as possible factors that may have influenced a shift in the social context toward *externalization*, *depersonalization*, and *dichotomization* of humans and their natural world.

It was also concluded in this chapter that the shift in discourse that emerged as a result of these cultural movements appears to contradict the kind of shift one might expect for this period, given that the general trend appears to have been moving toward a deeper enhancement of the microcosm-macrocosm relationship instead of its ultimate abolition. Finally, it was suggested that the new scientific relationship that began emerging toward the end of the 16th century appears to have been the same earlier microcosm-macrocosm relationship, only seen and expressed through a new conceptual lens of separation and division.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The point, in brief, is to transform the critique conducted in the form of necessary limitation, into a practical critique that takes the form of possible transgression.
(Foucault, 1984, What is Enlightenment?)

This study has endeavored to explore some of the various aspects related to why humans today are so divided in their perceptions of the natural world. In chapter one, I described how modernist science appears to be a discourse that divides us externally, socially and internally from our world. It was also suggested that this perceptual division might be related to how modern humans have learned to conceptualize their world through our modern educational system, and that education might itself be one of the primary means by which we can begin reconnecting our fragmented lives.

In chapter two I introduced a theoretical lens for considering how concepts, language, culture and history may influence our perceptions of meaning. This theoretical lens emphasized the relationship that appears to exist between our perceptions of meaning and concepts, between concepts and language, and between language and the unique cultural-historical context from which it ultimately derives its meanings.

In chapter three I identified and described the methodological approach to be used in exploring the research questions outlined in chapter one. This included a brief description of Michael Foucault's Historical Analytical approach, focusing mainly on his archeological and genealogical techniques for exploring how our perceptions of meaning evolve and change over time as a function of discourse, culture and history.

In chapter four, I began exploring my first research question related to why modern humans have become so perceptually divided from our world. The main focus of this examination was to identify and explain how discourse describing the natural world may have altered its form during the historical period surrounding the Scientific Revolution. It was concluded that, toward the end of the 16th century, there appears to have been a shift away from a pre-modern microcosm-macrocosm form of discourse toward a more modern material-mechanistic form of discourse. It was also suggested that this break in the smooth flow of discourse carried with it a change in the conceptual framework of meaning from one emphasizing integration with nature to one emphasizing division and separation from nature.

The second part of chapter four focused on a genealogical examination of some of the possible cultural factors that may have influenced this shift in discourse. The main purpose of this examination was to identify and describe how certain cultural movements that arose during the period surrounding the Scientific Revolution may have subtly, even unconsciously, created a new “condition of possibility” for the emergence of our own modernist scientific form of discourse. It was suggested that specific movements of thought in the traditions of learning, religion, politics and science may have encouraged a new social context for the *externalization*, *depersonalization* and *dichotomization* of humans and their natural world.

The purpose of this final chapter will be to explore some of the possible educational implications of this study. This chapter will be divided into two main sections. The first section will examine how our modernist scientific framework of a *separation from nature* might be promoted and sustained through contemporary

education. Specifically, this section will explore how the modernist curriculum may function as a primary form of discourse for the promotion of an empirical framework of meaning: one that ultimately encourages a conceptual division between humans and their knowledge of the world. The last section of the chapter will explore some of the inherent problems associated with the modernist curricular discourse and propose three broad conceptual approaches for expanding our future curricular discourses into a more comprehensive framework of meaning.

The Modernist Curriculum as a Discourse of Separation

εν δε φαι και ολεσσον:
They kill us in broad daylight!
(Homer, 628 BC, The Iliad)

In chapter four I suggested that toward the end of the 16th century, certain cultural-historical factors began influencing the primary forms of discourse through which many perceived themselves in relation to their natural world. It was also suggested that this shift in discourse carried with it a conceptual change that ultimately encouraged a movement away from a pre-modern framework of integration with nature to our own modern framework of division and separation from nature.

How then, it might be asked, is this modernist framework of separation represented and promoted in our culture today? Some believe that one of the primary places we can find this framework of meaning being promoted is in our own modern educational system. For instance, Bortoft comments on the role of contemporary education in promoting our modernist scientific framework:

In our technical-scientific culture we have specialized in the development of only one mode of consciousness, to which our educational system is geared almost exclusively. This is the analytical mode of consciousness, which

develops in conjunction with our experience of perceiving and manipulating solid bodies. The internalization of our experience of the closed boundaries of such bodies leads to a way of thinking which naturally emphasizes distinction and separation. (Bortoft, 1996, p.61)

This “analytical mode of consciousness,” I believe, directly corresponds with the quantitative mode of perception discussed in chapter four in that both assume a conceptual framework of separation between the knower and the known. As a result, both approaches share a strong conceptual affinity with the empirical discourse promoted under Descartes, since each conceptualizes the natural world as an extrinsically divided environment of independent material objects. This empirically divided, non-participatory view of the natural world is precisely the conceptual outlook Bortoft describes as being “alive and well in the teaching of science in schools and colleges, often hiding implicitly in the *way* that science is taught” (Bortoft, 1996, p. 145).

