

Among *Umwelten*: Meaning-Making in Critical Posthumanism

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Abstract

Conceptualizations of meaning ground formulations of human/nonhuman animal similarity and difference. Anthropocentric accounts of meaning-making are increasingly untenable in light of contemporary knowledge of nonhuman life, yet they remain influential, implicit and intractable even within conceptual frameworks that otherwise reject their explicit premises. This study traces dynamic, process-oriented notions of meaning from Jakob von Uexküll's seminal work through autopoietic, phenomenological, biosemiotic and Deleuzian thought. I critically examine how this lineage counters Cartesian dualist and humanist notions of meaning-making in favour of a view of meaning as dynamic process.

The relationship between organism and environment is characterized by Uexküll as a relationship of meaning. Uexküll envisions life as myriad complex melodic relations that entwine organism and environment in a practice of meaning-making. Uexküll's work and its extensions across a range of disciplines form a rich theoretical foundation for contemporary critical posthumanist efforts to change how human/nonhuman animal difference and similarity is conceptualized. Contemporary critical posthumanism— especially the work of Karen Barad, Rosi Braidotti, Elizabeth Grosz and Cary Wolfe— works to resituate human meaning-making within a wider ecological context. Yet a cohesive and comprehensive view of meaning grounded in critical posthumanism and its foundational works is fragmented across a broad and complex disciplinary and conceptual terrain. I draw out and develop from this literature the key components for a critical posthumanist concept of meaning.

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Introduction: Theories of Meaning and Nonhuman Experience

How do concepts of meaning pertain to questions of human/nonhuman animal similarity and difference? Contemporary theories of meaning emerge in the wake of Cartesian dualism, which conceives of meaning as arising only in human thought and language. Human minds are said to be uniquely capable of rational thought, which in turn makes it possible to have autonomy over one's actions. Nonhumans lie outside this world of meaning, incapable of the kind of self-possession and awareness that gives human life much of its value. This strict binary opposition is increasingly untenable in light of contemporary knowledge of nonhuman life, yet it remains influential, implicit and intractable even within conceptual frameworks that otherwise reject its explicit premises. Questions of human/nonhuman similarity and difference, if they are to be posed in new conceptual territory beyond Cartesian dualism, require a new understanding of meaning. I argue that meaning is central to understanding nonhuman life, that many nonhuman animals experience their lives as meaningful for them, and that human and nonhuman meaning-making share important features.¹ Thinking nonhuman life along these lines is not possible, however, without questioning both sides of the human/nonhuman animal binary. The Cartesian figure of the human that informs contemporary anthropocentric humanism is often an unexamined source of misleading assumptions in studies of nonhuman life. Theories of nonhuman experience, therefore, are bound up with assumptions about humans that need to be engaged critically.

Critical posthumanist theories of meaning challenge how human/nonhuman animal difference and similarity are conceptualized. Yet a comprehensive and cohesive view of meaning grounded in critical posthumanism and its foundational works is fragmented across a broad and complex disciplinary and conceptual terrain. My aim is to draw out and develop from this literature the key

¹ I employ the term “nonhuman animal” when discussing animals other than humans to foreground the fact that humans are animals as well. “More-than-human” would also be appropriate, but I find that language more amenable to ecological contexts including but surpassing the strictly human. “Nonhuman animal” is used here to refer to animals that are specifically not human.

components for a critical posthumanist concept of meaning. In the first section of the introduction, I will outline in more detail the context in which such a concept of meaning matters. In the second section I will describe the approach I take in the four main chapters of the dissertation. The third section provides an overview of three key ideas that guide my readings.

Contextualizing Meaning

Ethologists and other commentators on nonhuman animal experience tend to focus on evolutionary explanations for behavior, often at the expense of experiential ones. Evolutionary theory is crucial for ethological thought and study, but it also gives cover to scientists who are faced with empirical and disciplinary constraints on how they are able to study and discuss nonhuman animal experience, and especially nonhuman minds, directly. Jonathan Balcombe explains how a narrow focus on the evolutionary framework for interpreting lived experience side-steps questions concerning how life is meaningful:

Evolution and experience are complementary, not exclusive. Just as an animal is the product of genetics and environment, so too do both evolution and experience guide decisions and behaviors. When an animal—let's say a raccoon—eats, she is satisfying a basic need of survival: to sustain herself. But in choosing, seeing, smelling and tasting food, she also experiences it. The physical pleasures of life—like the pains—are current, even though they have evolutionary significance. It is these experiences, not the evolutionary forces underlying them, that put wind in the sails of a raccoon's existence. And a mouse's. And a pigeon's. (8)²

Pleasure and pain speak to the importance of lived experience. Experience is meaningful. It matters to the experiencing subject, and placing it within a broader evolutionary framework, Balcombe points out, does not satisfactorily account for it. Evolutionary theory offers crucial insight into why a particular behavior exists, but it cannot fully account for how these behaviors manifest in meaningful experience;

² See also Hoffmeyer, *Biosemiotics* xiii

that is to say, how they are lived. Balcombe further illustrates this evolution/experience parallel with an example from human behavior. Eating spicy food most likely has evolutionary benefits: spices may have antibacterial properties, help us cool down, help hide the taste of bad food, and provide important macronutrients. Evolution may have a role, along with personal taste, cultural traditions, and other forces, in influencing human food choices:

Yet when you bite into a burrito are you thinking about banishing bacteria, mitigating malnutrition, dissipating distastefulness or, heaven forbid, swimming in sweat? No, you're enhancing the palatability of your food. Spices make food taste good. They promote pleasure. This is the proximate, experiential reason that we reach for the oregano or the curry powder. Our behavior may be beneficial, and it probably originates in our genes, but it is guided by our experience, by our senses, our desires and preferences. Pleasure rewards adaptive behavior. It is a vehicle by which nature promotes evolutionary success. Pleasure is one of the blessings of adaptation. (9)

How might this relationship between evolutionary mechanism and meaningful experience be understood? Is it adequate to say that pleasure, and meaningful experience in general, is simply a supplement to natural selection, something which arose to nudge organisms into behavior that is in the best interests of the long term survival of their species? Even if pleasure, and sentience as a whole, were to be viewed this way, does that make it less real or less interesting? Despite the seemingly straightforward links between nonhuman animal behavior and experience, those who describe them in detail are by no means representative of scientific approaches to life as a whole. It is still common to see extreme mechanistic accounts of nonhuman animals as automatons, driven by genetic programming to carry out a series of actions, but lacking any relationship to themselves, to other organisms, or to their surroundings. To argue otherwise, from this position, would be to risk anthropomorphizing. However, there is a growing desire, both within cognitive ethology and beyond it, for a shift from

dualist and mechanistic Cartesian explanatory frameworks to ones more hospitable to accounts of nonhuman animal cognition, agency and experience. The conceptual common ground between human and nonhuman forms of life is expanding. However, even here nonhuman animal lives are often described using a language that attempts to position itself between mechanism and anthropomorphism. I argue that a more fully developed concept of meaning can help shift discourse on nonhuman animal lives away from these two extremes.

The sense of meaning pursued here can be productively described as a heuristic concept. Philosopher Colin Allen shows the value of such a concept when he points out that Jakob von Uexküll's notion of *Umwelt* is useful for ethologists, but primarily as a heuristic device: "Heuristics, in the intended sense, are loosely-defined rules or procedures that may point in useful directions without being tied to specific scientific practices of observation, measurement, or formal theory development in which well-defined theoretical terms are embedded" (139). Allen describes the *Umwelt* concept as too coarse to be used for fine-grained accounts of an animal's cognitive experience. He offers instead a concept of meaning capable of describing how mental representations might be shared across species. If the concept of *Umwelt* is a heuristic concept for diverting attention away from the error of positing a common environment modelled on a Cartesian spatial grid, Allen's proposed concept of meaning would go beyond a heuristic role, allowing for measurable and observable data capable of grounding descriptions of specific individual and shared experience. Measurable and observable data are essential components of a formal scientific theory. However, it is also possible that these requirements might constrain or eliminate otherwise viable explanations of nonhuman animal experience. If a theory must yield a certain kind of observable data, what possibilities for understanding nonhuman animal lives might be foreclosed or disqualified at the outset? Allen grounds his theory in mental representations, for example, for reasons that have more to do with the requirements of scientists than with the philosophical, political and ethical dimensions of ethological knowledge. What kinds of disciplinary

constraints are made visible here and how can humanistic knowledge intervene?

Allen points out that because of the complexity of even the least neurally complex brains, it is statistically improbable that any two organisms have exactly the same relationship to their surrounding environment. This raises questions of shared meaning, shared representation and cognitive similarity. Allen acknowledges criticisms of representationalism from within cognitive science and cognitive ethology, but he appeals to the recent successes from within the stream of cognitive ethology as one reason for remaining within a representationalist frame (Allen 138). Allen quite reasonably prefers to continue with what has yielded results rather than calling for an as-yet undeveloped revolutionary transformation of the cognitive ethological model.

Umwelt theory can only be a heuristic, argues Allen, because there is no rigorous way of accounting for or ensuring the veracity and completeness of an account of another *Umwelt*. Scientists can measure the “moos” of cows and represent them in ways that make it possible to observe distinct calls that match particular situations (getting caught on a fence, losing track of a friend or family member, etc.). The mooing of cows seems to be a significant aspect of their lives, but researchers who simply assume this are at risk of overvaluing the importance to cows of their vocalizations when designing experiments and equipment. Bias toward the human *Umwelt* is, in principle, ineliminable. So *Umwelt* theory raises the question of anthropocentric bias, but it seems ill-equipped to solve it.

Allen points out that in addition to inter-specific differences there are also intra-specific differences among all organism/environment couplings. In this sense each individual organism can be said to have its own *Umwelt*. On the other hand, two members of the same species will have more similarities than members of different species, and two mammals will have more in common than a mammal and a fish, for example. Meaning is what happens in the organism/environment relation and communication would seem to be the translation of this experience to another context. Communicated meaning can only ever be approximate. Allen defines what gets translated in communication as

content: “Meaning, understood socially as the content of communicative acts, must operate in this niche of similarities and differences. Communication itself serves to shape this niche; the niche is constructed, not occupied. Meaning, understood individually in terms of an organism's experience, is the product of the interplay between perception and action” (141). Meaning cannot be pinned down with precision, so claims about meaning are always, for Allen, claims about similarity. Similitude may be the best hope for those trying to understand how another organism makes meaning, and Allen argues that similitude can be made rigorous enough for scientific use. In fact, scientists have been successful in their studies while using a notion of similarity. Allen goes further, proposing a theory of cognitive similarity that can be made quantitative and thus measurable. Mental state attributions are theorized as diminished versions of mental representations. In other words, Allen and his dog Noche may see and thus represent the same squirrel, and while these representations may diverge widely in many ways, there remains an important overlap between them that can be described rigorously: “On this view, to say that Noche and I both see that there is a squirrel in the garden is to take two rather different shapes in initial spaces of different dimensionality and then to squash them down to a single representation whose major axis lines up with certain features in the world” (154). The full picture of Allen's theory is not yet available, but he acknowledges that formal models of representational language that allow for specific predictions and explanations must be constructed for the theory to be objectively grounded. Representations in this theory share enough similarity to be measurable. Allen points out that his theory needs to account for how representations can be measured in order to move beyond merely heuristic value for science.

