EPISTEMOLOGY AND ENVIRONMENT: THE GREENING OF BELIEF

by

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Following a sequence of papers in the middle of the twentieth century by W.V.O. Quine, epistemologists have increasingly recognized that the agent of knowledge is situated relative to certain social and natural conditions. This 'epistemic location' has been shown by feminist epistemologists to lend shape to the knowledge claims that individuals and communities make. Sensitivity to the facts of epistemic location has led to a process of increasing scrutiny of the range of variables believed to be epistemically significant.

In this dissertation, I argue for the introduction of local geographical and ecological conditions as an additional epistemically significant variable. After an historically informed discussion of why the situating of knowledge should be done and a survey of contemporary approaches to how it has been done, I construct a synthetic argument for the epistemic significance of place. Examples drawn from ancient philosophy, anthropology, cultural geography, environmental psychology, and personal narrative experience illustrate the agency of place. Next, an argument indicating the continuity between dialectical biology, ecological perception, and enactivist cognitive science illustrates a direction for research on cognition that would continue to take more seriously the significance of place.

Finally, I suggest through an argument for pluralism that the epistemic significance of place demands that some rich connections be made between environmental philosophy and epistemology. Diverse natural environments should be valued as epistemic sources that ensure the diversity of perspectives and theories necessary for knowledge to progress.

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CHAPTER I

KNOWING NATURE

> Why should it be threatening to question the idea that the world has pregiven properties that we represent? Why do we become nervous when we call into question the idea that there is some way that the world is "out there," independent of our cognition, and that cognition is a re-presentation of that independent world?...Our spontaneous and unreflective common sense would deny that these questions are scientific, perhaps by thinking, "How else could the mind and the world be related?" The realist in us claims that our questions are simply "philosophical" - a polite way of making them seem interesting, yet also irrelevant. -Varela, Thompson, & Rosch[1]

Introduction

This is a dissertation about agents of knowledge and the environments in which they reside. I am interested in epistemic locations and the situating of knowledge.[2] This work is in part a reaction against twentieth century logical positivism's lack of interest in the particularities of the epistemic agent. It is also in part a reaction against the lack of interest in epistemology in general with matters concerning the natural environment.

Early logical positivists such as Rudolf Carnap and Otto Neurath believed that knowledge was the product of a combination of, on the one hand, observable features of the physical world and, on the other, the correct use of logic. Since observation and logic were believed to function the same for all agents of knowledge under the right conditions, it did not matter where or how the agent of knowledge was situated. It was thought that

everyone, if they were being good epistemic agents, would see things the same way. Thomas Nagel later called it 'the view from nowhere.'[3] This conception of a detached, generic, wholly rational epistemic agent was perfectly consistent with, and one of the most powerful legacies of, Enlightenment thought.

The second half of the twentieth century has challenged this view. This challenge was initiated in a series of arguments made by Willard Quine, Wilfred Sellars, and N.R.Hanson that had the effect of de-transcendentalizing the agent of knowledge. Their arguments suggested that there simply is no point of view available to humans that enables them to transcend their location and view the world 'from nowhere.' Consequently, in contemporary epistemology, specialists in science studies, post-colonial philosophy of science, feminist epistemology, and cognitive science have all advocated an increase in the level of attention paid to the particularities of the epistemic agent or agents. In all these cases, epistemologists seek more detailed knowledge about the epistemic agent in order to inform their accounts of how we know. The way many of these theorists have put this is to say that their analyses call for the 'situating' of the agent of knowledge. This might mean situating her[4] as an organism with a certain physiology, as a person of a particular ethnic and cultural background, as a participant in a certain culturally constructed knowledge discourse, or as an information processor with a certain type of neurocircuitry. These theorists tend to believe that the particularities of the agent or agents of knowledge are often as interesting as the knowledge claims she makes because of the way that the former lend shape to the latter. The epistemic significance of these particularities points to the importance of documenting the effect of the human and

the social on the production of knowledge.

I am especially interested in exploring one particular and often overlooked aspect of an epistemic location. As photographs from space have made stunningly clear, humans are located on a deeply blue, infinitely interesting, and dramatically verdant planet that provides the conditions and possibility for absolutely everything that we do. Obviously, in some sense, the earth is our ultimate epistemic location. It is the place we know from.[5] This discussion sadly takes place against a background of the unprecedented destruction and poisoning of this planet and its biotic systems in the face of gross and ill-conceived commercial exploitation. As creatures that survive only because we are situated in delicate ecological relationships with the world around us, humans seem to me to be critically connected to the natural systems that continue to support our life on earth. As products of natural evolution and longtime residents of particular environments, humans are also profoundly (and, I shall argue, epistemically) connected to our historical, biological, and geographical roots on this planet. Contemporary discussions of situated knowledge have generally assumed that human situatedness in a natural environment is not an epistemically significant aspect of the location of an agent of knowledge. The primary claim of this dissertation is that this belief is simply false. I will argue that the natural environment belongs in contemporary discussions as an important component of the epistemic location of the agent of knowledge. In the course of making these claims, I will be pressing the notion of an epistemic location beyond discussions of the social and laboratory locations of knowledge production where it has exclusively resided in post-positivist discourse and on towards the natural locations of knowledge production.

Another way to put this would be to say that I argue for the epistemic significance of natural places.

In making these connections between natural environments and belief, I will also be pointing towards the stronger claim that it is both epistemically and ecologically irresponsible to ignore the fact that knowledge is the product of a dialectical relationship between organisms and environments. Towards the end of the dissertation, I will argue that the failure to consider the natural environment as an epistemic location is a potentially dangerous omission from an epistemology that endeavors to be both responsible and critical.[6]

There are several steps that I take to construct this argument. The first step is to show how this century's developments in epistemology are based on a realization about the production of knowledge that is similar to one made in the eighteenth century by Kant. It is this realization, which I suggest Kant realized was necessary to counter Hume's skepticism, that has made possible recent discussions of an epistemic location. I draw this parallel for two reasons. The first is to increase the evidence that a representationalist view of knowledge in which the epistemic agent is regarded as wholly passive is bankrupt. The second is to suggest ways in which those that have accepted Quine's critique of logical positivism in this century can benefit from considering how Kant responded to a similar issue in the eighteenth.

The second chapter will be a survey chapter in which I sketch the main approaches that have been taken to naturalizing epistemology in the second half of this century. I will show how, while the tendency of these approaches has been to include

more and more details about the epistemic location of the agent of knowledge, authors still invariably leave out a discussion of the natural location of the epistemic agent. I will highlight those theorists that seem to be headed in the right direction by including aspects of the material environment in their discussions. But I will suggest that even these theorists have failed to acknowledge that natural environments, as well as human constructed environments such as the lab or the university, are part of a complex and multi-layered relationship between individuals, communities, and their knowledge practices.

In the third chapter, I will place three theories from the natural sciences along side each other to indicate that there is a dialectical relationship between organisms that know and their environments. This dialectical account will serve as the general paradigm against which the analysis of the complex relationship between individual, community, and environment in naturalized epistemologies should proceed. In chapter four, I will start to move this discussion from a general claim about the organism/environment relationship to a more particular claim about how knowledge practices are tied into the activities of communities dwelling in particular natural environments over time.

The fifth chapter will be a little more speculative in nature. I will suggest a couple of different directions that one might take a stronger thesis about the 'agency' of particular environments in knowledge production. I shall use an argument for pluralism in situated knowledges to suggest that natural environments might potentially be regarded as important epistemic resources.

My discussion opens up new terrain for epistemological investigation. In

particular, by suggesting a dialectical relationship between knowing organisms and their environments, it presses naturalized epistemology in what I believe is a more fully naturalized direction. As David Abram lucidly expresses it "the encompassing earth…in all its power and depth…[is] the very ground and horizon of all our knowing."[7] As an environmental philosopher, I am particularly interested in the relationship between humans and natural environments, though I concede that the relationship between humans and artificial environments such as the laboratory will also be important for many types of knowledge practices.

I anticipate that many of my allies in this project will be found in feminist epistemology, environmental philosophy, and eco-feminism. By bringing natural environments into discussions of epistemology, I pick up on a connection made already by at least one feminist epistemologist.[8] And since developing this claim further involves articulating a rich set of connections between environmental philosophy and epistemology, I also answer a call made by ecofeminist philosopher Val Plumwood to take environmental philosophy beyond ethics and into epistemology.[9] I simultaneously engage with a second ecofeminist project. The epistemic significance of place is a way to flesh out the ecofeminist rejection of a human/nature oppositional dualism that insists on the passivity of the natural. This project should also find friends amongst those that study knowing as an embodied activity.

Rejecting Representationalism

My argument that the natural environment must be taken into account in epistemology proceeds via an argument that the agent of knowledge is an active participant in the knowledge process. This means challenging the view that an independent world supplies the epistemic agent with ideas that somehow offer a perfect reflection of reality. In the view being challenged, the agent is not regarded as contributing anything to the knowledge process except the sensory faculties. This view, held prominently by the seventeenth century British empiricists, was challenged by Immanuel Kant in his Critique of Pure Reason. To understand what it was that Kant was responding to, it is necessary to talk briefly about John Locke and David Hume.

John Locke's Essay Concerning Human Understanding was designed to be a comprehensive investigation into "the Original, Certainty, and Extent of humane Knowledge; together with the Grounds and Degrees of Belief, Opinion, and Assent."[10] This investigation proceeded through a discussion of the nature and status of 'ideas,' a term he designated as standing for "whatsoever is the Object of the Understanding when a Man thinks."[11] In Book I, Locke argued at length against the position that humans possess innate ideas, a doctrine that Locke saw as simply a mask for dogmatism. In place of innate ideas, Locke suggested that every idea is the product of sense experience. Only after the acquisition of ideas through sense experience does the understanding have anything to operate on. Prior to sense experience, which begins, according to Locke, in the womb, the mind is a blank slate. "The Senses at first let in particular Ideas," he says,

"and furnish the yet empty Cabinet."[12] Though there are "an almost infinite Variety" of things that the mind can then do with these simple ideas through abstracting from them or juxtaposing them with each other, these simple ideas gained from sense experience are the original source of all knowledge.

Locke was careful to point out that when these simple ideas are imposed upon the mind through the senses the mind assumes a passive role. There is no choice about whether or not to receive an idea from sensation. He states that "the objects of our senses do…obtrude their particular Ideas upon our minds whether we will or no."[13] Not only is there no choice about whether or not to receive an idea, there is also no choice about the shape that the idea takes in the understanding. Locke claims that "these simple Ideas, when offered to the mind, the Understanding can no more refuse to have, nor alter, when they are imprinted, nor blot them out, and make new ones in itself, than a mirror can refuse altar or obliterate the Images or Ideas which the Objects set before it, do thereby produce."[14] Though this does not mean - and in fact Locke explicitly denies it - that ideas are images or pictures of reality, it is clear that a passive mind receives through the senses ideas that in some sense are "representations" of reality that "conform" or "agree" with the material world.[15]

David Hume took Locke's contention that the objects of the understanding were ideas originating in the senses and showed that it led to some pretty undesirable consequences. For Hume, as for John Locke before him, the foundation of all knowledge was sense experience. He distinguished two different types of objects of the mind which he labeled impressions and ideas. "The difference betwixt these," he said, "consists in

the degrees of force and liveliness, with which they strike upon the mind and make their way into our thought or consciousness."[16] Impressions are the immediate product of sensation, passion, or emotion and hence contain more vivacity than ideas, which are only the faded remnants of those impressions when they are called back during thinking and reasoning. Impressions are the ultimate source of all knowledge. "All our simple ideas," Hume claimed, "proceed either mediately or immediately, from their correspondent impressions."[17]

By the time Hume wrote on these issues, Berkeley had already illustrated in A Treatise Concerning the Principles of Human Knowledge how Locke's positing of ideas as the basic contents of thought led to skepticism about the existence of the material world. The problem was that the understanding had access only to ideas and not to reality. In Berkeley's view, the appropriate way to remove this skepticism was to deny the materiality of the physical world and advocate an "immaterialist hypothesis." Berkeley did this by denying Locke's distinction between primary and secondary qualities. "For my own part," he said, "I see evidently that it is not in my power to frame an idea of a body extended and moving but I must withal give it some colour or other sensible quality which is acknowledged to exist only in the mind."[18] With this distinction dissolved, Berkeley suggested that primary as well as secondary qualities must exist only in the mind.

Hume turned Berkeley's skepticism about the existence of material objects into a general skepticism about the possibility of knowledge. Like Berkeley, Hume saw that when it comes to determining the veridicality of ideas or impressions, the mind has no

place to go for confirmation besides other impressions and ideas, which are themselves no better confirmed. This leads to skepticism about the existence of external objects. "The mind," he said, "has never anything present to it but perceptions and cannot possibly reach any experience of their connection with objects. The supposition of such a connection…is, therefore, without any foundation in reasoning."[19]

Not only does the mind have no way of making a connection between ideas and external objects, it also has no impressions of the causal connections between what it assumes to be external objects. Hume held that causation was a particularly important relation for the possibility of knowledge of the external world because the two other relations pertinent to external objects, 'identity' and 'situation in time and place,' both depended upon causation. When it comes to establishing the existence of causation itself there is a problem. Hume instructed us "cast our eye on any two objects, which we call cause and effect, and turn them on all sides, in order to find that impression, which produces an idea of such prodigious consequence."[20] Unfortunately, we find that there is no impression that produces the idea of causation. Instead we find only 'contiguity,' 'succession,' and 'constant conjunction' which are all that we can get from experience.[21] With causation reduced to constant conjunction, the physical science recently articulated by Isaac Newton was dramatically undercut.

It is notable that Hume's reflections on these weighty matters did not drive him to despair. In fact, whenever these concerns claimed too much of his attention, he reputedly resorted to a game of backgammon. He also claimed to take it for granted that "whatever may be [his] reader's opinion at this present moment…an hour hence he will be

persuaded there is both an internal and an external world."[22] But Hume's indifference to this kind of skeptical predicament, feigned or not, was certainly not shared by one of his readers on the continent.

Immanuel Kant was profoundly shaken by the skepticism Hume espoused. He was particularly concerned with how Hume's challenge to natural causality was devastating to Newtonian science. He resolved to find a way of showing what Hume denied, namely that it was possible to have objective knowledge about certain features of the physical world. Kant saw that if, as Locke and Hume supposed, nothing was presupposed by experience and all knowledge was derived from experience, then skepticism was unavoidable because the mind knew only ideas or impressions and not objects themselves. Kant felt that the way out of this predicament was to show that the very possibility of experience demanded some objective truths about the world. His guiding question therefore became "what and how much can the understanding and reason know apart from all experience?"[23]

In answering this question, Kant invoked the possibility of *a priori* synthetic knowledge, knowledge that is *a priori* because its truth is necessary, universal, and prior to experience and synthetic because its truth in not revealed by an analysis of concepts. *A priori* synthetic knowledge would be knowledge not garnered from experience but presupposed in experience. If Kant could show that there are certain things that have to be true about the world for us to have the kind of experience that we do- in Kant's terminology 'transcendentally necessary' truths - and if he could use these truths to prove the existence of external objects and of causation, then the radical skepticism espoused by

Hume would be undercut.

Kant's decision to seek a priori synthetic truths marked a radically new approach to knowledge gained through sensory experience. The problem with British empiricism that had led to Hume's skeptical predicament was that the mind did not know anything except ideas. There appeared to be no way of determining what these ideas corresponded to. The empiricist's rejection of metaphysics made this problem unsolvable. Rationalists such as Descartes, who called on a benevolent deity to solve this problem, were hardly more persuasive. Kant determined that he had to do something radical if he was to break this impass. "All attempts," Kant said, "to extend our knowledge of objects by establishing something in regard to them a priori, by means of concepts, have…ended in failure. We must therefore make trial whether we may not have more success in the tasks of metaphysics, if we suppose that objects must conform to our knowledge."[24] By suggesting that the world had to appear a certain way because of the structure imposed by the understanding, Kant was proposing a dramatic, Copernican revolution in epistemology.

In a section of the Critique of Pure Reason known as the Transcendental Analytic, Kant embarked upon such an argument. The most important step in this argument was the denial of the empiricist claim that thought involves the manipulation of impressions or ideas that are simply given in experience. According to Kant, there are always two things going on in knowledge. He stated that "Our knowledge springs from two fundamental sources of the mind, the first is the capacity of receiving representations (receptivity for impressions), the second is the power of knowing an object through these

representations (spontaneity [in the production] of concepts)" (B 74). For the possibility of knowledge, neither of these faculties could act alone. "To neither of these powers may a preference be given…without sensibility no object would be given to us, without understanding no object would be thought" (B75). The mistake made by the empiricists was to assume that concepts could be derived from impressions when really concepts were necessary in order to think anything about impressions. Kant argued that these concepts must exist *a priori* in the understanding itself.

What kind of concepts does the faculty of the understanding supply? In the first part of the Transcendental Analytic, known as the metaphysical deduction of the categories, Kant argued for the existence of twelve categories of thought that supply the formal structure all experience. This section consists in "the dissection of all our *a priori* knowledge into the elements that pure understanding by itself yields" (B89). By considering first how the understanding works in making judgments, Kant came up with a list of twelve categories that the understanding brings to its synthesis with intuitions. These categories include substance, cause, unity, negation, and necessity. The synthesis of intuition and the understanding under the form of these twelve categories supplied the conditions of the very possibility of meaningful experience. "By them alone," says Kant, "can [the understanding] understand anything in the manifold of intuition" (B106). Notice how, by making causation a condition of understanding anything about experience, Kant moves into a position from which he can combat Hume. The necessary existence of these twelve categories in understanding marks a dramatic new role for the mind in experience. Instead of the mind being a passive recipient of impressions of the

world, it in fact plays an active role in shaping the world that it knows. I shall argue that this insight, seen for the first time here by Kant, later assumed fundamental importance in twentieth century accounts of situated knowledge.

In the second part of the Transcendental Analytic, known as the transcendental deduction. Kant turned from a metaphysical argument for the existence of the categories to a transcendental one. Everything he had shown about the categories up to this point had followed from a consideration of the nature of judgment in general. In the transcendental deduction Kant sought an explanation of how "subjective conditions of thought could have objective validity" (B 122). This would show that the categories he had just deduced really did apply to judgments made by a self about an external world.

Kant argued that when the faculty of sensibility presents a sequence or 'manifold' of appearances to the faculty of the understanding there must be something outside of those appearances that supplies unity to that sequence. "The combination of a manifold in general," Kant said. "can never come to us through the senses" (B 129). We must "look yet higher" for the unity that synthesizes discrete representations into a manifold of appearances. This unity is supplied by the unity of consciousness which Kant called "the transcendental unity of apperception."

Kant's next move was to show that this unity of consciousness was possible only on the condition of the existence of an external world. He argued that the transcendental unity of apperception is possible only if there is a synthesizing of intuitions of external objects. "The thoroughgoing identity of self-consciousness cannot be thought…without the synthesis of the manifold given in thought" (B 135).[25] Only in the act of bringing

together of intuitions presented by a world of continuously existing objects is the unity of apperception possible. "The unity of this [combination] is at the same time the unity of consciousness" (B 138).

This transcendental deduction of the categories is one of Kant's most obscure arguments. It was completely rewritten between the first and second editions and supplemented in the second edition with the Refutation of Idealism. In the latter, Kant endeavored to show that the unity of apperception was a determination of the individual's existence in time which was possible only "through a thing outside me and not through the mere representation of a thing outside me" (B 275). Evaluating the strengths of Kant's arguments for the existence of external objects is a long way beyond the scope of the present project. It is enough to say that if his argument works, it shows that the twelve categories of the understanding are not only logically necessary features of judgment, they are also applicable to the intuitions that issue from actually existing external objects.

By making causation into one of the categories of the understanding that structures all empirical knowledge, Kant undercuts Hume's skepticism about causation. By making the transcendental unity of apperception, which makes the manifold of appearances possible, depend upon the existence of an enduring external world, Kant undercuts Hume's skepticism about the existence of external objects. Kant could do neither of these two things without ascribing an active role to the understanding. Contrary to the position adopted by the empiricists, passively received sense data are not an adequate foundation for knowledge. The understanding has to actively provide

structure in the form of the categories for knowledge to be possible. For the first time in epistemology, it was acknowledged that the epistemic agent actively contributes to the shape of the appearance of the world.

With the agent of knowledge adopting this active role, the problem how to get ideas in the mind to reflect or represent the structure of the world, is artfully dodged. Empirical knowledge is not a matter of ensuring a perfect reflection between ideas and the world because empirical knowledge demands that ideas and the world as it appears are already linked by certain structures. The insight Kant relied upon to relieve the deadlock presented by Hume's skeptical predicament was that facts about the knower contribute to the world as it is known. This means that it is necessary to understand knowledge as a product of the interaction of a mind and the world, a dialectic relationship which I will be pressing throughout this work. This was the only way to salvage the possibility of Newton's physics from Hume's skepticism. As we will see next, Kant's solution to the problems posed by Hume finds a similar expression in certain aspects of post-Quinean contemporary epistemology.

Rejecting Representationalism Again

This discussion of how Kant went about resolving the skeptical questions posed by Hume is interesting because of the way Kant's solution shares with contemporary naturalized epistemologies a commitment to investigating the capacities of the knower in order to understand the nature of the known. It also shares a rejection of the view that epistemology is a matter of finding secure bridges between mental images present to the

mind and an independent reality that the mind seeks to describe. Despite the fact that Hume ably pointed out the intractability of the problems associated with this model of epistemology and Kant went to enormous lengths indicating a direction for circumventing it, the conception of knowledge as ideas that correspond to the world found expression again in the early part of this century in the work of the Logical Positivists.

The approach of the British empiricists of the seventeenth and eighteenth century was taken up again with renewed vigor in Vienna in the early twentieth century. Coming on the heals of what they perceived to be the excesses of German Idealism, logical positivists sought to approach knowledge of physical reality scientifically. The product of this science, if it should succeed, would be truths about the physical world that were universally valid.

The inspiration for logical positivism was found in the work of Auguste Comte (1798-1857). Comte's work was part philosophy of history and part methodology for the production of knowledge. Comte argued that sciences go through three stages of maturity: the theological, the metaphysical, and the positive. In the most mature stage, a science becomes the study of relations of succession and resemblance. This was the part of this picture that inspired the logical positivists, the suggestion that all knowledge, including knowledge in non-scientific fields such as religion and ethics, could be reduced to a combination of knowledge of matters of fact and the relations between those facts. Logical positivists attempted to describe how this knowledge would be constructed.

Rudolf Carnap's Logische Aufbau der Welt provided the initial framework out of which logical positivism emerged. Much influenced by Ludwig Wittgenstein's Tractatus,

the Aufbau articulated how knowledge could be constructed of discrete sentences that represented states of affairs in the world. These sentences could be combined with each other using the logic of Russell and Whitehead's Principia Mathematica to produce more complex sentences. The purpose of using Principia logic rather than a natural language was to ensure that the material content of these complex sentences would be limited to atomic facts verifiable directly in experience. Quine later complimented Carnap for being "the first empiricist who, not content with asserting the reducibility of science to terms of immediate experience, took serious steps towards carrying out the reduction."[26] Such synthetic truths, comprised of atomic facts linked by Principia logic, would account for a large chunk of all possible knowledge. The only other kind of knowledge, analytic truths, would come from the analysis of concepts. The emphasis on the reducibility of synthetic truths to atomic facts gathered from experience was a crucial part of logical positivism. Otto Neurath later persuaded Carnap that these basic sentences should not be in the language of phenomena, as Carnap originally suggested in the Aufbau, but in the language of physical objects. As a result, the 'protocol' sentences out of which all empirical knowledge was built were supposed to correspond directly and immediately with states of the world.[27]

It is possible to see from this why logical positivism considered that its intellectual roots were located in seventeenth century British empiricism. A manifesto produced in 1929 under the title "The Scientific World View: The Vienna Circle" traced logical positivism back to Hume. Despite the fact that the basic units out of which empirical knowledge was constructed had changed from ideas to protocol sentences, there

were several marked similarities between the two approaches. The complete rejection of metaphysics was characteristic of both positions. For the logical positivists, this rejection resulted from their approach to meaning. They adopted Wittgenstein's suggestion in the Tractatus that to understand the meaning of a sentence is to know the conditions under which its utterance is true. Statements that could not be verified, such as metaphysical statements, were meaningless. A second similarity between Logical Positivism and seventeenth century British Empiricism was the emphasis on reduction. For both groups, all knowledge of the physical world could ultimately be reduced to some basic units of sense experience, called 'impressions' by Hume and 'atomic facts' by the Logical Positivists. All knowledge was derived from these basic units or the relations between these basic units. A third similarity was a rigid distinction between truths claimed to be analytic and those claimed to be synthetic. In Hume's words, "the operations of human understanding divide themselves into two kinds, the comparing of ideas and the inferring of matters of fact."[28] For the logical positivists, analytic truths could not contain anything from experience and synthetic truths could not contain anything other than direct reports of experience. This distinction was required by both groups in order to sustain their reductionistic approaches to knowledge. Only if this distinction was a good one could knowledge ultimately be based on units of sense experience that perfectly reflected facts about the world.[29]

The position maintained by the Logical positivists relied then upon a key assumption about what was possible in observation. Observations had to be capable of providing immediate access to the world, access that provided the atomic facts that

language users manipulated. It was essential to the logical positivist position that observations at their most basic simply reflect things as they are in the world, otherwise any subsequent rational reconstructions of the world would begin with the wrong shaped building blocks. A synthetic statement had to be simply a report on the content of an experience, guaranteed to be veridical.

As a consequence of the apparent simplicity of their approach to knowledge production, a matter only of observation and logical manipulation, logical positivists believed that universal and absolute knowledge of the world was possible. The same beliefs could be arrived at by any rational being who possessed the requisite sensory faculty and knowledge of the rules of manipulation. This meant that the particularities of the epistemic agent were not relevant to epistemology. As far as the logical positivists could tell, neither observation nor the manipulation of atomic facts under the rules of Principia logic admitted any subjective factors into the knowledge process. If the logical positivists were correct about this, it would follow that generic knowers, under the right conditions, could know things universally and with certainty. This truly would be a science of knowledge.

Unfortunately, the same skeptical questions posed by Hume can easily be asked of the logical positivists. The problem is one of being unable to ensure that the basic units out of which empirical knowledge is constructed reflect reality as it actually is. Recall how Hume stated that such an inference has 'no basis in thought.' In the middle of the twentieth century, work started to appear challenging the supposition that mental entities such as ideas, impressions, and atomic facts can be an immediate reflection of states of

affairs in the world. The first challenges came in studies of perception. N.R.Hanson articulated a position he called the theory dependence of observation, stating famously "there is more to seeing than meets the eyeball."[30] Gestalt psychology early in the century by Wolfgang Koehler and Kurt Koffka had convinced Hanson that what one sees in certain situations does not depend simply on the patterns of light that strike the retina. The ability to shift between seeing the duck and the rabbit in the famous gestalt example suggests that seeing involves more than retinal stimulation. Nests of theories that are brought to observation makes seeing into a matter of 'seeing as.' Hanson extended his theory about perception to the philosophy of science. In the geocentrism/heliocentrism debate, for example, Tycho and Kepler both literally see the sun at the horizon but Tycho sees it as the sun sinking below a stationary earth and Kepler sees it as the horizon rolling over the stationary sun.[31]

Hanson showed that one always makes observations against a theoretical background that influences what one sees. Karl Popper used to illustrate this point by walking into lecture at the London School of Economics and telling his students to 'observe!' Without further instructions about the kinds of things that they were supposed to be observing his students were at a loss for where to start.

At the same time as Hanson was completing Patterns of Discovery, Paul Feyerabend published a paper which illustrated the theory dependence of statements made about observation.[32] In this paper, Feyerabend argued that statements about observations take place within observation languages that determine their meaning. Statements about observations do not exist independently of the theoretical background that sustains the

observation language. "The interpretation of an observation-language," said Feyerabend, "is determined by the theories that we use to explain what we observe, and it changes as soon as those theories change."[33] Not just observations (Hanson) but also statements about observations (Feyerabend) are therefore products of a theoretical background. As a result of this work on observation, one of the most important assumptions in logical positivism, the assumption that protocol sentences could supply theory-free facts about the world, was thrown into doubt.[34]

A related challenge to the Logical Positivist account of atomic facts had been made a few years earlier in Willard Van Orman Quine's "Two Dogmas of Empiricism."[35] The two dogmas he challenged, which he characterized as "intimately connected," were the dogma of the analytic/synthetic distinction and the dogma of reductionism. Quine noted the difficulty of providing an account of the analytic/synthetic distinction that would do the work that logical positivists wanted it to do. He illustrated how every attempt to account for analyticity had been circular. So while he was still prepared to acknowledge that truth in general "depends upon language and extralinguistic fact,"[36] he denied that either one of these conjuncts can be entirely separated from the other. "For all its a priori reasonableness," he said, "a boundary between analytic and synthetic statements has not been drawn…that there is such a distinction to be drawn at all is an unempirical dogma of empiricists, a metaphysical article of faith."[37] Without this distinction, it would be impossible to isolate the empirical content of an individual statement from the formal content added by Principia logic. This means it would not be possible to claim that atomic facts simply represented reality directly.

The other dogma of empiricists, the dogma of reductionism, relies on the idea that there are basic sentences that can be confirmed directly by experience. Quine described it as the claim that "every meaningful statement is held to be translatable into a statement (true or false) about immediate experience…[as] Locke and Hume held that every idea must either originate directly in sense experience or else be compounded out of ideas thus originating."[38] Having already problematized this claim from the direction of the analytic/synthetic distinction, Quine now problematized it again from the direction of holism.

Quine challenged the reductionist dogma by questioning how it is possible for a sentence to represent a sensation immediately. Quine first noted the progressive shift of this basic unit from the idea to the term to the sentence. This latter shift was the result of the influence of Russell's theory of descriptions. Next, aligning himself with Duhem,[39] Quine challenged the empiricist supposition that statements "taken in isolation from their fellows, can admit of confirmation or infirmation at all."[40] He suggested that confirmation (or something like it) actually takes place in bigger units. He advocated an holistic approach to knowledge entailing that "our statements about the external world face the tribunal of sense experience not individually but only as a corporate body."[41] He introduced the metaphor of a web to illustrate how belief fits together. This rejection of the reductionist dogma connects with the rejection of the analytic/synthetic dogma because the latter states that there is no limiting case of statements with only analytic or only synthetic content. "It is the root of much nonsense," claimed Quine, "to speak of a linguistic component and a factual component in the truth of any individual statement."[42]

Without these limiting cases, sense experience must support theory holistically rather than atomistically.