Cultural historian Thomas Kuhn also recognized the role our educational system appears to play in promoting a conceptual framework of meaning. In fact, Kuhn believed formal education was largely a process of conceptual *indoctrination*, where the individual student was systematically initiated into the intellectual traditions of a particular worldview or paradigm. He explains:

At least in the mature sciences, answers to questions are firmly embedded in the educational initiation that prepares and licenses the student for professional practice. Because education is both rigorous and rigid, these answers come to exert a deep hold on the scientific mind...a strenuous and

devoted attempt to force nature into the conceptual boxes supplied by professional education. (Kuhn, 1962, p. 5)

If education is an institutionalized attempt to conform our understanding of the world into a particular worldview, how exactly are the “conceptual boxes” of our own modernist worldview represented and expressed in education today? Educator Jayne Fleener believes the concepts of our modernist worldview are promulgated through the modernist curriculum, since it is the curriculum that ultimately represents the very “heart of schooling,” and the primary forms of discourse that give the educational process its conceptual “life and meaning” (Fleener, 2002, p. 175). Educator Bill Doll also implicates the modernist curriculum as representing “the very heart of our traditional, modernist concepts and epistemology” (Doll, 1993, p. 125).

It would appear, then, that it is largely through the language structures of our modernist curricular discourses that the natural world is conceptually divided and quantified into an externalized, empirical world of inner and outer, mind and body, and observer and observed. We can see this empirical framework of separation working intrinsically on the modernist curriculum with its fragmentation of such things as objectives and outcomes, teachers and learners, and the knower and the known. Doll (1993) recognized how the modernist curriculum:

...falsely separates the knower from the known in its desire to create a transcendent *objective*. And in this view of knowledge, to which we are mere spectators, lies the view of curriculum formalized in Ralph Tyler’s rationale. (p. 125)

In his book the *Basic Principles of Curriculum and Instruction* (1950), the American educator Ralph Tyler (1928-1994) developed one of the primary forms of curricular discourse that continues to dominate our modern educational landscape. This Tyler discourse is essentially one that promotes an empirical outlook of the world by placing a strong conceptual emphasis on such practices as the development of predetermined learning objectives, the linear organization of curricular content, and the use of mathematics as a primary means for measuring and evaluating learning success. It is therefore an approach that not only negates our cognitive participation in structuring our knowledge of the world, but appears to do so by representing that knowledge as an objective “subject material” that can be perceived and transmitted in a linear fashion from the teacher to the student. Thus explains Sears and Marshall (1990) when summarizing the Tyler approach to learning:

Goals and objectives are predetermined, content is selected and logically organized, often in the form of a textbook; teachers are trained to present it efficiently; and student learning is objectively measured as to a way to determine the effectiveness of the curriculum. (p. 34)

As such, the Tyler curricular discourse is one that ultimately promotes a quantitative, linear, reductive conception of the natural world where the knower and the known are divided into a metaphysical dualism of passive spectator and objectified world of meaning. Even the teacher under the Tyler discourse assumes a uniquely empirical role as the privileged “keeper of knowledge.” Since it is also assumed under this discourse that the students will only learn that which the teacher disseminates, careful adherence and conformance to the *subject matter* of the

curriculum is persistently emphasized. This linear flow of knowledge from teacher to student, from external world to internal mind, and from curriculum to learner is an example of what Posner (1998) describes as the “production” conception of modernist education:

Schooling is assumed to be a process whose main purpose is to promote or produce learning. Students are termed learners; objectives are conceived in terms of desirable learning; evaluation of the schools’ success is targeted almost exclusively on achievement test scores; ‘educational’ goals are distinguished from ‘non-educational’ goals by determining if they can be attributed to learning; ‘curriculum’ is defined...in terms of ‘intended learner outcomes.’ Thus, schooling is perceived as a *production system*, in which individual learning outcomes are the primary product. (as cited in Fleener, 2002, p. 16)

Any deviations from these “primary products” of knowledge, especially into the vague areas of personal interpretation and inter-subjectivity, are considered under the Tyler discourse as an unproductive waste of valuable educational time. As a result, the personal, contextual, and even cultural-historical aspects of our knowledge and perceptions of the world are ultimately dismissed as either a secondary concern or completely inconsequential.

This “non-participatory” approach to knowledge is one of the distinguishing characteristics linking the Tyler discourse with the empirical discourses of Descartes. According to Descartes, the attainment of any true and lasting knowledge of the world requires that learners:

...first purify themselves of all bias, perspective, and emotional attachment which could only be achieved through a transcendence of body and all of its distractions, which serve only to obscure thought. (Dempsey & Butkus, 1999, p. 33)

Such a “value free” approach to our knowledge of the world unfortunately has an inveterate tendency for dichotomizing our perceptions of meaning into dualistic modes of reality: one consisting of objective abstractions like number, magnitude and position; and one consisting of subjective experiences like colors, tastes and sounds. This positivistic division between the objective and the subjective, the prosaic and poetic, and the mind and the body not only obscures our cognitive participation in knowing the world but also promotes a conceptual outlook that ultimately sees the world as an externalized *raw material* that must first be quantified, measured, and reduced before it can ever be known.