Allen proposes a theory of meaning grounded in a representationalist account of cognition in order to make interspecific comparisons of cognition measurable. I take a different route towards understanding meaning non-anthropocentrically for several reasons. For one, I am interested in how the scientific requirement that its objects be measurable clashes with the opaque nature of mental

processes, particularly those of nonhumans. Is the demand for a specific kind of measurement as an insurer of objectivity ultimately a good fit for cognitive ethology?³ Calls for a revolution or a paradigm shift in the study of nonhuman animal minds raise the possibility that scientific rigor may need to be rethought in the context of cognitive ethology. Part of the problem with traditional approaches to nonhuman experience is the set of assumptions that comprise the Cartesian framework for interpretation, and representationalism is a key element of that frame. As I show in the first chapter, representationalism is criticized within critical posthumanist theory for having an inherent anthropocentric bias. Allen points out the danger of anthropomorphic projection in experimental design, observation and interpretation of nonhuman cognitive processes, yet for critical posthumanism, mental representations are problematic for this very reason. Finally, beyond debates about what mental representations might be, or whether they are inherently anthropocentric, there is a clear bias in representationalism toward mental content over process that, I argue below, needs to be carefully drawn out and addressed. Allen makes it clear in his article that cognitive ethology has two potentially viable paths available to it. Allen makes a compelling case for moving forward in the task of refining those methods and interpretive frames that are yielding success within the field of cognitive ethology. I want to take the other path Allen alludes to, which adopts a more process-oriented, dynamic and distributed account of consciousness and rejects the primacy of mental representations in cognitive processes.⁴ I argue that this path, although it is less well developed within the science of cognitive ethology, has much to offer the field. If, as I argue throughout the dissertation, representationalist understandings of meaning remain too closely tied to Cartesian dualism and anthropocentric humanism, then they are inadequate as a conceptual basis for making nonhuman meaningful experience thinkable. In the next section, I introduce an alternative framework.

³ Studies of human experience, even if they operate under the same assumptions about objectivity, have two major advantages over studies of nonhuman experience: the researchers themselves usually experience mental phenomena similar to those they study, and their subjects can communicate their experiences to the researchers in detail.

⁴ For example, see Fawcett for an account of distributed cognition in the mimic octopus.

Conceptualizing Meaning

Taking up Allen's distinction between merely heuristic and formal scientific knowledge but reversing their importance, I argue that priority should be given to developing an account of meaning that would act as a heuristic device for diverting thought away from the mechanism/anthropomorphism binary. In the process, it becomes clear that notions of meaning grounded in mental representations, such as Allen's, may not be sufficient for this task. I offer an account of how Cartesian assumptions and proposed alternatives are made manifest in ethological and para-ethological discussions of nonhuman animal worlds by drawing on three entangled literatures. The emergence of cognitive ethology from within the science of ethology breaks with classical ethological frameworks by seeking cognitive explanations for nonhuman animal behavior. It is in cognitive ethology, particularly in literature and other media created by cognitive ethologists for a broad audience, that the desire for accounts of nonhuman animals as thinking beings whose experiences are meaningful runs up against the limitations of Cartesian thought. It is in the overlap between the sciences, humanities and popular culture, and in the tension between scientific rigor and ethical/political concerns, that scientists' calls for a new paradigm ring loudest.

Critical posthumanism is crucial for thinking meaning beyond human/nonhuman distinction. Authors such as Cary Wolfe, Rosi Braidotti and Karen Barad clear vital conceptual space for revisiting what can and cannot be assumed about differences between human and nonhuman meaning. Assumptions about the relationship between human language, meaning, and knowledge are reworked in this literature in ways that make the human relationship with meaning just one of many in the world.

The early 20th Century writings of Jakob von Uexküll and many of those who engage with his ideas across a number of fields constitutes the third body of work that informs this discussion. An increasing number of theorists build on Uexküll's call for a biology that approaches organisms as individuals who inhabit meaningful worlds. *Umwelten* are comprised of a combination of an organism's

physiology, those aspects of the surrounding environment that affect them, and their lived experience negotiating that environment. The relationship between organism and environment is characterized by Uexküll as a relationship of meaning. Instead of confining organisms in passive and mechanistic relationships to stimuli, Uexküll's *Umwelten* conceptualize life in ways that cut across binaries like passive/active and reaction/response. Contemporary theory that builds on Uexküll's work envisions life as myriad complex dynamic processes that entwine organism and environment in a practice of meaning-making: “We do no longer ask the animal 'How does the outer world push you around?', we now ask it 'What do you perceive of the outer world, and what is your response’” (Uexküll, “The New Concept” 117)? Critical posthumanism, by way of its engagement with the work of Uexküll and those he influences, helps lay the conceptual ground for theorizing nonhuman animal life as meaningful.

Chapter 1 begins with a discussion of cognitive ethology. I place cognitive ethology into contrast with a radically Cartesian form of comparative cognition in order to show how cognitive ethology works to counter a history of dualist and mechanistic interpretations of nonhuman animal behavior. Despite its many advances against Cartesian assumptions, however, I argue that cognitive ethology still too often retains a representationalist framework for understanding cognition that critical posthumanism places into question. The chapter concludes by identifying some of these sites of residual Cartesianism as potential opportunities for a productive dialogue between critical posthumanism and cognitive ethology. In order to set up this discussion, I introduce several concepts central to a critical posthumanist perspective.

Barad has emphasized the materiality and dynamism of Foucault's concept of discursive formations. Theorizing discursive formations as active re-organizations, re-articulations and transformations of material and semiotic assemblages allows for the extension of the concept of discourse beyond the purely ideal and the exclusively human. Meaning-making is, in one sense, discursive practice. Yet Barad also emphasizes the performative nature of discourse. Knowledge of

nonhumans, from this perspective, is not simply a reflection in language of a static world. The production of knowledge has shaping effects on the world it purports to describe. This suggests that, in a broad sense, ways of describing what nonhuman animals are will eventually impact their lives. Although there are many forces at work in discursive formations that generate accounts of nonhuman animal experience, the concept is valuable in that it refuses to perpetuate any illusion that the production of knowledge takes place in an ethical and political void. Instead, the ethical and political dimensions of discursive interventions are volatile. Thinking of the study of nonhuman animal experience as a discursive formation opens up any narrow disciplinary configuration of the field to its outside in ways that defy disciplinary boundaries. Yet, as Wolfe points out, one cannot simply occupy a perspective beyond disciplinary constraints. This complex relation of openness and closure necessitates an ongoing exploration of the relationship between the sciences of nonhuman animal experience and their philosophical and cultural dimensions. How do humanities scholars engage productively with the sciences of nonhuman animal experience? Following this discussion, I outline two of the main objects of the critique of humanism—the traditional figure of the human as rational and autonomous, and representationalist approaches to cognition—that characterize the critical form of posthumanism, especially insofar as that critique relates to meaning. I draw on Barad, Braidotti and Wolfe because they each embrace a specifically critical posthumanism and discuss concepts of meaning directly.

The remaining three chapters delve into the work of Uexküll and other key foundational figures for critical posthumanism, in order to begin tracing out a critical posthumanist theory of meaning. Chapter 2 places Uexküll's later work (collected in *A Foray*) alongside the theory of autopoiesis developed by Humberto Maturana and Francisco Varela. These two approaches are very different, their differences exacerbated by the rapid changes in biological understanding that take place between the publication of Uexküll's "Theory of Meaning" (*Bedeutungslehre*) in 1940, and the publication of *Autopoiesis and Cognition* in 1979 (comprising essays published in 1970 and 1972). They are

comparable, however, in that both approaches foreground self-reference as a process that selectively opens up access to an outside world by first closing it off. Chapter 3 discusses some of the contributions of phenomenology to nonhuman meaning, focusing on lecture courses of Martin Heidegger (*Fundamental Concepts*) and Maurice Merleau-Ponty (*Nature*). Phenomenological approaches to nonhuman animal experience are crucial resources for thinking opacity, auto-affectation, difference and intersubjectivity. Both Heidegger and Merleau-Ponty draw on Uexküll in their efforts to situate meaning in relation to human/nonhuman difference, but they do so in strikingly divergent ways. Chapter 4 brings together the biosemiotic theory of semiosis as it is presented by John Deely and Jesper Hoffmeyer, and metaphysical concepts theorized by Gilles Deleuze and Felix Guattari such as the refrain, becoming, affect, territory and expression. What brings these two very different approaches into productive dialogue is that both consider the organism/environment relation from the middle, so to speak (Bains 3-4). Biosemiotics theorizes meaning in terms of sign processes, while Deleuze and Guattari emphasize the expressive power of materiality and the elusive inorganic forces that shape, modify and animate bodies.

Chapters 2, 3 and 4 offer close readings of key texts that together form a trajectory linking Uexküll to contemporary critical posthumanism and cognitive ethology. There are other possible pathways that converge in the genealogy of critical posthumanist meaning, and this study makes no claim to be comprehensive. The goal, rather, is to use this Uexküllian lineage to foreground the importance of meaning for developing a new framework for understanding both human and nonhuman meaningful experience. The most productive way to bring the concept of meaning to the surface in this context is to strike a balance between depth and breadth. Focusing on a single theory, author or text would not be suitable for elucidating the connections among theories I wish to draw out. On the other hand, focusing on thinkers that connect to both Uexküll and critical posthumanism, while it must necessarily leave out some important voices, limits the scope of the inquiry to a relatively manageable

size, gives the study a coherent conceptual thread, and hits directly on what I argue to be perhaps the most important site of debates and ideas for the pursuit of a critical posthumanist concept of meaning. In the next section, I describe the key ideas informing the critical posthumanist approach to meaning.

Overview of Key Ideas

My Uexküllian reading of contemporary critical posthumanist scholarship identifies three features central to a viable concept of meaning which need to be drawn out and related in more detail. I will introduce each of them briefly. In broad terms, meaning is fundamentally active, dynamic and process-oriented in ways that problematize representationalist accounts of cognition. Meaning is a process that cuts across organism/environment, human/nonhuman, organic/inorganic, and perception/action binaries. This suggests that meaning-making should be conceived in a manner that does not rely, in the first instance, on a subject's access to external objects or the nature of their mental content. But if meaning is not initially a question of access to objects or possession of content, what is it directed toward? What is meaning's theme? Uexküll's work and its reception provides a fruitful vantage point from which to pursue this question.