A number of consequences follow from this holism. Echoing Duhem's earlier development of this idea, Quine claimed that theory is always underdetermined by experience. "We have no reason to suppose," he said, "that man's surface irritations even unto eternity admit of any one systematization that is scientifically better or simpler that all others."[43] The fact that a scientific theory is meant to cover more data than have been tested guarantees that there is no unique fund of experience that will confirm a given proposition. Quine referred to this underdetermination as an 'empirical slack.' The empirical slack in the web of belief means that every belief is potentially subject to revision. Quine claimed that experience touches belief only at the edges of the whole web. A recalcitrant experience at the edge can always be accommodated by making adjustments elsewhere in the web. "[T]he total field is so underdetermined by its boundary conditions," he says, "...that there is much latitude of choice as to what statements to reevaluate in the light of any single contrary experience."[44] And with all this slack between theories and data it becomes important to ask why one particular theory was chosen over another.

The explosion of these two dogmas in Quine's paper marked the end of logical positivism as the dominant approach to epistemology. A whole sequence of papers from the mid-nineteen thirties onwards, some written by former champions of positivism, had already seriously compromised its project. Carnap, for example, had distanced himself from the verificationist approach to meaning in "Testability and Meaning" (1937). He

had also, in his Logische Syntax (1934), turned towards semantical analysis as the main task of philosophy and identified some of his earlier concerns as 'pseudo-questions.' Carl Hempel pointed out a paradox inherent in the Logical Positivist approach to confirmation in his "Studies in the Logical of Confirmation" (1945). He also critiqued the verificationist theory of meaning in "Problems and Changes in the Empiricist Criterion of Meaning" (1950). Wilfred Sellars (1956) critiqued the 'myth of a given' in experience. A little later on, Nelson Goodman's 'new problem of induction' (1965) detailed how the properties of objects in the world have only 'degrees of entrenchment' depending upon the object languages being used. Together these arguments, even without Quine's criticism of the two dogmas, revealed the intractable difficulties attending the problem of verification in logical positivism.

But these problems are not limited to logical positivism. They will recur in any representationalist version of empiricism. The breakdown of the analytic/synthetic distinction showed that there are no purely synthetic statements. This means that the notion of an idea or an atomic sentence that simply represents reality, a notion essential to British empiricism and to logical positivism, is inherently problematic. The foundations upon which representationalist accounts of empirical knowledge are constructed – whether those foundations be ideas, impressions, or protocol sentences - are inherently dubitable. "The Humean predicament is the human predicament," cracked Quine.[45]

The reason why I have spent so long on my account of these 'two crises in empiricism' is that I believe they illustrate the need for an account of empirical knowledge that does not demand any basic units said to directly correspond with an

independent reality. The problem with the traditional picture - that there appears to be no way of confirming that ideas or sentences purporting to represent facts about the world actually do so - has repeated itself at two important junctures in the history of philosophy. We might still believe that knowledge has something to do with a combination of language and extralinguistic fact but, if we take Quine and Hume's critiques seriously, we should be suspicious of whether we can know extralinguistic facts to be veridical. On this issue, Quine opined, "I do not believe that we are any further along than where Hume left us."[46]

Kant's way around the skeptical problem presented by Hume was to suggest that knowledge is possible only if knowers are not simply passive recipients of sensation. According to Kant's transcendental deduction of the categories, the epistemic agent does not just collect accurate representations of the world in experience out of which she reconstructs an account of the world. Structures of the understanding make a substantial and important contribution to knowledge. In the next chapter, I will show how Quine's response to the demise of Logical Positivism parallels Kant's response to Hume's skepticism because they both acknowledge that facts about the knower are relevant to epistemology. For Kant, these are facts about all knowers in so far as they embody transcendent reason. Quine's own version of the Copernican revolution goes further than Kant's by rejecting his transcendental arguments. I will show how Quine's own followers have gone even further than he did. But I hope that it will be clear by the end of the next chapter why I think that none of them have yet gone far enough.

Notes

[1] Francisco J. Varela, Evan Thompson, and Eleanor Rosch, The Embodied Mind: Cognitive Science and Human Experience (Cambridge, MA: MIT Press, 1991), 134.

[2] Lorraine Code is the theorist that has spent the most time developing this notion of an epistemic location. See her What Can She Know? Feminist Theory and the Construction of Knowledge (Ithaca: Cornell University Press, 1991).

[3] Thomas Nagel, A View from Nowhere (Oxford: Oxford University Press, 1980)

[4] I will use the feminine pronoun throughout this dissertation to remind the reader that the generic knower that traditional epistemology embraced is not necessarily male.

[5] Some time in the future, when humans start to spend larger parts of their lives in space, this claim may have to be amended.

[6] The notion of 'epistemic responsibility' is one that is developed by Lorraine Code in her book of that title. It suggests that epistemologists need to describe ways of producing knowledge that are not only responsive to the facts, but also to the needs of communities that are producing them.

[7] David Abram, The Spell of the Sensuous (New York: Vintage, 1996), 217.

[8] See Lorraine Code, "What is Natural About Epistemology Naturalized?" American Philosophy Quarterly 33, no. 1, (January 1996): 1-22 and Sandra Harding, Is Science Multi-Cultural? (Bloomington, IN: Indiana University Press, 1998).

[9] Val Plumwood, "Nature, Self, and Gender: Feminism, Environmental Philosophy, and the Critique of Rationalism," Hypatia 6, no. 1, (Spring 1991): 3-27.

[10] John Locke, An Essay Concerning Human Understanding (Oxford: Clarendon Press 1975), 43.

[11] Ibid., 47.

[12] Ibid., 55.

[13] Ibid., 118.

[14] Ibid.

[15] Ibid, Book II.

[16] David Hume, A Treatise of Human Nature, 2nd ed., ed. L.A. Selby-Bigge (Oxford: Clarendon Press, 1976), 1.

[17] Ibid., 7.

[18] Berkeley, Principles of Human Knowledge, ed. G.J. Warnock (London: Collins 1962), Part I, Section 10.

[19] Hume, Treatise, 67.

[20] Ibid., 75.

[21] Ibid., Book I, Part III, Section 6.

[22] Ibid., 218.

[23] Immanuel Kant, The Critique of Pure Reason, tr. Norman Kemp Smith (New York: St. Martin's Press 1965), A xvii. (Pagination letters A and B are standard notation for referring to the first and second editions respectively).

[24] Ibid., B xvi.

[25] Kant gives a crucial role to the imagination in this synthesizing activity.

[26] Quine, From a Logical Point of View (Cambridge: Harvard University Press, 1953), 39.

[27] Logical positivism did not retain the same form throughout its years of influence. In fact, debates between Neurath, Carnap, Schlick, and Ayer lead to a gradual relaxing of some of its more stringent tenets. For example, Carnap later challenged radical reductionism in "The Unity Language of Science" (1935) and challenged the verificationist theory of meaning in "Testability and Meaning" (1936). However, here I articulate only the most simplistic account of logical positivism since this is the one most easily slayed by Quine's arguments.

[28] Hume, Treatise, 463.

[29] It was this bifurcation of truths into those arrived at from the analysis of concepts and those arrived at from experience that Kant challenged with his notion of the a priori synthetic.

[30] N.R.Hanson, Patterns of Discovery (Cambridge, U.K.: Cambridge University Press, 1958).

[31] See John Losee, An Historical Introduction to the Philosophy of Science, 2nd ed, (Oxford: Oxford University Press, 1980), 201.

[32] Paul K. Feyerabend, "An Attempt at a Realistic Interpretation of Experience," Proceedings of the Aristotelian Society 58 (1958): 160-2.

[33] Feyerabend, "An Attempt at a Realistic Interpretation of Experience," 164.

[34] Wilfred Sellars' attack on the 'myth of the given' in "Empiricism and the Philosophy of Mind" (1956) was also an important part of this challenge to what is given in observation.

[35] W.V.O. Quine, From a Logical Point of View, Chapter 2.

[36] Ibid., 36.

[37] Ibid., 37.

[38] Ibid., 38.

[39] Pierre Duhem, The Aim and Structure of Physical Theory, trans. P.P.Wiener (Princeton: Princeton University Press, 1954).

[40] Quine, From a Logical Point of View, 41.

[41] Ibid.

[42] Ibid., 42.

[43] Quine, Word and Object (Cambridge, MA: M.I.T. Press, 1960), 23.

[44] Ibid., 42-3.

[45] Quine, "Epistemology Naturalized" in Ontological Relativity and Other Essays (Columbia University Press: New York, 1960). This did not worry Quine because clearly some beliefs are better supported by the evidence than others.

[46] Quine, "Epistemology Naturalized," 72.

CHAPTER II

NATURALIZING WITHOUT PLACE

> When we enter the landscape to learn something, we are obligated, I think, to pay attention rather than constantly to pose questions. To approach the land as we would a person, by opening an intelligent conversation. And to stay in one place, to make of that one long observation a fully dilated experience. We will always be rewarded if we give the land credit for more than we imagine, and if we imagine it as being more complex even than language.
> - Barry Lopez[1]

> Places are important because all we really have are our particular places, our localities. We do not live in the universal, only in our small portions of the universe.
> - Sherman Paul[2]

Naturalizing Epistemology

Quine's response to the skeptical problem was significant. It opened the door to a whole new approach to epistemology. Instead of starting over and attempting to determine how to ensure that statements about the world corresponded exactly with how the world is, as thinkers such as Descartes had done, Quine accepted the hand humans had been dealt. He decided that the Cartesian quest for certainty was misguided. Skepticism is, after all, the human predicament. This realization led Quine to a radical approach to epistemology.

Quine adopted a distinction articulated by Carnap between 'internal' and 'external' questions in order to argue that the kind of approach that seeks correspondence between beliefs and the world is misguided. According to Carnap, questions concerning the existence of entities can only be asked from within a given theoretical framework; that is, internally. What Quine called in "Two Dogmas" the 'doctrinal question,' the question of whether one's theories about the world really reflect or represent features of the world itself, is a different type of question, an external question, that it makes no sense to ask.[3] The skeptic, in other words, is asking a pseudo-question. It follows that epistemology need not be concerned with questions of correspondence.

If epistemology need not be concerned with correspondence, then what should it be concerned with? The question epistemology should be concerned with, according to Quine, is how humans manage to move from the "meager input" of the surface irritation of their sense receptors to the "torrential output" of their theories and world views. How is it that humans can move from "two-dimensional optical projections…various impacts of airwaves on the ear drums some gaseous reactions in the nasal passages and a few kindred odds and ends" to, say, the theory of relativity?[4] This, thought Quine, is a question that can and must be answered empirically.

Making a commitment to answering this question empirically means naturalizing epistemology. A naturalized epistemology, according to Quine, draws on the best current theories in the sciences to account for how humans form their theories about the world. Implicit in all naturalized epistemologies is the belief that the agent of knowledge is a part of the same physical world and subject to the same physical laws as the rest of nature.

Adapting a phrase of early naturalist John Dewey, knowledge construction is in as well as of nature.[5] Gone is the belief that knowing is a matter of transcending one's situation in nature in order to know from nowhere. Since human beings are products of nature, epistemological questions should be investigated in the same way as other questions about the natural world are investigated. "Better to discover how [knowledge] is in fact developed and learned than to fabricate a fictitious structure to a similar effect," Quine suggested helpfully.[6]

In a naturalized epistemology, knowing is no different in kind from other natural activities such as breathing, talking, or digesting. A science that investigates how we know should, therefore, proceed not much differently from a science that investigates how we digest. As a committed empiricist, Quine maintained that all knowledge originates in the stimulation of sense receptors. He thought that epistemology should be concerned with what happens after these receptors are stimulated. If you take this tack, then epistemology "simply falls into place as a chapter of psychology. It studies a natural phenomenon, viz., a physical human subject."[7] Hume's skeptical question is simply not relevant to this study.[8]

Quine's naturalized approach to epistemology entails a more pragmatist orientation towards belief. He had given advanced warning of this in "Two Dogmas."[9] For Quine, knowing is a matter of "bridge building" that enables us to make it from one sensory stimulation to the next. The concepts and theories that humans adopt must always cohere in such a way that they make sense of the multiple and disparate sense data that humans are continually picking up. Theories bridge the gaps between sense data.

But these bridges must be constructed conservatively. Quine's incorporates the Darwinian insight that only those concepts and theories that can be used to make accurate predictions about the future will enable their bearers to survive and will thus survive themselves. Radical changes in theory must be approached cautiously.

In what follows, I wish to press a little further what I take to be the major insight that Quine brought to epistemology. Turning epistemology into a branch of empirical psychology means investigating the capacities of the epistemic agent in order to account for knowledge. This is the insight that in order to account for the nature of the known, one has to take into account the nature of the knower. Particularities of the knower, this insight tells us, particularities that Quine thought empirical psychology could best describe, are the key to forming an accurate account of how knowledge is constructed.

The soundness of this insight is confirmed by the fact that it parallels an insight appreciated by Kant in the eighteenth century.[10] In order to get around the skeptical question posed by Hume, Kant offered his Copernican revolution and made the claim that the nature of the known is constrained by structures brought by faculty of the understanding. In Kant's case, the constraints are revealed by transcendental argument. In Quine's case, the constraints are revealed by investigation of human biology. But notice how both Kant and Quine, in responding to the problem inherent in representationalist empiricism, shift the emphasis in epistemology away from exclusive attention to the objects of knowledge and towards the agent of knowledge. In both cases, the agent of knowledge becomes epistemically active.

Quine made some considerable advances over Kant. Quine's Copernican revolution was more radical because, while Kant endeavored to defeat Hume's skepticism, Quine decided to accept it and work with its implications by including revisability into the web of belief. Another significant difference between Kant and Quine is that Kant arrived at his constraints on the nature of the known through transcendental argument while Quine suggested empirical investigation of the agent's biology. In letting go of a priorism, Quine proved himself capable of casting off some weighty philosophical baggage. In this respect, Quine's approach is a clear advance over Kant's because it incorporates the fact that humans are natural creatures and products of biological processes.[11] Kant's arguments were based on a Christian, creationist perspective in which reason was the key to separating humans from the rest of nature. Quine's position entails that there is no difference in kind between the human organism and other organisms in nature thus making his arguments more in tune with an evolutionary story. But despite several significant differences, I am going to take it that Kant and Quine shared an important insight about how to study knowledge. They each saw that the way to respond to Humean skepticism was to articulate a role for the epistemic agent in the construction of knowledge. It is with this insight that epistemology can really start to engage with the world in interesting ways.[12]

Once you reject the part of the epistemological tradition that holds that the nature of the knower is irrelevant to what she can know, the agent of knowledge changes from being just a passive recorder of information into being an active participant in the knowledge process. Paying attention to the nature and situation of the agent of

knowledge yields an epistemology that is newly engaged with the world. Epistemological argument no longer need to be transcendental. Knowing no longer has to be treated as the formulaic activity of disembodied rational selves. This is potentially a rich and rewarding territory to explore. It releases epistemology from the stove heated room in which Descartes had locked it. A naturalized epistemology is an inherently grounded endeavor that demands that epistemology be an investigation of the real world conditions of knowledge production.

In what follows, I will trace two different general approaches to naturalizing epistemology that have dominated the discourse since Quine. For heuristic purposes, I will call these 'hard' and 'soft' approaches. In the course of illustrating how these approaches have gradually increased the range of variables relevant to a thorough consideration of the agent of knowledge, I shall note an important turn that they both take. Those looking for the relevant particularities of the epistemic agent have increasingly found themselves having to look back out from the individual and onto the relationships she has with the world in which she resides. Epistemic agents are part of communities, practices, and environments that form a crucial part of how it is that they know. It is the consideration of this wider context that is crucial for the richer situating of the agent of knowledge that is the central claim of this dissertation. I shall end this chapter by suggesting that those that have begun to look at this wider context have failed to recognize that natural environments, as well as artificial environments, form a significant part of this context in many knowledge practices.

Naturalizing with the "Hard" Sciences

The first approach to naturalizing, the one that Quine thought was the only approach, involves using the natural sciences to determine how the human as a biological agent comes to hold her beliefs about the world. Perhaps because scientific studies of mind are not really in the province of traditional philosophical research, this area has often appeared to be slightly outside the province of epistemology. Nor have scientific studies of mind until recently really been adequate to the task. The lack of a well developed empirical psychology in Quine's time hindered his own efforts at naturalizing epistemology. It was not until studies in artificial intelligence began to benefit from computer modeling, in a field originally known as 'cybernetics,' that scientific studies of mind really began to take off.

The use of digital computers yielded what was initially the most popular strain of this science, a strain that Varela, Thompson & Rosch (1991) have labeled 'cognitivist.'[13] This approach is characterized by the belief that the nervous system is the type of system that can be accurately modeled on digital computers. It employs the metaphor of intelligence as computation. The brain, like the computer, is taken to be a complicated symbol manipulator. The neurobiology of the brain is taken to resemble the electronic circuitry of the computer. Representatives of this approach are Pylyshyn (1984) and Fodor (1983).

The cognitivist approach has certain disadvantages. For one thing, it takes an eliminative approach towards conscious experience. Experience becomes, at best, an

epiphenomenon of computational processes and cognitivists are faced with what Jackendoff (1987) has called the "mind-mind" problem of having to reconcile the computational mind and the phenomenal mind. A second problem with the cognitivist approach is that it is still suggests an essentially representationalist view of knowledge. Cognitivist models see the brain as an information processor with inputs and outputs and representations filling the space between. It is, to be sure, an account of representation that is much more scientifically informed than the Humean account. Humean ideas have been replaced by symbols. But these symbols still have to represent the world in certain ways. Given the deeply entrenched representationalist biases of empiricism discussed above, it is unsurprising that early approaches to cognitive science might unwittingly reinscribe some of the familiar representationalist assumptions. But having come to naturalizing in this work as a way of escaping the problems of representationalist empiricism, it seems prudent to avoid all talk of symbols, ideas, and impressions as the basis of cognition.

A second approach, the emergent or connectionist approach, does not begin with the processing of symbols believed to represent reality. Connectionist models take a more organic approach to cognition in which the whole system must function together in order to allow the emergence of consciousness. Unlike cognitivism, this approach does not interpret cognition as the sequential following of rules applied to symbols. The connectionist model is much closer to a biological system than the cognitivist model since the nodes forming the heart of the system are meant to directly model the neurons of the brain. As in the brain, sequences of nodes run parallel to each other when performing

a function. This means that in the event of damage to one path of connections, parallel paths can take over with little loss of function. Connectionist models replace symbol manipulation with numerical operation. Operations occur simultaneously rather than sequentially. Cognition is characterized as "[t]he emergence of global states in a network of simple components."[14] Representatives of the connectionist approach are Dennett (1978), Churchland (1984), and Grossberg (1984).

Despite the fact that connectionist approaches do not start from the model of symbol manipulation according to rules, they do not necessarily eliminate symbols altogether. Varela, Thompson, & Rosch claim that a connectionist system is compatible with a symbolic description emerging at a higher level. It is just that these symbols are "ultimately embedded in an underlying distributed system" which Varela calls 'subsymbolic.'[15] Varela, Thompson, & Rosch characterize this higher level of symbolic representation as "approximate macrolevel descriptions whose governing principles reside at subsymbolic levels."[16] They claim that this makes connectionist accounts into just a bottom up approach to a problem that cognitivists approach from the top down.

Connectionist models are also conservative in the way that they separate the brain from its sensory inputs. Cognition still very definitely goes on in the brain and the brain is, in principle, isolable from the body. Brain activity occurs as a result of the stimulation of sense receptors. One positive result of this is that the study of cognition increasingly begins with a study of perception rather than with a ghostly introspection of mental states. But it also reveals how, just as with the cognitivist approaches, cognition is still to be understood as a process of turning inputs into outputs. For this reason connectionists

usually do their research with a computer standing in for brain being fed with inputs. Input-output approaches like this appear to miss the central Kantian insight of how the individual lends shape to the inputs. So it turns out that connectionist models bear the lingering traces of seventeenth century empiricist dogma - a latent representationalism, a brain/body split, and an input-output approach - even if they do sidestep the more blatant, explicit representationalism of cognitivist accounts.

The third contemporary approach to cognition is labeled by Varela, Thompson & Rosch the 'enactivist approach.' I will describe this approach in considerably more detail than the other two because I believe that it best incorporates the Kantian and Quinean insights that I take to be an important part of overcoming Humean skepticism.

The enactivist approach is acutely aware of the problems inherent in reinscribing representationalist credos into cognitive science. It rejects the idea of a pregiven world with extrinsic properties that the mind attempts to map. Enactivists concur with Richard Rorty's contention that "representation, as opposed to increasingly complex adaptive behavior, is hard to integrate with an evolutionary story."[17] Instead of representing an independent world, the cognitive system "enacts a world as a domain of distinctions that is inseparable from the structure embodied by the cognitive system."[18] Enactivism includes the Kantian synthesis between sensibility and understanding. In so doing it takes seriously the role of the agent in shaping cognition.

Enactivist accounts carve out an original space between empiricism and rationalism. In the former, representations recover what is outer, in the latter they project what is inner. The middle ground involves consideration of cognition as what Varela,

Thompson, and Rosch call "embodied action." Because of the key role that this notion will play in later parts of this dissertation, I will quote their definition at length:

> By using the phrase embodied we mean to highlight two points: first, that cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological, and cultural context. By using the term action we mean to emphasize once again that sensory and motor processes, perception and action, are fundamentally inseparable in lived cognition. Indeed, the two are not merely contingently linked in individuals; they have evolved together.[19]

The connection between cognition and sensorimotor capacities is crucial for two reasons.[20] First, it serves to connect cognition to the body of the agent of knowledge. Cognition is not something that can be understood solely by studying the mind or brain. Second, it opens a space in which differences between the sensory-motor (embodied) activities of individuals might later become significant for understanding cognition. This marks the first positive step away from the universal empirical psychology and the generic knower that Quine assumed. When discussing the 'soft' approaches in the next section, the importance of acknowledging the epistemic significance of differing activities becomes manifest.

The importance of understanding cognition as being derived from embodied activity was something that had already been appreciated by Piaget. Piaget's primary interest was in childhood development. He wanted to account for the progression that a child makes from the state of relative helplessness at birth, to the considerable autonomy exhibited by early childhood. He speculated that the formation of

certain sensorimotor patterns, which he labeled 'schemas,' played an important role in this process. Piaget defined a schema as "the generalizable characteristics of [an] action, that is, those which allow the repetition of the same action or its application to a new content."[21] Schemas are embodied patterns of interaction that individuals employ in situations that resemble each other.

According to Piaget, the growing child develops a number of schemas out of her sensori-motor interactions with the world. A few schemas, such as those necessary for breathing, suckling, and grasping are present at birth. The rest are learned through experience, though their range is tempered by biological constraints. The repertoire of schemas possessed by the child changes and evolves over time. New and additional schemas are not created *ex nihilo* but are a product of schemas already in existence and further experiences in the world. In order to recognize the Kantian insights, notice how the world does not present any intrinsic properties to the individual during experience. All experience is already shaped by existing schemas. There is a circle here that keeps the agent from direct access to the world itself. Schemas emerge out of a dialectical relationship between self and world. Contemporary schema theorists Mary Hesse and Michael Arbib describe Piaget's position as one of "dynamic Kantianism." It is dynamic because for Piaget these structures are continually evolving while for Kant they are fixed transcendentally.[22]

Piaget's schematic account of learning is one that can equally apply to non-humans that possess similar sensory and motor equipment. In all cases, organisms have a world shaped by their schemas. Schemas are also what enables them to act in that world.

Throughout Piaget's account of learning, the focus is not so much on how the organism knows or on how the environment appears as on how the organism and environment interact. His schematic account is, therefore, not so much a story of an organism learning about a world as of an organism adapting to one. According to Piaget, only out of this 'know how' can an organism later learn to 'know that.'[23]

Piaget goes from sensorimotor action to cognition by erasing the boundary between the two. He makes it a difference of degree rather than of kind. His account of childhood development includes the increasingly formal and abstract utilization of schemas. Generalization from schemas that govern particular sensorimotor functions allows for cognitive development through four stages of maturity that Piaget termed the sensorimotor, the pre-operational, the operational, and the formal operational. At the formal operational level, the individual engages in the kind of abstract thought that has traditionally claimed exclusive possession of the honorific 'propositional knowledge.' At this final stage, Piaget's account is not just a story of sensori-motor achievement but the basis of an epistemology.

Any attempt to turn Piaget's account into a fully fledged epistemology would need to retain his emphasis on cognition as a derivative of embodied interaction with an environment. Mary Hesse and Michael Arbib, in their 1986 Gifford Lectures,[24] stress how a Piagetian approach to epistemology offers "a theory of the embodied self, rooting human knowledge in the body's interaction with the world."[25] This approach seems to me to be essential if a naturalized epistemology is to be consistent with an evolutionary story. If cognition is something that evolved in humans, then we need a theory of how the

relationship between humans and their activities in an environment shaped its development. There must have been something about embodied activity in certain Paleolithic environments that enabled cognition to evolve in the way it did. As two enactivists put this point, "[p]hilosophically, the embodiment of reason via the sensory-motor system is of great importance. It is a crucial part of the explanation of why it is possible for our concepts to fit so well with the way we function in the world. They fit so well because they have evolved from our sensory-motor systems which have in turn evolved to allow us to function well in our physical environment."[26] Any explanation of cognition must, therefore, make room for a description of human embodied action in an environment.

The best attempt at rooting cognitive science in sensori-motor activity in an environment is to be found not in any disciples of Piaget but in the enactivist account of cognition developed by Mark Johnson. In The Body in the Mind, Johnson shows how a number of the image schemas that structure cognition emerge directly out of embodied activity.[27] Though The Body in the Mind is not primarily a work of epistemology, but a work of philosophical psychology, Johnson supplies many of the missing pieces for a richly naturalized epistemology. What Johnson endeavors to do is to banish the notion of a disembodied rational ego and its accompanying specter of the brain in the vat by putting the body solidly back in the mind. Just as in Piaget, embodied activity becomes the key to understanding cognition. The result is a Kantian constructivism that is grounded not in transcendental reason but in the particularities of the body.

Like Piaget, Hesse and Arbib, Johnson employs the notion of an embodied schema.[28] He defines a schema as "a recurring, dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience."[29] Examples of image schemas are 'contact,' 'part-whole,' 'center-perifery,' and 'balance.' Johnson holds that image schemas emerge out of an organism-environment interaction. It is because humans are embodied creatures, embedded in particular but constantly changing situations, that they need image schemas in the first place. Johnson gives eight kinds of evidence for the existence of image schemas then turns to explain how these schemas are products of embodied activity.

The balance schema is given the most extensive treatment in The Body in the Mind. It is clear that this schema emerges out of experiences in the world possible only for creatures with a particular type of body. The bipedal, erect nature of human posture makes balance particularly important. The location of the head with all its important organs on the top of the body nearly two meters above the ground means that the failure to succeed at balance has deleterious effects on survival. Because we live with balance all our lives, it fuses almost unnoticed into schematically structured experience of the world. "The experience of balance," says Johnson, "is so pervasive and so absolutely basic for our coherent experience of the world, and our survival in it, that we are seldom ever aware of it."[30]

The bodily experience of balance generates an image schema that, at a sensorimotor level, ensures that the body becomes good at doing what is needed to preserve it. Johnson describes how balance can be experienced bodily in several different

ways; in standing upright, in carrying equal loads in each hand, and in the experience of homeostasis in bodily organs.[31] Likewise, source-path-goal schemas are connected to the human ability to locomote and container schemas are connected to the ability to put food inside the body and the ability to move the body from the inside to the outside of an enclosed space.

Johnson shows how schemas are then extended to applications beyond sensorimotor function. Image schemas have "definite internal structure that can be figuratively extended to structure our understanding of formal relations among concepts and propositions."[32] The balance schema gets extended to non-sensorimotor, conceptual levels to structure our understanding of the world in ways that are useful to us beyond simply the ability to stand upright.[33] For example, the balance schema provides the structure for our conception of legal justice, moral fairness, psychological health, systemic balance, and mathematical equality.

The important point here is that abstract concepts such as fairness and equality have their roots in the peculiarities and activities of human bodies. It is only because humans are bipedal and erect that the balance schema comes to feature so heavily in the human schema assemblage. If humans got around like millipedes, if they had much lower centers of gravity, or if their most sensitive organs were in their feet, then the balance schema would likely be less important. Humans learn about balance, not by being taught it, but by feeling it with their bodies. Fish don't experience this because they can't fall over or balance loads on each fin.

If cognition is connected so firmly to embodiment then Nagel's insight was right. Humans could never know what it is like to be a bat. By connecting cognition so firmly to embodied action as Varela, Thompson & Rosch recommended, Johnson finally grounds epistemology in the body instead of just the circuitry of the brain as the cognitivists and connectivists had done. The emphasis is also firmly on the relationship between cognition and action, as Varela, Thompson, and Rosch recommended. As Lorraine Code makes clear in her aptly titled "What is Natural about Epistemology Naturalized?" humans are more - and other - than just information processors. They are 'marvellously corporeal,' embodied actors.[34] An enactivist account that pays due attention to the body, such as the one offered by Johnson, recognizes this fact and places it at the heart of epistemology.

Enactivism shows much promise for being an important part of a naturalized epistemology. Unlike cognitivism and connectionism, it succeeds in incorporating both the Kantian and the Quinean insights. Humans are active participants in the knowledge process, their schemas shape experience, and this influence is one that can be studied by the natural sciences. But Johnson's enactivism does raise an important issue for naturalized epistemologies. Johnson insists that to understand cognition we need to consider the whole body and not just the mind. But as soon as we being considering the whole body, it becomes clear that it is not just the body per se that is of interest, it is the kind of activities that this body engages in that lend shape to cognitive structures. Johnson himself admits that his image schematic approach describes "structures that emerge from our experience as bodily organisms functioning in interaction with an

environment."[35] Some significant considerations follow from this. In order to account for the activities of an embodied mind, enactivist approaches will have to recognize that bodily activity takes place through a complex interaction with the environments that make activity possible. One is compelled to look not just at the individual but also at the interactions that the individual has with its milieu. This relationship will be dialectical because interactions between organism and environment are shaped not only by what the environment offers, but also by what the organism perceives to be offered. What the organism perceives to be offered will always already be shaped by schemas resulting from previous organism-environment interactions. A description of this environment will, therefore, be an important part of understanding cognition.