By promoting an empirical conception of knowledge with its inherent separation between the knower and the known, the Tyler curricular discourse essentially divides us conceptually from our cognitive, emotional, and even physical participation in the natural world. That is because, as the medieval philosopher John Duns Scotus (1266-1308) pointed out long ago, “the knowledge of the things that are, *is* the things themselves” (as cited in Lindberg, 1992, p.188). In other words, by conceptually separating us from our knowledge of the world, the Tyler curricular discourse effectively separates us from the world itself.

Expanding our Modern Curricular Discourse

*There are no whole truths; all truths are half-truths.
It is trying to treat them as whole truths that plays the devil.*
(A.N. Whitehead, 1925, *Science and the Modern World*)

How might we begin changing our modernist curricular discourse into a form less fragmented and divided as a whole? Postmodern educators Swimme and Berry (1992) suggests *expanding* our curricular discourses into a more comprehensive framework of meaning that encourages individual humans to “fulfill their proper role in their larger pattern of meaning...we can understand this role in the Great Story only if we know the story in its full dimensions” (Swimme & Berry, 1992, p. 256).

This implies that what is needed is not necessarily an *escape* from the present modernist conceptual framework of separation, but rather a new way for finding a deeper *entrance* into the fuller dimension of the “Great Story” of meaning. And this, I am convinced, should involve not merely the outright rejection of our modernist framework of separation and division, but rather an attempt to find how this framework might fit into the “larger pattern of meaning.” In fact, this strong desire for thinking that one meaning must first be rejected in order to receive another is really only another “habit of thought” promoted by a narrowly conceived modernist discourse of empiricism. Educator Parker Palmer (1998) believes this habit is driven by our “Western commitment to thinking in polarities, a thought form that elevates disconnection into an intellectual virtue...This way of thinking is so embedded in our culture that we rarely escape it, even when we try” (p. 61).

How can our modernist curricular discourse be expanded into a more comprehensive framework that does not merely reject one meaning for another, but rather seeks to embrace a deeper understanding of the world as a whole? In exploring

this question I will propose three broad conceptual approaches. The first will recommend a conceptual approach based on the work presented in this study by encouraging a more participative approach to seeing meaning not merely differently, but more comprehensively as a whole. The second approach aims at the development of an historical consciousness within curricular discourse. The third approach recommends creation of a context for embracing both linear and nonlinear meanings by using language as an example for understanding the natural world as a living discourse of meaning.

I will remain intentionally broad and pedagogically nonspecific in the next three sections. My overall purpose is to address the educational implications of this study at the conceptual level of meaning instead of the pedagogical level of practice. However, many notable authors (Applebee, 1996; Doll, 1996; Greene, 2000; Fleener, 2002; Miller, 2000; Noddings, 1992 and Palmer, 1998) have already identified and developed many pedagogical methods for expanding our modern curricular discourse into a broader context of meaning. One of the main goals of this study has been to explore how concepts, language, culture and history influence perceptions of meaning. My final section will therefore focus on how these same interrelated factors might be used as a kind of “conceptual scaffolding” for reconnecting our fragmented perceptions of meaning through the process of education.

The Curriculum and “Seeing Comprehensively”
The true illusion celebrate, be joyful in this serious game
No living thing lives separate; for One and Many are the same.
(Goethe, 1821, Epirrhema)

In describing some of the difficulties inherent to the modernist conceptual outlook, Parker Palmer describes how a commitment to thinking in polarities precludes the

ability to “hold the tension of opposites” (Palmer, 1998, p. 83) and embrace the beauty and depth of paradox. The idea of paradox is an important metaphor for considering how to begin expanding our modernist curricular discourse into a broader context of meaning. Instead of promoting positivistic polarity, the experience of paradox actually encourages conceptual contemplation of vastly different meanings at the same time:

Paradoxical thinking requires that we embrace a view of the world in which opposites are joined, so that we can see the world clearly and see it whole. Such a view is characterized by neither flinty-eyed realism nor dewy-eyed romanticism but rather by a creative synthesis of the two. (Palmer, 1998, p. 66)

This simultaneous consideration of seemingly inconsistent meanings is what creates the tension of paradox. As such, the experience of paradox provides a unique opportunity for experiencing *more* meaning as opposed to just *different* meaning. Instead of merely alternating between meanings in a liner fashion, when we embrace the tension of opposites revealed through the experience of a paradox we are actually allowing ourselves to hold, at least as long as the experience lasts, vastly different meanings *simultaneously*. Barfield describes this sort of simultaneous seeing of different meanings at the same time as the faculty of “double vision,” where the synthetic imagination concurrently reconnects into a unity that the analytical intellect is perpetually reducing into separation and distinction:

Imagination, in fact, presupposes *double vision* and not simply the substitution of one kind of single vision for another. It requires a sober ability to have the thing both ways at once. (Barfield, 1977, p. 123)

This dynamic interplay between the analytical intellect and synthetic imagination allows us to simultaneously embrace the unique aspects of diversity and unity by perceiving them together as a comprehensive *harmony of differences*. Goethe referred to this “two-fold” seeing as the ability to perceive “multiplicity in unity” where the “the single phenomenon becomes, as it were, one larger phenomena,” and the imagination overcomes the isolation of the intellects single observations, and in so doing, accomplishes “a transition into a higher level of experience” (as cited in Bortoft, 1996, p. 291).