Uexküll claims in *A Foray* that nonhumans never seem to be observers. An observer, for Uexküll, is someone able to consider an object in a manner that is neutral with regard to the immediate environmental and bodily context in which it appears. Yet, as I argue in Chapter 2, Uexküll's discussion of the neutral object is brief and ambiguous. Much more prevalent in his work is his stated dissatisfaction with the bias towards isolation, identification and quantification indicative of the modern scientific view. What this view lacks, Uexküll argues, is precisely a focus on meaning as a dynamic process. In Uexküll's view, the observer and the neutral object are in part products of modern science and its tendency to strip objects of meaning ("The New Concept" 113). From this perspective, the neutral object is highly artificial and limited in terms of what it can tell us about nature. Uexküll moves away from a focus on objects and their modes of accessibility, toward an understanding of

meaning-making as a process which foregrounds possibilities for acting within specific contexts: “The word ‘chair’ for the dog is not the name of a thing but of a performance: to sit. To me this seems a fundamental feature of language as a means of communication between human beings as well. The spoken word, a certain sequence of sounds as carrier of sense and meaning, relates primarily to performances and not to things” (“Letter to Heinrich” 446). Rather than making the relation between the word “chair” and the action of sitting into a kind of representation that a dog would form, Uexküll suggests that communication (even between humans) is not fundamentally about forming referents, but must instead be conceived in dynamic, context-specific, action-oriented, performative terms.

The second feature integral to a critical posthumanist concept of meaning addresses difference. A concept of meaning as process acts as a basis for comparing radically different forms of life, but I argue that comparability must not be attained by eliding real and significant differences. In fact, exploring the radically divergent ways in which meaning is made is both crucial for and heavily dependent on ethological and other scientific studies of nonhuman animal experience. A theory of meaning should be able to conceptualize cognition and communication in a way that positions the human as only one iteration within a broader dynamics of meaning, a dynamics common to and perhaps even constitutive of life (Hoffmeyer, *Signs of Meaning* 8). Concepts of meaning have often been grounded in human language. Uexküll problematizes this connection in the above quote, suggesting that human language itself is a modulation of a process at work throughout the nonhuman world. It is this process that, in its general form, drives meaning-making in the living world. The diversity of forms of cognition and communication are all instantiations of it. The task is to begin to trace both the general form of meaning and the radically divergent ways in which this form manifests throughout the living world.

Biosemiotics offers one way of thinking meaning as a process ubiquitous in the living world which also gives rise to diverse manifestations. Jesper Hoffmeyer defines this process as semiosis:

“According to the biosemiotic perspective, living nature is understood as essentially driven, or actually consisting of, semiosis, that is to say, processes of sign relations and their signification—or function—in the biological processes of life” (Biosemiotics 4). Human language, a brown hare making itself visible to a fox, and cell metabolism are each instances of semiosis, according to Hoffmeyer. Despite their obvious and significant differences, they are each examples of semiosis at work in nature. Hoffmeyer suggests that the living world is driven by semiosis: evolution itself is, to a substantial degree, the result of semiosis. Sign processes, which biosemiotics seeks to account for, are the dynamic forces linking organisms to themselves, to one another, and to the outside world. In a biosemiotic interpretation, all living beings partake in this fundamental semiosis, yet none do so in exactly the same way. How did life evolve such a rich diversity of semiotic forms? Hoffmeyer discusses the Cambrian explosion, which resulted in the emergence of most kinds of animals 570 million years ago. According to Stephen Jay Gould,

Modern multicellular animals make their first uncontested appearance in the fossil record some 570 million years ago—and with a bang, not a protracted crescendo. This “Cambrian explosion” marks the advent (at least into direct evidence) of virtually all major groups of modern animals—and all within the minuscule span, geologically speaking, of a few million years. (23-24)

Hoffmeyer argues that although most morphological possibilities for animal evolution were sketched out in this geological moment, the proliferation of ecological niches themselves did not stop. Niches continue to shift and new ones emerge. What is missing in this evolutionary account is meaningful experience, and semiosis is the conceptual glue that binds meaningful experience to evolutionary emergence. Hoffmeyer argues that the ecological niche concept is insufficient in itself because it offers no explanation for how organisms are able to attune themselves to and take advantage of environmental regularities. The ecological niche concept must be supplemented with what Hoffmeyer terms the semiotic niche: “The semiotic niche thus comprises all the interpretive challenges that the ecological

niche forces upon a species” (*Biosemiotics* 185).

What drives the emergence of new semiotic niches, leading to increasingly complex forms of social interaction and cooperation, for example (*Biosemiotics* 188), is what Hoffmeyer calls semiotic freedom. Semiotic freedom is defined as “an activity that is indeed free in the sense of being underdetermined by the constraints of natural lawfulness” (*Biosemiotics* 187). Semiotic freedom, Hoffmeyer argues, grows over the course of evolutionary time. From a biosemiotic perspective such as Hoffmeyer's, then, evolution has trended toward the creation of organisms with more and more semiotic freedom. The semiotic component of evolution picks up where morphological differentiation slows down, making interpretative ability increasingly valuable in living systems. Semiosis becomes virtually co-extensive with life, yet it diversifies and differentiates along with life itself. Why would such an integral aspect of life go unacknowledged for so long? According to Hoffmeyer: “The main reason for this may well be that anthropomorphism is generally considered such a deadly sin of the first magnitude, that in setting up semiotic freedom, as I do here, as the pivotal point of evolution—at least in its later phases—we almost by definition must accord to human beings the status of being the foremost creatures in the natural history of the Earth” (*Biosemiotics* 188).

Indeed, this account of semiotic freedom is a problem, since the third feature I wish to identify for a critical posthumanist concept of meaning is an ongoing critical opposition toward arbitrary distinctions in value that would justify a natural hierarchy of beings. Critical posthumanism seeks to move beyond narratives that assume human cognition to be at the apex of natural history. This seems to be an implied, if perhaps not intended, result of Hoffmeyer's biosemiotic account of evolution. It makes of human language the culmination of the evolutionary process: “Human speech, for instance, has a very high semiotic freedom in this respect, while the semiotic freedom of a bacterium that chooses to swim away from other bacteria of the same species is of course extremely small” (*Biosemiotics* 187). Grounding species difference in a form of meaning-making that affords the human an unprecedented,

incomparable and context-free autonomy makes human exceptionalism seem locatable or readable in evolutionary history. Thinking species difference in this way is problematic from a critical posthumanist perspective.

How does critical posthumanism problematize the autonomous and rational image of the human? Kelly Oliver offers a nuanced critique of humanism by drawing on critical, feminist, and deconstructive approaches. She shows how notions of human identity and sexual difference are grounded in a usually disavowed species difference which links human treatment of nonhumans to human self-understanding:

My aim in this book is not only to propose an animal ethics but also to show how ethics itself is transformed by considering animals. In this regard, I am not arguing for animal rights but suggesting that our entire conception of rights, based as it is on assumptions about autonomous human individuals, is altered by animal pedagogy and kinship. We must reconsider our notions of autonomy and freedom in relation to animals and ourselves. (22)

In order to become the kind of beings we imagine ourselves to be when we try to isolate humanity from animality, we have to acknowledge the interdependence and interconnectedness with other beings that humanist purification processes have tried to repress. It is a false notion of humanity, created at least partly via the repression of animality, which gives us our sense of human identity and responsibility. In turn, this image and these ethics clash violently with the reality of human treatment of nonhuman animals, necessitating the re-examination of this figure of the human. In this way, the demands that humanism creates for itself are what gesture beyond it.

For Matthew Calarco, the political task of moving beyond anthropocentric humanism means cultivating forms of community and co-existence that do not rely on or mobilize repressive human/nonhuman animal distinctions and the destructive and violent power relations they help to maintain. Achieving the political power to realize such goals depends on forging intersectional

alliances with other movements for radical social change (*Thinking Through* 69). Thinking meaning in terms of process, I argue, helps in this task by highlighting that what we value most about human meaning-making is not entirely unique to the human, enabling new understandings of cross-species “modes of relation” (*Thinking Through* 69).⁵

In contrast to Calarco, I agree with Derrida that moving beyond anthropocentric humanism also means recognizing and drawing out a multiplicity of inter-species, intra-species and sub-organismic differences, that, through their sheer complexity, confound the categories upon which anthropocentric humanism operates (Derrida, *The Animal* 30-31). I will argue that, when it concerns the concept of meaning, the best strategy is to take both similarity and difference seriously. Meaning can be conceived in terms of process. Describing the basic features of this process shows what very different forms of life have in common, but this must be done in a way that takes differences among them seriously. The following chapters read a series of attempts to think this play of similarity and difference in ways that push past anthropocentric humanism and the dangerous hierarchies of value it helps to maintain.

⁵ An important example of such a mode of relation is Val Plumwood's concept of narrative ethics. Articulating a narrative ethics means rethinking human/nonhuman animal similarity and difference beyond Cartesian dualism: “A post-Cartesian reconstruction of mind that emphasizes intentionality, for example, could enable us to extend our recognition of mind-like qualities much more widely into the world and give better recognition to radical difference” (176).

Chapter 1: Critical Posthumanism and Nonhuman Meaningful Experience

Philosophers, in particular, have much to gain and to contribute by getting out of the armchair and into the field. The stakes are high—answers inform where humans fall in the evolutionary scheme of things and influence how animals are treated—and more detailed interdisciplinary studies are needed. —Allen and Bekoff, “Animal Consciousness” 68.

Introduction

Cognitive ethology studies nonhuman meaningful experience by building compelling cases for evidence of mental phenomena in many species. Yet it retains traces of Cartesian dualism that, in privileging a humanist model of meaning-making processes, makes nonhuman meaningful experience exceedingly difficult to conceptualize. Critical posthumanism, by contesting the traditional figure of the human and the dualist understanding of human/nonhuman distinction that it imposes, offers a pathway toward a new framework for thinking meaning. In the first part of this chapter, I turn to the study of nonhuman animal experience as it is theorized in cognitive ethology. I contrast cognitive ethology with an avowedly Cartesian form of comparative cognition to compare their modes of accounting for and taking up Cartesian assumptions.⁶ The second part of this chapter introduces some of the basic ontological and epistemological assumptions central to a critical posthumanist framework. I draw primarily on Karen Barad, Rosi Braidotti and Cary Wolfe for several reasons. All three thinkers concern themselves with critiquing Cartesian dualism on a methodological as well as an analytical level. They also draw heavily on poststructuralism to put forward a critique of the human as a metaphysical concept defined in opposition to a particular notion of the nonhuman animal, rather than focusing primarily on diagnosing a technologically driven, historically emergent posthuman era (although they do this to various degrees as well). They each embrace the label 'posthumanist' and engage in the process of defining what that might mean. They interrogate the human by challenging the

⁶ I rely predominately on Allen and Bekoff (*Species*) for an account of cognitive ethology. For comparative cognition, I turn to Zentall and Wasserman. Both texts are authoritative and comprehensive representations of their respective approaches.

human/nonhuman binary in ways that open up possibilities for rethinking how both human and nonhuman animals are conceptualized. Finally, they are each interested in rethinking the concept of meaning and expanding it beyond the human. Wolfe, Barad and Braidotti critique modern humanism and its relationship to Cartesian dualism via a critical posthumanist focus on the figure of the human and representational thought as guarantors of human exceptionalism. The representationalist understanding of cognition grounds an anthropocentric concept of meaning that privileges those forms of meaning-making that most easily resemble human cognition.