Unfortunately, individuals do not just exist in physical environments, they also exist in complex social and cultural environments that also contribute to the organism's activity. This means that a place has to be found in enactivist accounts for complex social and political analyses that reveal how the activities of epistemic agents are shaped by their social and cultural environments. The other kind of naturalizing, naturalizing with the soft sciences, can help us with this.

Naturalizing with the "Soft" Sciences

Rather than look at how theory building takes place by considering how the mind functions, as Quine had intended, one group of theorists employed historical, ethnographic, and sociological methods to determine how theory building occurs. This is what I am describing as the 'soft' approach. In the light of fact that it is usually assumed

that science offers the paradigm case of knowledge production, many of these analyses have tended to focus on the culture that surrounds the production of scientific knowledge. While these approaches often eschew empirical psychology, they remain naturalistic because they are consistent with Quine's claim that it is better to investigate how knowledge does in fact develop, than to fabricate a fictitious structure to similar effect. There are many different ways of approaching this kind of naturalizing, but it is possible separate out a few key strains.

One of the earliest soft approaches was the historical method employed by Thomas Kuhn (1962) in his Structure of Scientific Revolutions. Though Kuhn never called himself a naturalizer, he fits the criteria that Quine laid down because he looked historically at how science has in fact proceeded. Kuhn considered a number of case studies in the history of science in order to create an inductive argument for how scientific knowledge is constructed. Through consideration of Copernicus, Newton, Lavoisier and Einstein (among others), Kuhn assembled a picture of science proceeding by process of revolution, followed by periods of normality, anomalies, crisis, and further revolution. Paul Feyerabend (1975) also employed detailed historical analysis of particular case studies to argue for his prescription of 'anything goes' as the best methodology for the pursuit of scientific knowledge. His historically situated discussions of Aristotle, Galileo, Priestley, Lorentz and Maxwell illustrated that there are never solely rational reasons that determine when one theory should be replaced by another.

Kuhn and Feyerabend were two of the earliest philosophers of science to naturalize by situating knowledge. They made it clear that the epistemic subject is always

situated in a particular historical and theoretical context and they were mainly concerned with how that context affected the chance of novel theories being accepted. It was the status of current and competing theory that interested them. Particularities about the knowing subject herself, as opposed to her historical situation, were largely left out of their analyses. This makes the scope of their situating relatively narrow. Despite this narrow focus, Kuhn and Feyerabend's writings caused an immediate and strong reaction from those that accepted the situatedness of knowledge but were unwilling to let go of the notion of progress. Imre Lakatos (1970), Larry Laudan (1977, 1984, 1987), and Dudley Shapere (1984) all attempted to reconstruct the notion of rational progress in science while granting the fact that theorists work from within a particular theoretical and historical context.

A second strain of the soft approach contains a large and expanding volume of literature. This I call the sociological strain. Broadly speaking these theorists look at the interests and values of those involved in the production of knowledge for clues as to why particular claims take one shape rather than another. This approach has the potential to add several more levels of situatedness to the agent of knowledge.

In the last twenty-five years, there have been a growing number of studies that have exposed the value biases inherent in work that, at the time, passed as value-neutral, objective science. Some of these studies have their roots in radical feminist empiricisms of the early nineteen seventies that sought to eliminate androcentric biases from the laboratory. Adrienne Zihlman, for example, exposed how man-the-hunter accounts of evolution are biased by the androcentric assumption that only men have the potential to

cause evolutionary change.[36] Ruth Bleier (1984) tracked androcentrism in biology. Cynthia Russet (1989) and Stephan J. Gould (1981) from physical anthropology showed how Victorian gender biases shaped the Victorian science of physiognomy. Nancy Stephan (1993) argued for similar conclusions about Victorian studies of race. And Robert Proctor (1993) has done the same kind of work in exposing the value biases brought to Nazi Medicine. Such studies will likely proliferate as scientific communities become more diverse because it is often people traditionally kept out of science that are best able to spot where the biases lie.[37]

These case studies all incorporate the insight I discussed in chapter one. They challenge the belief in the passivity of the agent of knowledge by showing how her value biases trickle into scientific research and theory. Bleier captures the spirit of the insight when she notes that scientists "cannot hang their subjectivity up at the door."[38] As Harding (1993) points out, value judgments occur at many important junctures during scientific inquiry including the selection of problems, the formation of hypotheses, the design of research, the formation of research committees, the collection of data, the interpretation and sorting of data, decisions about when to stop research, and the way results of research are reported.[39] Harding believes that value biases inhere so strongly in scientific practice that it might be more accurate to characterize all science as indigenous knowledge.[40]

The empirical studies cited above illustrate that agents of knowledge speak from particular epistemic locations which influence what they say. It follows that epistemic agents are not generic in their contributions to the knowledge process. In order to become

aware of how epistemic locations introduce bias, Lorraine Code suggests that we 'take subjectivity into account' by pressing epistemologists to "pay as much attention to the nature and situation - the location - of [the agent] as they commonly pay to the content of [her claim]."[41] Sandra Harding agrees with Code and requests a 'reflexive approach' to knowledge in order to reveal the agent's value biases.[42]

A more radical group of sociological naturalizers advocate what is known as the "strong program" in the sociology of scientific knowledge. The strong program, associated with the Edinburgh School of Barry Barnes and David Bloor (1982), goes beyond just looking for particular biases that distort what would otherwise be considered value-neutral scientific knowledge. Strong Programmers reject any absolute distinction between true and false, rational and irrational, subjective and objective. They advocate a 'symmetrical,' sociological treatment of beliefs held to be true and beliefs already rejected as false. In their view, the reasons for adhering to certain beliefs should always be investigated at the local level. For the Edinburgh School, the honorific 'knowledge' applies to any collectively maintained system of belief. This is a radical type of constructivism. The production of knowledge is an arena in which interests compete to 'win the game.' For Barnes and Bloor, epistemology becomes the sociological study of what it takes to for a particular corpus of belief to triumph at the local level. Once again the agent of knowledge has to be richly situated amongst a mass of socially held values.

At the same time as the strong programmers have been questioning non-local epistemological standards, there has also been a growing appreciation that the agent of knowledge may not be the individual but the community. Beliefs are not held by

individuals but negotiated by epistemic communities. Helen Longino (1990) and Lynn Hankinson Nelson (1990) both advocate a "changing of the subject of knowledge" from the individual to the community. Miriam Solomon (1994) advocates a 'social empiricism' that utilizes the community as epistemic agent to counter to the relativism she sees in the strong programmers.[43]

Before moving onto a third group of soft approach theorists, there are three important observations to make of both historical and sociological approaches. The first observation is that by stressing the importance of historical and sociological location, these theorists have moved away not only from the notion of a passive agent of knowledge but also from the notion of a single, generic agent of knowledge. Historical and social locations are taken to bring particular shapes to the knowledge claims of different groups of individuals. The second observation is that, as with the enactivist approach described in the previous section, situating the agent of knowledge has involved looking not just at the agent of knowledge, but also at the milieu in which she resides. In looking to what the individual brings to knowledge in terms of the values and interests of her society, one is forced to look back out at her interactions with society. The third point is related to this. Andrew Pickering notes how sociological approaches have done important work in thematizing the role of human agency in science. In doing this they have "partially displaced the representational idiom by seeing the production, evaluation, and use of scientific knowledge as structured by the interests of and constraints upon real human agents."[44] The down side of this, according to Pickering, is that the success of the sociological approaches has led to the neglect of the material component of scientific

practices. Sociological emphasis on the traces of human agency in science have had the unintended effect of leading to what Pickering refers to as "the invisibility of material agency."[45] Agents of knowledge, he counters, should not treated as isolable from their material (social and physical) environments. This fact is recognized most by the next group of theorists.

A third strain of the soft approach is ethnographic. Representatives of this approach look at a special kind of 'tribe' to determine how it is that they form their beliefs.[46] The tribe they are interested in is the one that occupies the scientific laboratory. The original exemplars of this approach - an approach also known as lab studies - are Bruno Latour and Steve Woolgar with their 1979 study Laboratory Life: The Social Construction of Scientific Facts.[47] Latour and Woolgar recognized that a scientist in a laboratory is not just engaged in 'representing' nature, she is also 'intervening' in nature.[48] The material technologies of the lab are 'inscription devices' that transform nature into something usable by the laboratory community. This insight is particularly relevant to my concerns because of the way it draws attention not just to the social but also the material environments in which knowledge producers reside.

Pickering claims that the recognition that laboratories intervene in nature in the process of trying to represent it necessitates a change in focus for those who study science from investigating the construction of scientific knowledge to investigating forms of scientific practice.[49] It is only by investigating practices that the material, conceptual, social, and institutional dimensions of science can be reviewed. For Pickering, scientific practice is a "mangle" in which all these dimensions are pressed together. His approach

recommends replacing what he calls the representational idiom for science with the performative idiom.

Karin Knorr-Cetina (1981, 1992, 1995) takes her own characterization of the 'manufacture of knowledge' in some of the same directions as Pickering. She first notes that, when you take this approach, the lab replaces the experiment as the vehicle through which nature is viewed. Analyzing the lab rather than the experiment creates a shift from a focus on methodology to a focus on science as a cultural activity. As Latour and Woolgar had already pointed out, there is an important sense in which the lab is simultaneously a richly social, cultural, and physical environment.

In addition to her focus on how accounts of nature get negotiated in the lab, Knorr-Cetina also points out that the study of experimental practices embodied in the physical organization and of the instrumentation in the lab opens the door to a much more wide ranging analysis of how scientific facts are constructed. Focusing on physical structures in the lab "allow[s] us to consider experimental activity within the wider context of equipment and symbolic practices within which the conduct of science is located."[50] She claims that inscription techniques used in the lab create an order of nature that is both natural and social, what Haraway calls the material-semiotic.[51] Acknowledging this ordering of nature makes the study of knowledge into a much richer and more complex project. It shows, Knorr-Cetina claims, how "scientific objects are not only 'technically' manufactured in laboratories but are also inextricably symbolically or politically construed, for example, through literary techniques or persuasion such as one finds in scientific papers, through the political stratagems of scientists in forming

alliances and mobilizing resources, or through the selections and decision translations which 'build' scientific findings from within."[52] The lab is then a gateway into a rich and complex account of the construction of knowledge that has to include both social and material actors.

A third component of Knorr-Cetina's characterization of lab studies is her recognition of the laboratory itself as "an important agent of scientific development."[53] This is the major point of departure from the purely sociological approaches. Using Merleau-Ponty's terminology, Knorr-Cetina points out that the laboratory supplies the "phenomenal field" in which experience is made in science. It is within this field that the system of "self-others-things" is reconfigured.[54] In this reconfiguration, the materiality of the lab is itself a participating agent. According to another ethnographer of science whom she cites, the laboratory functions 'like an environmental niche.'[55] The phenomenal field that the laboratory participates in is, in Knorr-Cetina's words, "the world-experienced-by or the world-related-to agents." Being able to artificially "enhance" the environment in the laboratory under electron microscopes or devices that remove background noise brings different phenomenal fields to the fore that might offer improved opportunities to analyze material objects. She claims that this is the essence of what goes on in the production of scientific knowledge since science "derives its epistemic effects from a particular reconfiguration of the natural order in relation to the social order."[56] But this reconfiguration is a product of both human and material agency. A phenomenal field requires the active participation of the lab every bit as much as the participation of the scientist.

Pickering concurs. The error made by the sociological naturalizers of considering only human agency in the laboratory can be remedied, according to Pickering, by recognizing the material agency of the technologies in the lab. As a basic assumption of his approach, Pickering asks us to acknowledge the general point that "the world…is continually doing things, things that bear upon us not as observation statements upon disembodied intellects but as forces upon material beings…think of the weather…."[57] This is an agency that he says cannot be reduced to anything within the human realm. Machines in the lab are vehicles with which to "capture, seduce, download, recruit" that material agency. Knowledge, he says, is "threaded through the machinic field of science."[58] It is the recognition of this material agency that ensures that the study of science as a practice investigates what Pickering calls "the constitutive intertwining [that] exists between material and human agency."[59] The material is at least as vital as the human. He later refers to this as a "dance of agency" and a "dialectic."

An interesting part of Knorr-Cetina's analysis of the agency of the lab is that the exact nature of what is to count as a laboratory appears to be left pretty open. In a footnote designed to illustrate how labs alter the world-experienced-by the scientist she gives as an example the fact that "a culture in which artificial light is available will have a means of extending the day and as a consequence will experience the world differently than a culture without artificial light."[60] A room with artificial light is therefore a primitive form of laboratory that offers an epistemically useful reconfiguration of the phenomenal field. Knorr-Cetina seems to be suggesting here that her insight is not limited to labs. Rather she has a more general insight about the potential of artificial

environments of various different kinds to enhance the phenomenal field.[61] If I am not mistaken, it is an insight about the agency of all physical environments in knowledge production. Walking outside on a morning when snow has fallen during the night is also a reconfiguration of the phenomenal field. This being the case, the distinction between a lab and any other type of material environment may not be too important. Bruno Latour seems also to recognize the complexity of this question of what is to count as a lab when he claims that Lois Pasteur's experiments with the anthrax virus problematize what is inside and what is outside the lab. Since half of Pasteur's experiments took place on the farm, Latour argues that the inside/outside boundary is meaningless and "noone can say where the lab is and where society is."[62]

The thesis that Knorr-Cetina is moved by a more general insight about the agency of artificial environments appears to be confirmed by her suggestions in a recent article about the directions in which laboratory studies might go in the future. She thinks that lab studies should extend their range of investigation beyond the lab and into settings such as "the clinic, the factory, the garden, and the government agency." Ed Hutchins has recently done one such study in his analysis of how knowledge is constructed on a navy ship.[63] Knorr-Cetina seems to be suggesting that what has been learned from lab studies can be applied in studies such as Hutchins' "to larger questions about the localization of experience in multiply embedded and varied sites." She wonders about "what different patterns emerge when we consider these sites in regard to their epistemic relations to an environment."[64] Clearly, Knorr-Cetina thinks that lab studies has taught us lessons that can be applied to studying knowledge outside of the lab. One way of re-interpreting these

lessons into a more general claim might be to say that a rich account of knowledge must include analysis of the agency of any material environment that surrounds the knowledge producing individual or community.

A fourth point that Knorr-Cetina makes about lab studies approaches, one that supports Pickering's observations about a dance and a dialectic, is that the materiality of the lab reflects back to shape the scientists who do their work there. In her words, labs magnify parts of the social order to produce "enhanced agents." The soft approaches I have already discussed acknowledge that social and political considerations lend shape to scientist's conduct. What Knorr-Cetina adds to this is the claim that "the social is not merely 'also there' in science…[r]ather, it is capitalized upon and upgraded to become an instrument of scientific work." In the laboratory, she adds, "agents are enhanced in various ways so as to fit a particular order of self-other-things, a particular ethnomethodology of a phenomenal field."[65] The example she offers of a scientist as an enhanced agent is when the research crew requires one of its members to do some measuring but is unable to offer formulaic instructions for what and when to measure. The research crew depends upon the individual having an intuition or feel for the material. Knorr-Cetina claims that this makes the scientist into a 'method' of going about inquiry. Such an enhanced agent is shaped by he laboratory arrangement to be a particular kind of epistemic agent. The fact that labs create enhanced agents means that there is a dialectic at work here between the laboratory, the scientists, and their knowledge claims.

A fifth and final point of interest in Knorr-Cetina's approach to lab studies is how she has come to emphasize the inherently local nature of science that lab studies suggests. The field of self-others-things is reconfigured one place at a time though the engagement of the scientist with the materiality of the lab. In every research project in a laboratory, a particular configuration of the social order is lined up alongside a particular configuration of the natural order. This local emphasis in lab studies, she says, "flies in the face of received interpretations according to which claims and procedures in science are standardized and universal and according to which the local environment is merely incidental to the generation of particular results."[66] In a statement echoing Haraway's assertion that feminist objectivity is a matter of partial perspective, Knorr-Cetina claims that results in the laboratory become "more solid" and interesting through local specifications. This point is related to her previous remarks about the agency of the particular material environment. Though results may be reproducible in other laboratories, there is an important sense in which lab studies acknowledges the localness of research in the light of the fact that the local environment is constitutive of particular results. Adopting some of Sandra Harding's terminology, this makes particular scientific results indigenous to particular experimental arrangements. These five points that Knorr-Cetina makes about lab studies approaches illustrate that one of the most significant things that they do is they bring the material environment alive.

Varieties of Environments

The distinctions I have made between historical, sociological, and ethnographic strains of the soft approach are fairly roughly made cuts through a tangled mass of theories. Moreover, the tangle is getting bigger at an impressive rate.[67] The thread that connects all three approaches is the commitment to using the 'soft sciences' to situate the agent (or agents) of knowledge. Despite the tangle, there are two points of note. First, it is clear that since Kuhn (1962) there has been a gradual expansion in the number of factors that have been deemed relevant components of an agent's epistemic location. The historical, social, and material situation of the agent (or agents) of knowledge are all shown to be relevant in different versions of the soft approach. Even within just the sociological approach, theorists such as Lorraine Code have identified race, gender, ethnicity, and class as being among the 'hidden subjectivities' that an agent might bring to knowledge claims. When you add lab studies and historical methods, several more levels of situatedness appear. In the post-Quine/Kuhn process of detailing the different aspects of an agent's epistemic location, agents of knowledge have been shown to be decreasingly generic and increasingly situated.

A second point which is particularly important for my thesis is that the ethnographies of the lab studies theorists like Knorr-Cetina illustrate that the material surroundings of agents of knowledge have an active role to play in shaping knowledge claims. This is consistent with the claim that emerged from the earlier discussion of enactivist cognitive science. In the enactivist discussion, this claim took the form that

understanding cognition requires knowing something about the environments that epistemic agents act in since it is embodied activity that shapes image schemas. Drawing lessons from both these discussions, it is my claim that both 'hard' and 'soft' approaches suggest the need to press naturalized epistemologies in the direction of considering the effect of material environments. Understanding knowledge naturalistically involves consideration - at some currently unspecified level - of the material environments within which agents of knowledge act. Enactivists and lab studies theorists both appear to acknowledge a dialectic at work between organisms and their environments.

If we are going to consider the interaction between agent of knowledge and environment, it is also going to be important to consider what kind of environments we are talking about. Laboratory studies consider only a tiny fraction of the kinds of environments in which knowledge construction actually takes place. In this dissertation, I wish to extend this scope. If my discussion of Knorr-Cetina's third point above is correct, then her claim about the agency of the material environment is a claim about material environments in general. As Knorr-Cetina's comments on the future of lab studies indicate, naturalized epistemology must ultimately be interested in environments beyond the laboratory. Ed Hutchins has already done this with a navy ship and David Noble has done it in an industrial factory.[68]

The importance of moving beyond the laboratory to analyze how materiality effects agents of knowledge reflects that fact that the laboratory is not the only place in which knowledge gets manufactured. In fact, the phenomenal field that is presented to the scientist in the lab is reconfigured in such a way that only a very limited set of

questions can be answered by research projects that take place there. The limits of the laboratory have implications for the project of naturalized epistemology itself. Studying knowledge cannot be limited to studying individual cognitive agents in a laboratory settings. Knowing takes place in a number of other settings. As Lorraine Code puts this point "naturalism cannot deliver on its promise to relinquish a prioricity in favor of a return to natural cognitive activity if it grants uncontested pride of place in its study of natural knowledge to behaviors studied in the laboratory."[69] In an earlier essay Code criticized epistemologists for taking observational knowledge of medium sized, colored, material objects such as cups, spoons, and chairs as being the paradigmatic examples of knowing. She suggests that "knowing other people in personal relationships is at least as worthy a contender as knowledge of everyday objects."[70] A paradigm such as Code's, if it were to be a model for a naturalized epistemology, would demand a whole host of other sites in which knowing looks more like knowing a person. A more comprehensive account of the material environment and its contribution to knowledge clearly must involve moving outside of the laboratory.

Once outside of the laboratory, there are numerous different types of environments that might be considered for how they lend shape to knowledge production. The home, the workplace, and the city immediately come to mind as constructed environments that can likely be shown to have considerable agency in the knowledge claims that individuals and societies make. Environmental psychology has, since the nineteen seventies, been considering these types of environments. [71] While this work will be an important part of expanded naturalized epistemologies, I am more interested in the

epistemic effects of environments that show less sign of being constructed by humans. What can we make of the material agency of western Montana? How about the high arctic? What is the epistemic significance of the temperate rain forest? It is significant, I think, that when Pickering first makes his basic point about the material agency of nature he says "think of the weather." "Much of everyday life," he adds, "has this character of coping with material agency."[72]

I find these questions about weather and natural environments interesting, no doubt, partly because I view my work as a project in environmental philosophy and I am eager to show that the epistemic significance of place has some relevance for how we treat natural environments. But my interest in these questions is also very much informed by the belief that human historical and ecological roots in the natural environment, though now often obscured by artifice, are still a deeply important part of who we are. We still like to breathe cold, clean air, walk along river banks in the fall, and hike to the top of steep hills when we are feeling fit. We still shiver in a cold wind, steel ourselves against winter's early morning darkness, and rejoice when we feel the warmth of the sun's rays on the first days of spring. If, as Knorr-Cetina suggests, artificial light is enough to reconfigure the relation of self-others-things, then torrential downpours, fast flowing rivers, and the perceived presence of grizzly bears likely does the same thing in equally significant ways. In fact, I submit that the reconfiguration of the self-other-things relationship is at least as apparent in wild nature, for example when you step onto a fishing boat and head out into a storm, as it is when you step from a classroom and into a laboratory. There are several times in each day, when even the most office-bound of us

finds the phenomenal field reconfigured through direct or indirect contact with the natural world.

It is not only the case that we constantly engage with the natural environment in our daily lives. We also have historical contact with the natural world. We are creatures that evolved into environments that look much more like the Badlands of South Dakota than like suburban Portland. Our upright posture is still useful for very much the same reasons as it was when it evolved in the early hominids in the Rift Valley of East Africa. Our opposable thumbs do many things today that they did not do when we first gained them, but they are still useful for essentially the same reasons as they were originally, such as for picking things up off the ground and holding on tightly. If it is the case, as Piaget suggested, that some of our image schemas are innate, then these schemas are presumably related to the situations we evolved in. Natural environments, because they are our historic home, are the original sources of all knowing.

In the rest of this dissertation, I will continue to argue for the agency of the material environment, with particular emphasis on natural environments. In Chapter III, I will support the claim that comes out of both enactivism and lab studies that knowing involves a complex, dialectical relationship between agents of knowledge and the environments in which they reside. In naturalized epistemologies, the environment side of this dialectic has received less attention that it should. The 'death of nature' that Carolyn Merchant argued was the result of Greek rationalism, Cartesian dualism, and Baconian scientific method has resulted in the view that nature is inert and epistemically uninteresting.[73] Yet the very notion in post-Quinean naturalized epistemology of a situ-

ated knowledge seems to suggest that the site in which the agent (or agents) of knowledge reside merits some attention. The idea of an epistemic location suggests a locus from which one speaks. In only a small portion of the soft approaches and in virtually none of the hard approaches is the agency of the material being taken seriously. In neither approach is the agency of less artificially constructed environments being discussed. I hope to show in chapters four and five why this is a serious mistake.

Notes

[1] Barry Lopez, The Rediscovery of North America (New York: First Vintage, 1992), 36-7.

[2] Sherman Paul, "From 'Here/Now: Mostly on Place," in On Nature's Terms, eds. Thomas Lyon & Peter Stine (College Station: Texas A&M Press, 1992), 119.

[3] Donald Davidson later made a distinction between scheme and content that had similar implication concerning what can be said about existence. Davidson, "On the Very Idea of a Conceptual Scheme," Proceedings and Addresses of the American Philosophical Association 47 (1973-4): 5-20.

[4] Willard Quine, The Roots of Reference (La Salle: Open Court, 1981), 2.

[5] John Dewey, Experience and Nature (New York: Dover Publications, 1958), 4.

[6] Willard Quine, Ontological Relativity and Other Essays (New York: Columbia University Press, 1969), 78.

[7] Quine, Ontological Relativity and Other Essays, 82.

[8] Donald Davidson questions whether the skeptical question does in fact disappear but, for present purposes, I am going to set this particular debate aside.

[9] Willard Quine, From a Logical Point of View (Cambridge: Harvard University Press, 1953), 20.

[10] This is a point at which I depart from Rorty's analysis in Philosophy and the Mirror of Nature. Rorty sees Kant as part of the problem. In reading Kant as offering "[a] picture of concepts and intuitions getting together to produce knowledge" (Rorty, Philosophy and the Mirror of Nature [Princeton: Princeton University Press, 1979], 168), Rorty places Kant in the same camp as Locke. Yet Kant clearly departed from Locke when he insisted that the knower does not play a purely passive role in experience. So, Kant does not maintain, as Rorty thinks he does, a distinction between what is given and what is added by the mind because there are no intuitions without concepts.

[11] Without Darwin's insights to work with, it is perhaps unsurprising that Kant missed this important point.

[12] From this point on in the dissertation I will be referring to all accounts that acknowledge an active contribution by the epistemic agent as situated. I choose this term because such accounts recognize that knowledge claims are always situated relative to certain capacities and particularities of the agent or agents.

[13] In what follows, I employ distinctions made by Francisco Varela, Evan Thompson, and Eleanor Rosch in their excellent study of cognition to characterize the three different approaches to cognitive science. F.Varela, E.Thompson & E.Rosch, The Embodied Mind (Cambridge: MIT Press, 1991).

[14] Ibid., 99.

[15] Ibid., 101.

[16] Ibid., 102.

[17] Richard Rorty, Truth and Progress (Cambridge: Cambridge University Press, 1998), 20.

[18] Varela, Thompson, and Rosch, The Embodied Mind, 140

[19] Ibid., 172-3.

[20] This connection is helpful for an account of cognition that seeks to be faithful to Darwin.

[21] Jean Piaget and E.W. Beth, Mathematical Epistemology and Psychology, trans. W. Mays (Reidel: Boston 1966), 196.

[22] Mary Hesse & Michael Arbib, The Construction of Reality (London: Cambridge University Press, 1986), 45.

[23] On this account, organisms learn 'how' to 'know that.' This does not reduce all 'know that' to 'know how,' but it does emphasize how the former is a derivative of the latter.

[24] Published as Mary Hesse & Michael Arbib, The Construction of Reality (London: Cambridge University Press, 1986).

[25] Mary Hesse, "Need a Constructed Reality be Non-Objective? Reflections on Science and Society" in The End of Science? Attack and Defense, ed. Richard Q. Elvee (Lanham: University Press of America, 1992), 52.

[26] Mark Johnson & George Lakoff, Philosophy in the Flesh, (New York: Basic Books, in press).

[27] Mark Johnson, The Body in the Mind (Chicago: University of Chicago Press, 1987).

[28] Johnson also calls them image schemas. This terminology reflects the role that the imagination plays in mediating between an embodied pattern of activity in an individual and the particularities of the situation she finds herself in. This role for the imagination as mediator is also found in Kant's account of experience.

[29] Johnson, The Body in the Mind, xiv.

[30] Ibid., 74.

[31] Ibid., 96.

[32] Ibid., 38.

[33] Just how a schema gets extended to other domains - through metaphor - is a major part of Johnson's book. I do not need to go into this here since my main concern is with the kind of constructivism that this account supports. The cognitive semantics that attends Johnson's account is another story.

[34] Code employs here a phrase coined by Annette Baier. Code, "What is Natural about Epistemology Naturalized?" American Philosophy Quarterly 33, no. 1 (1996): 8.

[35] Johnson, The Body in the Mind, xv-xvi.

[36] Adrienne Zilman, "Gathering Stories for Hunting Human Nature" Feminist Studies 11, (1985): 364-377.

[37] Cynthia Russet, Sexual Science: The Victorian Construction of Womanhood (Cambridge: Harvard University Press, 1989); Stephan J. Gould, The Mismeasure of Man (New York: W.W.Norton, 1981); Robert Proctor, "Nazi Medicine and the Politics of Knowledge," in The 'Racial' Economy of Science, ed. Sandra Harding, (Bloomington: Indiana University Press, 1993); Nancy Stephan, The Idea of Race in Science: Great Britain, 1800-1960 (London: Macmillan 1982).

[38] Cited by Lorraine Code in What Can She Know? (Ithaca: Cornell University Press, 1991), 170.

[39] Sandra Harding, "Rethinking Standpoint Epistemology," in Feminist Epistemologies, eds. Linda Alcoff & Elizabeth Potter (New York: Routledge, 1993), 69.

[40] Harding, Is Science Multi-Cultural? Postcolonialisms, Feminisms, and Epistemologies (Bloomington: Indiana University Press, 1998).

[41] Code, "Taking Subjectivity into Account," 20.

[42] Harding, The Science Question in Feminism (Ithaca: Cornell University Press, 1986)

[43] For most of this discussion I have been speaking about an agent of knowledge. Many of those that naturalize epistemology with the soft approach have concluded that the epistemic agent is not, in fact, the individual but the society in which she makes her knowledge claims.

[44] Andrew Pickering, The Mangle of Practice (Chicago: University of Chicago, 1995), 9.

[45] Ibid., 10.

[46] It is Latour that first characterized himself as an anthropologist of science.

[47] Bruna Latour and Steve Woolgar, Laboratory Life: The Social Construction of Scientific Facts (London: Sage, 1979).

[48] This observation was first made by Ian Hacking in his Representing and Intervening (Cambridge: Cambridge University Press, 1983).

[49] See especially Science as Practice and Culture, ed. Andrew Pickering (Chicago: University of Chicago Press, 1992).

[50] Karin Knorr-Cetina, "Laboratory Studies: The Cultural Approach," in Handbook of Science and Technology Studies, eds. S. Jasanoff, G. Markle, J. Peterson, T. Pinch. (London: Sage Publications, 1995), 115.

[51] Donna Haraway, Simeons, Cyborgs and Women: The Reinvention of Nature (New York: Routledge, 1991).

[52] Ibid.

[53] Ibid., 116.

[54] Ibid., 145.

[55] This characterization of the lab as environmental niche would rely on the Levins and Lewontin dialectical understanding of niche discussed below.