This approach to meaning is obviously very different from our modernist approach that not only overemphasizes the analytical intellect’s role in dividing and separating meaning, but also obscures the imagination’s role for integrating meaning into a single unity. This explains why our perceptions of meaning become so one-sided and fragmented. However, seeing meaning from a context of “multiplicity in unity” allows the analytical intellect to distinguish between different colors and textures of meaning without ever allowing those meanings to become isolated and fragmented in their distinction.

This kind of mental breathing between analysis and synthesis is what Bortoft describes as an example of seeing meaning “more comprehensively” as opposed to merely seeing it differently as an either-or proposition. The process of seeing comprehensively is a conscious attempt to allow the analytical intellect to apprehend

the separateness of distinct meanings, *while at the same time*, allowing the synthetic imagination to apprehend their interrelationship and togetherness within the broader context of the “Great Story” of meaning.

It should also be emphasized here that seeing comprehensively is in no way an attempt to assimilate different meanings into a kind of neutral relationship where each is blended generically into a lukewarm compromise of meaning. Rather, seeing comprehensively is a conceptual approach that seeks to *accentuate* not *amalgamate* different aspects of meanings by allowing each to remain brilliantly divided and wonderfully related at the same time. A good example of this might be seen in the distinctions of meaning that this study highlighted between the modernist framework of *separation from nature* and the pre-modern framework of *integration with nature*. Instead of seeing these two frameworks of meaning as competitive and therefore incommensurable in nature, under this new approach, both perspectives can now be embraced as a unique and valuable insight into a more comprehensive understanding of the natural world.

Instead of promoting a complete abandonment of one conceptual framework for the wholesale acceptance of another, as in Merchant’s call for “a total transformation in science and worldviews that will replace the mechanistic framework with an ecological framework” (Merchant, 1992, p. 11), there is an invitation to embrace these vastly different conceptual frameworks simultaneously as completely valid modes for “illuminating” a different aspect of the same natural world. Seeing comprehensively actually provides a conceptual context for *holding the tension* between the unmitigated strength of a “dewy-eyed” romantic perception of the natural

world, and the full vigor of a coolly rational, “flinty-eyed” perception without sacrificing the unique perspective of either.

If we are to begin expanding modernist curricular discourse into a form that is more conducive to seeing the world, not merely differently, but more comprehensively, I believe we must begin by promoting a form of curricular discourse that essentially sees our world *paradoxically*: that is to say, as a world incredibly diverse and deeply integrated at the same time. By always insisting on one conceptual framework at the exclusion of another, I believe we may be in danger of losing our intellectual-imaginative “double vision.” In that loss we risk becoming, as Wittgenstein says, “aspect blind,” by falling prey to the same mistake the poet William Blake (1757-1827) warned us against when writing “may God us keep, from *single vision* and Newton’s sleep” (Blake, 1996, p. 85).

By learning to hold the tension between the intellect and the imagination we allow ourselves to begin participating in what Goethe described as the “eternal systole and diastole, the eternal *synkrisis* and *diakrisis*, the breathing in and out of the world in which we move and have our being” (Naydler, 1996, p. 52). Unless we can begin overcoming our current modernist aspect blindness for thinking in polarities, and for approaching our natural world as an “endless series of either-ors” (Palmer, 1998, p. 62), it is difficult to see how we can begin expanding current curricular discourses into a form that is more conducive to reading the “Great Story” in its fuller dimension of meaning.

The Curriculum and Developing a “ Historical Consciousness”

The modern person invents new ideals because they dare not attempt old ideals. They look forward to the future, because they are afraid to look back at the past
(Chesterton, 1910, What’s Wrong with the World?)

Another recommendation for expanding modernist curricular discourse into a more comprehensive context of meaning can be seen in a concept similar to that of paradox: the idea of *growth*. Like the paradox, the concept of growth is an example of *augmentation* as opposed to mere *alteration*. This can be seen, for instance, in Whitehead’s (1824-1947) description of growth as the rhythm that exists between change and permanence, or “the continual process of preserving order amid change, and preserving change amid order” (Whitehead, 1978, p. 339). This continual “rhythmic breathing” between change and permanence is what distinguishes growth from mere change or alteration, in that change seeks to vacillate between differences, whereas growth seeks to find a *unity within difference*. This explains why a tree grows by adding rings and not by merely replacing one ring with another. It also explains why growth is more than just the mere absorption or assimilation of one thing into another. Where there is no distinction and separateness there can be no unity, no harmonizing of differences, and therefore no “preserving of order amid change.”