Engaging with the sciences of nonhuman meaningful experience from within the humanities raises questions about cross-disciplinary scholarship that also need to be addressed. I follow the critical posthumanist strategy of using the concept of discourse to think the shifting relations between disciplines; particularly cognitive ethology and the environmental humanities. Discourse, as it is theorized by Barad, also provides a way of illuminating and foregrounding the connections that link the study of nonhuman animal experience to more general contemporary issues in human/nonhuman animal relations. That is to say, ontological and epistemological issues are never fully separable from valuing practices.

Cognitive ethologists seek to enact a post-Cartesian paradigm shift concerning the nature of nonhuman animals. Doing so successfully, I argue, means seriously reconsidering the status of the human and human cognition in line with a critical posthumanist perspective. The conclusion puts critical posthumanism and cognitive ethology into dialogue. How might the critique of humanism, as it is currently conceived in critical posthumanist thought, help in the task of moving cognitive ethology further away from Cartesian assumptions?

Animal Experience and Cognitive Ethology

Cognitive ethology emerges with the publication of Donald Griffin's *The Question of Animal Awareness* in 1976, but the roots of this field are most often traced to the work of Charles Darwin.

Darwin, along with his protege George Romanes, studied behavior using a comparative method, finding analogies and affinities among humans and other animals in the expression of emotions, the use of reasoning, and in communication and social life that parallel the powerful connections Darwin made among living beings through their evolutionary history. But while evolutionary theory is bolstered and becomes a hegemonic interpretive framework throughout the 20th century, Darwin's approach to nonhuman animal behavior and cognition does not fare so well. Evolutionary theory eventually incorporates genetics and is embraced as an explanatory ground upon which experiments can be carried out, calculations can be performed and a wide range of phenomena can be predicted and observed. This synergy reinforces the legitimacy of evolutionary theory as an interpretive framework. Even as interpretations of evolutionary history and the role of genes, environment and development continue to be debated and amended, it is difficult to imagine a time when the basic argument that life evolves is abandoned. The study of nonhuman animal experience since Darwin has a much more fragmented history. Since it is not possible to observe what any given individual is thinking, and since only humans can use words to express and thus provide evidence of thought, it is ineluctably scientifically problematic to explain nonhuman behavior in terms of cognition. Where evolutionary theory finds a good fit with the practices of science, the study of nonhuman minds presents a gap that hinders scientific study. Evolutionary theory suggests that the human mind and language did not evolve in a vacuum or arise spontaneously. However, the inability to observe a mind in a scientifically rigorous fashion in this case creates serious methodological problems.

At the turn of the 20th century, several North American authors of popular animal literature came under attack for purportedly exaggerating the degree to which wild animals resemble humans in their cognitive abilities (Lutts; Fiamengo), while the Clever Hans case roused similar suspicions in Germany (*Species* 25-26). Uncomfortable with the influence these accounts gained over the public imagination, those who led the backlash against anecdotal cognitivism sought more rigorous and

objective, less anthropomorphic accounts of the lives of animals. Behaviorism arose in the early 20th century as a way to avoid the question of minds entirely. Behaviorists leave aside questions of interiority. Early practitioners also avoid references to evolutionary theory. Behaviorism emerged from out of the logical positivist school of philosophy. Logical positivism proceeds by bracketing all explanations that do not derive from the observation of sense data in line with logical criteria designed to purge from scientific concepts what cannot be verified by that criteria. In theory, this approach should be agnostic about the existence of nonhuman minds. In practice, however, the theory is strongly biased against them.

Classical ethology, closely bound up with the work of Konrad Lorenz and Niko Tinbergen, came to prominence just before the Second World War (Burkhardt 5). These scientists built on and greatly extended and reframed earlier work by Darwin and Uexküll, as well as figures such as Julian Huxley and Oscar Heinroth. Classical ethology breaks with both behaviorism and psychological approaches of the period that sought to understand nonhuman animal experience subjectively but lacked in scientific rigor. Classical ethology embraces evolutionary theory and places a strong emphasis on the study of animals in their natural habitats. Cognitive ethology emerges from classical ethology by focusing more on the role played by cognitive processes in the behavior of many animals. In this effort, cognitive ethology moves closer to Darwin, albeit with some important caveats: the available scientific methods and technologies make it easier today to apply rigor to the study of nonhuman minds; ethological and behaviorist studies that bracket cognitive explanations, despite the discoveries and advances they have made, show explanatory gaps that underscore the need to engage with the question of minds; finally, the cumulative effects of environmental crises, industrial animal exploitation and mass extinction compel scientists who care about helping other animals to push back against accounts that de-emphasize meaningful experience.

Cognitive ethology is one among a variety of perspectives through which nonhuman animal

experience is studied today. Each of the perspectives outlined above is still actively pursued, and there are many shades or hybrid positions in between these extremes. In order to get a sense of the constraints that Cartesian thought places on the study of nonhuman experience in general and on cognitive ethology in particular, I place cognitive ethology into contrast with a framework that enthusiastically embraces the main tenets of Cartesian discourse. Comparative cognition is the sub-field of comparative psychology (itself a rich and varied field) concerned with cognitive processes in humans and nonhumans. The editors of the *Oxford Handbook of Comparative Cognition* (Zentall and Wasserman) outline the context and scope of an avowedly Cartesian approach to the study of nonhuman animal minds. They trace the field back to Descartes and Locke, another canonical philosopher who argued that only humans have cognition. Another crucial figure for comparative cognition is C. Lloyd Morgan, whom, they argue, anticipates behaviorism with his *Canon*. Morgan's *Canon* states that, to ensure parsimony, a behavior should never be attributed to a higher mental capability if it can be explained by reference to a lower mental capability. While behaviorists Ivan Pavlov and Edward Thorndike devised the basic methods, Edward C. Tolman is the most crucial early behaviorist for comparative cognition. It was Tolman who largely pioneered the comparative cognition approach, encouraging speculation about cognitive processes while systematically and empirically testing his predictions. Tolman was criticized by more radical behaviorists for his ideas, the most important of which are latent learning and cognitive maps. His carefully controlled experiments involving objective measures of choice and latency of response are crucial influences on contemporary comparative cognition.

The *Handbook* itself is organized into sections that correspond to what the authors see as increasing levels of behavioral complexity. The organization assumes that intelligence at its fullest and most complex is human cognition. The first section asks whether nonhumans perceive the world in the same way humans do. If there was no overlap here, a science of comparative cognition would not be

possible. The second section looks at attention and the ability to search. How do different animals recognize objects? The third section inquires into the cognitive processes behind causation. The assumption here is that cognitive processes complicate, but do not ultimately displace, linear causation. How, they ask, are nonhuman cognitive processes similar to what in humans is called decision making? The fourth section is dedicated to episodic memory and future planning, followed by a fifth section on spatial cognition, a sixth on counting and timing, and a seventh on categorization and concept learning. Section eight is concerned with the degree to which some animals can learn about temporal, spatial and cognitive patterns of events. The penultimate section discusses problem solving, behavioral flexibility, challenges in measuring animal intelligence, tool use, and the capacity to make inferences. The final section concerns programs of research that involve social cognition, taste preferences and imitation. The editors clearly and distinctly communicate the major assumptions of their approach in the introduction. Scientific explanations are supposed to be objective, materialistic and mechanistic. The authors position comparative cognition in direct opposition to cognitive ethology, which they criticize as mentalistic. It is not a stretch to say they equate all trace of anthropomorphism with superstition. In fact, they employ a strict division between mechanism, which they view as objective science, and mentalism, characterized as superstition.

Cognition is a uniquely difficult problem for scientists primarily because it cannot yet be directly observed. Neuroscience is purportedly making progress in this area. However, the authors do not make it clear how images of minds can produce new knowledge independently of an interpretive framework. It is unclear how neuroscience, by adding evidence, might be able to decide whether comparative cognition or cognitive ethology has the most accurate interpretation of that evidence. The authors argue that it is very difficult to distinguish cognition from instinct, reflex or another form of behavior not driven by some sort of cognitive agency. They define cognition as the ability to remember the past, make choices in the present and plan for the future (2). Simple learning processes are not

considered to be properly cognitive processes. They interpret Morgan's Canon as insisting that researchers must expect to be able to explain behavior without invoking cognition (although G. Burkhardt ("Animal Awareness" 912) and Allen and Bekoff (*Species* 25) point out that Morgan's Canon actually presupposes cognition). Repetition is also eliminated as authentic evidence of cognition. For this reason, novel behavior must be observed using unfamiliar stimuli. Otherwise, what looks like cognition may actually be the simple transfer of knowledge from one context to another.

For comparative cognition, the lab is a crucial tool for separating cognition from what only looks or seems like cognition. Lab research is considered properly scientific because it allows for control: control of variables, control over bodies, control over expectations, and control over measurement: "Precise control over relevant factors and systematic variation in pertinent organic and environmental parameters encourages researchers in the field to adhere closely to the experimental method" (Zentall and Wasserman 3). There are instances in which work in the field is necessary, they admit, and lab studies undertaken by comparative cognitivists are meant to complement those of field biology and ecology. However, the authors stress the absolute importance of well-designed experiments. These experiments are, it would not be an exaggeration to say, meant to harass the research subject into revealing hidden cognitive capacities, suggesting that what any given animal does on its own is less relevant than what it can be forced to do in an extremely artificial context: "It may be necessary to expose an animal to artificial procedures both to rule out explanations of behavior in terms of simple learning principles and to induce the animal to deploy advanced cognitive abilities" (4).

Because cognition is (at least currently, for these authors) unobservable, comparative cognition must reluctantly make reference to unobservable phenomena. The authors draw an analogy between their field and work in other fields such as chemistry and physics, claiming that memory works in a way akin to a stored electrical charge. Past stimulus affects present action, but the missing piece or delay in the reaction must be derived from the ways in which linear causality is rerouted by the

nonhuman body. This is one way in which comparative cognition cannot close the loop or circle that seeks to have everything laid out for observation. Observability implies certainty. Other unobservables are categorized as mentalistic and are to be strictly avoided. These are described as things that spring from our own, private experience, influenced by folk psychology and by some of the more unsavory aspects of Cartesianism (behaviorism and positivistic science have their own history of opposition to Descartes' rationalist, mentalistic account of human consciousness). There is no need to say, for example, that a rat who seeks warmth “feels” cold, “wants” warmth or “knows” any of these things. Such language is described as projection. The push to avoid the kinds of anthropocentric explanations associated with the mentalistic approach dictates that there is a real world of nonhuman behavior that is obscured by the projection of personal human experience onto nonhumans, informed by centuries of attempts to discuss both human and nonhuman minds without the benefit of contemporary scientific rigor. Cognitive ethology and comparative cognition both pursue an understanding of nonhuman behavior by starting with the actions of a nonhuman that can be observed, measured and verified, and then tracing these actions back to their sources in order to determine the role of cognition in behavior. However, comparative cognition takes the additional step of eliminating the possibility that nonhumans live lives that are meaningful for them by removing such possibilities from their interpretive frame. They criticize any reference to subjective experience as anthropomorphic mentalism: “According to the mentalistic approach, we should be mainly interested in the internal or subjective world of the dog rather than in its overt actions” (6). To assume the existence of an inner world, for comparative cognition, is to assume that dogs have minds in the same way humans do. There is no nuance here: mentalistic language is virtually unavoidable in everyday practice, but it is at best a heuristic device that allows for shortcuts around exceedingly laborious and technical, but more accurate, language. There is a pervasive distrust of language as deceptive, imprecise and incompatible with scientific rigor.