[56] Ibid., 134.

[57] Pickering, The Mangle of Practice, 6. This is a basic assumption that I also share when I request that we take these insights out of the laboratory.

[58] Ibid., 7.

[59] Ibid., 15.

[60] Ibid., footnote 7, 116.

[61] If I am right about Knorr-Cetina's insight being a more general one about artificial environments then it bears asking why this insight would pertain only to artificial environments. Would not natural environments of dramatically different types also contribute to epistemically interesting restructurings of the phenomenal field.

[62] Latour, "Give Me A Laboratory And I Will Raise The World," in Science Observed: Perspectives on the Social Study of Science, eds. Karin Knorr-Cetina & Michael Mulkay (London: Sage, 1983): 154.

[63] Ed Hutchins, Cognition in the Wild (Cambridge, MA: MIT Press, 1995)

[64] Ibid., 163.

[65] Ibid., 119.

[66] Karin Knorr-Cetina, "Laboratory Studies: The Cultural Approach," in Handbook of Science and Technology Studies, eds. S. Jasanoff, G. Markle, J. Peterson, and T. Pinch (London: Sage, 1995), 157.

[67] The tangle also involves mixing the soft with the hard approaches. Steve Fuller, for example, explores the possibility that "both social and cognitive factors can profitably be retained in science studies." The Social Psychology of Science, eds. S.Fuller and W.Shadish (London: Guildford Press, 1994), 6-7.

[68] Hutchins, Cognition in the Wild and David Noble, Forces of Production: A Social History of Industrial Automation (Oxford: Oxford University Press, 1986).

[69] Code, "What is Natural about Naturalized Epistemology?" 7.

[70] Code, "Taking Subjectivity into Account," 32.

[71] See Environmental Psychology, eds. Bell, Green & Fisher (Philadelphia: Temple University Press, 1996) and Environment and Cognition, ed. W.Ittelson (New York: Seminar Press, 1973).

[72] Pickering, The Mangle of Practice, 6.

[73] Carolyn Merchant, The Death of Nature (New York: Harper Rowe, 1980)

CHAPTER III

ORGANISMS AND ENVIRONMENTS

> I only went out for a walk, and finally concluded to stay out until sundown, for going out, I really found I was going in. - John Muir[1]

> We pass through a stand of the rarest of things; old-growth, high-altitude lodgepole that survived the fire. These trees have the genetics we need: they've survived beyond their years, avoided bug infestations evaded the infamous fire of 1910, as well as this most recent 1994 fire. They've lived up here at the top of the world, immersed to the hilt in the glories of natural selection, and now we're going to erase all that work, all that grace, all that meaning. - Rick Bass[2]

Place and Mind

When John Muir went out into the wilderness, what he found there was a curious reflection of himself, a psyche that both was and was not his own. Nature presented to his senses something that he felt was already incorporated within the structures of his experience. What are we to make of this claim from one of the pioneer advocates of wilderness preservation? Is Muir caught up in an illusion that causes him to romantically project a union between mind and environment in the face of his obvious aesthetic interest in nature? Or is he reaching towards the important insight that the processes traditionally taken to be inner workings of mind are in fact intimately connected with the physical spaces around us - the same insight that leads eco-critic Scott Slovic to refer to

nature writers as 'literary psychologists'?[3] My suggestion is that it is the second of these two and that Muir was reaching for an epistemic insight that we are now in a position to articulate. According to this insight, we should not look only at the human agent to understand the nature of knowing. Physical environments, I submit, also come to play an active role in shaping the knowledge claims that people make. There is, as Paul Shephard has remarked, "a strange and necessary relationship between place and mind."[4] If this is the case, the wilderness might indeed contain patterns that are recreated in many of the activities of the human mind, as John Muir eloquently suggested.

My goal in this chapter is to do as Quine suggested epistemologists should do and bring evidence from the natural sciences to support my thesis about how humans know.[5] I intend to use scientific arguments to show why those who seek to naturalize epistemology should follow cognitive scientist Ed Hutchins' advice and articulate "an ecology of thinking in which human cognition interacts with an environment rich in organizing resources.[6] I will use two theories from the 'hard' sciences to suggest that the production of knowledge involves a complex dialectical relationship between organisms and environments. This argument will lend support to my observations in the previous chapter about the direction of both the lab studies and the enactivist approaches to naturalized epistemology. Though both theories that I employ in this chapter are from the 'hard' sciences, I do not believe that either 'hard' or 'soft' approaches can claim conceptual priority. Nor do I believe that 'hard' and 'soft' arguments for the agent-environment dialectic are always easily separable.[7] I do believe, however, that there are pragmatic reasons for making an argument in this chapter that retains a certain distance

from the cultural critiques would surely be directed at it. Given the culture in which we currently reside, there is particular persuasive power in an argument for the agency of the material that is rooted in the natural sciences.

The enactivist account of cognition that I have been advocating is a relatively new approach in the hard sciences.[8] Most of the work done by enactivists so far has neglected the role of the physical environment in cognition. Among contemporary cognitive scientists, Ulrich Niesser (1987) is one of only a handful of theorists that have made a point of showing that an important part of the development of the self concept stems from the interaction of the individual's body with the physical spaces around her.[9] Just putting the body back into the mind has been enough of a challenge for enactivists. As a result, the evidence for the role of the physical environment in cognition in this field is patchy at best. This puts certain constraints on the kind of argument I can produce here. I cannot demonstrate the epistemic significance of environments using empirical evidence gathered from enactivist cognitive science. What I can do is bring scientific evidence to bear from outside cognitive science that supports Hutchins' directive about articulating "an ecology of thinking in which human cognition interacts with an environment rich in organizing resources."[10] Such evidence suggests that the consideration of the particular physical environments in which the agent of knowledge resides is a natural extension of the work done by enactivists so far. I shall do this by demonstrating that Hutchins' recommendations about studying environments rich in organizing resources have both evolutionary and psychological support.

The first step of this argument will be to articulate an account of the organism-

environment relation from evolutionary biology that supports the enactivist approach to cognition. I will spend some time describing how Levins and Lewontin's dialectical biology posits an organism that is mutually enfolded and in reciprocal evolutionary tension with its environment.[11] Levins and Lewontin's argument shows how organism and environment cannot be understood separately from each other. This account is important for my argument for two reasons. The first reason is that the organism-environment relationship described by Levins and Lewontin undercuts any approach to cognition that posits an organism passively responding to stimuli supplied by an autonomous environment, as the representationalists would have us believe.[12] The second reason is that the relationship between organism and environment they describe provides reasons to acknowledge the kind of particularity in environments that Hutchins recommends.

The second part of my argument will be to offer an account of perception that is both consistent with the organism-environment relation articulated in dialectical biology and at the same time gives solid support to the idea that physical environments play a constitutive role in activities normally considered the unique province of the mind. I will use J.J.Gibson's ecological account of visual perception to do this.[13] What Gibson's account adds to dialectical biology is a connection to perception and cognition. He takes a position similar to Levins and Lewontin on the relationship between the organism and environment and articulates an account of perception that draws on the mutual enfolding of both. By moving the discussion on to perception, Gibson serves as a bridge figure between the evolutionary account offered by Levins and Lewontin and the naturalized

epistemological account offered by the enactivists. In the final section of this chapter, the connections between Gibsonian psychology and enactivist cognitive science will be articulated.

My goals in this chapter are reasonably modest. I will not claim a perfect continuity between dialectical biology, ecological perception, and enactivist cognition, but I will claim that the three views have enough in common to make a pretty good case for a certain direction in enactivist research. The most important point of convergence for my purposes is that each of these three views insists that the particularity of physical environments is highly relevant to a discussion of the full range of the activities of an organism.

Dialectical Biology

The enactivist approach to cognition demands a very particular account of the organism-environment relation, an account considerably different from the one demanded by the representationalist approach. One of the major differences between representationalists and enactivists is over whether the environment is extrinsic or intrinsic to cognition. For a representationalist, an extrinsic environment supplies certain inputs to the organism which she codifies in the form of propositions and returns to the environment as outputs in the form of behavior. For an enactivist, cognition cannot be understood as the mind processing pre-given inputs and returning them as outputs to an autonomous environment because the environment is already shaped by the organism when she experiences it.[14] The organism does not so much experience an environment as

have one. But at the same time, for an enactivist, the influence is also going the other way. How the environment appears to the organism will depend upon cognitive structures that are shaped by the nature of the organism's activities in that physical environment. Organism and environment are in a dialectical relationship.

Such an account of cognition requires the rejection of the idea that organism and environment are isolable from each other. With this move comes a blurring of the distinction between a subject and an object of knowledge. It requires that the notion of a world extrinsic to the cognizing system be replaced with the notion of a world integrally linked with the cognitive processes the organism continually employs. According to Varela, Thompson, and Rosch, enactivists have to "call into question the idea that information exists ready-made in the world and that it is extracted by a cognitive system."[15] They can begin to do this, I believe, by adopting a mutualist account of the organism-environment relation such as the one developed by Richard Levins and Richard Lewontin.

Levins and Lewontin offer dialectical biology as an alternative to the standard adaptationist interpretation of Darwin. According to this traditional interpretation, organisms with randomly mutating genes get selected by environments when they stumble into pre-existing, ecological niches. The environment, which is taken to be wholly external to the organism, is assumed to contain certain problems that genes internal to the organism endeavor to solve. On this view, those organisms that survive, "are those whose morphological, physiological and behavioral traits represent the best solutions to the problems."[16] Finding itself a comfortable niche becomes the primary task

for a successfully evolving organism.

This adaptationist view has certain implications. For one thing, it reduces the role of the organism in evolution to something almost insignificant. The forces that propel evolution are provided by the gene and by the environment. In both cases, the organism is the object of forces acting independently of itself. The organism is merely the object of evolutionary tensions. In technical language, the phenotype is determined heteronomously. In The Selfish Gene (1976), Richard Dawkins reveals his commitment to this view when he characterizes the organism as a 'lumbering robot' completely controlled by the efforts of its genes to replicate themselves. Levins and Lewontin point out how this places the organism "at the nexus of internal and external forces, each of which has its own laws, independent of each other and of the organism that is their creation."[17] Organisms unfold according to a predetermined genetic plan and environments either kill them or let the genes survive and replicate. The organism is merely the medium through which these two sets of forces act. According to Levins and Lewontin, this makes the organism itself almost irrelevant to evolution. The study of evolution is reduced to a combination of molecular biology and geology.

A second implication of the adaptationist view is a peculiarly distant relationship between organism and environment. Organism and environment are, for all epistemic purposes, separated from each other. It is as if the organism gets parachuted into a pre-existing environment and then has to use its wits and chance mutations to find the niche in which it can best survive. According to this view, the environment already contains certain pre-existing problems such as limited food sources, difficulties of locomotion, and

extremely cold temperatures. The random mutations of the genes inside the organism either solve the problem or these environmental conditions bring its death in a timely fashion. 'Adapt or die' is the Darwinian injunction. So, for example, the problem pressed proto-penguin found a way to add a food group, some webbing between the toes, and a thick layer of blubber in order to survive in the Antarctic. The dinosaurs, in their environment, unfortunately did not adapt so well. The heavy influence on Darwin of Thomas Malthus'(circa 1805) Essay on the Principle of Population is apparent in the underlying characterization of evolution as a struggle for survival against certain limiting environmental conditions.

This adaptationist account assumes that the environment has sole responsibility for supplying the problems and the organism arrives and either finds itself a niche by solving a problem, migrates elsewhere towards a different set of problems, or dies out. Organisms through geological time are, in this account, like spheres rolling down a gently inclined plane with carefully sized holes cut into it. The organisms either find a pre-existing hole in which to settle or they miss all the opportunities to arrest their fall and roll helplessly off the end of the plane and into oblivion. The adaptationist interpretation of evolution, all told, leads to a highly impoverished account of the relationship between an organism and the environment.

Dialectical biology rejects all of the above elements of the adaptationist view. In the process, it pulls the organism and its activities into a much tighter relationship with the environment. A first point of departure is that dialectical biology denies that organisms can be reduced to the product of just two forces, genes and environment.

Organisms do not simply unfold as a product of their DNA, limited only by the constraints of their environment. Levins and Lewontin question the power ascribed to the gene in the adaptationist account. Even though they accept the idea that a phenotype is influenced by both genotype and environment, they deny that it is determined by them.

Lewontin uses his studies of the fruitfly to illustrate how "even if I knew the genes of a developing organism and the complete sequence of its environments, I could not specify the organism."[18] Differences between the number of bristles that develop under the left and right wings of a fruitfly are not the result of genes or environment but "random variation in the growth and division of cells during development."[19] This 'developmental noise' ensures that organisms with the same genotype and the same environment vary considerably. "It is a fundamental principle of development genetics," claims Lewontin, "that every organism is the outcome of a unique interaction between genes and environmental sequences modulated by the random chances of cell growth and division."[20] This means that the organism itself, in addition to its genes, has a hand in its own future. "At every moment," say Levins and Lewontin, "gene, environment, chance, and the organism as a whole are all participating."[21] This part of their argument resurrects the importance of the organism in evolution. This move is significant because the organism - both genotype and phenotype - ceases to be a product solely of environmental conditions, it plays an active role in creating itself. Organism and environment are both active players in creating an evolutionary tension.

The second mistake in the adaptationist picture, according to Levins and Lewontin, lies in its assumption that the external environment is a completely

autonomous entity that exerts its forces on an organism. This is the notion that lies behind the image of an organism parachuted into a pre-existing environment to find a niche in which it can survive. The problem with this interpretation of events becomes apparent when one asks what these homes or niches would look like before the organism arrives. The question makes no sense because there is no such thing as a niche independent of an organism filling it. Niches, the dialectical biologist points out, are in fact created by organisms from amongst an infinite number of potential possibilities. For example, Levins and Lewontin cite the fact that no birds eat the leaves from the tops of trees and no animal crawls on its stomach, lays eggs, and eats grass. Without an organism filling them, none of these things are niches. In other words, 'niche' cannot be a natural class because niches only exist in relation to the activities of organisms. A niche of a bird gets defined by "a list of what the bird eats, of what and where it builds its nest, how much time it spends foraging in different parts of the trees or ground, what its courtship pattern is and so on."[22] A niche, then, is not a pre-existing home, but a pattern of activity of a given organism. Organism and environment, once again, need to be described together.

As they continue to problematize the notion of a niche, Levins and Lewontin give a series of concrete examples to illustrate how organism and environment are integrated with each other. Together these examples confound the adaptationist account of evolution. First they point out how organisms always determine what are the relevant parts of their environment. Thrushes, for example, use the stones at the base of trees to break snail shells while woodpeckers have no use for the same stones. Next they draw

attention to how organisms change the environment they interact with by, for example, displacing other species as sitka spruce is doing to the alders in recently uncovered glacial planes in south-east Alaska. The arrival of a certain microbe might also dramatically change the composition of the soil and a good berry year can result in large increases in the populations of certain fauna. Environments are constantly being reshaped by organisms. They point out next that a part of the adaptationist account, the idea that a trait is something 'possessed' by an organism, is a misunderstanding. Traits can only be analyzed it in terms of an organism-environment relationship. An insect eating lizard with no natural predators may possess a certain size and agility that results in a particular trait of 'predation effectiveness.' But if a larger predator then comes on the scene, the same trait of 'predation effectiveness' may become more important as a trait of 'competitive ability' or perhaps 'ability to flee.' Traits are not properties of organisms but of the organism-environment relation. In addition to the problem with the adaptationist notion of a trait, they note how organisms respond to their environments by amplifying and transforming certain signals and suppressing others. Canids have evolved to amplify olfactory cues while suppressing visual ones. Each organism experiences in a different world and so there is no single environment into which all species fit. Finally, they tell of how features of the organism can determine what 'universal' laws of nature it experiences. A bacterium in a liquid is too small to be effected by the force of gravity yet small enough to be effected by Brownian motion. Hence, the universality of certain laws is called into question.

What this list of examples shows is that an environment is not just the space that

surrounds an organism and supplies it with a fixed number of stimuli, it is something that can only be understood relative to the activities and characteristics of the organism. As Levins and Lewontin put it, "'environment' cannot be understood merely as surroundings, no matter how dynamically. It is also a way of life."[23] The environment of an organism is not "an autonomous process but a reflection of the biology of the species."[24] There is here a special emphasis on activity. In a very broad sense, then, environments are not experienced by organisms but created by them even as the organism itself continues to be shaped by its environment.

The adaptationist picture of the organism as the passive object of autonomous forces, external forces in the case of the environment and internal forces in the case of DNA, is shown by Levins and Lewontin to be false. Organism and environment actively co-determine each other. Organisms are not "the passive objects of external forces, but the creators and modulators of these forces."[25] As Levins and Lewontin repeatedly stress, the organism is both the subject and object its evolution. Levins and Lewontin suggest that the metaphor of adaptation be replaced by a metaphor of construction. This change in metaphor brings out a mutualism between organism and environment in evolution. It puts a new emphasis on dynamism and activity in the organism-environment relation. Organisms and environments must be understood as being engaged in a constant process of interaction with, and modification of, each other.

My own interest lies less with how dialectical biology says we should think about evolution and more with the implications this account has for cognition and for knowledge in general. Dialectical biology speaks particularly to the organism-

environment relation, and knowledge is, after all, just one aspect of this relationship. Naturalized epistemologies have to be consistent with biological and evolutionary theory. Varela, Thompson, & Rosch note right away how accepting dialectical biology means rejecting representationalism in epistemology because of the separation between organism and environment that the latter demands. "Representationalism in cognitive science," claim Varela, Thompson, & Rosch, "is the precise homologue of adaptationalism in evolutionary theory."[26] Any demise of the latter signals a similar fate for the former. Naturalizers can be further informed by Levins' and Lewontin's approach to biology.

The organism-environment relation in dialectical biology provides a clue as to how epistemologists should go about considering situated knowledge. Neither naturalizers in epistemology nor Levins and Lewontin in evolutionary biology take the organism to be a passive object of forces external to it. In neither case does the organism simply sit back and receive stimuli from an autonomous environment. What Levins and Lewontin's approach suggests should be added to naturalized epistemology the fact that this relationship is dialectical. Their account suggests a kind of situated knowledge in which the agent participates in the construction of an environment in the activity of knowing at the same time as the environment is shaping what and how the organism knows.[27] Not only are agents epistemically active, but environments are too. Organism and environment actively co-determine each other.

There does, of course, appear to be a significant difference between the project of naturalized epistemology and that of Levins and Lewontin. The former are talking about

the construction of knowledge and Levins and Lewontin are talking about the construction of organisms and environments. The conservative might object that the epistemology talk should be kept separate from the ontology talk. But a second interesting move that dialectical biology encourages is the softening of the distinction between knowing and being. Dialectical biology does this by supporting the enactivist description of knowing as an organism's having a world. Recall the emphasis that Johnson's account places on knowing as a kind of activity. For Johnson, cognition is an activity, "a matter of an organism's embodiment…of perceptual mechanisms, patterns of discrimination, motor programs and various bodily skills."[28] Knowing is not a static mental state but an ongoing process of being able to function in an environment that continually exerts its energy and forces upon us. "Consciousness and rationality," Johnson claims, "are tied to our bodily orientations and interactions in and with our environment."[29] Knowing is connected directly to physical activities in an environment and can not be reduced to the holding of propositions in the mind. If biology tells us that neither the organism nor the environment can be understood without considering the active co-determination of each with the other, then activities like knowing can hardly be considered in the absence of the same co-determination.

While it should be pretty clear that dialectical biology is consistent with a view of cognition as an organism enacting for itself a world while in conversation with that world, more needs to be said, perhaps, to press home the point that all perceptual and cognitive experience is an organism-environment exchange with both parties to this relationship making an active contribution.[30] There seem to be a couple of pieces missing

before we can make the jump from the dialectic between environment and organism in evolutionary theory to a similar dialectic in epistemology. Only by filling out this connection between dialectical biology and cognition some more can I support my central claim that epistemology must involve a more particularized consideration of the physical environments in which knowing takes place. Making the link to knowing will require an argument to show that the activity of knowing is much like any of the other activities of the organism, such as the use of the rocks by the thrush to break open snail shells or the eating of leaves at the top of the tree by the insects. This in turn involves a softening of the 'know how/ know that' distinction.

The connection between cognition and the particularities of an environment will become clearer after considering an account of perception that advances some of the insights contained in dialectical biology towards the more specialized activities of animals such as seeing and thinking. This account can be found in J.J.Gibson's ecological approach to perception.

Ecological Perception

J.J.Gibson's (1979) ecological psychology might be considered an attempt to rescue psychology from its own schizophrenia. For most of this century, psychology had struggled with the 'two worlds' legacy Descartes had bequeathed. By separating the world into mental substance and physical substance, Descartes had given to psychologists, scientists of the mind, the very difficult task of trying to straddle both the material and the mental worlds. Psychology found itself with a dilemma that one

contemporary theorist articulated as "insofar as it is scientific, psychology must be about bodies as distinct from minds; and, insofar as it is about mental states, psychology cannot hope to be scientific in the explanatory sense."[31] Gibson's ecological approach to perception is an attempt to offer an account of perception that brings the mental and the physical together. It works by studying perception, not as a mental activity of an organism, but as an activity of an organism in an environment.

Gibson's influential study focuses exclusively on visual perception. In his earlier study of vision, Gibson (1950) had thought that to understand visual perception one just had to know something about the brain and something about the visual image on the retina. He later realized that vision was more complicated than that. His revised position in The Ecological Approach to Visual Perception takes a much more systems oriented, holistic approach. He suggests that vision depends "on the eyes in the head on a body supported by the ground."[32] This whole visual system is constantly engaging the world in dynamic ways. Trying to understand vision by placing images in front of a subject seated in a lab and talking about stimuli is, according to Gibson, to give an artificially restricted account of what seeing is all about. In his view, natural vision includes looking around, walking up to interesting things, and moving oneself around objects to get different perspectives on them. It is a much richer and more embodied activity than simply the processing of retinal images by the brain.[33]

The notion of a stimulus does not vanish all together from his account. Gibson does not deny that the retina is stimulated by light, but he claims that it is a mistake to think that seeing is a matter of processing an image there. There is not another eye lying

behind the retina that looks at the image projected there. Gibson calls this mistaken view "one of the most seductive fallacies in the history of psychology."[34] Since reports on the visual appearance of the environment are not to be found on the retina, and cannot be found pre-formed in the mind as long as idealism is unacceptable, Gibson concluded that they must lie somewhere beyond the lens.

But if vision is not simply about processing a retinal image created by environmental stimuli, then what is it really about? Gibson denied that perception can be studied in terms of stimulus and response. He claimed that this approach served a valuable purpose in ridding psychology of the ghost in the machine, but it is found wanting for its tendency to reduce perception to a form of behaviorism. In place of the environmental stimulus, Gibson posits 'environmental information.' Information is not something that an organism receives in the form of a stimulus, it is something that the organism obtains by putting itself in particular relations with an environment. It is not described by physics, but by an ecological account that focuses on the activity of exploring relationships. Information is a much richer concept than stimulus, so rich, according to Gibson, that the whole of empirical psychology should be an investigation of how information is picked-up, rather than of some supposed internal mental transformation of stimuli.

Gibson's solution makes vision into a process that links organisms as a whole directly with the information found in the environment. Eyes, he claims, can "go into activity in the presence of stimulus information."[35] Eyes are just one component of the whole perceptual system that does the seeing. And though stimulation of receptors

occurs during vision, that alone is not sufficient for seeing. There is a whole eye-head-body-brain system participating. Seeing a table is not a matter of processing photons of light on the retina but of discovering structure in the environment. As two contemporary Gibsonians stress, "information…is obtained by, not presented to organisms."[36] During ongoing embodied interactions, information is obtained directly from the environment by the perceptual system in the form of a "flowing, ambient array" of energy. It is not mediated through retinal, neural, or mental images.

This radical position may not initially seem like much of a departure from the traditional empiricist account in which an autonomous external environment supplies an organism with data out of which the organism reconstructs some account of the world. Yet there does seem to be something mildly absurd about it. How could an explanation of vision be concerned primarily with something beyond the organism doing the seeing? Doesn't vision go on inside an organism? The differences from traditional empiricism and the resolution of the apparent absurdity both occur when considering Gibson's dialectical interpretation of the relationship between organism and the information in the environment. For Gibson, an environment is something that can only be understood in relation to the behavior of animals. This conception of an environment echoes that of Levins and Lewontin. "The words animal and environment," Gibson says, "make an inseparable pair…each term implies the other."[37] Organisms are inevitably immersed in physical surroundings that provide both the medium and the possibilities for the activities that they engage in.

Because of the dialectical relationship between organisms and environments, the

information the organism picks up is in the form of what Gibson calls an 'affordance.' Affordances are "what [the environment] offers the animal, what it provides or furnishes, whether for good or ill."[38] The total quantity of information provided by the physical world might exceed the affordances in the ambient array of a given organism, but the organism can pick up only what is an affordance for it.[39] This means that an affordance is not just a physical property of the world, but a unified set of possibilities relative to the activities of the organism being considered. For example, a table might afford a cat a surface to sit on, a roof to shelter under, or a post to scratch claws on. The same table might in addition afford a human a surface to eat dinner from and a place to rest feet on.

This approach to affordances illustrates how ecological perception is compatible with dialectical biology. To be an affordance, a pattern in the ambient array of information must persist for an organism. An ecological niche is a whole set of relatively persistent affordances. Thus, as for Levins and Lewontin, niches have to be specified relative to the activities of specific organisms and populations of organisms. Perceiving an affordance means perceiving an object that has certain meaning in relation to an organism's activities. Affordances are thus 'value rich' because they can only be specified in relation to the needs and desires of an active organism. Perception becomes a process that unites an organism with her environment: an exploratory rather than a performatory activity.

To get around the problem of how an organism might interpret a certain stimulation of her sense receptors as an affordance, Gibson insists that affordances are perceived directly from the environment. Contemporary Gibsonian E.S.Reed gives an

example of what Gibson means by the direct perception of an affordance:

> According to Gibson, one's awareness of the world, including its values, is direct. The fire looks dangerous because we can actually see that its heat and flames would burn us. We may have to learn to see such things, yet this learning is not a process of associating a sensed fire and a sensed burning into a representation of a dangerous fire, but a process of learning to pick up the information specifying the burning capacities of fires. Observers do not have to learn to construct representations of things or to associate sensations and representations with pleasurable outcomes. Observers do have to learn to make use of the information that is available to them in ways that are relevant to their activities and needs.[40]

The mature organism knows that a fire is dangerous. But this knowledge is parsed not as a matter of grasping a certain proposition, but as a matter of having achieved a certain level of familiarity with what the environment affords the individual. The information exists in the organism-environment relation and not in a head somewhere. Perception is then an activity that enables an organism to keep in touch with her world in the broadest possible sense. The perception of an object or an event, says Gibson, is "an achievement of the individual, not an appearance in the theater of his consciousness."[41]

By characterizing perception as a process of picking up possibilities directly from the environment, the traditional account of sensation is abandoned. Processing stimuli is just a fraction of what perception is all about. Perception is less to do with sensation than with animacy. Gibson rejects the received view of perception as a matter of the passive receipt of something provided heteronomously from the environment. The enduring empiricist account of perception as a matter of receiving an impression of an object is banished. As Gibson himself puts it "the theory of affordances implies that to see things is to see how to get about among them and what to do or not do with them."[42]

If Gibson is right, then what he has shown is that it is impossible to talk about how an organism perceives without giving a detailed and particularized account of the environment within which that organism is acting. He has, says commentator Aaron Ben -Zeev "transfer[ed] the main explanatory load from the animal's head to its environment. This requires…a very careful description of that environment."[43] Habitats are as important to psychology as the organisms that dwell in them. To understand perception, one Gibsonian suggests, "ask not what's inside your head, but what your head's inside of."[44] To put this in language that ties in with my concerns, a Gibsonian account of perception looks not just at the physiology of the organism doing the perceiving but also at the location in which perception is taking place. The point is not simply the near tautology that perception always takes place somewhere, nor is it the more subtle Kantian point that perception is always structured a priori by space. It is instead the much more radical claim that perception must be understood locally in terms of a particular organism-environment dialectic. Perception is, as one recent commentator has called it, "a multi-sensory experience in a richly textured landscape."[45] Understanding the nature of this textured landscape and the affordances it offers is, for Gibsonians, an essential part of understanding perception itself. The environment is no longer just an object that the sensory organs look out on to. Environmental psychologist William Ittelson suggests that Gibson's legacy is that "a detailed understanding of the environment as a source of information is an essential and necessary part of the study of perception."[46]

Cognition and the Environment

The connecting of perception and perceptual skills to particular environments and habitats is further evidence in support of the thesis that places are epistemically significant. Perception is, after all, one of the most important 'mental' activities that an animal engages in. Empiricists are obliged to have a particular interest in perception. But does this necessarily mean that cognition too is affected by different physical environments? It does if perception is a significant part of what cognition is all about. The relationship between perception and cognition described by ecological psychology substantiates this claim.

The ecological psychologist does not face a particularly difficult task in connecting perception and knowledge because they are both understood in terms of an organism's activity in an environment. Gibson himself was initially not particularly concerned with the implications of his theory for epistemology. In a disappointingly short passage titled 'A New Approach to Knowing,' Gibson claims that his theory "closes the supposed gap between perception and knowledge."[47] Both activities, he claims, involve the abstracting of invariances (concepts and affordances) from an array of information. Knowing is thereby merely an extension of perceiving.

In the passage mentioned, Gibson briefly ties his account of perception into language. Language, he claims, is simply a way of indicating certain affordances to members of the same species. Invariances are put into words to make explicit what was already tacitly perceived. Not surprisingly, this happens at a cost. Words, according to

Gibson, are severely limited relative to the ambient array. He illustrates this with an example that appears to be designed to poke fun at philosophers:

> Consider an adult, a philosopher, for example, who sees the cat on the mat. He knows that the cat is on the mat and believes the proposition and can say it, but all the time he plainly sees all sorts of wordless facts - the mat extending without interruption behind the cat, the far side of the cat, the cat hiding part of the mat the edges of the cat, the cat being supported by the mat or resting on it, the horizontal rigidity of the floor under the mat and so on. The so-called concepts of extension of far and near, gravity, rigidity, horizontal, and so on, are nothing but partial abstractions from a rich but unitary perception of cat-on-mat. The parts of it he can name are called concepts, but they are not all of what he can see.[48]

So words do not really do justice to what the environment affords. But the important point is that knowledge itself is not contained in sentences or in propositions but in the organism's ability to pick up the information in the first place.