Capra (1996) refers to this same rhythmic relationship of persevering order amid change when he describes the concept of *autopoeisis*. According to Capra, autopoeisis is the organic process where each individual component within a living network “participates in the production or transformation of other components in the network. In this way the entire network continually *makes itself*” (Capra, 1996, p. 98). This perennial transformation and renewal of a living system through the

continual readjustment of the individual components within the system is not a unique concept today, but is an idea that Goethe indirectly referred to over two centuries ago when describing the dynamic characteristics of all living things:

...the basic characteristic of an individual organism: to divide, to unite, to merge, into the universal, to abide in the particular, to transform itself, to define its, and, as living things tend to appear under a thousand conditions, to arise and vanish, to solidify and melt, to freeze and flow, to expand and contract. Since these effects occur together, any or all may occur at the same moment. Genesis and decay, creation and destruction, birth and death, joy and pain, all are interwoven with equal effect and weight; thus even the most isolated event always presents itself as an image and metaphor for the most universal. (Naydler, 1996, p. 52)

How might this fluid framework of growth and autopoietic transformation be related to expanding our modernist curricular discourse into a more comprehensive framework of meaning? One possible approach might be seen in the unique way that an autopoietic system uses feedback loops of communication to continually adjust itself in order to “correct mistakes, regulate, and self-organize itself” (Capra, 1996, p. 83). The German sociologist Niklas Luhmann (1927-1998) has suggested that autopoietic feedback networks can extend themselves into the social domain of living things, such as when “social systems use communication as their primary mode of autopoietic reproduction” to expand, adjust, and transform their context of meaning (as cited in Capra, 1996, p. 212).

This implies that a social system can continually recreate itself by using meanings gleaned from the past to adjust, modify and structurally reproduce a more comprehensive understanding of the present. As such, this newly integrated meaning that emerges from the dynamic interrelationship of both past and present is autopoietic in that neither of the original meanings are completely replaced or assimilated by the other. Each is “recast” and transformed into a broader context of togetherness. Dewey (1859-1952) refers to a similar adjustment of past and present meanings when describing how the imagination can serve as “the gateway through which meanings derived from past experiences find their way into the present; it is the conscious adjustment of the new and the old” (Dewey, 1980, p. 272).

Doll also refers to a similar autopoietic process of consciously adjusting the new and the old when describing the process of *recursion*. According to Doll, it is through recursion that past and present meanings are allowed to “loop back upon themselves” to transform and enhance our understanding of the world. It is also the primary means by which we become conscious of ourselves as distinct beings existing within a particular framework of time:

In recursion, reflection plays a positive role; for thoughts to leap back on themselves, as in Dewey’s secondary experience reflecting back on primary experience, or in Piaget’s reflexive intelligence reflecting back on practical intelligence, it is necessary, as Bruner has said, to step back from one’s doings, to distance oneself in some way’ from one’s own thoughts. (Doll, 1993, p. 178)

Without this essential “*distancing of oneself*” that comes from casting our experiences against a backdrop of history, there can be no looping of thoughts back on themselves, no conscious adjustment of new and old, and therefore no autopoietic transformation of meaning. That is because the more completely a past experience has been “left behind,” the more thoroughly it is at the disposal of our imaginative powers to be reorganized, reconnected and recast into a more comprehensive context for understanding the present. Thus Greene explains:

...meaning derived from previous experiences find their way through the gateway of the imagination to interact with present-day experiences. When aspects of the present are infused by materials originating in the past there is always a re-viewing of the past, even as the new experience (*enriched now*) comes to consciousness. (Greene, 2000, p. 76)

One possible way that this recursive power might help expand our modernist curricular discourses is by encouraging what Foucault refers to as the development of a “historical consciousness.” Without this contextual understanding of the past, we simply limit our ability to understand why we think and feel as we do in the present. Nor could we begin to see (as this study has endeavored to show) the seemingly contingent nature of our present knowledge of the world as it is cognitively and socially constituted within a unique cultural-historical context of meaning. Lewis communicates a similar belief when addressing the importance of developing an “intimate knowledge of the past” in education:

We need to develop an intimate knowledge of the past. Not that the past has any magic about it, but because we cannot study the future, and yet need

something to set against the present, to remind us that the basic assumptions have been quite different in different periods...A man who has lived in many places is not likely to be deceived by the local errors of his native village: the scholar has lived in many times and is therefore in some degree immune from the great cataract of nonsense that pours from the press and the microphone of his own age. (Lewis, 2001, pp. 28-29)

To neglect the development of this historical consciousness from future curricular discourses would be to effectively preclude seeing, as Goethe did over 200 years ago, that “the history of science *is* science itself” (Goethe, 1971, preface). The development of a historical consciousness can also help reveal the contingent nature of modernist intellectual traditions by seeing that:

...all the traditions that surround us; those of architecture, agriculture, engineering, the arts, religion, history, science, mathematics, literature...are traditions of knowledge-in-action, deeply contextualized ways of participating in the world of the present. (Applebee, 1996, p. 2)

Such a historical awareness not only creates a more comprehensive context for understanding the present, it also affords, as Foucault describes, a unique ability for “straying afield” by realizing the contextual nature of all intellectual traditions. That is because it is through the development of a historical consciousness that we begin to realize that no matter how monolithic its foundations may appear, no matter how rigorously it is promoted through the various social modes of discourse, all knowledge regardless of its form is ultimately influenced by the unique cultural-historical context in which it is embedded. Therefore, by encouraging the

development a historical consciousness in our curricular discourses we are in essence encouraging a strong tincture of personal insight and intellectual freedom that comes from the dynamic process:

...of leaving something behind while reaching toward something new...A reflective grasp of our life stories and of our ongoing quests that reaches beyond where we have been, *depends* on our ability to remember things past. It is against the backdrop of those remembered things and the funded meanings to which they gave rise, that we grasp and understand what is now going on around us. (Greene, 2000, p. 20)