Comparative cognition relies on a rigid, strict binary division between objectivity and

subjectivity. They criticize cognitive ethology for making personal experience too important. They mention that it was important to Descartes as well. Descartes, however, used the method of hyperbolic doubt as a way of condemning the unreliability of subjective experience. He sought an objective foundation for thought by eliminating any potential sources of error in his own mind. Comparative cognition applies a similar disciplinary regime to the human mind to produce objectivity. Comparative cognition is therefore highly critical of the emphasis placed in cognitive ethology on interspecific communication and the very notion that there could ever be a window into another mind. Humans, they argue (Zentall and Wasserman 6), use private experiences that are inaccessible to scientific observation to explain the behavior of other humans, but for comparative cognition, this tactic is simply a case of projecting our own experience back onto ourselves. They argue that this practice is comforting, but wrong, and especially so when extended to nonhumans. Cognitive ethology is seen as wrong from the start because it can never escape the danger of anthropomorphic projection. Knowledge of behavior, for comparative cognition, must rather be reducible to biological mechanisms, which are taken to be the fundamental building blocks that constitute the true matter of life: “Behaviors—be they simple or complex, be they verbal or nonverbal, be they those of human or nonhuman animals—are purely the product of biological mechanisms” (Zentall and Wasserman 6).

The authors ask what cognitive ethologists hope to achieve. This is a good question to pursue, and it should be turned back on comparative cognition as well. When it comes to achievement, comparative cognition teaches caution. Caution is valued here as scientifically prudent, although they acknowledge that the wait for adequate knowledge of the biological mechanisms underlying human and nonhuman behavior may take a very long time. Time is a crucial issue for the study of nonhuman animal experience, because for many populations, time is running out. How do comparative cognitivists see their work in relation to time? Scientific study, ideally, should have no time limits. However, scientific study is hardly exempt from time, funding priorities, and broader social and

political context. Comparative cognitivists raise but do not answer this criticism: “Many critics fear that this wait will be endless” (Zentall and Wasserman 7).

The authors conclude with the suggestion that perhaps mentalistic explanations should be left to the philosophers, implying, despite their invocations of Descartes and Locke, that they do not understand the role of philosophical thought at the heart of their own conceptual framework. They devalue interpretation and make every attempt to eliminate it from their own studies, because they cannot envision a rigorous science as anything except the task of identifying a series of biological mechanisms that are ultimately reducible to the laws of physics.

As it is presented in the introduction to the *Handbook* (again, this is only one presentation of comparative cognition, although these authors are literally editing the book on the subject), comparative cognition can be summarized by the following themes:

Mechanism and the objectivity/subjectivity binary: mechanistic explanations are objective; non-mechanistic explanations are mentalistic, subjective projections. Comparative cognition is haunted by the fact that cognition is unobservable, and adopting a strict mechanistic frame is the only way to stay close to this ocularcentric notion of objectivity. There is a strict binary between objectivity and subjectivity. Behavior is ultimately the result of biological mechanisms.

Isolatability, measurement, and the lab: genuine cognitive processes must be isolatable to ensure that they are not examples of simpler (bodily) processes. These processes can be isolated in the lab, where there is control over variables; what a nonhuman animal can be made to do in artificial circumstances is more reliable evidence of cognitive ability than what they would do on their own.

Patience, rigor and disciplinary boundaries: they preach caution and patience, implying that cognitive ethology is willing to sacrifice scientific rigor too hastily. Finally, they believe that mentalistic explanations can safely be left to the philosophers, which implies that philosophy can be purged from their discipline and that philosophers have nothing to teach their science.

In their 1998 text *Species of Mind*, Allen and Bekoff lay out the main tenets of the cognitive ethology framework. This text, co-written by a scientist and a philosopher, provides an apt point of comparison with the stated assumptions of comparative cognition. Cognitive ethological studies strive to remain open to surprising findings about nonhuman animals' cognitive abilities. Willingness to be surprised means giving some agency to the organism being studied. It implies that knowledge is provisional and that understanding will change over time. This is a dramatically different approach to the status of scientific knowledge than the caution advised by comparative cognition, which asks researchers to refrain from speculation and interpretation until certainty can be ensured.

In addition to comparative studies, cognitive ethologists consider evolutionary and ecological dimensions of behavior. Rather than isolating one organism or one capability and only later integrating their findings with those of ecologists and evolutionary biologists, cognitive ethologists consider the spaces, places and temporalities that inform behavior as integral to their conceptual framework. Considering how cognition evolved, for example, places the question of cognition within an evolutionary context in which it makes sense that affinities among cognitive processes would emerge. This appeal to evolutionary history challenges the tendency within comparative cognition to dismiss similarities between human and nonhuman minds as anthropomorphic projection. From an evolutionary standpoint, it is unlikely that human cognition would evolve in a vacuum.

Categories such as “lower” and “higher” presuppose a hierarchy that envisions differences among organisms as deviations from the human. In other words, making human cognition the standard against which other organisms are measured ensures that all nonhuman cognition will be framed in terms of what it lacks in comparison to the human. Cognitive ethology seeks to mitigate anthropomorphism and anthropocentrism by considering a wide range of species, including domestic animals, and by carefully qualifying any hierarchical terms. This is a displacement of the human as the center of value, although not yet a deconstruction of traditional accounts of human cognition itself.

Cognitive ethologists seek to understand the world from the point of view of the animal under study. This strategy is heavily criticized by comparative cognition. They dismiss it wholesale because as a method it is speculative, provisional and impossible to protect against the risk of anthropomorphic projection. However, the alternative—denying interiority or access to interiority altogether in favor of the practice of indexing observed actions to biological mechanisms—also entails a considerable risk. That is the risk that nonhuman animals will come to be seen as automatons with no interiority, and that they will be treated as such. Both enterprises are risky, but what is put at risk differs between the two. The risk of anthropomorphic projection is one taken by the researcher, while the risk associated with denying any nonhuman mental life is a risk placed primarily on the nonhuman world. Cognitive ethologists argue that there are sound strategies for attempting to build some kind of model for how a particular organism makes life meaningful. One strategy being developed is that of attempting to communicate with another animal in their own language. Another strategy is that of studying another animal in their own environment. Trying to communicate with an animal in their own language, in their own home, is an attempt to invite the animal to be a distinct self. Provoking a nonhuman animal in a laboratory setting to learn human language, on the other hand, creates a context in which it is difficult to grasp what kind of knowledge is sought, unless it is the knowledge that nonhuman animals cannot be made human.

Cognitive ethology also differs from comparative cognition in its effort to draw on a wide range of scientific methods, data, research programs and even anecdotal evidence in the pursuit of knowledge. Whereas comparative cognition seems preoccupied with shoring up its borders, cognitive ethology emphasizes the need to show how studies of cognitive skills in the lab function in the appropriate ecological context. There is a divide between the two approaches that concerns where the cut should be made between organism and environment. For comparative cognition, knowledge of the nonhuman world worth seeking is to be found in the ways that a particular organism's biological

mechanisms are expressed. There seems to be little need to consider that organism as an experiencing subject with a history and a home. For this reason, comparative cognition is also less interested in intra-specific differences. Rather, individual organisms are meant to be models of their species.

Finally, cognitive ethology differs from comparative cognition in that it does not seek to model itself after the “hard” sciences in an attempt to gain credibility. Cognitive science is decidedly interdisciplinary. *Species of Mind* is subtitled, *The Philosophy and Biology of Cognitive Ethology*. Allen and Bekoff insist that disciplines should not be closed to one another. Cross-disciplinary dialogue is challenging, and it is commendable that Allen and Bekoff undertake this risky move of opening the discussion up to a plurality of voices rather than closing it off via an appeal to authority.

Cognitive ethology, in summary, advocates openness to surprising findings and intra-specific difference, close integration of evolutionary and ecological contexts, avoidance of anthropocentric hierarchies of intelligence, efforts to envision the world from the perspective of the animal in question, willingness to draw on a wide variety of methods and data sources, and a degree of disciplinary, methodological and conceptual plurality that runs counter to attempts to police the boundaries of their science.⁷ In the remainder of this chapter, I outline how critical posthumanist authors problematize anthropocentric humanism, and why doing so can be helpful for cognitive ethology. Before moving on to this discussion, I draw on Wolfe and Barad to discuss in more detail two issues raised by Allen and Bekoff that critical posthumanism can further theorize. One concerns the relationship between knowledge of nonhuman animals, on one hand, and treatment of them, on the other. I argue against the position that these two aspects of human/nonhuman animal relations can or should be considered entirely separable. The other issue concerns the disciplinary divide between scientific and humanistic approaches to nonhuman animal lives. Both of these issues can be productively addressed via the concept of discursive practices.

⁷ See Bekoff (*The Emotional Lives*) for an extension of this framework to address recent research on nonhuman emotion, empathy and ethics.

Discursive Practices

The material effects of human discursive practices on environments are exceedingly powerful in relation to those of nonhumans (most of the time at least, although certain species of bacteria would challenge such an unqualified assumption), but this does not mean that only humans engage in discursive practices. Barad draws on Foucault's understanding of discourse and expands it to include all matter. Knowing, she claims, is a matter of direct material engagement. In other words, knowledge is a matter of transformation rather than representation. Discourse is about more than simply using words to represent things. Stuart Hall makes this point in reference to Foucault's concept of discourse:

One important point about this notion of discourse is that it is not based on the conventional distinction between thought and action, language and practice. Discourse is about the production of knowledge through language. But it is itself produced by a practice: “discursive practice”—the practice of producing meaning. Since all social practices entail meaning, all practices have a discursive aspect. (Hall 291)

Thinking in Foucaultian terms about discourse means linking conceptual and material practices, drawing connections between how the world is made sense of and what possibilities might exist for living a meaningful life within it: “Discursive practices define what counts as meaningful statements. Statements are not the mere utterances of the originating consciousness of a unified subject; rather, statements and subjects emerge from a field of possibilities. This field of possibilities is not static or singular but rather is a dynamic and contingent multiplicity” (Barad, “Posthumanist Performativity” 819). Barad defines meaning as material reconfigurings of the world: “Meaning is not a property of individual words or groups of words. Meaning is neither intralinguistically conferred nor extralinguistically referenced. Semantic contentfulness is not achieved through the thoughts or performances of individual agents but rather through particular discursive practices” (“Posthumanist Performativity” 818). In place of discrete things whose identities are painted by the proper use of words

(the distinction between language and practice alluded to above by Hall), Barad places movement, matter, and a notion of identity always understood as a cutting off from the whole: “The primary ontological units are not “things” but phenomena–dynamic topological reconfigurings/entanglements/relationalities/(re)articulations. And the primary semantic units are not “words” but material-discursive practices through which boundaries are constituted” (“Posthumanist Performativity” 818). Meaning, for Barad, is never something added onto an object as an attribute, nor is it projected by a being who engages with that object. Instead, it emerges from practices. The boundaries of meaning are dynamic. Meaning is the play of possibility and constraint.