Though Gibson does not really make a concerted attempt to show it, if knowing really is just an extension of perceiving, then the importance of environment to cognition could be inferred directly from its importance to perception. Notes that he made in 1977 suggest that Gibson believed perception to be one of a number of modes of cognition along with remembering, imagining, dreaming, expecting, guessing, and hallucinating. All of his speculations in this area are incomplete.[49] Edward S. Reed recently made a more concerted attempt to show how an ecological account of perception is continuous with knowing, while at the same time acknowledging the provisional nature of his claims about this connection. The experimental work has simply not yet been done.

Reed's book Encountering the World (1996) ties the Gibsonian approach to perception into both evolution and cognition. Reed does the former by suggesting that it

is capacities for detecting information in the ambient array that are selected by evolution. He does the latter by claiming that the central nervous system evolved as a regulating mechanism to "maintain the animal's functional contact with its environment."[50] The evolution of consciousness served to enable the organism to explore the affordances of its environment. This position makes awareness into "not an internal state of the mind or the brain but an ecological and functional state of an animal making its way through the environment."[51] Cognition becomes a process of making selections for how an organism is going to interact with information extant in the environment and not exclusively (or even principally) about how the organism is going to follow propositional rules. Psychology becomes the science of how animals place themselves into relations with the information contained in their environment. It is the study of an activity. As Ittelson puts it in his introduction to ecological psychology, a Gibsonian approach considers "the whole of the perceptiocognitive system as part of a larger system whose fundamental function is the processing of information."[52]

It is worth noting that this is not a reduction of all knowledge to matters of 'know how.' Thought is still very much about recognizing what the environment affords and about being able to communicate this with others. It is not just a matter of finding the means to satisfy certain needs and desires. But recognizing an affordance is definitely not a matter of a kind of mental light going on, it is a dynamic and ongoing process of an organism putting herself in relation to an environment. Rather than rejecting 'knowing that' in favor of 'knowing how,' the ecological approach to perception and cognition suggests that it is not a good distinction in the first place.

This ecological approach leads Reed to conclude that "the study of cognition begins with an analysis of information and exploratory activity."[53] This information is located in the environment relative to an organism's activity and this exploratory activity is something that an organism does in a particular place, niche, or biome. This means that knowing is primarily a situated activity. Whatever cognitive skills an organism possesses are acquired, says Reed, in "specific cultural contexts; at particular places; within particular events and settings."[54] For this reason, Reed suggests that psychology should begin constructive dialogues with archeology, anthropology, and cultural geography.

The dissolution of the boundary between perception and cognition from the point of view of ecological psychology is mirrored by the same dissolution from the point of view of enactivist cognition. When Varela, Thompson & Rosch present their enactivist account of cognition, they offer evidence for the dissolution of the boundary between perception and cognition. In a detailed consideration of the perception of color, they show that color categorization is "entirely dependent upon a tangled hierarchy of perceptual and cognitive processes, some species specific and some culture specific."[55] The seeing of color is therefore at the same time both a perceptual and cognitive activity. Perception of color is a form of enaction in the same way that more traditionally cognitive activities such as theory building or decision making are forms of enaction. They characterize this connection with the following two propositions: "(1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided."[56] Perception, action,

and cognition are integrally linked. Perception is not just something that organisms do while embedded in an environment, it is part of the process of enacting an environment.

Varela, Thompson, and Rosch cite two important sets of experiments, the first of which connects perception, and the second cognition, to the activities of organisms in environments. The first is a famous (and cruel) experiment done by Held and Hein in the nineteen fifties that supports the hypothesis that perception is connected to acting in an environment.[57] Several kittens were raised in the dark. On the only occasions in which they were allowed access to light, half of the kittens were put in carriages towed behind individuals from the other half. This ensured that pairs of kittens had almost identical visual stimuli but, in each case, only one of them was allowed to couple those stimuli with their motor functions. When all the kittens were released from these constraints, the group that had towed the carriages around behaved normally. By contrast, the group that had been the passive passengers bumped into objects and fell over ledges. In short, this group had not learned how to see because they had not been able to pair their visual stimuli with action. The experiment shows that the learning of perceptual skills is entwined with sensorimotor activity.

Eleanor Rosch's (1978) discovery of basic levels of categorization also supports the suggestion that cognition and perception are closely related activities.[58] Grouping the phenomenal world into categories has always been seen as one of the most distinctive of cognitive activities. Basic level categorizations explain why we characterize the things we sit on as 'chairs' rather than as 'collections of molecules,' 'pieces of wood,' or 'furniture.' Contrary to what was maintained in previous theories about categorization,

the basic level is not arbitrary. It is the level at which there will be the optimal, functional interaction between organisms and their environment. Categorizing the world this way has survival value for the organism. Rosch showed that the basic level helps the organism to meet biological, cultural and cognitive needs.

Varela, Thompson, and Rosch call the basic level, "the point at which cognition and environment become simultaneously enacted."[59] There are several factors that Rosch found determine at what level basic categorization occurs. One of these is concerned with perceptual ability. Basic level categories usually occur at the level of those things that can be easily perceived. Chairs are such objects. Countries are not and nor are molecules. Another factor is how the category stands in relation to sensorimotor activity. Can an exemplar of the basic level be walked around, touched, picked up? Gibson had also recognized that ontology is connected with perceptual ability. He claimed that "the size-level at which the environment exists is the intermediate one measured in millimeters and meters."[60] This position is required by his view that seeing is the rich activity of looking around, walking up to something, and viewing it from different angles. The idea of a basic level of categories suggests that biological constraints supplied by our bodies and the way they interact with their environments play an important role in structuring both perception and cognition.

The mutual enfolding of organism and environment that both dialectical biology and ecological psychology involve suggest an attitude in which environment is not just a "site" for human activity, as Edward Casey calls the narrow view, but a highly particularized location that is partly constitutive of that activity. The Gibsonian approach

to perception presents a radical challenge to contemporary psychology and it is not yet widely accepted. However, the growing interest in Gibson's approach points towards the relevance of the environment to studies of the mind. The 'situated' movement in the philosophy of mind is another indication that studies of cognition are increasingly broadening their sphere of interest beyond the brain and towards the engaged, materially embodied activities of individuals and groups in particular settings.

These connections between environment and cognition have cropped up from time to time across several disciplines. For example, E.H.Lennenberg (1967) suggested that the categories used in language were based on prototypes supplied by the external environment. Edith Cobb (1977) suggested a connection between cognition and landscape in The Ecology of Imagination in Childhood. Cobb claimed that the process of childhood play in nature supplies a context that enables the child to structure her relations to others humans. Claude Levi-Strauss (1966) posited a fundamental homology between the systems of differentiation used in primal societies and the systems of differentiation that these societies found in their contact with their environment.[61] And Paul Shephard (1982) speculated with concern about how the decreasing contact that industrialized peoples have with the earth may have consequences for their mental health. Our ancestors, he states in one of his many provocative essays "assembled the self cognitively by reference to extensive fauna swallowed bit by bit."[62] A whole new field known as ecopsychology has emerged in the last few years in response to this concern.[63]

These examples all suggest that enactivist accounts of cognition should give some consideration to the physical environments in which the cognizing agent or agents act.

Ed Hutchins, Karin Knorr-Cetina, and Andrew Pickering are already doing this. But all of these theorists look to environments that are full of artifacts such as missile systems and mass spectrometers. The same kind of analysis can be done with natural environments.

In the process of tracing the connections between dialectical biology, ecological psychology, and cognitive science, I have ignored certain difficulties and discontinuities between these three accounts. One example of a potential problem is that Gibson rejects the link between his approach to perception and cognitive science because he sees the latter as being still premised on an input-output model. However, the kind of cognitive science that was being practiced in his day was cognitivism. No enactivist approaches had yet been developed. Whether enactivist accounts can circumvent this input-output problem as I have suggested is a question that lies well beyond the scope of this project. This is a good time to remember that the goals of this chapter are humble. Given the paucity of the work done on the role of place in cognition, it is enough for now to indicate research programs that are actively pursuing more particularized account of the environment. It is clear that both Gibsonian psychology and the enactivist account of cognition both do this by taking the focus of their study to lie in an organism's activities in a particular environment.

Even if they haven't yet worked it into their accounts, some enactivists suggest that they share these concerns. The importance of environment is implicit in Johnson's account. When Johnson sets the parameters for a non-objectivist account of cognition at the end of The Body in the Mind he suggests that, as Lorraine Code might put it, the

environment has to be taken into account. Throughout the book, he develops the key notion of an embodied understanding. Understanding must be considered in terms of embodiment because "[w]e are never separated from our bodies and from forces and energies acting upon us to give rise to our understanding (as our 'being-in-the-world')."[64] The theories, schemes, and paradigms that we use to describe the world are structures that "enable us to function more or less successfully in our environment"(emphasis added).[65] Understanding is, for Johnson, no doubt an activity of embodied beings. But it is also quite clearly the activity of beings embodied in particular environments.

Johnson has a broad conception of environment. It includes "our history, culture, language, institutions, theories, and so forth."[66] By stressing these cultural aspects of environment, Johnson exhibits his sympathies with the position of those I described as using the soft approach. And while he has not himself shown it, it is clear from the work of feminist standpoint theorists such as Nancy Hartsock (1983) and Dorothy Smith (1987) that different cultural environments exert a wide range of different forces upon the bodies of those that make their homes in them. Cultural standpoints are physical, if not quite athletic, achievements. But Johnson also makes it clear that, in addition to these cultural environments, organisms are active in physical environments that shape their embodied schemas. By tracing the genealogy of the schematic account to Piaget's sensorimotor schemas, I hope to have made it particularly clear in my own rendition that schemas are constructed in conversation with the physical surroundings that an organism finds herself in.[67] It is for this reason that an adequate account of knowing, says Johnson, would have to be one that "reveals our engagement in a physical environment."[68] It follows from this

that no account of knowledge can be adequate unless it makes explicit and detailed reference to the environment in which knowing takes place.

Consistent with this move, Johnson's source-path-goal, container, and force schemas all suggest movement through physical space and interaction with the constraints and forces of a physical environment. But, as I made clear at the end of chapter two, the physical environment is not simply an homogeneous space in which movements and interactions can occur, its heterogeneity also provides the potential for some very place specific interactions that, I suggest, shape embodied schemas. Recall that organisms enjoy a 'multi-sensory experience in a richly textured landscape.' Different physical environments, both natural and artificial, supply radically different experiences for those that reside in them. An aqueous environment provides different balance and energy requirement from a terrestrial one. Life in a village on the steep slopes of a Himalayan mountain affords different physical challenges from life in Manhattan and both of these environments in turn provide radically different experiences from those afforded to fisherman in the Aleutian Islands off south-western Alaska.[69] As Johnson admits, the physical environment is "structured in ways that limit the possibilities for our categorizations of it."[70]

The emphasis Johnson places on knowing as an active engagement with an environment suggests that the kind of activities the environment affords become relevant to the study of cognition. Environments do not supply endless possibilities but very specific limits for particular organisms. Humans cannot jump off tall buildings and expect to fly and city dwellers can rarely expect the silence necessary for listening to the

birds. Residents of extreme northern and southern latitudes cannot expect consistent periods of daylight throughout the year and those living in arid regions must always make provision against the possibility of life-threatening drought. In addition to these purely physical limitations provided by the environment, different facets of social organization also restrict the kinds of physical engagement that people can have with an environment. Certain cities do not provide safe environments for walking late at night and most of us that are used to eating out of grocery stores would find living off the land nearly impossible wherever we tried it.[71] It is the different experiences that these places afford that means that cognition will be structured differently depending upon where the agent of knowledge is located, what practices she is engaged in, and what cultural values she brings to her practice.

If structures of the physical environment do indeed supply some limiting factors for our categorizations, then environments should not be treated as generic spaces that supply to organisms only the possibility for locomotion and perhaps the continuous subjection to gravitational forces, they should be considered highly particularized micro-environments that bring different possibilities to different organisms. In anticipation of some terminology introduced in the next chapter, the physical environment is not just a space in which knowing occurs, but a highly particularized place. Recognizing this insight in epistemology would mean moving away from treating the physical and especially the natural environment as a mere 'site' for human activity, as Edward Casey puts the received view. What the student of cognition must then strive to do is to articulate the relevant details of physical environments that are always 'rich in organizing

resources.'

Notes

[1] John Muir, The Story of My Boyhood and Youth (New York: Houghton Mifflin, 1913), 197.

[2] Rick Bass, The Book of the Yaak (Boston: Houghton Mifflin, 1996), 51.

[3] Scott Slovic, "Nature Writing and Environmental Psychology," in The Ecocriticism Reader, eds.Cheryl Glotfelty & Harold Fromm (Athens: University of Georgia Press, 1996), 351.

[4] See Shepard's excellent and prescient article, "Place in American Culture," North American Review (Fall 1977): 23.

[5] When I talk about the contribution that places make to the production of knowledge, I am not, of course, claiming simply that in different places we come to know about different things. Obviously, in mountain areas we tend to seek knowledge about cliffs, snowfalls, forests and streams, while in desert areas we focus on sand, sun, and wind. If this was all I was saying, it would not be a very interesting epistemological claim. What I do propose in this chapter is the more radical thesis that mountain and desert environments contain physical facts that contribute to a different structuring of knowledge.

[6] Ed Hutchins, Cognition in the Wild (Cambridge: MIT Press, 1995), xiv.

[7] As mentioned at the end of the last chapter, several theorists in naturalized epistemology make efforts to blend both approaches. Steve Fuller in particular seeks to blend cognitive and social approaches, Fuller, "Social Psychology of Science: A Conceptual and Research Program." See also Paul Thagard, "Scientific Cognition: Hot or Cold?" in The Cognitive Turn: Sociological and Psychological Perspectives on Science S.Fuller, M.DeMey, T.Shinn & S.Woolgar, (Dordrecht: Kluwer, 1989) and Nancy Nersessian, "How do Scientists Think? Capturing the Dynamics of Conceptual Change in Science," in Explaining Science: A Cognitive Approach (Chicago: Chicago University Press, 1988)

[8] James, Dewey, and Mead might count as proto-enactivists though they did not have the benefit of contemporary empirical studies of mind.

[9] Ulrich Niesser, The Perceived Self (Cambridge: Cambridge University Press, 1987).

[10] Hutchins, Cognition in the Wild, xiv.

[11] The standard account of this field is offered by Richard Levins and Richard Lewontin in The Dialectical Biologist (Cambridge, MA: Harvard University Press, 1986). Readers will recognize some similarities between the account offered by Levins and Lewontin and one offered by John Dewey in Experience and Nature (Dover: New York, 1958).

[12] Dialectical Biology also undercuts the contrary view that the organism, constructing accounts of the world at will, is the only active member of the relationship.

[13] James J. Gibson, The Ecological Approach to Visual Perception (New York: Houghton Mifflin, 1979)

[14] In fact, as we shall see in this chapter, the organism shapes both her experience of the world and the physical structure of the world.

[15] Varela, Thomposon & Rosch, The Embodied Mind, 140.

[16] Levins & Lewontin, The Dialectical Biologist, 97.

[17] Ibid., 88.

[18] Richard Lewontin, Biology as Ideology (New York: Harper Perennial, 1992), 26.

[19] Ibid., 27.

[20] Ibid.

[21] Ibid., 89.

[22] Ibid., 98.

[23] Ibid., 58.

[24] Ibid., 99.

[25] Ibid., 104.

[26] Varela, Thompson & Rosch, The Embodied Mind, 194.

[27] As Dewey anticipated in Experience and Nature, knowing is a form of being.

[28] Johnson, The Body in The Mind, 137.

[29] Ibid., xxxviii. Note how the connection Johnson makes between knowing and being able to function in an environment is consistent with Quine's suggestion that knowledge is what enables us to make it successfully from one sensory stimulation to the next.

[30] Varela, Thompson & Rosch outline some of these connections in Chapter 9 of The Embodied Mind.

[31] This is how Gibsonian Edward S. Reed characterizes the dilemma in Encountering the World, 6.

[32] Gibson, The Ecological Approach to Visual Perception, 1.

[33] The gap between how an activity is studied by scientists and how that activity normally occurs in everyday situations is also subjected to critique by Lorraine Code in "What is Natural about Epistemology Naturalized?"

[34] Ibid., 60.

[35] Ibid., 53.

[36] Edward Reed & Rebecca Jones, "James Gibson's Ecological Revolution in Psychology," Philosophical Psychology (1980): 91.

[37] Gibson, The Ecological Approach to Visual Perception, 8.

[38] Ibid, 127.

[39] Gibson here finds himself forced into making a Kantian distinction between phenomenal and noumenal worlds. An organism that perceives only affordances perceives only a world as it appears. Yet Gibson would like to maintain that information in general is a feature of the environment in-itself, independent of the perceptions of any organisms. Unfortunately, Gibson never really explains where he stands on this issue. If, like Quine, he maintained that 'the doctrinal question' (see p.20 above) cannot be asked then the phenomenal world should be enough. This is the position enactivists hold. For further discussion see Aaron Ben-Zeev, "The Kantian Revolution in Perception," Journal for the Theory of Social Behavior 4, (March 1984): 69-84

[40] Edward Reed, James J. Gibson and the Psychology of Perception (New Haven: Yale University Press, 1988), 235.

[41] Gibson, The Ecological Approach to Visual Perception, 239. Because plants are not considered animate, Gibson does not believe that the study of perception can be extended to include plants. However, to the extent that plants 'keep in touch with their world' by sending out roots to seek water, by orienting themselves in relation to the up-down axis, and by turning their leaves towards the sun to assist in photosynthesis, it seems to me that they do behave in response to what their environment affords. This suggests that it does, on the Gibsonian view, make sense to talk of plants perceiving. Moreover, this conclusion seems to be desirable. Such a move would be consistent with evolution, would save having to draw a difficult line to delimit natural kinds, and would support a gradualism among the biota. See Reed & Jones "Gibson's Theory of Perception: A Case of Hasty Epistemologizing?" 26-7, note 4, for a short discussion of perception in plants.

[42] Ibid., 129.

[43] Ben-Zeev, A. "The Kantian Revolution in Perception," 80.

[44] Mace & Pettiger, "Directly Perceiving Gibson," Psychological Bulletin 82 (1975): 137-139.

[45] Gary Nabham & Sara St.Antoine, "The Loss of Floral and Faunal Story: The Extinction of Experience," in The Biophilia Hypthesis, eds. Stephen Keller and Edward Wilson (Washington D.C.: Island Press 1993), 241.

[46] Ittelson, Environment and Cognition, 9.

[47] Gibson, The Ecological Approach to Visual Perception, 258. In the last year of his life, Gibson returned to the important questions concerning what the ecological approach to visual perception meant for cognition in general. He died of lung cancer in 1979 before he had the chance to publish on the topic.

[48] Ibid, 261.

[49] See Reed, James J.Gibson and the Psychology of Perception, Chapter 16.

[50] Reed, Encountering the World, 82.

[51] Ibid, 67.

[52] Ittelson, Environment and Cognition, 10.

[53] Reed, Encountering the World, 183.

[54] Ibid., 177.

[55] Varela, Thompson & Rosch, The Embodied Mind, 171.

[56] Ibid., 173.

[57] R. Held & A. Hein, "Adaptation of Disarranged Hand-Eye Coordination Contingent Upon Re-Afferent Stimulation" Perceptual Motor Skills 8, (1958): 87-90

[58] Rosch, E. "Principles of Categorization" Cognition and Categorization, eds. Eleanor Rosch and B. Lloyd (Hillsdale, NJ: Lawrence Erlbaum 1978).

[59] Varela, Thompson, and Rosch, The Embodied Mind, 177.

[60] Gibson, The Ecological Approach to Visual Perception, 8.

[61] Claude Levi-Strauss, The Savage Mind (Chicago: University of Chicago 1966)

[62] Paul Shepard, "On Animal Friends," in The Biophilia Hypothesis, eds. Stephen Kellert and Edward Wilson (Washington D.C.: Island, 1993).

[63] Paul Shepard, Nature and Madness (San Francisco: Sierra Books 1982) and Ecopsyhcology: Restoring the Earth, Healing the Mind, eds. T.Roszak, M.Gomes, and D.Kanner (San Francisco: Sierra Books 1995).

[64] Ibid., 205.

[65] Ibid.

[66] Ibid., 207.

[67] Ben-Zeev complains that Gibsonians "have not realized the opportunities afforded to their own approach by the notion of a schema." He suggests that schemas can help explain how an organism picks up the affordances offered by the environment. "The Kantian Revolution in Perception," 79.

[68] Ibid., 206.

[69] As I write this, a forest activist named Julia Butterfly is completing her seventh month on a small platform two hundred feet up a redwood tree in Northern California. Her environment is alive and constantly moving in the wind. I often wonder what these experiences bring to her that are unavailable to me living my life in concrete buildings on *terra firma*.

[70] Ibid., 207.

[71] For an interesting account of what happens when a person tries this see John Krakauer's Into the Wild (Doubleday: New York, 1996).

CHAPTER IV

LIVING LANDSCAPES

> No one can say for sure when a place becomes your home, or when a fit is achieved, or peace, any more than one can say when a river best fits the valley through which it cuts. It flows and changes, shifts - cuts deep in some places, fills in in others. It transports sediment, logs and lives. It makes music in the day and in the night. Animals come down out of the mountains at dusk to stand at the river's edge and drink. In the dimness as light fails, the animals sometimes cross the river, wading or swimming. - Rick Bass[1]

> I am fascinated by what Samuel sees and what I am missing. In the Great Basin I can read the landscape well. I know the subtleties of place. A horned lizard buried in the sand cannot miss my eyes because I anticipate his. A kit fox at night streaks across the road. His identity is told by the beam of my headlights. And when a great horned owl hoots above my head, I hoot too. Home is the range of one's instincts. - Terry Tempest Williams[2]

The Ground and Horizon

Abram's suggestion that the enveloping earth is "the very ground and horizon of all our knowing,"[3] is a far cry from the belief that reason allows humans to transcend their location in nature to attain absolute and objective knowledge. In fact, between Descartes' retreat to his stove-heated room and the arrival of naturalized epistemologies

in the second half of this century, the study of the production of knowledge in the dominant tradition of western philosophy has been pursued in settings that seek to maintain the illusion that the knower can transcend her natural situation; to know from nowhere. The library and the closed office space are usually considered to be the most reliable sites for the production of philosophical knowledge. The freedom from sensory distraction that these places afford allows the philosopher to forget for a while that she is an embodied creature and allows her to engage in what appears to be nothing but the work of the mind. In these settings, the enveloping earth is nowhere in sight.

In this dissertation, I am challenging the idea that the mind can claim any particular kind of work as exclusively its own. I seek a naturalized position that, in the process of de-transcendentalizing knowledge, establishes the environment as not only the geometrical space but also the place in which the complex activity of knowing goes on. Place is introduced here as a technical term.[4] Places have a relevant particularity and character that spaces lack. Acknowledging environments to be the places in which knowledge gets manufactured transforms their role from being simply the incidental location in which knowing happens to occur into being active participants in the complex dialectic that is involved in the production of knowledge.

Humans are in the strange - though perhaps not unique - position of being both products of the earth, formed and propelled forward by natural evolution, and agents that can look back at the earth to tell stories about its functioning. Humans are part of earth's story and earth is part of theirs. Forgetting the former creates the illusion of a view from nowhere in the latter. It makes a dialogue into a monologue, or even an interrogation.

For the last several centuries it has made the experimental method of the natural sciences into a matter of, in Francis Bacon's words, "wresting nature's secrets from her" in order to ensure "the propogat[ion] of man's empire over the universe."[5] It is long past time for this kind of ill-informed arrogance to be rethought.

In this chapter, I intend to show how, as the ground and horizon of all knowing, the earth comes to lend its shape to knowledge constructions and practices. I press further my thesis that places are active participants in the dialectic out of which knowledge is constructed. My focus in this chapter is specifically on natural rather than artificial environments. As many of those who naturalize epistemology have noted, the way we know is constrained by the limits of our cognitive and perceptual equipment. For example, we cannot know what it is like view infra-red light. The fact that human biology is an evolutionary product of the natural environments that surround us suggests to me that these places too might exert some influence upon the constructions we call knowledge. As I mentioned at the end of Chapter II, I am particularly interested in natural environments. This is not only because they contain the historical and biological roots of all of humanity, but also because of the fact that they have historically been treated, even in those cases where they have been protected, as passive resources that gain their value only through the activities of humanity. My thesis about the role of place in the construction of knowledge challenges this conception of passivity.

I am also particularly interested in natural environments because of the continuing recognition of their importance to the cultures and lives of many indigenous peoples. It is in indigenous knowledge practices that one might perhaps find the clearest indication of a

culture-nature dialectic at work in the construction of knowledge. This chapter is intended to investigate some of these links. I hope that it will lead us to a position from which we might be able to appreciate what Aristotle felicitously referred to as "the marvelous potency of place."[6]

Looking for examples of where natural places take on an epistemic significance involves, by necessity, going outside of the contemporary Anglo-American epistemology.[7] Natural environments just have not been an area of concern to Anglo-American epistemologists. I will turn shortly to Vine Deloria's account of an 'Indian' approach to place in God is Red and to Keith Basso's account of the Western Apache's treatment of geographical features of their reservation in Wisdom Sits in Places. Before talking about the role of the natural environment in these indigenous views of religion and morality, I will briefly discuss Plato's treatment of *chora* in the Timaeus and of *topos* in the Phaedrus. These accounts are interesting because they indicated that the western tradition did once ascribe considerably more significance to place.

In the Timaeus, Plato tells a story about creation that grapples with the question of what preceded the created world. Creation, Plato reasoned, must occur is some place since nothing can come to be in no place. A certain kind of space, which Plato refers to as both place (*chora*) and necessity (*ananke*), is posited as the location in which creation occurs. This space is granted a pre-eminent cosmological significance. *Chora* is what exists prior to the act of creation. It provides "a home for all created things."[8] It is the original place. The status of time is secondary to that of place since time was bestowed on nature only after creation, apparently so that the Demiurge might have a "moving

image of eternity" (37d).

When the Demiurge created the world and the objects that populate it, he placed them all within this *chora*. *Chora* itself, existing prior to the creation of any object, is not a thing but a "receiving principle." Plato also uses the term "receptacle" to designate *chora*. The ontological status of *chora* is thus unusual. It is not material itself, but a receptacle for the material. *Chora* also remains ontologically distinct from the objects created within it. In his discussion of its ontological status, Plato states "inasmuch as she always receives all things, she never departs at all from her own nature and never, in any way or at any time, assumes a form like that of any of the things which enter into her"(50b). About *chora*'s exact nature, Plato claims that we have only a "dreamlike sense"(52c).

For part of the time, Plato portrays *chora* as if it is an amorphous piece of clay that is imprinted with the stuff of the world at the moment of creation. He states that "she is the natural recipient of all impressions and is stirred and informed by them"(50b-c). So one might think that *chora* plays only a passive role in creation. But what is notable about Plato's account is that *chora* also assumes a distinctly active role in cosmogenesis. As well as being a receptacle for created things, *chora* somehow conditions creation. *Chora*, as the "nurse of generation" that forms out of her own being the rich spectrum of individual entities that populate creation. *Chora* and *ananke* are together the principle agents in ensuring that the created world contains "a strange variety of appearances"(52d). Plato clearly suggests that *chora*, which he describes as being "full of powers" (52d), exerts a subtle influence over what is.

We can get some idea of why this is relevant to epistemology if we look to Plato's explanation of how the created world came to be intelligible. It is in his discussion of intelligibility that a link between *chora* and certain epistemic concerns first surfaces. Plato claims that "out of disorder [the Demiurge] brought order, considering that this was in every way better than the other"(30a). This order was a product of both reason and the necessity that was already there in *chora*. The Demiurge, after all, could produce only what *chora* allowed. So the created world, the world of sense, is a product of two realms of being; one, the uncreated and indestructible realm of the forms, a realm of pure reason (*logos*), and the other, the receptacle (*chora*) which provides a home for all created things. The intelligibility of the created world results from features of both of these other realms of being. This combination of these two realms can be characterized as two triangles touching at their tips. As Ed Casey describes it in his history of Western treatments of place, "the bottom triangle represents the 'abyss' and 'turbulent welter' of the Receptacle…and the upper triangle the 'order and design' of mathematical rationality."[9] Creation exists where the two triangles touch. The disorder of *chora* is tempered by the rational order of *logos* to produce the objects of the sensible world that imitate the forms. The world of appearances is, for Plato, a blending of *logos* and *chora*. *Chora* "receives all things and in some mysterious way partakes of the intelligible"(51a).

What is significant about this cosmogenetic account is the dialectical relationship between *chora* and *logos*. It is because *chora* provides a home for earth, air, fire and water that the addition of *logos* during creation results in an intelligible world. *Chora* is receptive to the addition of intelligibility during creation. Without *chora* having the

nature that it does - a nature of which we can have only a dreamlike sense - the created world would be unintelligible. But *chora* is not a passive space, a simple location in which creation occurs, it is an active participant in creation, one that conditions the intelligibility objects of experience. This activity, we shall now see, is carried over into the particular places (*topoi*) of the created world.

In the created world that is the home of the bulk of the rest of Plato's dialogues, the particular places that are described also appear to adopt some agency in relation to the ideas discussed. Particular places in the created world are derivatives of original *chora*. Ed Casey calls the tracing of the evolution of *topoi* out of *chora* in the Timaeus "a story of increasing implacement."[10] But during this evolution, it appears that the potency of place is not lost. The care Plato takes to situate each of his dialogues in some specific place, for example Agathon's house in the Symposium, Cephalus' house at Pireaus in the Republic, and the plane tree by the spring in the Phaedrus, might be a hint that the active role ascribed to *chora* in the Timaeus is carried over into particular *topoi* in these other dialogues. The dialogue in which this case can most easily be made is the Phaedrus.