The Curriculum and “Reading Nature” as Discourse
I see,’ she said at last, thoughtfully. I see now...The further up and the further in you go, the bigger everything gets. The inside is larger than the outside.
(Lewis, 1956, The Last Battle)

Finally, there is one more conceptual approach that I will recommend for expanding modernist curricular discourses into a more comprehensive framework of meaning: the concept of the whole itself. In his book *The Web of Life*, Capra identifies two opposing conceptions of the whole when he writes:

The basic tension is one between the parts and the whole. The emphasis on the parts has been called mechanistic, reductionistic, or atomistic: the emphasis on the whole has been called holistic, organismic, or ecological.
(Capra, 1996, p. 17)

The relationship between the parts and the whole for the mechanistic perspective is essentially one that sees the whole as a product arising from the sum of the individual parts, as those parts are added together in a linear fashion. We can observe this linear aspect primarily in how the parts add up to the whole inductively, as well as in how

the whole can be reduced back down to the individual parts in a deductive fashion. This linear conception of the whole is ultimately one that emphasizes a positivistic division between the parts and the whole.

The relationship between the parts and the whole under the organic approach is somewhat different. Instead of seeing the whole as arising linearly from the accumulation of the individual parts, the organic, or systems perspective sees the meaning of the parts and the meaning of the whole as being joined together into a kind of an inseparable unity. As Capra explains:

The great shock of twentieth-century science has been that systems cannot be understood by analysis. The properties of the parts are not intrinsic properties but can be understood only within the context of the larger whole. Thus the relationship between the parts and the whole has been reversed. In the systems approach the properties of the parts can be understood only from the organization of the whole...Systems thinking then is 'contextual' which is the opposite of analytical thinking. Analysis means taking something apart in order to understand it; systems thinking means putting it into the context of a larger whole. (Capra, 1996, p. 29-30)

So instead of the parts just adding themselves up *quantitatively* into a kind of composite whole, under the systems conception the parts are conceived as being arranged into a kind of "nested relationship" that actually *transcends* the mere accumulation of the individual parts. In short, the linear conception sees the whole as a product built up from the summing of the parts, whereas the systems conception is *nonlinear* in that it sees the whole as being already *immanent* within the parts.

I believe a good example of this nonlinear conception of the whole can be suggested through the example of a *hologram*. Holograms are a special kind of image produced on a photographic plate using a fine beam of light. What makes the holographic image unique is its *pervasiveness* throughout the plate. For instance, if the hologram plate is broken into fragments, each fragment will still retain a complete copy of the original image. The only difference between the images is that fragment's resolution of the completed image is a little less well defined than before. The important point to remember however is that each individual part or fragment of the entire image still contains, *within itself* a complete image of the original whole. Goethe referred to this kind of holographic "nested wholeness" as an example of "*unfolding of enfolding*" where the image of the whole is *enfolding* within each of the individual parts, and where each of the individual parts *unfold* more and more of the whole as they come together into a unity. Goethe explains:

Nothing is more consonant with Nature than that she puts into operation in the smallest detail that which she intends as a whole...And if you would seek comfort in the whole, you must learn to discover the whole in the smallest part. (as cited in Naydler, 1996, p. 59)

This idea of the unfolding of the whole that is already enfolding in the parts, I believe, is a powerful image for considering how to begin expanding modernist curricular discourse into a more comprehensive framework of meaning. For instance, when describing our relationship with language and meaning, Bortoft refers to the paradox of the "hermeneutic circle" in language, which basically states "that in order

to read an author we have to understand him first, and yet we have to read him first in order to understand him” (Bortoft, 1996, p. 7).

This linguistic paradox arises only insofar as we subscribe to an exclusively linear understanding of the meaning of language. As long as we regard the meaning of language as arising inductively from words to sentence or else deductively from sentence to words, the paradox of the hermeneutical circle becomes *logically* insoluble. However, if we consider actual experiences with language in reading, writing, speaking and listening to others, what we find is something altogether different. We find the meanings we discern from language emerge, not linearly as an accumulation, but holistically as an “unfolding of enfolding.” As Bortoft explains:

...we do not have to store up what is read until it is all collected together, whereupon we suddenly see the meaning all at once in an instant. On the contrary, the meaning of the text is discerned and disclosed with progressive *immanence* throughout the reading of the text. (Bortoft, 1996, p. 7)

This “progressive immanence” of meaning is not only revealed holistically as we participate with the text, but it is another good example of experiencing meaning comprehensively. Understanding language requires that we read meaning linearly and nonlinearly at the same time. For instance, when we read an individual word we not only perceive several distinct meanings in the form of letters linearly combined together (R and E and D), but we also perceive an emergent holistic meaning in the form of the word itself (RED). In similar fashion, when we read a sentence, we perceive distinct meanings of individual words as they make up the sentence, as well as the central message or meaning of the sentence as a whole.