Discourses are also performative, Barad explains. They are not simply passive or normatively neutral accounts or infrastructures created solely to reflect a world that would be self-evidently available. Instead, they play a role in enacting or bringing into existence those phenomena they purport to describe. Cartesian dualism may not be nearly as important as capitalism when it comes to understanding what drives the crises of mass suffering, extinction and ecological destruction that overshadow human/nonhuman animal relations today, but it could be said to play a complementary and enabling role.

Analyzing the study of nonhuman meaningful experience as a discourse also allows for a consideration of the disciplinary constraints and forms of agency internal to the scientific discipline of ethology without remaining confined to the inside of the discipline. That is to say, it opens up another perspective on the ways in which humanistic and scientific knowledge shade into and overlap with one another. Spaces are revealed for contributing to and shaping what are too hastily considered to be questions internal to the sciences. Rather than collapsing the borders separating disciplines, however, analyzing nonhuman meaningful experience as a discursive formation means acknowledging disciplinary limitations without purporting to speak from beyond disciplinary situatedness.

Wolfe builds on Foucault in his discussion of disciplinary boundaries and animal studies,

arguing that disciplines are not defined and shaped by their objects of attention, but “...disciplines constitute their objects through their practice, theoretical commitments, and methodological procedures—and they do so selectively” (*What Is Posthumanism?* 108). Wolfe draws on systems theory to point out that no discipline can account for the underlying conditions and assumptions which ground its own observations (*What Is Posthumanism?* 116). Only from another disciplinary configuration can the theoretical or conceptual blind spots endemic to the organization of that discipline be challenged. The individual human subjects that are partially entangled or that engage with disciplinary frameworks are subjected to the same limitations. As Wolfe points out, critical consciousness cannot rise above the finitude that bounds disciplines. My own engagement with cognitive ethology must be heavily qualified by my disciplinary location, and any claims I make about the science of cognitive ethology are of only very limited utility (they would have to be taken up by that discipline and translated); however, the fact of disciplinary perspective means that attempts at dialogue are necessary and productive within these limitations (blind spots create opportunities for disciplines to be of use to one another). Wolfe's position on disciplinarity benefits from his critique of humanism. What kind of world does the humanist see? The anthropocentric humanist sees a world open for inspection and amenable to comprehensive understanding. Rethinking this image of the human changes what counts as knowledge and makes possible a critical stance against the desire for scientific rigor conceived as the necessity of strategizing to make nonhuman cognitive processes entirely visible and measurable.

In important ways, the study of nonhuman animal experience is productively resistant to disciplinary closure. Conceptualizing it is not solely the concern of a subset of ethologists negotiating the shifting disciplinary formations within the sciences themselves. Ethology in the 20th and early 21st centuries has been bound up in interesting ways with literature, film and popular culture, philosophy, and the fine arts and social sciences. Each of these interdisciplinary movements unfolds within a broader re-configuring of the disciplinary divisions separating scientific from humanistic inquiry.

Making sense of these cross-disciplinary adventures, however, requires close attention to how knowledge is both forged within and translated among disciplinary frames.

How do ethology and the environmental humanities shade into, diverge from, and parallel one another? Cartesian interpretative frameworks in ethology cannot ultimately be proven or disproven by collecting and presenting evidence. This is because these conceptual frames are ways of interpreting evidence. Philosophy and theory are already at work at the heart of ethological knowledge. Asking what a particular animal is, is already to be working within a history of scientific, ethical, political and disciplinary configurations. At the same time, the ways in which disciplines shape their objects of inquiry deserve close attention. Since disciplines are forms through which knowledge is produced and contested, there is no space of knowledge that would be free of disciplinary perspective. Writing about the nonhuman world from within the humanities involves learning to discern how the sciences discipline their objects of knowledge, how this knowledge gets translated into other contexts, and what possibilities and limitations exist for participating in these projects from within the humanities.

Meaning is a fundamental concept for the humanities, but it has traditionally been seen as marking the emergence of the human from the nonhuman. Uexküll makes meaning a key concept for thinking the nonhuman, necessitating and enabling a cross-disciplinary investigation of this concept that now draws closer those forms of life it had once helped keep apart. That Uexküll was a scientist, and that his most celebrated work regarding nonhuman worlds is a literary account intended for a popular audience (*A Foray*), makes his work one particularly interesting site for thinking the relations between the sciences and the humanities as well as between the human and the nonhuman.

Uexküll is far from unique in seeking to bring his ideas about nonhuman animal lives to a popular audience. Susan McHugh traces a complex web of influence throughout the 20th century running through the production of ethological knowledge, the cultural representations of exotic and charismatic species primarily via visual media, and the narrative weaving of nature and culture,

scientific and humanistic inquiry in popular ethology books. Animal stories tell us about disciplinary boundaries and transgressions. McHugh points out that, while literature has long been tasked with defending human exceptionalism from the cold rationality of the sciences, figures such as Jane Goodall and Konrad Lorenz have employed literary depictions of nonhuman life, complete with embellishments and fictional accounts, to make the sciences accessible beyond their borders. Although she does not explicitly do so, it would be easy for McHugh to make a case for Uexküll as a key figure in this lineage:

While groundbreaking ethological studies provide the basis for policy and other changes in the ways in which people live with animals in industrialized societies, best-selling ethological narratives of life in the field influence broader imaginative engagements with elusive species like the great apes that are otherwise largely mediated through film, video and digital media. Obscuring the more mundane realities of data-driven science, such stories promote instead popular ethologists themselves as skillful storytellers. But in so doing, they also forge links in chains of literary influence, raising questions about how this pioneering scientific field traces its roots back to fiction, and continues to send out shoots through visual narrative forms. (McHugh 212)

McHugh argues that, from Anna Sewell to Frans de Waal, animal narratives do important work to improve the treatment and understanding of nonhumans, and they sometimes lend support for ethological work in the field as opposed to the lab. In such cases, an excursion into literary worlds can double back recursively and affect funding priorities within the sciences. The effects of present-day scientific insights also affect literature, not only in terms of what is produced today but in how literary accounts of the past are read differently: “Now that scientists are identifying the interdependence of life forms even below the cellular level, the pervasive companionship of human subjects with members of other species appears ever more elemental to narrative subjectivity, a dark matter of sorts awaiting

literary analysis” (McHugh 2). These examples suggest that, when the sciences and humanities mix, the effects are neither unidirectional nor predictable, but diffractive. How does the work of translation from scientific study to popular literature parallel other cross-disciplinary movements? How does disciplinary authority work in these scenarios?

Ted Toadvine questions some pervasive myths about interdisciplinary research, particularly in collaborations between humanities scholars and scientists. Taking environmental problems as his reference point, Toadvine explains that humanities scholars should not be seen as adding (inevitably undervalued and extraneous) ethical and historical content to round out empirical problems, and they should especially not be seen as public relations officials. Finally, there is not a one-way relation that sees humanities scholars as learning from scientists and not vice-versa. Rather, it is in the process of constructing or framing issues themselves that humanities scholars have the most to offer:

In contrast with the empirical method of the natural sciences, the method of the humanities is hermeneutical; the concern here is not with the gathering of facts, but rather with the assumptions that frame what counts as a fact and the broader context that determines which facts are gathered and how they are to be put to use. In short, the humanities are concerned with meanings and values, of which facts are only one subset, and which require the specific skills of interpretation, clarification, evaluation, and judgment that the humanities develop across all of their range. (“Six Myths” 4)

Toadvine sees a reciprocal relation between these two approaches that leads to better, stronger understanding all around: “Empirical research is needed to establish facts, while hermeneutical research interprets the broader implications of those facts for the meaning and value of our lives. Of course, both approaches must serve a critical role with respect to the other” (“Six Myths” 4).

Interdisciplinarity is not some state that can be attained by a group or even an individual, but a conversation from out of disciplinary commitments: “Interdisciplinarity cannot afford to move beyond

the stage of being a constant site of negotiation and re-negotiation. It is inherently and ineliminably problematic and unfinished. But, in my view, this is not a weakness. This is precisely what makes it a site for the production of novel and hybrid ideas that can change the world” (“Six Myths” 7).

Humanities deals with the larger context in which facts make sense. Scientific approaches need this context to be fixed for their experiments to achieve objectivity or reliable repeatability. Therefore, the larger context can be a blind spot for the sciences, but an opportunity for the humanities. This is one way of thinking the role of the humanities in relation to the sciences. In this scenario, a theory of meaning is part of the wider context within which empirical facts make sense.

In the next section I outline how critical posthumanist theorists critique humanism and the lingering Cartesian dualism still informing contemporary understandings of human/nonhuman similarity and difference. Rethinking the figure of the human and representationalist concepts of cognition opens up a variety of possibilities for thinking nonhuman cognition differently. Critical posthumanism problematizes views of human cognition grounded in autonomy from ecological and corporeal ties.

Critique of Humanism and Subjectivity Beyond the Human

Cartesian metaphysics conceives the human/nonhuman distinction as an absolute difference between two fundamental types of substance. For Descartes, everything on Earth with the exception of the human mind is made up of the same inert matter, whose fundamental quality is extension in space. Human minds, on the other hand, are neither inert nor extended in space. Human thought is alone among worldly phenomena in that it has the capacity to act without first being acted upon. Nonhuman animal behavior, on the contrary, is conceived as having no relation to any mental process. Descartes argues that the actions of all nonhuman animals can be explained without the invocation of interiority. Although few modern humanists would subscribe to his metaphysics explicitly, Descartes' substance dualism plays a formative role in the elaboration of modern humanism. The reflexive ability to think

about one's thoughts, via language, purportedly allows for the kind of abstract thinking that engenders autonomous human decision-making. As a thinking being able to place oneself at a distance from the compulsions of the body, the emotions and the immediate environment, the human is free to act in accordance with rational thought. This freedom by way of reason also implies that some actions are better than others, and that a normal, healthy adult human should have the ability to act properly; that is, rationally. The normative dimension of humanism emerges from the assertion that a human being should place reason into the service of self-improvement.

The human of humanism is thus defined as autonomous and rational. A specific relationship between thought, language, representation and autonomous action is deemed constitutive of the human and set off against a deterministic, mechanistic, uncomprehending and ultimately meaningless nature. The human body becomes a site of struggle for the dominance of nature by reason, via the normative claim, central to modern humanism, that the human must strive to overcome and dominate the nature within themselves. Braidotti links these aspects of modern humanism to Eurocentrism and colonialism, describing this material and discursive nexus as a basic structural element of Western cultural practice (15). Eurocentric humanism draws on classical and Renaissance ideas of the human, filtered through Cartesian dualism and updated in 18th and 19th century political philosophy. Its hegemonic force arises in the claim that the free use of reason enables an “almost boundless capacity of humans to pursue their individual and collective perfectibility” (Braidotti 13). The ideal of perfectibility installs a binary logic demarcating those who are more perfect in contrast to those who still have work to do, while the universalist aspiration requires that all humans must strive to achieve perfection (Braidotti 15).