In the Phaedrus, Plato suggests several times that the particular place Socrates speaks from lends shape to the things that he says. When Phaedrus leads Socrates outside of the city with the promise of Lysias' speech, Socrates appears to know that the place in which they settle will subtly influence their discussion. Upon arrival at their chosen spot, under a plane tree with a spring at their feet and cicadas humming overhead, Socrates proclaims that he is 'inspired' by his location. Later he tells Phaedrus that he is "in the grip of something divine" and "on the edge of speaking in dithyrambs"(238c)[11] The place

apparently elevates Socrates in some way. Phaedrus, for his part, remarks that Socrates "appear[s] to be totally out of place" and that his speech contains, for Socrates, "an unusual flow of words"(230c).

In the dialogue that follows, Socrates is uncharacteristically confident about his ability as a rhetorician and uncharacteristically dismissive of Lysias' speech. "I wouldn't even think that Lysias himself could be proud of it," says Socrates when Phaedrus finishes reading the transcript of Lysias' speech. He then adds confidently, "my breast is full and I feel that I can make a different speech , … better than Lysias'"(235a,c). In the Great Speech that follows, Socrates outlines his theory of the forms, but with some important amendments that are articulated here for the first time. For example, in the myth he tells about the two-horse chariot, Socrates for the first time adds detail to his suggestion in the Meno that knowledge of the forms is a matter of remembering something known in an earlier life. Given that Plato is all along hinting that the unusual outside setting contributes something extra to Socrates' thought, it hardly seems an accident that the theory of the forms begins to change as a result of the change of place. Two of Plato's commentators, Alexander Nehemas and Paul Woodruff, characterize this peculiar aspect of the Phaedrus as follows:

> The countryside for which Socrates has left Athens, has turned him, surprisingly into an accomplished rhetorician. Much more surprisingly, however, it has provided him with an opportunity to cast doubt on views that, within the fiction of Plato's dialogues, he had developed within the city walls. This Odysseus returns home from abroad a different man indeed[12]

Going outside of the city and into a very distinctive location in nature clearly had an effect on Socrates' discourse. The Phaedrus suggests that *topoi*, even natural *topoi*, are

epistemically significant.

A history outlining the gradual decline in the significance of place over the last two millenia is well told in Ed Casey's The Fate of Place.[13] There is no need for me to tell any more of this story here, except to report that Casey's detailed account traces what he calls "the gradual and forceful encroachment of space upon place."[14] The potency of place was eclipsed by a conception of inert, geometrical space. As a result of this encroachment, anything philosophically relevant about the particularity of places was effaced by the homogeneity of space, understood as simply infinite extension by Descartes and as absolute geometrical space by Newton. Geographers have referred to this encroachment as the 'evacuation' of place in philosophy. Location in absolute space became merely incidental to the study of more philosophically interesting things such as actions or events. Casey is currently involved in a project of resuscitating place in philosophy.[15] As part of my own attempt to resurrect the significance of place, I turn now to discuss a non-western tradition of thought that also accords epistemic significance to place.

Indigenous Relations to Place

If it is the case that places come to exert a subtle influence on how we know through a dialectic with a knowledge producing community, then this influence will likely be most evident in communities that have lived in the same places for long periods of time. Indigenous cultures have long been perceived as having a connection to the land that immigrant cultures lack. Non-nomadic groups of indigenous peoples have often

lived in the same places for millenia. Ever since Diamond Jenness's ethnographies of the Ojibwa peoples in the nineteen thirties, this century has seen a growing interest in indigenous North American people's ethical and religious relationships to the land.[16] Professional environmental ethics has often held up indigenous relationships to the land as moral exemplars.[17] It has also received criticism for doing so.[18] In what follows, I am not interested in championing any one particular set of moral or religious beliefs over any other. I am more interested in examining how the dialectic between land and culture plays itself out in knowledge practices of those who have lived in the same place for a long time.

One intriguing account of how this relation between knowledge and place can play itself out is told by Keith Basso. Basso lived for twenty-two years amongst the Western Apache in Cibecue, Arizona. During his time with the Western Apache, Basso learned from a cattleman named Dudley Patterson that particular places on tribal lands could be used for moral guidance. Patterson taught Basso how the Western Apache rely on places in order to teach them the smoothness, resilience, and steadiness of mind necessary to "live rightly."[19] These lands are lands in which Western Apache ancestors are buried. This means a certain amount of respect for the places is accorded simply because the elders rest there. But the wisdom that the places provide appears to come not simply from the bones of the ancestors, but also from a dialectic between the land and a series of cultural narratives.

Basso first became aware of the role that places play in Western Apache morality when he heard Patterson say to a fellow hand who had missed several days of work for

romantic reasons "Trail Goes Down Between Two Hills will make you wise."[20] Basso learned that the stories associated with particular places, in this case a story about two beautiful sisters teasing Old Man Owl at a place where a trail runs between two hills, could be used to give indirect advice or criticism when a direct approach was inappropriate. Once the story of a place had been learned and the place experienced, merely reciting the name could conjure up the requisite moral wisdom. After having been told the story of Trail Goes Down Between Two Hills by Patterson, Basso remarks on how the narrative had "transformed its referent from a geographical site into something resembling a theater, a natural stage upon the land…where significant moral dramas unfolded in the past."[21] Basso determined to research this further.

At the beginning of his study, in order to clarify the nature of his research with his informers, Basso asked Patterson "what is wisdom?" Patterson responded not with a definition but with the assertion "it's in these places…wisdom sits in places."[22] Patterson then responded to Basso's further inquiry about how to become wise with the following remarks:

> How will you walk along this trail of wisdom? Well, you will go to many places. You must look at them closely. You must remember all of them. Your relatives will talk to you about them. You must remember everything they tell you. You must think about it and keep on thinking about it, and keep on thinking about it. You must do this because no one can help you but yourself, If you do this, your mind will become smooth. It will become steady and resilient. You will walk a long way and live a long time.[23]

Patterson added that just as one needs to drink water to stay alive, so one needs to drink from places in order to become wise.

Basso confesses to a certain confusion about the metaphors Patterson used to express the process of becoming wise. The idea of "drinking from places" was alien to his experience. He referred to the baffling "covert cultural logic" to which he was not a party. Significantly, Patterson did not leave Basso to figure out these metaphors by himself in a closed room. He took him out on horseback to these different places, to teach him their names and to tell him what had happened at each of them a long time ago. This education, carried out over many long, hot days on horseback, was designed to achieve a state in which the mere mention of a name would evoke both the particular physical location and the experience of it. These images could be used in future to evoke a story containing a particular piece of practical wisdom about how to live rightly.

The fact that Basso had to feel the character of these places in person in order to know what they taught suggests that it is not simply the story that generates the wisdom. If it were, then these places would be merely symbols that reminded the Western Apache of culturally constructed accounts. Instead of this, the actual topography of the place had to filter through Basso's limbs, the smell of the vegetation had to permeate his clothes, and the sweat created by the exertion of getting there had to drip from his body onto the ground.

David Abram calls the kind of experience Basso had a "synaesthetic participation" with the animate surroundings.[24] Abram adds that, in oral cultures, mountains, canyons, and streams present themselves to the senses with "an expressive potency and dynamism." The places are not passive. "A particular place in the land," he continues, "is never, for an oral culture, just a passive or inert setting for the human events that occur

there. It is an active participant in these occurrences. Indeed by virtue of its underlying and enveloping presence the place may even be felt to be the source, the primary power that expresses itself through the various events that unfold there."[25] One of Basso's informers hinted at this when he told him "the land is always stalking people."[26]

Basso concludes that the sense of place of the Western Apache, or the sensing of place, as he prefers to call it, is part of the activity that creates Apache cultural and moral identity. Basso is reluctant to characterize this sensing in any mystical terms, calling it instead "a commonplace occurrence…an ordinary way of engaging one's surroundings and finding them significant."[27] It is something that the Western Apache simply do in their day to day lives. The significance of place is clear when Basso notes how the Western Apache "show by their actions that their surroundings live in them"[28] (emphasis added). This metaphor suggests that places are more than just sites in which actions and events happen to take place, they in fact play a role in shaping behavior and belief. These places are not passive for the Western Apache; instead they 'exert a certain influence' or perhaps even exhibit a 'marvelous potency.'

The wisdom of particular places that Dudley Patterson taught Keith Basso was clearly not spoken wholly by the places themselves. The wisdom was a product of the Western Apache having lived and died in those lands over many years. Cultural narratives about ancestors make a crucial contribution to the wisdom sitting in those places. Basso notes how the knowledge or wisdom the places provide is gained from "observing different places (thus to recall them quickly and clearly), learning their Apache names (thus to identify them in spoken discourse and song), and reflecting on

traditional narratives that underscore the virtues of wisdom."[29] But despite the importance of cultural narrative for making these places significant, it would be wrong to suggest that this is just a case of the arbitrary ascription of value upon 'sites' or 'spaces'. The character of these places is at work determining the kind of narrative that can be told at that place. It is the topography and aridity of the land at Trail Goes Down Between Two Hills that made it possible for Two Sisters to tease Old Man Owl for his lasciviousness. Trail Goes Down Between Two Hills has a particularity that lends itself only to a certain kind of story. The rich sense of place that the Apache have, Basso describes as being comprised of "a stream of symbolically drawn particulars - the visible particulars of local topographies, the personal particulars of biographical associations, and the notional particulars of socially given systems of thought."[30] The sense and sensing of place is therefore a product of a dialectic between the material, the personal, and the social. It is what Basso calls, "a kind of imaginative experience, a species of involvement with the natural and social environment."[31] It is a dialectic because the peoples living in that landscape over a sustained period of time have developed a moral system that both emerged from their interactions with the landscape and governs their interactions with the landscape.[32] My concern in this dissertation is to remedy the fact that one part of this dialectic is typically seen as less important by the Anglo-American epistemological tradition. David Abram complains that even Basso over-emphasizes the social at the cost of the material.[33] In contrast to Basso, a white anthropologist at the University of New Mexico, Vine Deloria, a Sioux Indian who grew up on the Pine Ridge Reservation, appears more eager to emphasize this material side of the dialectic.

Deloria's God is Red is an outline of a Native American view of religion. Deloria juxtaposes a Native approach to religion with a Christian approach in order to illustrate their respective emphases on space and time. He criticizes Christian peoples (and also Western European peoples in general) for never having "learned to consider the nature of the world from a spatial point of view."[34]

Deloria argues that the linear sequence of events described in the Bible encourage Christians to focus on time instead of place. This 'tunnel' approach to time means that events of special importance, such as the birth of Christ, are locked into a particular time in history as markers of dates after which it was assumed that "the peoples of western Europe became the guardians of the world."[35] Anniversaries of these dates are often marked in expectation of further dramatic revelation. Deloria suggests that the whole of Western European culture has adopted the same emphasis on time and temporal progress. "The very essence of Western European identity," claims Deloria, "involves the assumption that time proceeds in a linear fashion."[36] The notion of manifest destiny as the unfolding of a divine plan further encourages Christians to view history as a march through time on the path of moral progress. Events such as the expansion westwards across the North American continent by Christian European immigrants and the taming of the wilderness that they found there were considered to be exemplars of such progress. The failure to consider the world from a spatial point of view is connected, claims Deloria, to Christianity's historic and ongoing perpetration of genocide and ecocide.

This emphasis on history results in a particular approach to revelation. In Christian religions, revelation is "the release of new information and insights when the

deity has perceived that mankind has reached the fullness of time and can now understand additional knowledge about the ultimate nature of our world."[37] Important religious events are understood as elements of a divine plan. Since it is essentially information being revealed in these revelations, the place in which they occurred is not considered to be an important part of its content. This means that the information can be freely disseminated to peoples around the globe in different places. Preaching, teaching, and spreading the word become an important part of the Christian calling. The significance of the particular place in which the revelation takes place is lost. In Deloria's view, religion is not suitable for such transmission "without doing severe damage to both the message of revelation and the society that receives it."[38] Deloria claims that if the place of the revelation is marked at all in Christian religions it is marked with a massive cathedral structures which effectively separate worshippers from the natural location itself.

Deloria explains some striking contrasts between these Christian approaches and the religious beliefs of American Indians. Deloria claims that history is far less important in Indian religions. Notions of linear progress are absent. Value judgments," says Deloria, "involve present community realities and not a reliance on part of future golden ages toward which the community is moving or from which the community has veered."[39] Religious experience is therefore primarily valued for what it teaches about living in a particular place. The structure of religious beliefs comes not from some transcendent realm but from the lived relationship with landscapes and other forms of life. The emphasis on learning how to live rightly means that it is not so important to learn an accurate chronology of events in order to understand a tribal religion. Deloria tells how

the recounting of tribal histories is usually prefaced with a casual "the way I heard it" or "it was a long time ago." The recording of history becomes always an approximate affair. Plains Indians inscribed the 'winter count' on a buffalo hide when they wished to commemorate an event during the year, but the hide was good only for as long as people were around to remember what each symbol meant. Another way of experiencing a tribal history would be to let oneself be guided around the sacred places by a tribal elder. History combined with geography to produce a "sacred geography;" one that stores historical events in stories associated with particular places on tribal lands.

Without the desire to keep an accurate written record of elapsed time, particular historical events rarely play a large role in tribal religious belief. Deloria goes so far as to claim that "[N]o Indian tribal religion was dependent on the belief that a certain thing had happened in the past that required uncritical belief in the occurrence of the event."[40] This means a certain tolerance between conflicting accounts of past events and a relative lack of interest in asserting the primacy of one's own tribal history over another's. Believing the creation stories of other tribes, even when they conflicted with the tribe's own stories, was an important gesture of civility. Tribal histories, in so far as they assume any importance at all, serve only to offer descriptions of the places and the conditions under which people lived. The date of a migration is always less important than the reason why the people moved.

This different approach to history means a different approach to revelation. Revelation is seen as "a continuous process of adjustment to the natural surroundings and not as a specific message valid for all times and places."[41] It is a message about how to

live in the right relation with a particular place. The natural environment in which the revelation takes place is therefore a significant part of the content of the revelation. The site of a revelation is remembered and consecrated by rituals and ceremonies. Ancestral lands, lands which are full of sacred places containing the stories of the circumstances surrounding revelations to tribal members, play a crucial role in the construction of tribal knowledge of how to live. Sacred places enable Indians to "look out along the four dimensions and locate their lands, to relate all historical events within the confines of this particular land, and to accept responsibility for it."[42] Knowing how to live rightly is, as Basso described with the western Apache, achieved through the knowledge of the narratives and histories of particular places on tribal land. "Spatial thinking," Deloria suggests, "requires that ethical systems be related directly to the physical world and real human situations."[43] Tribal religious and moral knowledge is, for this reason, always geographically situated knowledge.

Elements of the dialectic between the personal, the social, and the material that emerged in Basso's account of the Western Apache moral thought are clearly present in Deloria's more general account of Native religion. Narratives about culturally important events at particular places take on a key role in the formation of religious belief. The land becomes imbued with meaning through the history of a tribe's residence there.

The significance of the land become particularly clear in Deloria's account of sacred places. One of the four kinds of sacred places that Deloria describes acknowledges how places gain their sanctity through commemorating important events in tribal history. When ancestors are buried in those same lands, the land becomes sacred

not just because of what happened to tribal members there but also because of the actual presence of the bones of the ancestors. Deloria quotes a Crow Indian chief refusing to sell any more of his land to the federal government in 1912:

> The soil you see is not ordinary soil - it is the dust of the blood , the flesh, and the bones of our ancestors. We fought and bled and died to keep other Indians from taking it, and we fought and bled and died helping the Whites. You will have to dig down through the surface before you can find nature's earth, as the upper portion is Crow. The land as it is, is my blood and my dead; it is consecrated; and I do not want to give up any portion of it.[44]

While tribal history is certainly important, the other three kinds of sacred places ascribe less importance to cultural history and the bones of the ancestors and more to the characteristics of the places themselves. The second kind of sacred place, Deloria describes as "locations where we have perceived something specifically other than ourselves is present."[45] These are places where something holy inserts itself into a secular situation. Deloria notes pointedly "no matter how we might attempt to explain this event in later historical, political, and economic terms, the essence of the event is that the sacred has become part of our experience."[46] Something from the more-than-human realm associated with the place makes an appearance into a sequence of human events. This appearance goes on to shape religious belief through its incorporation over time into a cultural narrative. This might be the appearance of some white buffalo to feed a starving people or an occasion where a bear lets itself be taken so that a tribe has an offering at a potlatch. In these cases, the sacred takes an active involvement in human affairs. This second type of sacred place makes less reference to tribal activity than the first.

The third and fourth types of sacred places make no reference whatsoever to events in tribal history. The third type of sacred sites are places holy in themselves, without regard to any particular events in tribal history when the divine might have inserted itself into human affairs. Mount Shasta is one such sacred place. The fourth type of sacred place is land in which people should be ready to experience future revelation. Native American religions embrace the possibility of the continuing revelation of the sacred in our lives. It is because of the belief that sacred and potentially sacred lands remain active that Native religions have the ability to stay vital for future generations.

In this account of sacred places it is clear that elements of the sacred emerge only over long periods of continual inhabitation. Deloria does not underplay the significance of continual residency. "Thousands of years of occupancy" on their lands, says Deloria, are what taught tribal peoples about the sacred landscapes for which they are responsible. It is also clear from his account that cultural narratives play a crucial role in 'capturing the power' of the place and ensuring that knowledge of the sacred is passed down through the generations. These narratives in turn affect the kinds of interactions that a culture has with a place. Narratives might instruct tribal members to go to one place to hunt and to another for instruction on how to resolve a thorny family matter. But what is also interesting about Deloria's account - and this seems to come through much more clearly in Deloria that in Basso - is the emphasis on the agency of the land itself independently of human affairs. Places do not become active in tribal religion only as a result of human activities. Mount Shasta is a sacred site for the Chumash people because of its physical

characteristics. The snows, the forests, and the game animals that are the manifestations of its power in tribal stories are present on Shasta regardless of whether there is a tribe in residence. Shasta becomes incorporated as a sacred site to the Chumash people through their experience of living in its shadow. The power of the land is incorporated figuratively through story and literally through ingestion of the game animals that live there. This incorporation becomes a dialectical relationship when, as a result of the lived experience of the tribe, the stories go on to govern tribal interaction with the mountain. But even before this dialectic starts to operate, Deloria insists that the land itself "must somehow have an unsuspected spiritual energy or identity that shapes and directs human activities."[47] As Basso's informant said, 'the places keep stalking us.'

The agency that Deloria ascribes to sacred places makes tribal religion into something "considerably greater than a simple allegiance to abstract religious principles." It suggests a much tighter relation between religious belief and the land since "the structure of [Native American] religious traditions is taken directly from the world around them."[48] Deloria is not talking figuratively when he states that "the mountains rivers, waterfalls, even the continents and the earth itself have intelligence, knowledge, and the ability to communicate ideas."[49] This makes the natural physical world, as an agent in itself, "integral to human activities and ambitions."[50] Exactly what is meant by the 'agency' of the land here is a complicated issue to which I shall be returning.

Basso's discussion of the Western Apache approach to morality and Deloria's account of Native American religions both suggest that knowledge practices emerge out of a dialectical relationship between particular places and cultures that have existed

within those places for long periods of time. These accounts, I have claimed, appear to share something with an insight latent in Plato's Timaeus and his Phaedrus. The accounts also appear to confirm something that lab studies theorists acknowledge, namely that the materiality of the setting in which knowledge practices occur contributes something to the knowledge claims that are made. Whether Deloria and Basso are really making the same point as the lab studies theorists is not exactly clear. In lab studies, the influence of the materiality of the lab does not require thousands of years of residence and the handing down of culturally incorporated narratives before it attains its significance. Also in lab studies, the material environment that contributes is a highly artificial arrangement of spaces and instrumentation set up in order to answer a very particular set of questions about the behavior of certain aspects of physical reality. This contrasts sharply with the expansive natural environments that Deloria and Basso talk about. However, at the very least, it seems reasonable to conclude that all these accounts establish minimally that certain types of knowledge claims emerge out of a complex interaction between cultural activities, social values, individual idiosyncrasies, and material arrangements of physical environments. Using again some of Yi-Fu Tuan's terminology, an environment is more than just a space in which knowledge making happens to go on, it is a highly particular place.

With such a complex dialectic at work, it is important to ensure that none of the pieces get overlooked. Exactly how much attention gets paid to each part of the interaction will depend on many of the same social and cultural factors that are participating in the dialectic itself. Since it is my claim that physical reality, and in

particular the physical reality of natural environments, is the part of the interaction most often left out of contemporary Anglo-American naturalized epistemologies, I shall continue to discuss the agency of natural environments rather than laboratory environments. In the next section, I hope to persuade the reader how particularly powerful natural environments can exhibit their agency even to someone steeped in the Anglo-American epistemic tradition.[51] In order to illustrate this, I offer my own narrative about a particularly powerful 'dislocating experience.'

A Non-Indigenous Narrative about Place

The potency of place becomes apparent, I believe, to those that watch carefully what happens when they enter unfamiliar and dramatic physical territory. These kinds of 'dislocating experiences' are, I shall argue, epistemically valuable because of the shock they cause to the particular combination of values, practices, and habits in perception that evolve through extended living in one environment. I experienced a powerful example of such a dislocating experience in the summer of 1997 when working with the National Park Service in Dry Bay, at the mouth of the Alsek river in South-East Alaska.

Dry Bay is on the seaward side of the glacier covered peaks of the Fairweather Range, a range John Muir described as "ineffably chaste and spiritual."[52] Mount Fairweather, which Muir calls "the noblest and most majestic in port and architecture of all the sky-dwelling company," rises straight out of the ocean to 15,300 feet in the south-east. The Fairweather Range dominates the glacial outwash plane on which the forty or so summertime human inhabitants of Dry Bay reside. I moved there in June of 1997 to

check the permits of rafters floating the Alsek and Tatshenshini rivers for the National Park Service.

On first moving to Dry Bay, I was both culturally and perceptually out of place. Dry Bay is the home of many brown bears, moose, and wolves and only a few part-time human residents. The summer fishcamps that dot the banks of the Alsek and the East Alsek Rivers are removed before the darkness of winter sets in. Dry Bay is a place of unusually massive scale. Each visitor needs time to adjust her perceptual faculties in order not to make grand errors of judgment. The mountain I saw to the north, Mount St. Elias, was not twenty, but eighty miles distant and the frigid, silty river at my feet was not flowing gently past as it appeared, but racing by at more than nine knots. Local knowledge and caution are essential companions for the newly arrived.

While still in the throes of the dislocating experience that such a move provides, it becomes abundantly clear how perceptual experience happens both in and through places. I learned that my eyes do not recognize distances in the same way in the same places. Even more than when I arrived in Dry Bay (perhaps because the views from the airplane had prepared me), my return to Oregon resulted in great perceptual confusion. The City of Eugene seemed unusually crowded. The forested hill half a mile from my home seemed to be practically on top of me, having grown used to the scale in Dry Bay. These visual confusions infected more than just my quantifications of distance. They resulted in a changed relationship to my environment. Despite possessing the same body, I was quite unclear what constituted 'near' or 'far.' In Dry Bay, it would have been unthinkable that I could get beyond the horizon within a day under my own power, while in Eugene, I do

this nearly every time I get on my bike. When the ranger took me out 'ranging' with him for a few hours on the ATV's it was very hard for me to conceptualize from my cabin where and how far we would go in relation to the land I could see.[53]

The other senses were similarly shocked. The yipping of coyotes was, in Dry Bay, the sound of the end of the summer day, replacing the sound of my roommate taking his dog out for one last walk. In Oregon, a creak in the night was the reassuring sound of my home contracting as the temperature changes. In Dry Bay, the same creak was a brown bear nosing around my cabin. Bringing with me to Dry Bay an excessive, culturally inscribed fear of the brown bear, I first turned every sound at night into an alarming reminder of my status as potential prey. But the longer I lived there, the more I became able to set that fear into a context that was appropriate for the place. As my perceptual skills adjusted over time to the landscape, my senses became directed towards different things. Sounds of the same volume were tuned in or out depending on their relevance to life in that environment. In Dry Bay, the Alsek river was first deafening and then silent as I grew used to living beside a river. At the same time, my ears grew acutely sensitive to the sound of an incoming bush plane. Moving back to Eugene, the refrigerator was at first thunderously noisy at night and then almost silent.

A dislocating experience suggests that in moving to a new place there is a time period in which you have to learn how to sense in that place. It is not that you no longer have the capacity to hear or see in the new place, but you do have to learn for the first time which of the sounds and sights are important.[54] Since in every environment we only focus on a portion of the data available to us, we have to learn in each new place what

this portion is going to be.[55] This learning process will be shaped by the kinds of activities you are engaged and the kinds of physical realities (such as brown bears!) that your environment might present to you.

These observations about the senses suggest that synthetic knowledge is not something that occurs only incidentally in places, rather places are responsible in complex ways for determining what is observed. It is not just the sense data itself that changes when one changes place but also the selection of the data, as well as the skill at determining it, varies depending upon where one is located, what activities one is engaged in, and what cultural values one has. Freshly turned earth goes unnoticed in Eugene, home of many moles, while in Dry Bay it can be an important warning of brown bear activity. Even if this does not mean that the world itself changes, the world as it is perceived certainly does.

In moving to Dry Bay, these perceptual challenges also translated into a deeper set of challenges about how to structure my world. My location in nature did not just effect what I perceived, but also challenged a number of the important categories that govern my experience of the world in general. For example, 'inside' and 'outside' took on a slightly different significance. In Eugene, outside was a place where I would go to find people and have conversations, in Dry Bay I would go inside to do this. Outside was also a place for some caution in Dry Bay due to the dense population of brown bears. Outside was thus associated with a certain amount of fear, being a clear manifestation of the 'other.' The relation of 'self' and 'other' was thereby impacted by the particular place I was in.[56] The territory that counted as 'home' shrank in Dry Bay as the number of

unknowns beyond the familiarity of my cabin increased. It started to enlarge again as I became more comfortable in the area.

The forces that motivated my daily economy, the provision of food, the need to stay dry, the necessity of completing my park service responsibilities, acted out upon my body in ways different from the comparable forces in my life in Eugene. For example, provision of food in Eugene was something mediated through money, by going to the ATM and thence to the grocery store. It did not manifest itself as an ecological activity that connects me to the place in any way.[57] In Dry Bay, the same task was accomplished either socially by exchange with a fisherman or a rafter, or, on some occasions, by sharing fish caught in the local rivers and by picking berries. On these occasions, my day was literally organized by the natural ecology of the region. In the provision of food, the ecology of the region played itself out on my body in particular ways.[58]

It would be hard to describe an exact set of direct causal relationships between these organizational categories and Dry Bay itself. Too many other factors were also at play in the way I experienced Dry Bay that summer. It is also unclear what would have happened had I remained there longer than two months. Would I have adjusted back to 'normal' after a few more months and become 'cognitively identical' to how I was in Eugene? Or would I really have started to experience the world through a different set of schemas? Are these perceptual challenges epistemically significant? Though these questions are beyond my ability to answer at this point, the stories I read and the pictures I saw of the Tlingit people formerly resident in Dry Bay make me think that the place would have changed me. The value of dislocating experiences such as the one I describe

is that they give a hint that places come to influence a good deal more than just what falls into our field of vision in a new region.

A Causal Role for Place?

Most of the foregoing claims about how dislocating experiences challenge our perception and experience of reality can probably be accommodated by contemporary epistemological wisdom. They appear to rest on a geographical version of the theory dependence of observation thesis. As Hanson put it back in 1958, "there is more to seeing than meets the eyeball."[59] Hanson argued that what we choose to observe is selected relative to a background of theories and assumptions. The selection of certain data as being more valuable to us than others enables us to make sense of sensation. In this geographical version of the theory dependence of observation thesis, what we observe depends upon contingencies associated with the geography that locates us. These contingencies are, at least in principle, able to be articulated. Inuit hunters need to navigate on the ice, so they pay attention to non-visual cues; persons living in the Kalahari bush get most of their nutrition from under the ground, so they must become good at finding it; the City of Eugene has no 15,000ft mountains, so its residents need not be good at judging their height. Over time, the senses adjust without the individual having to articulate the reasons why they should adjust. Any settled state that we might arrive at will be the result of a dialectic in which local geography, in dialogue with particular human interests, practices, and technologies[60] shapes what we observe. What we observe in turn filters back to shape our activities and the dialectic is in place.

My narrative about the perceptual and organizational challenges that individuals face during a dislocating experiences is lent credence by some work in cultural geography by Yi-Fu Tuan. In his 1974 work Topophilia, Tuan described the effects of physical settings on the perception, the attitudes, and the world views of peoples living in geographically distinct environments. He suggested that the straight lines of what he calls a 'carpentered' world lead to different skills of perception than the jumbled world of natural landscapes.[61] Unusual environments such as the high Arctic, where there is often little differentiation between the sky and the ice sheets, demand particular perceptual adaptation. The Inuit hunter, according to Tuan, navigates more by acoustic, olfactory, and sensory cues than by scanning the horizon for non-existent visual signposts. The Kalahari bushperson is acutely sensitized to the presence of minute leaves that indicate that certain of edible roots can be found nearby. And the Polynesian sailor is finely tuned into the motion of the waves and currents under the boat.

With perception tied into particular organism-environment relationships, perceptual skills that become embodied over time will be skills relative to particular environments. Environmental psychologists have found that significantly different environments produce observers with significantly different skills. Colin Turnbull's (1961) study of the Mbuti people of the equatorial forest reveals how the perceptual skills of these forest people do not function effectively on open grasslands. A herd of buffalo grazing several miles away were seen by a Mbuti informant as insects. The informer treated with much hilarity Turnbull's assurance that these 'insects' were buffalo. As long as it could be shown that the body has some kind of 'memory' for preserving perceptual

skills, this localizing of perception might explain the perceptual difficulties and subsequent feelings of dislocation that attend migrations to a dramatically different places such as the ones I described in the previous chapter.