The *linear* emphasis to reading, then, focuses on the individual meanings of letters and words that accumulate together to comprise the physical text, whereas the *nonlinear* perspective focuses more on the meanings that actually emerge holistically as a result of the relationships that exist, not only between the letters and words, but also between the text and the individual reader. The important point to make is that both the *linear expressions* of the text and the *nonlinear intuitions* of the reader are required to understand the text at all. In fact, one might even say that the processes of reading, speaking, writing and so fourth are but the delicate art of holding the tension between the *physical expressions* and *nonphysical impressions* of the text simultaneously.

This kind of comprehensive seeing of the unfolded whole that is already enfolded within the parts may explain why Bortoft describes our experiences with language as being essentially “*hologrammatical*.” Lewis also refers to a similar experience of reading meaning holistically when describing his perceptions of beauty in general:

The colors and shapes in a beautiful painting are really only sensations in my eye, produced by light waves between me and the painting. It follows then that neither the painting, nor any other material thing can be beautiful in itself. The beauty therefore is not in the painting at all but is something purely spiritual, arising almost mysteriously out of the relation between the painting and me. (Lewis, 1986, pp. 216-217)

This I believe is an extremely important point when thinking about current curricular discourses and how to expand them into a more comprehensive context of meaning, especially when we consider how incredibly one-sided the linear

perspective continues to be in many modernist discourses today. The problem with this overemphasis is that it strongly promotes a positivistic *cause and effect* framework of meaning, one that tends to recognize and accept only those meanings that can be validated linearly, that is to say logically through analysis. But discerning the linear relationships is really only half the story. To see meaning from an exclusive analytical context is to see it but partially.

If the ultimate goal is to expand modernist curricular discourses into a more comprehensive framework of meaning, then I believe this should encourage seeing meaning not merely from a linear perspective of analytical logic, but from a nonlinear perspective of intuitive holism as well. Without the development of this nonlinear perspective on meaning I believe we preclude a more comprehensive understanding of the world by ignoring the intuitive, emergent and nonlinear meanings that can arise holistically only as we interact directly as participants in the phenomena. In fact, such a comprehensive curricular discourse would be one that approached the phenomena of nature much in the same way that we approach language: as a text to be read comprehensively with the “double vision” of the analytical intellect *and* the synthetic imagination.

This comprehensive approach to “reading nature” like language would involve, among other things, a conscious attempt to resist our modernist habit of always trying to replace *concrete experiences* with *abstract explanations*. It would also resist the even more questionable modernist educational practice of actually encouraging students to engage in carefully “engineered concrete learning experiences” only to later define and instruct the students as to what those experiences actually *meant* from

a modernist scientific perspective. This sort of educational practice is unfortunate in that it often portrays itself as a kind of holistic, “experience based” alternative to more traditional modernist curricular discourses. It gives the appearance of promoting concrete experiences with nature only to strip those experiences of their nonlinear qualities by smuggling in a linear abstract explanation in their place. This kind of modernist “Trojan Horse” approach to “experience based learning” is in many ways similar to an educational practice described by Lewis in his *Abolition of Man* (1974) where “in a sort of ghastly simplicity we remove the organ and expect the function...We castrate and then bid the geldings to be fruitful” (p. 26).

Therefore, instead of allowing our concrete experiences with nature to be mitigated or completely replaced with an abstract explanation, the curricular discourse that incorporates a genuine nonlinear approach would actually encourage students to allow their own concrete experiences with nature to become the explanation of the phenomena themselves. Naydler refers to this idea when describing Goethe’s qualitative scientific approach:

Goethe’s method is characterized by a ‘soft’ approach to nature, in which the scientist works from an attitude of receptive ‘listening’ rather than an overactive conjecturing combined with attempts to either prove or disprove the conjectures. Goethe seeks instead to attune to what is experienced, refraining as far as possible from trying to fit the experience into any preconceived ideas or theories. (Naydler, 1996, p. 70)

This “delicate” empirical approach is one that consistently endeavors to *receive* the meaning of the phenomena holistically through a direct participation with those

phenomena instead of allowing them to be *replaced* with an abstract theoretical idea. Simply stated, it is an approach where the observer endeavors:

...to sink himself in contemplation in the phenomenon than to form further thoughts about it. It implies a certain--if one may use the word--chastity of thought, a willingness not to go beyond a certain point. The blue of the sky, said Goethe, *is* the theory. To go further and weave a web of abstract ideas remote from anything we can perceive with our senses in order to explain this blue is to darken counsel. (Barfield, 1966, p. 34)

This strong modernist desire to go beyond the phenomena and replace our concrete, nonlinear experiences with an abstract, linear explanation is largely based in another modernist desire: to dominate and control the natural environment.

Unfortunately, nonlinear meanings are not normally conducive to domination and control of our natural world. In fact, they tend to move in the opposite direction of most modernist techniques of domination, such as the preponderance of analytical reasoning, the quantification of matter, and the over emphasis of a logical cause and effect relationships. However, I do believe these nonlinear meanings can be conducive to engendering such things as depth of meaning, a sense of interconnectedness and belongingness, and an increased capacity for enjoyment and aesthetic appreciation of nature. Again, such holistic meanings may do very little toward helping us master learning objectives, increase material wealth and comfort, or even extend our life on this planet. But I believe they can do a great deal toward making our lives feel a little less fragmented and a bit more worth the living.