There is some evidence to suggest that it is not only learned perceptual skills that emerge out of particular organism-environment relations. Physiological capacities might themselves be linked to active engagement with the affordances that particular environments supply (Wallman and Miles, 1993). A study of Inuit children found a predisposition to myopia that would not manifest itself as long as the children were exposed to the full range of the visual stimuli in their outside environment. However, if these children spent the majority of their time in physical environments that they were not adapted to, then the myopia became a problem. In the time that books and audiovisual media have become the primary mode of education for Inuit children, the rate of myopia has increased to fifty percent of the general population.[62] This appears to be an example of how not just observation but observers themselves are effected by the landscapes in which they reside. As contemporary Gibsonian E.S.Reed remarks "if one removes an animal from the habitat to which it is adapted its behavioral flexibility may become very circumscribed."[63] Biologist Ruth Bleier makes a similar suggestion when she claims that "the biology of the brain is itself shaped by individual environment and experience."[64] Though none of these claims are conclusive knockdown proofs of a direct causal relationship between physical environments and perceptual skills and abilities, they are all at least consistent with the dialectical approaches to biology and perception that I discussed in the previous chapter.[65]

Tuan also makes some claims parallel to my own about how places lend shape to structures that organize experience and shape knowledge claims. He compares the cosmology, the sense of time, and social structure found in the BaMbuti pygmies of the Congo rainforest to the that of the pueblo Indians of the American South-West. Tuan connects the lack of seasons in the equatorial rainforest to the lack of importance attached to time by the BaMbuti. There is little attention paid either to human genealogy or to life histories of the plants on which they depend. Creation stories are almost non-existent among BaMbuti legends. In addition, the inability to see very far in the rainforest results in a cosmology largely devoid of spatial organization. By contrast, the openness of the country in the American South-West is responsible, Tuan claims, for pueblo Indian accounts of a cosmos that is "spatially well-defined, stratified, and rotary."[66] The emergence and recession of the sun and the dramatic presence of particular mountains and mesas provide the axes that structure not only cosmology, but also the organization of home and of the pueblo. The seasons supply the ground for the cyclical approach to time. In both these cases, geography and local ecology structures the science and cosmology of a people.

While Tuan is useful to my argument as someone that believes that local geography plays an active role in shaping perception, cosmological, and religious belief, there are some problems with his account. While Tuan certainly seems to make some claims reminiscent of those made by Basso and Deloria, he posits a much more direct link than either of these two between local environment, perception, and belief. Tuan makes local geography into an efficient cause of particular beliefs. Deloria and Basso paint a

much more complex picture. They claim that environment is part of a dialectic that also involves cultural practices, cultural histories, and particular activities that a culture might engage in. For Deloria and Basso, it seems perfectly reasonable that a culture might have developed a completely different set of moral and religious strictures that would have involved different stories about their native lands. Tuan's claims do not so readily allow this. In fact they suggest an environmental determinism of the sort proffered by Ellsworth Huntingdon in the late nineteenth century. Environmental determinism has been heavily criticized for the essentialism it seems to support. The connection between landscape and knowledge production that I seek to describe, and the one that Basso and Deloria do describe, is a more subtle one in which the earth can play a grounding, but not a causal role in belief. According to this view, knowledge structures are not determined by landscapes, but neither are they totally independent of then.[67]

A geographer who does a better job than Tuan of appreciating the complexity of the relationship between environments and belief is David Sack. Ever since the publication of Henri Lefebvre's The Production of Space in 1974 geographers have been acutely aware of how there is more to place than just physical extension. In his recent book Homo Geographicus, Sack considers what role the notions such as place, world, and home play in human lives.[68] He claims the notion of place "draw[s] together the natural, the social, and the intellectual" in a way that is important for providing us an understanding of how we are to function in the world.[69]

Geography is about more than just the physical spaces that surround us. The forces exerted on us by nature, such as gravity, are different from those exerted on us by

place. A geographical awareness, an awareness of place, is an awareness that already combines the natural, the social, and the intellectual. Sack describes a place as something that is known; something that has been experienced. In the process of being experienced, nature becomes a place and starts exerting its influence on us.

Using some of Tuan's terminology, Sack elaborates on this distinction between place and space. Places are more intimate than spaces. As Sack puts it, "[they] possess rules about the things to be included and excluded, and they have meaning."[70] It is these cultural features of places, in addition to the natural features they possess through their materiality, that ensure that places exert an influence over the social, the natural, and the intellectual. It is, says Sack, "the very fact that place combines the unconstructed physical space in conjunction with social rules and meaning …[that]…enables place to draw together the three realms, and makes place constitutive of ourselves as agents."[71] While spaces are just physical, places are both physical and cultural. It is through the way that place binds together the social, the intellectual, and the natural that Sack articulates the causal efficacy of place. It is place, which Sack refers to as "primary," that undergirds human reality.[72]

Sack's articulation of his notion of place is more in tune with my claim about the dialectic between social values, cultural practices, and natural environments, than the causal efficacy that Tuan attaches directly to local geography. The place I experienced in Dry Bay was more culturally constructed than simply a physical environment with a certain ecology. I really had no idea what it was like to live amongst brown bears, but I brought numerous preconceptions with me. The places that Sack describes already

include social rules and involve human actions and intentions. What Sack as a geographer offers to the epistemologist is an enriched notion of place that lends itself more easily to the 'epistemic locations' that post-Quinean epistemologists already talk about. But however complex is the relation between geography, culture and history, we should remember that places, for Sack, are still a potent force.

Notes

[1] Rick Bass, The Book of the Yaak (Boston: Houghton Mifflin, 1996), 6.

[2] Terry Tempest Williams, An Unspoken Hunger (New York: Vintage, 1994), 9.

[3] Abram, The Spell of the Sensuous, 217.

[4] This distinction between 'space' and 'place' was first made by Yi-Fu Tuan in his Space and Place: The Perspective of Experience (Minneapolis: University of Minnesota Press, 1977). Places have a particularity, familiarity, and agency in our lives that spaces, which are merely geometrically bounded areas, lack. In Getting Back into Place, Edward Casey characterizes this as the distinction between 'place' and 'site.'

[5] Quoted in R.W.Church, Bacon (New York: Harper, 1902), 67. Notice also the gendered language Bacon employs. For the use of such language Bacon often bears the brunt of eco-feminist critique.

[6] Aristotle, Physics, in The Basic Works of Aristotle, tr. R.P.Hardie & R.K.Gaye, ed R.Mckeown (New York: Random House, 1941), 208B34.

[7] If epistemologists need some inspiration for this thesis a bit closer to home, they might look across the hallway at the nascent field of ecocriticism that is blossoming in several English departments in North America and the United Kingdom. See The Ecocriticism Reader, eds. C.Glotfelty and H.Fromm (Athens: University of Georgia Press, 1996)

[8] Plato's Timaeus, tr. Benjamin Jowett, in Plato: Collected Dialogues, eds. E.Hamilton and H.Cairns (Princeton: Princeton University Press, 1961), 52b.

[9] Ed Casey, The Fate of Place (Berkeley: University of California Press, 1997), 39. The triangle image is adapted from Casey's diagram.

[10] Ibid., 41.

[11] Plato's Phaedrus, tr. A.Nehemas and P.Woodruff (Cambridge, U.K.: Hackett Publishing, 1995).

[12] Introduction to Plato's Phaedrus (op. cit.), xliv.

[13] Casey, The Fate of Place.

[14] Ibid., 333.

[15] Casey, The Fate of Place, Getting Back into Place, and "How to get from Space to Place in Fairly Short Stretch of Time" in Senses of Place, eds. S.Field & K.Basso (Santa Fe: School of American Research Press, 1996).

[16] Diamond Jenness, The Ojibwa Indians of Parry Island; Their Social and Religious Life (Ottawa: Canadian Department of Mines, 1935).

[17] Booth, A. & Jacobs, H. "Ties that Bind: Native American Beliefs as a Foundation for Environmental Consciousness," Environmental Ethics 12, (Spring 1990): 27-43 and Callicott, B. "Traditional American Indian and Western Attitudes Towards Nature: An Overview," Environmental Ethics 4, (Winter 1982): 293-318.

[18] V.F.Cordova, "Eco-Indian: A Response to J.Baird Callicott," Ayaangwaamizin 1, no. 1, (1997): 31-44.

[19] Keith Basso, Wisdom Sits in Places: Landscape and Language Among the Western Apache (Alburqerque: University of New Mexico Press) 1996. Page references are to the important final section of the book reprinted in Senses of Place, 53-90, eds. K.Basso & S.Feld.

[20] Ibid., 60.

[21] Ibid., 66.

[22] Ibid., 67.

[23] Ibid., 70.

[24] Abram, The Spell of the Sensuous, 162.

[25] Ibid.

[26] Basso, "Stalking with Stories," in On Nature: Nature, Landscape, and Natural History, ed. D. Halpern (San Francisco: North Point Press, 1987), 95.

[27] Basso, Senses of Place, 83.

[28] Ibid., 86.

[29] Ibid., 76.

[30] Ibid., 84.

[31] Ibid., 83.

[32] Recall how in the image schematic account of cognition discussed above, the image schemas both emerge out of interactions with the environment and govern interactions with the environment.

[33] Abram, personal communication.

[34] Vine Deloria, God is Red (Golden, CO: Fulcrum, 1994), 63.

[35] Ibid.

[36] Ibid.

[37] Ibid., 66.

[38] Ibid.

[39] Ibid., 68.

[40] Ibid., 100.

[41] Ibid., 67.

[42] Ibid.

[43] Ibid., 73.

[44] E.T.Seton, The Gospel of the Red Man (New York: Doubleday Doran, 1936), 58-9

[45] Deloria, God is Red, 273.

[46] Ibid., 274.

[47] Ibid., 148.

[48] Ibid., 66.

[49] Ibid., 152.

[50] Ibid., 154.

[51] The impact of highly artificial environments on knowledge practices are beginning to be realized by the lab studies theorists. See also Pickering's The Mangle of Practice and Donna Haraway's Modest Witness (New York: Routledge, 1997).

[52] John Muir, Travels in Alaska, (New York: Houghton Mifflin Co., 1915).

[53] I didn't care. I just followed him. It was fun.

[54] This phenomenon of learning how to sense in a new place also became evident to me through working on fishing boats in Alaska. Most boats keep the VHF radio on all the time for safety reasons. At first it was an annoying intrusion into the auditory space, but after a while I learned how to tune it out into the background. However, when the radio announces "Pan-pan…Pan-pan…Pan..pan" (a request for assistance) or "F/V Reflection" (the name of my boat) the sound leaps out of the background into the center of attention. This sensitivity to certain sounds on the radio was a product of the kind of activities I was engaged in (commercial fishing) and the nature of the physical environment in which I was practicing (a dangerous and cold sea).

[55] The same process occurs when you travel from a small town to a dangerous city.

[56] See Greta Gaard's "Ecofeminism and Wilderness," Environmental Ethics 19, Spring (1997): 5-24 for a discussion of how wilderness functions as other.

[57] Well perhaps it does connect me to Food Value on Franklin. There is then an artificial ecology of the region with a web of interrelations between grocery stores, banks, and movie theatres.

[58] In his much celebrated 'frontier hypothesis,' Frederick Jackson Turner made some similar claims about how the startling physical realities of life on the frontier leant a distinctive shape to American political and legal institutions.

[59] N.R.Hanson, Patterns of Discovery (Cambridge: Cambridge University Press, 1958).

[60] For example, I did not see anything like as much bear sign when I was riding an ATV. One reason for this was that I would usually be moving too fast to see some of the tracks but another reason was that the prospect of meeting a brown bear when riding an ATV was not as alarming as the prospect of meeting one when on foot.

[61] Yi-Fu Tuan, Topophilia (Prentice-Hall: New Jersey, 1974), Chapter 7.

[62] Nabham & St. Antoine, "The Loss of Floral and Faunal Story: The Extinction of Experience," in The Biophilia Hypothesis, eds. Stephen Kellert and E.O.Wilson (Washington D.C.: Island Press, 1985), 242.

[63] Reed, Encountering the World, 36.

[64] Cited in Code, What Can She Know?, 16.

[65] There is obviously more to a knowledge practice than whether living in a particular environment makes your eyes work in a certain way.

[66] Tuan, Topophilia, 81.

[67] It is important to note that in backing away from Tuan's direct causal claim, I do not wish to revert to the position in which geography is merely incidental to belief. The central thesis of this dissertation is that places play an active role in the construction of belief and are not merely backgrounds for more interesting human agencies. What it means for places to have agency if they don't have causal efficacy is a tricky question. Perhaps one could suggest that environments have a direct causal effect on perception and only an indirect effect on belief through the structures that organize belief.

[68] Robert David Sack, Homo Geographicus (Baltimore, MD: Johns Hopkins University Press, 1997).

[69] Ibid., 12.

[70] Ibid., 32.

[71] Ibid., 33.

[72] It is noteworthy how Sack calls places 'primary' even though they include an element of the social and cultural which spaces do not. Sack consciously steps away from the Cartesian picture that makes space as geometrical extension the primary physical substance. The connection of human agency and place at a primary level anticipates the argument of the next chapter.

CHAPTER V

THE EPISTEMIC ARGUMENT FOR PRESERVING NATURE

> To my way of thinking, these roadless areas, these cores of remaining unprotected wildness, are the best asset Montanans and Americans have going for us. They filter the water, filter the air, and, if you believe in such things, as I do - that a people's culture is sculpted by its landscape - these roadless areas filter and shape our spirits, too. Any continuing harm we do to them harms ourselves. And then we wonder where all our anger and confusion comes from. - Rick Bass[1]

Epistemology and Environmental Philosophy

Now is a good time to review the terrain that has been covered so far. I argued in Chapter I that there are intractable skeptical problems with empiricist approaches that consider knowledge to be a matter of forming representations in the mind that mirror the world. In Chapter II, I showed how Kant's and Quine's insights on how to solve this skeptical problem have led to an increasingly wide array of naturalized approaches. Naturalizers have shown how the manufacture of knowledge is a dialectical process involving a number of natural and social factors. I pointed out how several of these theorists now include a discussion of the material surroundings of knowledge producers for a more fully informed naturalized account. I suggested that these theorists should also consider natural environments to be a relevant part of the material surroundings in

which a culture produces knowledge. In Chapter III, I pressed further my argument that the natural environment should be taken into account by considering theories from biology, psychology, and cognitive science that emphasize dialectical relationships between environment and organism, environment and perception, and environment and cognition respectively. In Chapter IV, I used examples taken from ancient philosophy, Native American philosophy, personal narrative experience, and cultural geography to illustrate cases in which the natural environment appears to be part of the dialectic involved in knowledge production.

These four chapters taken together, I believe, comprise a broad synthetic argument for the claim that natural environments are, at the very least, one party in a complex set of interactions out of which knowledge gets produced. Exactly how directly causally efficacious natural environments are in shaping knowledge claims and practices is a question that I have left relatively open at this point. I am keen to avoid the environmental determinism of Tuan but I am equally keen not to completely surrender the potency of place by subsuming it under cultural interests and human idiosyncrasies. The extent of the causal efficacy of place in effecting perception and cognitive structure is a question that future empirical research in both the 'hard' and 'soft' sciences can and should address. While I doubt that it would ever be possible (or appropriate) to make claims such as "environments of type X give rise to knowledge claims of type y," I hope I have shown that it already is possible to claim that natural environments make some

distinctive contributions to the production of knowledge, contributions that it is essential to understand if we are to have adequately naturalized epistemologies.

If the argument so far has been cogent, and if natural environments really are a significant part of the epistemic location of the agent of knowledge, where does that leave us? What normative lessons can we draw from the fact that natural environments must be taken into account? Or to put it another way, once they have been taken into account, what relevance does this have for future knowledge projects and, indeed, for environments?

These questions can only be answered, I believe, through a careful consideration of the normative implications of situated knowledge in general. Situated knowledge has certain methodological implications that follow from the unavoidable 'partiality' of knowledge claims, claims that issue from persons and communities subtly shaped by their epistemic - natural and cultural - locations. I shall consider these implications shortly by pointing to the normative recommendations of two theorists who situate knowledge: one a philosopher of science and the other an enactivist cognitive scientist. It is norms emerging out of the situatedness of knowledge in general that are important for showing the implications of the epistemic significance of place. But before turning to these figures, I wish briefly to tie these normative questions into the larger concerns that are the motivation for my own study. Why was I so moved by David Abram's insight that the natural environment is 'the ground and horizon' of all knowledge? Why am I concerned about adding a normative dimension to this project?

The ultimate motivation for this dissertation was to suggest some rich links between environmental philosophy and naturalized epistemology. These two disciplines have hitherto mostly ignored each other.[2] Environmental philosophy has generally concerned itself with apportioning value to appropriate parts of the natural world and epistemology has concerned itself with finding the best methods for describing that same world. Only when environmental philosophers have discussed certain indigenous knowledge systems have they made statements to the effect that there might be "an epistemological function of place in the construction of our understandings of self, community, and world."[3] Not surprisingly given the focus of the concern in environmental ethics, these works discuss only the situatedness of moral knowledge relative to place and not the situatedness of knowledge in general.

Why should environmental philosophy consider epistemology? Ecofeminist Val Plumwood has noted how environmental philosophy has, to its detriment, focused too much on ethics. In fact, so concerned are environmental philosophers with ethics that, when I presented some of the ideas from this dissertation at the American Philosophical Association, a number of people in the audience were disappointed that the argument for the epistemic significance of place per se did not appear to contain any particular ethical norms. But their reaction was, I suggest, too hasty. According to Plumwood, challenging the collection of pernicious dualisms that lie at the heart of environmentally destructive attitudes involves epistemological in addition to ontological, ethical, and political analysis. She claims that the 'underside' of the human/nature dichotomy must be

reconceptualized so that nature, like women, is no longer conceived by the dominant group as "passive and lacking in agency and teleology."[4] I hope that I have challenged the passivity of nature in the previous three chapters. I believe that challenging the conception of nature as epistemically passive has implications for environmental philosophy.

Only in the last few years have there been signs in epistemology that the time might be ripe to stop ignoring environmental philosophy. Post-Quinean epistemology now engages with a number of other social and political concerns. Feminist epistemologists should take most of the credit for this. As I discussed in chapter two, feminists have brought to light a string of compelling evidence to support their claim that there can be a certain 'politics' at work in key epistemic notion such as truth, reason, and logic. To these concerns of feminist epistemologists, lab studies theorists such as Knorr-Cetina and Pickering have now introduced the material as another significant site of analysis for post-Quinean epistemology. Alone amongst these post-Quineans, only Sandra Harding has also begun to recognize that natural environments are part of the material environment and that they can play a significant role in the manufacture of knowledge.[5]

Harding's recent work in post-colonial studies acknowledges four categories of 'localness' in scientific practice which leads her to suggest that all science should be regarded as 'indigenous knowledge.' The categories of localness she recognizes are 'culturally distinctive interests,' 'ways of organizing knowledge production,' 'discursive

traditions,' and 'location in heterogeneous nature.' She notes how culture's different locations in heterogeneous nature expose them to different sets of regularities. "Some cultures daily interact with high altitudes and others not; some with mountainous terrains, deserts, oceanic islands, rain forests, or rivers; some interact with extremely cold and others with extremely hot climates; some with one range of diseases and health hazards, and others with quite a different range."[6] 'Nature' is also not to be treated as static since cultures move and climates change. She adds that biological differences such as skin pigmentation and relative immunity to malaria (which she hurriedly footnotes as often being socially constructed), also make possible different interactions with surrounding environments.

In acknowledging location in heterogeneous nature as a site of analysis, Harding seems to be supporting my central claim about the epistemic significance of place. She speculates that "cultures living on the edges of continental plates might well find the geology of plate tectonics more plausible (and 'interesting'!) than do cultures with little experience of earthquakes, volcanoes and other phenomena characteristic of plate-juncture environments."[7] For Harding, place belongs alongside cultural interests and practices in discussions of how knowledge is situated.

In what I would characterize as the literature's first hint of a connection between post-Quinean epistemology and environmental philosophy, Harding suggests that interactions with different local environments can be used as a valuable resource for advancing knowledge. She maintains that local specificity "could, should, and does have

positive effects on the growth of knowledge."[8] This means treating cultures, in their location in nature, as a "toolbox" rather than a "prison house" for sciences and technologies. It is not exactly clear what she means by this in relation to nature. Her discussion of 'location in heterogeneous nature' occupies only three of the two hundred and twenty-five pages in the book. But it seems to be a claim that parallels a move that she makes in her standpoint epistemology.

Harding's standpoint epistemology is an example of how to keep naturalized epistemology normative. She first explains, using arguments that originate in Hegel's master/slave dialectic, how the standpoint of a marginalized group is shaped by the activities they are forced to perform. To this descriptive claim, Harding adds the normative claim that it is only from this kind of achieved, subordinated standpoint that it is possible to offer "the most trenchant critiques of the dominant institutions and their discourse."[9] Harding claims that, by virtue of this ability to generate the most critical questions about received belief, marginalized groups are the most valuable resource for maximizing objectivity. The methodological norm that follows from this is to start scientific research from questions generated in the social margins and to take their critiques of the mainstream institutions of knowledge production to be the most pertinent. The trick for restoring normativity, one that Haraway[10] also employs, is to turn the situatedness of knowledge into something epistemically useful.

I shall take a similar course to Harding and Haraway, one that treats the situatedness of all knowledge not as a forewarning of pernicious relativism but as a

potentially valuable resource for improving the production of knowledge. My claim will be, along with Harding's, that the situatedness of knowledge in physical nature should be regarded as an epistemic resource. Out of this treatment of situated knowledge will come a methodological norm for how to treat heterogeneous nature and the link between epistemology and environmental philosophy will have been made. This relationship will turn out to be dialectical since not only does nature effect the structure of knowledge, but knowledge producing communities obviously have enormous power to effect nature. My recommendation will be that these knowledge producing communities be structured in such a way that natural landscapes and the indigenous communities that call them home are not destroyed and homogenized through development and the eradication of biotic diversity. Ensuring the preservation of cultural and natural diversity will in turn enable those knowledge producing communities to generate more critical knowledge. The argument begins by showing an important connection between situated knowledge and pluralism. A natural place to start is with Paul K. Feyerabend.

Situated Knowledge and Feyerabendian Pluralism

Any reputation Feyerabend might deserve as a leading twentieth century philosopher of science is usually torpedoed by his status as a maverick philosopher and jokester. His outspoken challenges to the hegemony of reason in Against Method (1975) and Farewell to Reason (1987) make him an iconoclast amongst the philosophical community. Any philosopher that irreverently enjoins her colleagues to bid adieu to what

they perceive to be their primary tool is unlikely to be appreciated, even if the call is not quite what it seems at face value. Can philosophers really take seriously someone who argues as length for the position that "there is no need to suppress even the most outlandish product of the human brain"?[11] It is appropriate that Feyerabend notes with no self-pity that "unhappiness is the fate of bold inventors."[12] Nevertheless, Richard Rorty puts him towards the end of a short list of elite philosophers (that includes Quine) that have shaped the Classical American Tradition. Rorty characterizes Feyerabend's legacy as one of changing the metaphor of inquiry from that of a process converging towards some transcendental goal to that of a proliferating diverse practice that serves the purpose of helping humans to meet certain ends.[13] After playing a significant role in helping tear apart logical positivism in the nineteen fifties and early sixties, Feyerabend turned his attention to articulating the importance of pluralism to the production of knowledge.

Feyerabend acknowledged that one of his major influences was John Stuart Mill. Mill proposed several arguments in favor of what he called a 'principle of proliferation.' In the essay On Liberty, Mill claimed that the proliferation of viewpoints emanating from the large diversity of peoples in Europe was the main reason for Europe's "progressive and many sided development."[14] Proliferation is methodologically important, according to Mill, to compensate for human fallibility. "We can never be sure," said Mill, "that the opinion we are endeavoring to stifle is a false opinion."[15] Proliferation of opinion meant not just nurturing alternatives to accepted belief, but also retaining beliefs that had fallen from general acceptance.

Mill offered four reasons for not suppressing divergent opinion. First, opinions one has reason to reject may yet turn out to be true. Second, rejected beliefs may contain elements of truth useful for plugging the gaps in a theory. Third, a prevailing belief that has no challengers will come to be held as a matter of prejudice with little attention to how well it might account for the phenomena. Finally, the meaning of a prevailing belief can only be realized by contrast to the beliefs that it replaces and competes with.[16] Encouraging diversity of opinion was, for Mill, a methodological norm for epistemology. Beliefs could only be justified as true after an adequate number of alternatives had been considered. "[C]omplete liberty of contradicting and disproving our opinion," Mill said, "is the very condition which justifies us in assuming its truth for purposes of action."[17]

There is a lot of historical and philosophical space separating Mill from Feyerabend. However, Feyerabend was impressed with Mill's emphasis on fallibility and he sought to incorporate it in his own post-positivist discourse. Instead of embracing Mill's quest for absolute truth about the world, Feyerabend denied that knowledge is a transcendent phenomenon, calling it instead "a local commodity designed to satisfy local needs and to solve local problems."[18] The theories that communities construct in the process of solving their problems are not absolute accounts of how the world is, but strategies for coping that contain many of the idiosyncrasies of the groups that created them.

Feyerabend's commitment to the situatedness of all knowledge was strong. He denied that laws of nature can be found independently of particular cultures. "It needs a

very special mental attitude," he says, "inserted into a particular social structure combined with sometimes quite idiosyncratic historical sequences to divine, formulate, check and establish laws such as the second law of thermodynamics."[19] For Feyerabend, any convergence of opinion towards such a law says as much about the hegemony of certain attitudes and social structures as it does about nature itself. Mixing philosophy with dismissive parody of the mainstream in his usual irreverent fashion, Feyerabend states that "the world is not a static entity entirely populated by thinking ants, who, crawling all over its crevices gradually discover its features without affecting them in any way. It is a dynamic and multifaceted entity which affects and reflects the activity of its explorers."[20] It is against this view that world both 'affects and reflects' the activities of its explorers that Feyerabend develops his pluralistic methodology.

What Feyerabend adds to his belief that all knowledge is deeply situated are the norms necessary to make good on his belief that science can (and must) proceed in a way that contributes to the development of human consciousness. In his later works,[21] Feyerabend rejects any absolute standards for progress, but claims that there are always provisional and local ones. But in no case can the move from one theory to its replacement (judged on the basis of whatever local criteria of success happen to be operating) be justified solely in terms of the empirical merit of each. This is because the theory dependence of observation thesis entails that the empirical observation of 'facts' is always tied into particular theoretical accounts of the world. This means that certain empirical facts that might undermine a particular theory are not always evident from

within its vernacular. These 'facts' will only be discovered upon making observations prompted by multiple alternative and mutually inconsistent theories.[22] He maintains that "not only is the description of every single fact dependent on some theory, (which may, of course, be very different from the theory to be tested), but there also exist facts which cannot be unearthed except with the help of alternatives to the theory being tested."[23] Determination of the empirical adequacy of a theory are inadequate unless they include observations suggested by multiple competing theories. Science, then, should never strive to be monolithic. "The methodological unit to which we must refer…" says Feyerabend, "…is constituted by a whole set of partly overlapping, factually adequate, but mutually inconsistent theories."[24]

The example he gives to support this claim involves observations to confirm Brownian motion over the second law of thermodynamics. Feyerabend claims that there was no single crucial experiment to confirm the existence of the Brownian particle. The measurements of energy loss that would have been required were too small. Because such an experiment was not possible, the two mutually inconsistent theories were held until the arrival of a third theory, Einstein's general relativity theory, enabled the existence of the Brownian particle to be confirmed. Only when Einstein used kinetic theory to analyze the statistical properties of the Brownian particle did it become possible to show that the Brownian particle contradicted the second law of thermodynamics. Feyerabend claimed that it follows from these kind of examples that mutually inconsistent and competing theories are a necessary part of the scientific method.[25]

Feyerabend also argued for a proliferation of theories on the basis of the Quine-Duhem underdetermination thesis. The underdetermination thesis states that no theory is ever uniquely determined by the data. As Feyerabend put it, "one and the same set of observational data is compatible with very different and mutually inconsistent theories."[26] Quine referred to this gap as an "empirical slack." Feyerabend calls the same slack "the ocean of deviational noise" that surrounds a theory.[27] One of the methodological functions of alternative theories is to separate current theory from this noise. The more general the theory is, the more important it will be to supply alternatives that delimit the theory from a larger amount of deviational noise. A scientist that wants to understand as many different aspects of her theory as possible will adopt as pluralistic a methodology as she can.[28]

These arguments for proliferation allow Feyerabend to incorporate much of what he admired in Mill. Feyerabend explicitly seeks competing theoretical accounts. "The scientist who is interested in maximal empirical content," he says, "and who wants to understand as many aspects of his theory as possible, will adopt a pluralistic methodology."[29] The part played by alternatives to accepted theory takes on a pivotal role. Like Mill, Feyerabend recommends that empiricists "[I]nvent, and elaborate theories which are inconsistent with the accepted point of view, even if the latter should happen to be highly confirmed and generally accepted."[30] The invention of alternatives is best facilitated if scientists are prepared to tolerate not just competing theories but also competing methods. Feyerabend's openness to radical alternatives is startling. "There is

no idea, however ancient and absurd, that is not capable of improving our knowledge."[31] He thus paints a complex, dynamic, and mildly chaotic picture of the knowledge process.

If Feyerabend had stopped with his post-Quinean interpretation of Mill's insights on proliferation, his impact on late twentieth century philosophy of science might have been significantly greater than it in fact is. But in Against Method, Farewell to Reason, and Science in a Free Society he went on to support a series of more radical and polemical claims about how science must proceed. He suggested that some of the notions that lie at the very heart of empiricism, such as empirical adequacy and consistency, will actually impede science if they are adhered to rigidly. His discussion of the triumph of Copernican over Aristotelian astronomy in Chapters 6-14 of Against Method illustrates how the criteria of empirical adequacy and consistency had to be shelved in order for Copernicanism to ever gain a foothold against the received belief. Feyerabend notes that this need to wait and ignore large masses of falsifying evidence is completely overlooked in traditional accounts of scientific change. He argues that changes between old and new theory are not as clinical as most philosophers of science would have us believe - a point Kuhn also makes in The Structure of Scientific Revolutions.

The need to sometimes surrender empirical adequacy and consistency is due in part to the incommensurability thesis. Incommensurability between competing theories is a problem that Feyerabend and Kuhn identified together when they were both teaching at Berkeley.[32] The incommensurability thesis holds that there is a problematic change in meaning between old and new theories. The new theory not only suggests different sets

of observations and tests from the old one, it also introduces a new language and stock of concepts with which to describe the world. Because of this incommensurability, it is unclear, especially in the early stages of the transition between an old and a new theory, whether the new can really be said to be an improvement on the old because the two theories in effect describe a different reality. It will be clear only that "the old and the new are different and out of phase."[33]

When an old theory and its prospective replacement are out of phase it is not possible to tell which one is better. "A judgment of this kind," Feyerabend pointed out, "presupposes that the competitors confront each other on equal terms."[34] This makes allegiance to the old or new not an entirely rational matter. Incommensurability thus makes room for some radical methods in science. Theory change will be brought about by "irrational means such as propaganda, emotion, ad hoc hypotheses, and appeal to prejudices of all kinds."[35] Value biases will weigh heavily in the transitions between theories. The degree of institutional authority that a theory can muster will affect its resilience. Space is opened up for art and rhetoric to play a role in moving scientific knowledge ahead. "Once it has been realized that a close empirical fit…must be relaxed in times of change, then style, elegance of expression, simplicity of presentation, tension of plot and narrative, and seductiveness of content become important features of our knowledge."[36] Reason must frequently be dismissed if knowledge is to progress.