As such, this comprehensive curricular approach to reading nature like a living discourse would be one that utilized “the sense-perceptual aspects of nature like letters of words, or words of a text: as signs for meaning” (as cited in Bortoft, 1996, p. 309). The Romantic poets referred to a similar approach to reading nature holistically as the process of *deep calling unto deep*. This process consisted of a conscious attempt to allow the pervasive whole that already connected the individual and the natural world into a unity of togetherness, to become one light of meaning in the individual’s mind so that they could begin “hearing what the phenomena were really saying” (Naydler, 1996, p. 71). Lewis refers to this Romantic approach to nature as one that ultimately seeks to receive the “moods of time” and the “spirit of the place” as opposed to replacing the phenomena with abstract explanations:

It is the “moods” or the “spirits” that matter. [Romantic] Nature lovers want to receive as fully as possible whatever nature, at each particular time and place, is, so to speak, *saying*. The obvious richness, grace, and harmony of some scenes are no more precious to them than the grimness, bleakness, terror, monotony, or “visionary dreariness” of others. The featureless itself gets from them a willing response. It is one more word uttered by nature. They lay themselves bare to the sheer quality of every countryside, every hour of the day. They want to absorb it into themselves, to be colored through and through by it. (Lewis, 1988, p. 18)

This linguistic approach to reading nature like a living discourse, then, would be one far less like a logical *investigation* and more like a personal *invitation* to look, listen, and attend to the “poetry of the earth,” that “is never dead” to those who have

ears to hear (Keats, 1996, p. 26). It is therefore a comprehensive approach that sees the natural world as a “language of images” to be read by the two-fold vision of the analytical intellect and the synthetic imagination. But unlike our own aspect blind modernist approach, this holistic curricular discourse would be one that never allowed the intellect to logically reduce the intrinsic meanings of the natural world into a mere sum of isolated parts; something the English poet William Wordsworth (1996) foresaw and warned against when writing in his poem *The Tables Turned* (1798):

Sweet is the lore that nature brings; our meddling intellect,

We misshape the beautiful form of things; we murder to dissect

By holding the tension between the intellect and the imagination, reading nature like a living discourse would be a curricular approach that persistently encouraged a comprehensive perception of meaning by allowing the intellect to *separate without isolating*, and the imagination to *integrate without assimilating*. As a result, it would be an approach where the logically deduced theoretical meanings would never be allowed to overshadow or completely abolish the nonlinear holistic meanings that can only be read intuitively from the phenomena themselves.

In summary, unlike our own narrowly defined modernist curricular discourse that is forever trying to replace the external surfaces of the appearances in order to explain the deep meanings that are believed to cumulatively produce them, the linguistic, nonlinear approach to reading nature as a living discourse would be one, as Scottish poet George MacDonald (1824-1905) describes, where “*the surface is the deepest after all*” (MacDonald, 1996, p. 258). That is because it is ultimately through the surfaces, through our own concrete experiences with the outer appearances of the

phenomena themselves, that we are afforded a privileged glimpse into the deep enfolded meanings that can only be read in the wholeness of nature. Thus

MacDonald concludes:

All about us, in earth and air, wherever eye or ear can reach there is a power ever breathing itself forth: now in a daisy, now in a wind-waft, a cloud, a sunset; a power that holds constant and sweetest relation with the dark and silent world within us...inside the *spirit*; outside the *word*. And the two are ever trying to meet within us; and when they do meet, then the sign without, and the longing within become one light, and the man no more walketh in darkness, but knoweth whither he goeth. (MacDonald, 1998, pp. 415-416)

Conclusion

What I have attempted to do in this chapter is to identify some of the ways that a modernist curricular approach may act as a discourse for separating us from our world today and to recommend possible conceptual directions for expanding that discourse into a more comprehensive framework of meaning for the future. Three broad curricular approaches were recommended for helping us to expand modernist curricular discourses.

The first involved an approach to the curriculum that would encourage a paradoxical context for embracing more meaning as opposed to merely alternating between meanings. This involved an approach that encouraged the simultaneous holding of the tensions between the analytical intellect that divides and separates and the synthetic imagination that organizes and integrates. It was also suggested that this

paradoxical approach to meaning might result in a greater ability to see the natural world more comprehensively, as opposed to just seeing it differently.

The second recommendation for expanding modernist curricular discourses involved a discussion of the concept of autopoietic growth and the importance of developing a historical consciousness in general. It was suggested that by developing a historical awareness in our future curricular discourses we can begin enhancing our ability to see the contingency of our knowledge and beliefs about the world. Such information, it was suggested, could help us not only “stray afield” of ourselves conceptually speaking, but it could also help us in transforming our current understanding of the world by recasting it into a broader context of togetherness with the past.

Finally, this chapter recommended a holistic curricular approach to understanding our world from a linguistic point of view. This suggested that there are certain intrinsic meanings and relationships that can only be discerned and “read” from nature holistically as we participate with the phenomena. Approaching the natural world from a “hologramatical” conceptual outlook could be one approach for helping us to expand modernist curricular discourses into a more comprehensive framework of meaning. By learning to “read nature” holistically like a living discourse, we can begin apprehending not only the *physical surface* of the phenomenal world, but its intuitive and *psychical depth* as well.

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