This dismissal of reason made necessary by the incommensurability thesis led Feyerabend to advocate a radical kind of pluralism and led most of his peers to advocate

that Feyerabend himself seek therapy. The only quasi-epistemic norm Feyerabend allowed was the iconoclastic 'anything goes.' Anything goes is not really an injunction to be irrational but a warning against dogmatism.[37] The best way to avoid dogmatism is to value diversity and proliferation. Feyerabend proposed that "individuals, groups, entire, civilizations may profit from studying, alien cultures, institutions, ideas, no matter how strong the arguments that support their own views."[38] This takes the pluralistic norm beyond the theories and methods of science and onto questions that concern the composition of knowledge producing groups and the interaction between diverse and traditions and practices. The injunction is to actively seek out those that might have different viewpoints.

The benefits from studying alien cultures and ideas demands a special kind of attitude from epistemic agents. Feyerabend called for an "open exchange" of the views of the participants in any such discussion. In Science in a Free Society (1978), he characterized these exchanges as those in which "the participants get immersed into each other's ways of thinking, feeling, perceiving, to such an extent that their ideas, their perceptions, their worldviews may be entirely changed."[39] An open exchange is thus more than an indication that difference is tolerated, it is a commitment to valuing difference as a source of insight and change.

Open exchange is fostered by lessening the authority of any one particular approach to knowing the world. Feyerabend claims that the authority that western science has claimed is dangerous. He says that "it would not only be foolish, but

downright irresponsible to accept the judgment of scientists and physicians without further examination."[40] He recommends that committees of elected lay people be formed to ask questions about what is accepted as dogma in scientific communities. In anticipation of some of Lorraine Code's recommendations in Epistemic Responsibility, Feyerabend suggests that those immediately concerned by scientific decision making should have a chance to challenge scientists on morality the research programs they engage in.

Feyerabend's pluralistic norm is thus active at several different levels. First, there must be a plurality of competing and mutually inconsistent theories within science. Second, there must be a plurality of methods employed by scientists in order to generate a sufficient proliferation of competing theories. At a practical level, this means funding as many different approaches as possible. Third, scientific communities must be diverse.[41] Fourth, there must be lines of communication open between scientific and non-scientific communities as a way of tempering the former's authority. Equality means "equality of traditions and not only equality of access to one particular tradition."[42] For this reason, it is especially important to Feyerabend that non-scientists can challenge the authority of science.

Feyerabend turns his position on pluralism into a depressing cultural critique. Space does not allow me to discuss this critique here except to say that he laments the 'creeping fog of sameness' caused by science's hegemony. It is homogeneity that Feyerabend seems to fear most because of its connection to decay. He believes that

proliferation is perhaps "the only possible means of preventing our species from stagnation."[43]

Biological Arguments for Pluralism

The arguments for proliferation that Feyerabend offers are based soundly in the philosophy of science. What I mean by this is that Feyerabend reaches his conclusions through an analysis of scientific theory and its relation to observation. He considers the implications of underdetermination, the theory dependence of observation, and the incommensurability thesis before he concludes that science needs a proliferation of competing and inconsistent theories, viewpoints, standards, and methodologies if it is to contribute to the development of human consciousness. Part of his support for these arguments uses what I called above the 'soft' approach. He brings numerous historical case studies as inductive support for his claims. In this section I will show that support for the pluralistic norm is now also available using the 'hard' approach in the form of enactivist cognitive science.

It is interesting to note that both Feyerabend and his inspiration on the topic of proliferation, Mill, both included the suggestion that there might be a biological basis for proliferation. In On Liberty, Mill many times suggested that his views are connected to the proper functioning of the human being as a biological organism. He claimed, for example, that his argument "recognize[s] the necessity to the mental well being of mankind…of freedom of opinion and of freedom of expression of opinion."[44] He chose a

revealing analogy to support this claim: "the mental and moral, like the muscular powers, are improved only by being used" (emphasis added).[45] The analogy suggests that Mill saw his principle of proliferation as not just a good methodological norm for determining true belief, but also as a condition of the healthy physiological functioning of the brain. This would be a naturalistic argument for liberty.[46]

In is interesting to note that Feyerabend too added to his methodological reasons for proliferating alternatives a speculative naturalistic explanation. He was probably influenced by Mill in this regard. He praised the era in which Mill lived as one in which scientific method was seen more broadly as part of a general theory of human nature. He claimed that Mill introduced proliferation not just as an epistemological solution but also as "a solution to the problem of life" - by which he understands a way of responding to timeless questions such as "how can we achieve full consciousness; how can we learn what we are capable of doing; how can we increase our freedom so that we are able to decide, rather than adopt by habit, the manner in which we want to use our talents?"[47] This conforms with Feyerabend's stated motivation for writing Farewell to Reason as "...humanitarian, not intellectual...to support people, not to 'advance knowledge." But this naturalistic connection is a little obscure. If he really does think that pluralism must be understood in relation to a biological *telos*, he needs to explain the connection a bit better. How exactly is it that pluralism supports the full development of human beings? What is it that is biologically bad about homogeneity? We get some clues as to how he

thought he might answer this when we listen to Feyerabend talk about the dangers of dogmatism.

It was largely due to Popper's influence that Feyerabend was so concerned about dogmatism. In his Conjectures and Refutations, Popper claimed that 'dogmatic thinking' is a result of an inborn propensity to seek regularities in nature. He speculated that the expectation of finding regularities in nature is 'genetically a priori' in humans. This feature of human nature is the origin of the unhealthy dogmatic attitude.

Dogmatism, according to Popper, is not all bad. To some degree it is desirable in order to make sense of the world. It is dogmatism that enables observers to make conjectures about the laws of nature and to direct attention away from the 'background noise' that would otherwise make generalization impossible. Dogmatism becomes a problem when people are seized by "an uncontrollable wish to impose regularities."[48] The problem becomes pathological when dogmatism turns into a way of life. Popper cites as circumstantial support for his claim the psychoanalytic wisdom of his day that held that neurotics are those with the inability to let go of a personally set pattern of interpreting the world. The result is that the pattern takes over all ability to be critical; "every new experience is interpreted in terms of it; verifying it, as it were, and contributing to its rigidity."[49] Popper adopts a similar analogy to Mill, that of the stiff limb, to illustrate how the tendency for dogmatism creeps up in the absence of the exercise of the critical attitude. A dogmatic attitude turns out to be a pathology.

Like Popper, Feyerabend cautions against dogmatism which he characterizes as "the inability to imagine alternatives to the point of view in which one believes."[50] There is evidence that Feyerabend thought that an empirical study of how the brain functions might support his thesis. Questions about physiology are questions that Feyerabend frequently suggests are "sorely underdiscussed" in the philosophy of science. He claims that the issue of whether concepts are cultural or biological products (or both) 'cries out' for further research. He speculates about whether certain modes of thinking are "physiologically more basic and are hence more firmly ingrained into human life, behavior and perception."[51] In other words, he seeks biological explanations for how we think and he wonders whether biology might dictate some norms about how we should think. To take this turn towards asking how the human organism functions in its environment in order to inform an epistemology is to truly take the turn towards a naturalized epistemology in the sense that Quine intended it. While the biology was not really in place when Feyerabend was writing, some of it is now.

Paul Curchland, discussed above as one of the primary figures in the connectionist approach to cognitive science, has recently published a paper that offers the results of neuroscientific research to support some generally Feyerabendian themes.[52] He claims that computational neuroscience and connectionist artificial intelligence lend empirical support to several of the theses that he judges to be at the center of Feyerabend's philosophy of science. These theses include incommensurability, the proliferation of alternative and mutually inconsistent theories, and the proliferation of research

methodologies. While Churchland's article is provocative, I can not rest much of my argument on it since I earlier rejected the connectionist approach. I suggested in chapters two and three that the input-output model that is characteristic of connectionism should be rejected in favor of an enactivist approach that places the epistemic agent and the environment into a dialectical relationship with each other. This dialectical relationship is an important part of my argument to take the natural environment into account when understanding cognition. Since I don't think I can use Churchland's argument, I must look for an enactivist account will support the pluralistic norm in epistemology. Fortunately, there is one.

I have already mentioned that Mark Johnson is not attempting to develop a fully fledged epistemology in The Body in the Mind. There are no chapters devoted to making normative recommendations about how humans should go about forming belief. The primary purpose of his book is descriptive. It is an account of the embodied structures that contribute to cognition in the human organism. But in the last chapter he does begin to address some of the ontological and epistemological issues that his position raises. In these pages, he explains how his approach is compatible with realism and he tantalizingly goes on to consider some of the implications of his view for the notion of objectivity. This is the part of his discussion from which it is possible to begin to tease out some of the normative implications of his theory.

Johnson holds on to the notion of objectivity, but transforms it into a human, rather than a God's eye, version. This notion has nothing to do with correspondence

between a representation and the external world but Johnson denies that this makes it empty. Though we can not claim that our beliefs correspond with the structure of world, we can claim that they correspond with the way we experience the world given the structures and differentiations that we use to carve it up. Nor is this experience entirely subjective because these structures are shaped by the biology, the environments, the values, and the purposes that we share with the fellow members of our species. "It doesn't really matter," Johnson claims, "that we can't see the world through God's Eyes; for we can see the world through shared, public eyes that are given to us by our embodiment, our history, our culture, our language, our institutions, etc."[53] The quest for objectivity is a matter of discovering beliefs that fit both our own experiences and those of others that have similar image schematic structures of the understanding. This means "taking up an appropriate publicly shared understanding…rising above our personal prejudices, idiosyncratic views, and subjective representation."[54]

Though these are more or less the last lines of The Body in The Mind, the matter is taken up again towards the end of Johnson's next book, The Moral Imagination. In this work, Johnson is concerned with the implications of the image schematic approach to cognition for morality. Since Johnson shows in this book that moral understanding is governed by the same image schematic structures as other aspects of cognition, the discussion of objectivity in morality will be a good guide for considering how objectivity can be achieved in knowledge in general.

Johnson continues to develop the claim that objectivity is a matter of taking up a publicly shared understanding based on the embodied cognitive structures that underlie cognition. Human objectivity is a process, he says, one of being "able to take up multiple perspectives as a way of both criticizing and transforming our own views and those of others."[55] Imaginatively taking up other perspectives is an essential part of the transformation and improvement of one's own views. This version of objectivity is what Stephen Winter has called "transperspectivity." Winter characterizes transperspectivity as "an exercise of the empathetic ability to imagine what a question looks like from more than one side."[56] Transperspectivity is the act of taking up the perspective of others and using it as a resource for "chang[ing] one's world in the light of possibilities revealed by those alternative viewpoints."[57] Notice that with objectivity understood as a process rather than as a matter of matching beliefs with the world, transperspectivity is not a method for attaining objectivity, it is objectivity.

According to Johnson, imaginatively taking up the perspective of others is not simply an act of empathy. Imagination is a technical term. Taking his lead from Kant, Johnson claims that the imagination is "our capacity to organize mental representations (especially percepts, images, and image schemata) into meaningful, coherent unities. It includes our ability to generate novel order."[58] The imagination has both a schematizing and a creative function. In the former it mediates between the structures that are brought to experience and the objects of experience, matching the formal to the material. In the latter it plays around with currently held sets of cognitive structures to create new

structures and enrich meaning. Notice that, in both of these functions, imagination is not a faculty but an activity that plays a critical role in making experience meaningful. Johnson depends on a revived and enriched notion of the embodied imagination to serve as the linchpin of his account of rationality.

This notion of an embodied, creative imagination has a critical role to play in enabling knowledge to progress. Image schemas are multiple and creating meaning involves employing as many of them as possible. According to Johnson, there are "many other as-yet-unexplored schemes that will prove even more useful in pursuing our purposes as they are currently shaped."[59] It is the creative imagination that makes transperspectivity possible and it is transperspectivity that makes progress possible. Growth in meaning, which is equivalent to increasing objectivity, is a matter of imaginatively transforming image schemas to accommodate new experience. Johnson speculates that the creative imagination "gives us image-schematic structures and metaphoric and metonymic patterns by which we can extend and elaborate those schemas."[60] Piaget called this a process of "assimilation and accommodation."

Exactly how the creative imagination works is unclear. Johnson finds Kant's account inadequate because the imagination doesn't appear to fit very well in either Kant's formal realm of reason and understanding or in his material realm of bodies and sensation. A fully articulated theory of the creative imagination awaits future work. This project will be a challenge because it will have to explain how the imagination can be embodied (derived from sensory-motor experience), formal, and creative all at the same

time. But it is this enriched account of the creative imagination that is necessary to explain the transperspectivity that comprises enactivist objectivity.

Within this account of enactivist objectivity as transperspectivity, it is possible to recognize a naturalistic argument for Feyerabend's pluralistic norm. Enactivist objectivity is simply the process of increasing the meaning of experience through the process of what Piaget called 'assimilation and accomodation.' Increasing the meaning of experience means taking up the perspective of others and moving towards seeing things through 'shared, public eyes.' If experience is to become more meaningful for both individuals and communities, then organisms should endeavor to exercise this faculty of the creative imagination as much as they can in taking up the perspectives of others.[61] Only by engaging with as many opportunities as possible for the creative imagination to be active can humans hope to achieve a shared understanding that reflects their common embodiment, purposes and values. Without this, transperspectivity remains locked in subjectivity and relativism. Johnson states the imperative that "we ought to use as many of these imaginative methods as we can…transperspectivity requires it, for that is the only way we can criticize our present [moral] understanding …and expand our sense for the possibilities of constructive action."[62]

The fact that we live in a changing world with new problems and possibilities constantly emerging means that a critical approach to being-in-the-world precludes aiming towards a final and static set of image schemas. The uncovering of multiple possibilities for creative and meaningful action should replace the quest for objectivity.

New possibilities for action appear only in the presence of novel sensori-motor image schemas. An organism's need to increase the meaning of its experience thus demands a pluralistic approach to the production of knowledge in order to employ the transformative services of the creative imagination. Employing the creative imagination means taking up the theories and methodologies of others. Such acts as engage the creative imagination do not lead to the one truth of a situation, but they present possibilities for how experience might be different and better. The danger of dogmatism that Feyerabend and Popper were concerned about turns out to be the danger of letting the embodied, creative imagination fall idle.

The Greening of Belief

It seems to me that Feyerabend's early insight that situated knowledge requires a pluralistic norm was a good one. It turns out that his norm can now be supported naturalistically using Johnson's account of objectivity as transperspectivity. If the argument in this chapter for pluralism is cogent and if the arguments in the previous chapters for the significance of natural environments in knowledge practices is also cogent then some important conclusions follow.[63] It is possible to frame these conclusions in two different ways. I shall start with the more conservative of the two ways.

Recall how Harding suggested that we use categories of localness as epistemic resources and recall how one of these categories of localness is location in heterogeneous

nature. She claimed that this specificity "could, should, and does" have positive effects on knowledge production. The positive effect is generated essentially by applying the pluralistic norm. She claims that given her four categories of localness "the standpoint of the outsider …provide[s] powerful resources for enabling sciences more accurately to understand their own processes."[64] The outsider here is the non-local. Following the pluralistic norm means seeking out those with different local specificities.

The more conservative way of applying this result is to say that Harding is asking us to treat the cultures that dwell in different locations as epistemic resources. The complex dialectic that I earlier argued includes natural environments results in knowledge practices that are embodied in particular cultures and communities. Harding refers to different peoples as "repositories" for historically developed beliefs suggesting that it is the particular culture that she actually regards as the epistemic resource.[65] This is confirmed by the fact that she characterizes her four categories of localness as "'causes' of the necessary cultural features of scientific traditions."[66] Hence we should treat a culture that dwells in a distinctive part of heterogeneous nature as an epistemic resource. The location in nature itself ends up being only contingently important for epistemology.

This is a conservative way of interpreting the implications of pluralism for geographically situated knowledges because it is not the environment itself that is treated as an epistemic resource, it is the culture and its distinctive practices evolved in dialogue with a place over many centuries. This accords with what was uncovered in the discussion of Basso and Deloria, namely that the role of place in native religion and

morality is contingent upon numerous other factors that contribute to the dialectic such as length of residence and cultural activity.

Reading more into Harding's brief treatment of location in nature than she develops herself, indigenous cultures would seem to be especially valuable as epistemic resources for at least two reasons. The first reason is that indigenous peoples have traditionally been marginalized from the mainstream institutions of knowledge production. It follows from her standpoint approach (which she now calls 'borderlands epistemology') that this marginalized population will have particularly trenchant critiques of the dominant institutions. According to this argument, indigenous cultures will be particularly important because their marginalized experiences and lives have been "devalued or ignored as a source of important questions about nature and social relations."[67] The second reason why indigenous cultures will be particularly valuable epistemic resources is because it is only they that have spent the lengths of time in the same place necessary for knowledge practices tailored to local geographical specificity to evolve. Immigrant cultures do not have the benefit of this history. It will probably do no good to examine someone recently transplanted to Santa Fe from Seattle in order to determine how the character of the natural environment there effects her knowledge practices. Though she may be having an interesting dislocating experience, she is unlikely to have developed any geographically distinctive knowledge practices. It does, however, make sense to ask the same questions of a western Apache woman in Cibecue who has inherited knowledge practices handed down through many centuries of residence

on the same land. What increases the value of this epistemic resource even more is the fact that there are not many intact indigenous cultures left resident on their native land.

Treating the culture and not the place as the epistemic resource is not necessarily bad for the place. These two reasons for protecting indigenous cultures as valuable epistemic resources also suggest an indirect reason for protecting the lands on which they dwell. With many of the distinctive cultural practices, such as whale hunting for the Makah and gathering salmon for the Nez Perce, already having been made unavailable to them for various reasons, the additional loss of the native lands themselves would likely be more than any 'culturally distinctive knowledge practice' could bear. But while this conservative way of framing the conclusion yields only an indirect reason for preserving natural environments, there is a more radical way of framing the conclusion that provides a direct reason for preserving diverse natural environments. This is to treat the natural environment itself, and not the culture living there, as the epistemic resource. While Harding ended up maintaining that it was the culture that was the epistemic resource, she did concede that location in heterogeneous nature, along with the three other categories of local specificity, is a "cause" of the distinctive features of indigenous knowledge practices. She put the word in scare quotes in order to avoid accusations of adopting an essentialistic or deterministic approach. Remember that this was the same reason why I turned away from Yi-Fu Tuan's direct causal account of the effect of natural environments on perception and religious belief. But, as was noted in that earlier

discussion, it is an open question of what exactly is meant by cause in this context. It is certainly unclear what Harding understands by it.

At issue appears to be how much agency we are willing to ascribe natural environments in shaping knowledge. None of the parties in a dialectical relationship can be given conceptual priority, but nor can it be said of any of them that they do not effect the product of the dialectic. As I mentioned earlier, to answer the question of how much agency we are willing to ascribe to natural environments we would study the organism-environment relation empirically with studies of perception, cognition, and the sociology of knowledge.[68] But if it could be shown that natural environments are a sufficient cause of distinctive knowledges then it would follow from the pluralistic norm in epistemology that we should maintain the integrity of, and the differences between, the environments in which people live to help ensure that there will be a proliferation of alternatives to accepted belief.[69] The thing to avoid would be the homogenization of the environments in which people live. To a large extent, this would be the concern of city planners and architects and not particularly of environmentalists and wilderness advocates. However, the more that living in the Front Range of the Rocky Mountains becomes like living in the desert in Phoenix, and the more that both of these become like living in Trenton, New Jersey then the less guarantee do we have that people will come to the discussion of knowledge shaped by the geographical locale in which they live. One of the important contributing factors towards diversity will have been erased.

Treating a natural environment as an epistemic resource finally brings epistemology and environmental ethics together. Diverse natural environments make important contributions to critical beliefs. Environments could be treated as epistemic resources. This would not be the first time that natural environments have been considered a storehouse of resources. Environmental philosopher Holmes Rolston III's axiological approach to environmental ethics might be instructive for us here. The way Rolston would likely put it would be to say that these natural areas are not so much epistemic resources for us as epistemic sources.[70] For Rolston, axiology starts not with a valuer but a value-able source. This means a source that is able to carry or generate value. Rolston does not currently claim that nature carries epistemic value. He does claim that nature carries scientific value since it is "interesting enough to justify being known."[71] But my position entails that nature is not just something that warrants being studied, it is the very ground and horizon of all study. On this argument, nature carries value because it is an important epistemic source. This looks like it might be a good reason to preserve nature with all its stability, integrity, and diversity rather than to continue to replace it with homogeneous strip malls, suburban housing, and highways. Ensuring that diverse natural environments are preserved opens up possibilities for knowledge practices being shaped in certain ways which might in turn have an effect on how the natural environments get treated. The dialectic would then be in place again.

Concluding Remarks

This argument linking environmental ethics to epistemology is the end product of the long chain of reasoning that I have strung together in this dissertation. Though the reasoning is at times complex and at times obscure, I embarked upon this project with the goal of getting a norm for preserving natural environments out of naturalized epistemology. This required two main parts to the argument. The first was to offer a more comprehensive account of what the situating of knowledge involves. I argued that situating involves recognizing a complex dialectical relationship between cultural practices and the material - and, in particular the natural - environments in which the culture resides. The second part of the argument was to make the connection between situated knowledges and pluralism. The partiality of a situated knowledge demands a Feyerabendian pluralism if knowledge production is not to stagnate.

If the two parts of this argument are cogent, then I have shown that there are some connections to be made between environmental philosophy and naturalized epistemology. Of course plenty of work remains in order to articulate these connections better. It will certainly be important to determine empirically what the causal connections are between environments and perception, cognition, and belief. But I see the present work as just a start in a project that I have called the greening of belief. The greening of belief serves naturalized epistemology by exploring to a fuller extent what is natural about it. It serves environmental philosophy by bringing epistemology, one of philosophy's heavy hitters, into its camp. And I hope that in some small way it serves natural environments

themselves and the diverse biotic communities that call them home. Because that, for me, is what this is all about.

Notes

[1] Rick Bass, "Getting it Right," in Headwaters, ed. A. Smith (Missoula, MT: Hellgate Writers Inc., 1996), 6.

[2] I should qualify this remark a bit by acknowledging a couple of moves in the right direction. Lorraine Code is working on an 'ecologically modeled' epistemology that makes the health of the biotic community into one of its goals. Though her research project has all the right words in it, I am unable to determine at this point whether she is positing any epistemic connection between knowledge and the land. The account of indigenous knowledge systems by Sandra Harding (1998) discussed below is the first work I have seen that attempts to describe some of these connections.

[3] See Jim Cheney's excellent and pathbreaking article, "Post-Modern Environmental Ethics: Ethics as Bioregional Narrative," Environmental Ethics 11 (Summer 1989): 117-134. There is also a very brief discussion of these topics in King, R. "Critical Reflections on Biocentric Environmental Ethics: Is it an Alternative to Anthropocentrism?" Philosophy and Geography I (Lanham, MD: Rowman & Littlefield, 1997), 209-230.

[4] Val Plumwood, "Nature, Self, and Gender: Feminism, Environmental Philosophy, and the Critique of Rationalism," Hypatia 6, no. 1, (Spring 1991): 21

[5] Sandra Harding, Is Science Multi-Cultural?

[6] Ibid., 62.

[7] Ibid., 64.

[8] Ibid., 62. She seems to echo Donna Haraway's claim about the importance of 'situated knowledge' to feminist versions of objectivity.

[9] Harding, Is Science Multi-Cultural?, 142.

[10] Haraway, "Situated Knowledges."

[11] Paul Feyerabend, Philosophical Papers I (Cambridge: Cambridge University Press, 1981), 143. Statements such as these contribute to my affection for him.

[12] Paul Feyerabend, Against Method (London: Verso, 1988), 30.

[13] Richard Rorty, Objectivism, Relativism, and Truth (U.K: Cambridge University Press, 1991), 26.

[14] John Stuart Mill, "On Liberty," in The Six Great Humanistic Essays of John Stuart Mill (New York: Washington Square Press, 1963), 197. "Progressive" is perhaps an unfortunate choice of word to describe nations regularly engaged in such imperialistic and exploitative endeavors.

[15] Ibid., 142.

[16] Mill, On Liberty (Indianapolis: Hackett Publishing, 1978), 50-51.

[17] Ibid., 144-5.

[18] Feyerabend, Farewell to Reason (London: Verso 1987), 28.

[19] Ibid., 88.

[20] Ibid., 89. Emphasis added to illustrate Feyerabend's recognition of a dialectic at work.

[21] In the late fifties and early nineteen sixties, Feyerabend was influenced by Popper's falsificationist criteria for science. By the first edition of Against Method in 1975 Feyerabend had rejected any such programmatic account of theory change.

[22] Feyerabend, Against Method, 27.

[23] Ibid.

[24] Ibid.

[25] Discussion of this example can be found in Against Method, 27-28 and again in "Explanation, Reduction, and Empiricism," Philosophical Papers I , 71-72. It is not entirely clear to me that this example shows what Feyerabend wants it to show. Simply because the measurements of the kinetic energy of the Brownian particle could not be made in this case, it does not follow that multiple theories will always be needed in order to enable rejection of a theory. However, the example does show that two mutually inconsistent theories can both be empirically adequate until the examination of further theory brings the problems of one to light.

[26] Feyerabend, Philosophical Papers I, 59.

[27] Ibid., 106.

[28] Feyerabend reports that this is what Faraday actually did.

[29] Feyerabend, Against Method, 33.

[30] Feyerabend, Philosophical Papers I, 105.

[31] Feyerabend, Against Method, 33.

[32] Feyerabend's essay "Explanation, Reduction, and Empiricism" (reprinted in Philosophical Papers I) which contains his first discussion of incommensurability was published in 1962, the same year as Kuhn's The Structure of Scientific Revolutions.

[33] Feyerabend, Against Method, 118.

[34] Ibid.

[35] Ibid., 119.

[36] Ibid., 123.

[37] Feyerabend, Against Method, 249. The warning against dogmatism includes being dogmatic about pluralism.

[38] Feyerabend, Farewell to Reason, 20.

[39] Feyerabend, Against Method, 29. Note how these are almost the same words as those used by Steven Winter and Mark Johnson to describe transperspectivalism below.

[40] Feyerabend, Science in a Free Society, 96

[41] One of the important reasons to seek pluralism in knowledge production is so that knowledge producing groups can have their value biases exposed by those from outside their epistemic location. This, I believe, is an important subset, but not the entirety of Feyerabend's arguments for pluralism. The fact that incommensurability demands pluralism has nothing particularly to do with value biases.

[42] Feyerabend, Science in a Free Society, 39.

[43] Feyerabend, Philosophical Papers II, 144.

[44] J.S. Mill, *On Liberty* (Indianapolis: Hackett Publishing Co, 1978), 50.

[45] M. Cohen, The Philosophy of John Stuart Mill (New York, 1961), 253.

[46] Similar speculative naturalistic justifications for pluralism can be found in John Dewey's Human Nature and Conduct and in his Logic.

[47] Feyerabend, Philosophical Papers II, 67.

[48] Karl Popper, Conjectures and Refutations (New York: Basic Books 1963), 49.

[49] Ibid.

[50] Feyerabend, Philosophical Papers II, 74.

[51] Ibid., 131.

[52] Churchland, "A Deeper Unity: Some Feyerabendian Themes in Neurocomputational Form," in Cognitive Models of Science, ed. Ronald Giere (Minneapolis: Minnesota, 1992): 341-363.

[53] Johnson, The Body in The Mind, 211.

[54] Ibid, 212.

[55] Mark Johnson, Moral Imagination: Implications of Cognitive Science for Ethics (Chicago: University of Chicago Press, 1993), 241.

[56] Johnson, Moral Imagination, 241.

[57] Ibid.

[58] Johnson, The Body in the Mind, 140.

[59] Ibid., 209.

[60] Ibid., 169.

[61] Notice that the creative imagination is also employed while engaging in novel sensori-motor experiences. Hence, hiking some unfamiliar territory in particularly nasty weather also engages the creative imagination.

[62] Johnson, Moral Imagination, 242. This approach to knowledge is mirrored by Gibson's follower E.S.Reed in his discussion of the ecological approach to perception. Reed suggests that the epistemic norm emerging from ecological psychology is "to be as open as possible with one's ideas and to share them as widely as possible. Ecological perception does not succeed by providing a final picture of the world, but by getting more and more people trying to understand how it works," Encountering the World, 183.

[63] The same conclusions could be drawn about any physical environment that demands particular kinds of sensory motor activity. The machine shop would be one such environment, the hospital another. The fact that we spend only a very small portion of our time in natural environments may mean that it is more important that these lessons be applied to the built environment. However, I focus on the natural environment here in part because of my own idiosyncrasies and in part because of the urgency of finding arguments for preserving the natural environments and biotic communities that are fast being paved over and destroyed. I see the epistemic significance of place as one more argument in the arsenal of those that devote their lives to protecting the integrity of the non-human world in the face of those that would exploit it.

[64] Harding, Is Science Multi-Cultural? 72.

[65] Ibid., 64.

[66] Ibid., 62.

[67] Ibid., 151.

[68] But before this question could be answered empirically we would also have to determine what we mean by 'knowledge.' Is a geographically situated knowledge a set of beliefs, a set of practices, or something else entirely. Since this is a question that is the subject of much discussion in the sociology of scientific knowledge and in cultural studies of science, I have largely avoided it here. See Pickering, The Mangle of Practice and J.Rouse, "What are Cultural Studies of Scientific Knowledge?" Configurations 1, no. 1 (1993): 57-94.

[69] I am not embracing the claim here that natural environments are a sufficient cause of distinctive knowledges but nor am I rejecting it out of hand.

[70] Holmes Rolston III, Environmental Ethics: Duties and Values in the Natural World (Philadelphia: Temple University Press, 1988), chapter 6.

[71] Ibid., 9.

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