Braidotti sees the emergence of post-structuralism in 1960's France as one crucial point at which humanist universalism is radically contested, but she explains that there are at least two others that are particularly important for critical posthumanism. One is comprised of a series of important interventions that arise from those many groups that are not represented by the traditional figure of the

human. Social justice movements aimed at countering the racist, misogynistic, homophobic, colonialist, classist and other biases in the Western European figure of the human vary widely in terms of their concerns, their goals, and their relationships with humanism. Some try to expand humanism, for example, while others seek to replace it or deconstruct it. Feminist, anti-colonial and anti-racist movements are especially pertinent for efforts to challenge humanist assumptions along the nature/culture binary. The other important challenge to modern humanism discussed by Braidotti comes from the increasing evidence that supports a radically new understanding of the nonhuman living world. A diverse and dynamic array of research and theory seeks at different times and for different purposes to either expand or challenge humanism outright. New knowledge about matter, cognition, living systems and evolution is also crucial for developing an understanding of meaning that engenders critical thinking about humanist assumptions. These major strands of thought will be revisited continually throughout the dissertation, and they are also intricately bound up with post-structuralism itself. For now, I will move on to a discussion of post-structuralism, because it is especially salient for a critique of humanist notions of meaning.

Barad, Braidotti and Wolfe all turn to the work of Foucault as one starting point from which to critically engage modern humanism. The anti-humanism of Foucault cuts through the binary logic and universalist aspirations of humanism by challenging the notion of an autonomous, rational human subject who drives history in a progressive direction. The human is described instead as a contingent historical convention. The humanist ideal, theorized as autonomous, ethical, rational, neutral and universal, is found in practice to reflect a narrowly male, white, heterosexual, able-bodied image that casts difference as deviation. Braidotti sums up this situation:

The human is a normative convention, which does not make it inherently negative, just highly regulatory and hence instrumental to practices of exclusion and discrimination. The human norm stands for normality, normalcy and normativity. It functions by transposing a specific

mode of being human into a generalized standard, which acquires transcendent values as *the* human: from male to masculine and onto human as the universalized format of humanity. This standard is posited as categorically and qualitatively distinct from the sexualized, racialized, naturalized others and also in opposition to the technological artefact. The human is a historical construct that became a social convention about 'human nature'. (26)

Braidotti defines the posthuman condition as the displacement of approaches that rely on a strict binary division between nature and culture (2). As Braidotti points out, boundaries that have long served in Western thought to demarcate human from nonhuman are shifting. One effect of this shift has been a proliferation of incommensurable reactions clustered around the term 'posthuman'. There are those such as Nussbaum who defend a traditional humanist ideal as the best way to uphold crucial democratic, universalist values (Braidotti 38-39). There are others who see in the near future the emergence of a technologically mediated transhuman era characterized by dramatically and decisively enhanced human bodies, perhaps even allowing consciousness to transcend the biological altogether (see for example More and Vita-More). The desire to transcend materiality and embodiment characteristic of affirmative transhumanism is, in light of traditional notions of the human, aptly described by Wolfe as an intensification of the dualist, anti-corporeal tendencies of humanism (*What is Posthumanism?* xv). Braidotti also finds limitations in attempts to diagnose the posthuman through a social constructivist lens. The defence of humanism, the intensification of humanism, and the social constructivist account of humanism are all ontologically insufficient from a critical posthumanist perspective. While the first two positions attempt to conserve and defend humanism, Braidotti sees the social constructivist position as grounded in a binary opposition between the given (nature) and the constructed (culture), an opposition described by Barad as critical to representationalist metaphysics. A truly posthumanist metaphysics, for Braidotti and Barad, would reject any trace of nature/culture dualism. For Braidotti, this binary can be displaced by a scientifically informed understanding, not

primarily of the technological extensions of the human, but of the autopoietic organization of living matter itself. Barad also grounds her metaphysics in the agential power of living matter that underlies and conditions what a dualistic metaphysics takes as discreet, isolatable entities.

Critical posthumanism takes for its starting point a critique of strict binary divisions between nature and culture. Humanism is not something that can simply or easily be left behind, however. Braidotti outlines the many positive humanistic ideals that deserve to be upheld. Anti-humanism, she claims, is not a wholesale rejection of all intellectual, ethical and political aspects of humanism. Yet these positive aspects are inextricable from the negative elements: “The difficulties inherent in trying to overcome Humanism as an intellectual tradition, a normative frame and an institutionalized practice, lie at the core of the deconstructive approach to the posthuman” (Braidotti 30). How might humanism be overcome, she asks, when the ability to simply leave it behind assumes a form of agency and a form of self-possession that must ultimately be described as humanist? Neither Wolfe nor Braidotti seek an absolute break with all of the aims of humanism (Braidotti 29; *What is Posthumanism?* xvi). Both point out that humanism is so conceptually and politically complex that it requires ongoing, sustained critical engagement. Braidotti identifies Wolfe as taking up the deconstructive project in relation to the posthuman. She frames her own posthumanist, materialist ontology as a choice that may risk succumbing to the re-inscription of humanist logic. The risk of a purely deconstructive approach, on the other hand, lies in failing to advance any positive and adequately materialist account that would replace humanism. The constitutive outside of humanist discourse is not easily demarcated. Perhaps, like Derrida's treatment of the human/animal distinction, it is better conceptualized as a differential series of distinctions, a series of humanisms deeply embedded in Western thought.

Braidotti's approach draws heavily on poststructuralist and feminist scholarship. She follows Haraway in claiming that the technologically mediated transformations currently working through the traditional image of the human are at best ambivalent and in need of ethical, political and cultural

reshaping. This means opening up, in the wake of the crises of humanism, new possibilities for subject formation. In this way, Braidotti pursues an affirmative posthumanism. Braidotti describes posthumanist subjectivity as complex, relational, embodied, affective, and applicable beyond the human (82). The posthuman is formed through a nexus of material and discursive power relations that are simultaneously intransigent and ultimately incoherent and contingent, thus necessitating ongoing critical engagement.

The figure of the human criticized by critical posthumanist theorists is described as distinct from the nonhuman because of the way the human can think rationally. The recursive power of reason enables the thinking being to achieve autonomy from their immediate bodily and environmental context by reflecting on their mental representations. For this reason, theories of cognition based on mental representations are seen as dualist by critical posthumanists. For Barad, representationalism is based on a metaphorical notion of knowledge as reflection of an outside world. She abandons a view of knowledge as reflection in favour of a dynamic account of meaning-making as practice. For Wolfe, representationalism is too closely bound up with a version of Cartesian mind/body dualism that imposes a sharp distinction between human and nonhuman minds. Wolfe argues instead for a concept of meaning that would be a basis for comparability among many different forms of cognition and communication. I will describe these critical points in more detail in the next section.

Critical Posthumanist Critique of Representationalism

Donald Griffin, widely credited with founding cognitive ethology, disapprovingly cites a wide range of philosophers and linguists who assert that human language constitutes a difference in kind between humans and other animals (31). He shows how human language is widely assumed to be capable of transmitting vastly more information than nonhuman communication. It is also purportedly unique because it creates distance between a human and their immediate, present circumstances, allowing for autonomy from sheer biological necessity (Griffin 33). Language is commonly conceived

as a wedge between environmental stimulus and bodily response that, by weakening this causal relationship, allows human thought to emerge. Language engenders thought, which severs the links between individual subjectivity and environmental, evolutionary and bodily necessity. Through language, reason and hence freedom emerge. Investment in this view of language drives debates about bee communication, for example. Do bees use symbolic language? Do they engage instead in a simpler form of indexical semiosis? Or is the dance an epiphenomenon (odour is perhaps the real stimulus and does not qualify as communication, since it comes directly from the food source and is thus unmediated by the bee that would simply be its vehicle) (Griffin 27)? Perhaps what seems like communication is really just a function of the inner state of the bee (the bee is compelled to dance and is not trying to communicate) (Griffin 29)? Each of these potential explanations of the waggle dance is also an assertion about the difference between human and nonhuman. Too often, theorists take human language as constitutive of an abyssal difference between human and nonhuman, and then look to see what is lacking in nonhuman communication. Opposing this framework does not necessarily entail denying difference, but in questioning what possibilities get foreclosed by this model, and what areas of research and theory might be possible from a different perspective.

Griffin critically engages Cartesian assumptions informing ethological discourse by challenging the views of Noam Chomsky, who adopts a Cartesian perspective on the radical uniqueness of human language. No animal, for Chomsky, can make their thoughts apparent in a sentence, while this ability belongs to all humans, even “depraved and stupid” ones (Chomsky quoted in Griffin 32).⁸ Human language is an ability that, beyond any measure of intelligence, is “...unbounded in scope and stimulus-free... no brute [is] so perfect that it has made use of a sign to inform other animals of something which had no relation to their passions... for the word is the sole sign and the only certain mark of the presence of thought hidden and wrapped up in the body...” (Chomsky quoted in Griffin 32). Human

⁸ Griffin is combining, without distinguishing, Chomsky's own writing (“...unbounded in scope and stimulus-free...”) with quotations from Descartes that Chomsky uses to support his points. See Chomsky 60-61.

language, in this view, marks the uniqueness of the human species because it is thought to be limitless in scope and application. It is a universal and creative prosthesis because it is stimulus-free. For Chomsky, human language emerges because of unique structural differences that evolved in human mental organization (Griffin 33). For this reason, he sees human language as unprecedented rather than as a more complex case of nonhuman cognition and communication. Griffin expects ethology to intervene in this debate and re-situate human and nonhuman communication and cognition on the same conceptual ground. Such a move would have a direct impact on philosophical and linguistic presuppositions about language and human uniqueness. Griffin sees inter- and intra-specific communication beyond the human as a particularly rich site for cross-disciplinary activity:

To some, this will appear to reflect a fundamental difference between scientists and humanists, but I am more optimistic, and suggest that communication behavior presents a magnificent opportunity for fruitful interaction and cross-fertilization between broad-minded scientists and equally perceptive humanists. The implicit denial of mental experiences to animals has almost become an act of faith, supported by arguments and assertions that true language is a unique and characteristic attribute of our species. (41)

Elizabeth Grosz approaches the question of nonhuman meaning by looking for ways of talking about cognition and communication that cut across the human/nonhuman divide. She asks what the humanities might become once the human is decentered: “How open-endedly must we understand language, representation, and art—those qualities that we have up to now relegated to the human only to the extent that they are denied to the animal—if we are to problematize the opposition between animal and human, and fully immerse the human in the worlds of the animal” (*Becoming Undone* 14)? In the Darwinian/Deleuzian frame she proposes, human culture becomes one particular and constantly shifting modulation of a process intensified by sexual selection, but widespread throughout the nonhuman world. Grosz challenges the humanities to open itself to this larger, posthumanist

framework:

...if there are a hundred thousand potential languages, expressive impulses, and modes of bodily communication, from human language to the dancing of bees and the song performances of birds, to the chemical language of cells themselves within every living body, then new notions of collectivity, new notions of social production, new modes of linguistic analysis are waiting to be born, waiting to be commensurate with and adequate to the multiplicity of life-forms to which they apply. A new humanities becomes possible once the human is placed in its properly inhuman context. (*Becoming Undone* 21)

Grosz pursues an expanded notion of the humanities via her discussion of Uexküll and art (*Chaos, Territory, Art*). For many critical posthumanists, however, such an expansion, particularly as it concerns language and meaning, can only occur via a transformation in how representationalism is understood. The representationalist approach, as it pertains to cognition, is succinctly defined by Evan Thompson: “In a broad and theoretically neutral sense, a mental representation is supposed to be a mental structure (concept, thought, image) with semantic properties (content, truth conditions, reference), or a state or process involving such a structure. Usually, a mental representation is that by which one cognizes or is aware of something in the world” (*Mind in Life* 25). In other words, we humans purportedly have in our minds a set of structures that allow us to determine particular things *as* particular things. Our brains are, at least in part, vast libraries of categorized and cross-referenced ideal objects. Theories of meaning that conform closely to this definition identify the veracity of a subject's knowledge by the accuracy of their mental representations. This model has been criticized for a variety of reasons. Most critics of representationalism seek to expand meaning beyond the narrow path that traffics between things out in the world and the images and words that represent them. Thompson's enactive approach to cognitive science combines phenomenological analysis with autopoietic systems theory in order to expand our understanding of cognition. Thompson points out that, in a

phenomenological frame, “intentional experiences are conceptualized not as *states having content* but as *acts having directedness*” (*Mind in Life* 25). Self-organizing, autonomous dynamic systems, which Thompson cites as the key concept for the enactive approach, blur the boundaries between the external environment and the internal representations of the subject: “Such systems bring forth or enact meaning in continuous reciprocal interaction with their environments. “Inner” and “outer” are not preexisting separate spheres, but mutually specifying domains enacted or brought forth by the structural coupling of the system and its environment” (*Mind in Life* 26). In these examples, the representationalist preoccupation with identification is subordinated to some sort of action, an action that complicates the separability of organism and environment. For Thompson and other enactive cognitive scientists, meaning is not represented by a subject removed from their environment. Meaning is not something a subject possesses, but something a subject does.

Barad and Wolfe offer substantial critical posthumanist critiques of representationalism. Barad argues that representationalism insists on a divide between a representing mind and an outside world awaiting representation. Knowledge becomes a matter of having accurate representations. For Barad, meaning-making is not a matter of accurately reflecting an outside world, but of acting to reshape it. Wolfe attacks representationalism for its role in facilitating distinctions between cognition and meta-cognition that ground an inaccurate and ethically problematic human/nonhuman dualism. Because of the dualism they identify with it, both critical posthumanist thinkers describe representationalism as Cartesian.

Barad critiques representationalism as a crucial part of her call for a return to materiality, a materiality she sees as having been lost in the preoccupation with language in contemporary social theory. Representationalism, for Barad, instills a dualism between reality and appearance. Within this frame, the veracity of scientific, juridical, aesthetic, and philosophical knowledge is grounded in the accuracy with which a representation can mediate between the world and the knower. She cites science

studies scholar Joseph Rouse's claim that debates between scientific realists and social constructivists are carried out on the basis of the same assumptions about representation. They merely argue about whether scientific representations owe more to nature or culture. Her alternative to representationalism, posthuman performativity, culminates in a desire for a notion of meaning that brings the knower back into contact with their body, their environment, and their fellow beings:

The move toward performative alternatives to representationalism shifts the focus from questions of correspondence between descriptions and reality (e.g., do they mirror nature or culture?) to matters of practices/doings/actions. I would argue that these approaches also bring to the forefront important questions of ontology, materiality, and agency, while social constructivist approaches get caught up in the geometrical optics of reflection where, much like the infinite play of images between two facing mirrors, the epistemological gets bounced back and forth, but nothing more is seen. ("Posthumanist Performativity" 802-803)

Wolfe builds his critical account of representationalism by placing the computationalist form of cognitive science represented by Daniel Dennett into sharp contrast with the deconstructionist approach to cognition. Wolfe points out that Dennett is often understood as holding a post-representational, post-Cartesian, functionalist and materialist view of cognition. Wolfe argues that Dennett in fact retains a form of Cartesian dualism that has serious negative consequences for human understanding of and treatment of nonhumans. In Wolfe's reading, Dennett establishes the ontologically unique status of the human by bringing back the disembodied Cartesian subject via a representationalist concept of language. It is not that Wolfe denies the power or uniqueness of human language. The problem is that Dennett claims that subjectivity and other related concepts emerge via the recursive ability to have thoughts about thoughts.⁹ Nonhumans, Dennett claims, have know-how but not represented knowledge.

⁹ The idea that subjectivity, selfhood and other forms of self-possession arise due to the recursive power of language to enable thoughts about thoughts is a common assumption, not an idea unique to Dennett. Wolfe includes in his critique a number of others who are important in later chapters, such as Maturana and Varela for autopoiesis and Deacon for biosemiotics. I discuss these theorists and the problems that arise from their views on human language in detail in the following chapters.

This becomes clear in his distinction between first- and second-order intentional systems, for example: “A first-order intentional system has beliefs and desires about many things, but *not* about beliefs and desires. A second-order intentional system has beliefs and desires about beliefs and desires, its own or those of others” (Dennett 121). The move from first-order to second-order intentional systems is described by Dennett as an integral step toward becoming a person. He moves on to cite a variety of examples of nonhuman behavior that he describes as clever but unthinking (121-124). Nonhuman behavior is unthinking, he argues, because it is unreflective.

Wolfe, like Barad, argues that the question of whether human and/or nonhuman cognition is representational is at once an ethical, epistemological and ontological question of fundamental significance. He attacks Dennett for presenting a view of cognition that remains Cartesian in that it claims that nonhuman animals can react but not respond to stimuli that affect them. The ability to respond requires the ability to form concepts and to think about those concepts. A dog, Dennett claims (cited in *What is Posthumanism?* 40), can have a concept of a cat that is very close to a human concept of a cat. What it cannot do is consider that concept. That is to say, no language-less being can think about something like a cat in general. In order to generalize from particular experiences, a living being must have a way of moving from the immediate present to the abstract. Wolfe points out that the ability to think the “in general” is not necessarily dependent on having a human-like linguistic ability. There is evidence that such an ability may have evolved for reasons other than communication and that it is not one complex relationship linking consciousness, language and representation.¹⁰ Wolfe also appeals to Derrida's critique of Lacan, arguing that Dennett falls into the same set of problems as philosophers from Descartes to Heidegger to Lacan in trying to distinguish cognition from meta-cognition. The

¹⁰ Wolfe cites Haraway (*When Species Meet* 234-236). Interestingly, Haraway herself cites a recent article by prominent linguists and ethologists which argues that any claim to the radical uniqueness of human language should no longer be assumed but must be made in the form of a testable hypothesis. The most famous author of this article is none other than Noam Chomsky (Hauser; Chomsky; Fitch 2002). Haraway argues that these and other recent studies show “No single axis of difference, and no single postulate of continuity, does justice to the motley of communicating critters, including people and dogs” (*When Species Meet* 236).

difference between thinking and knowing that you are thinking becomes the basis for a natural, hierarchical, ontological distinction for Dennett, and this leads him to make further ontological distinctions. Humans can suffer, for example, while nonhumans can only ever feel pain: “The problem is that Dennett's ontological distinction between pain and suffering is based on a set of phantom abilities, anchored by but not limited to language and its imagined representational capacities in relation to the world of things, that no subject, either nonhuman or human, possesses in fact” (*What is Posthumanism?* 46). Dennett pursues a line of reasoning very similar to Lacan, whom Derrida describes as Cartesian. In the following quote, Derrida outlines how modern humanism, informed by Cartesian thought, separates the rational, autonomous—in other words, responsive—human from the animal who is limited to mechanistic reaction, and how pushing back against this legacy by expanding the autonomy reserved for the human is not guaranteed to net positive results for nonhumans:

Now, when it comes to the relation to “the Animal,” this Cartesian legacy determines all of modernity. The Cartesian theory assumes, for animal language, a system of signs without response: *reactions* but no *response*. Kant, Levinas, Lacan, Heidegger (much like the cognitivists) hold a position in this regard almost identical to Descartes's. They distinguish *reaction* from *response*, with everything that depends on this distinction, which is almost limitless. With regard to the essential and to what counts on a practical level, this legacy, whatever the differences may be, governs modern thought concerning the relation of humans to animals. The modern concept of right depends massively on this Cartesian moment of the *cogito*, of subjectivity, freedom, sovereignty, etc. Descartes's “text” is of course not the cause of this large structure, but it “represents” it in a powerful systematicity of the symptom. Consequently, to confer or to recognize rights for “animals” is a surreptitious or implicit way of confirming a certain interpretation of the human subject, which itself will have been the very lever of the worst violence carried out against nonhuman living beings. (Derrida and

Roudinesco 65)

As Derrida argues, the Cartesian subject is defined in terms of autonomy and sovereignty, enabled by the mediating force of human representational thought. For this reason, expanding a form of representationalist cognition beyond the human does little to challenge human exceptionalism. To respond purportedly requires a unique ability to represent the “in-general,” which requires language to enable one to consider their own concepts. Human/nonhuman difference is cast as “the difference between communication and metacommunication, signifying and signifying *about* signifying, thinking and *knowing* that you're thinking, and so on” (*What is Posthumanism?* 42). Wolfe's larger critical point is that representationalist formulations such as Dennett's end up conceptualizing nonhuman cognition as diminished, unfinished, parochial forms of human cognition:

And just as different forms of being human in the world are re-written, as they are here, in terms of a homogeneous Cartesian ideal, so nonhuman beings, in all their diversity, are now rendered not as complete forms of life that are radically irreducible to such a thin, idealized account of what counts as subjectivity but rather as diminished or crippled versions of that fantasy figure called the human—the Cartesian *cogito* now rewritten as the user-illusion qua enduring subject. (*What is Posthumanism?* 45)

The human/language/representation nexus critiqued by Wolfe and Barad instills a rigid and false distinction between human and nonhuman, and it gives a false or at least incomplete view of both human and nonhuman varieties of cognition and communication. Wolfe and Barad advocate for an understanding of meaning that can make human and nonhuman cognition and communication comparable while recognizing and appreciating radically different ways of being in the world. How critical posthumanist thought might flesh out this understanding of meaning is the subject of the remaining chapters. The critical interventions made by Barad and Wolfe already suggest opportunities for dialogue with cognitive ethology. This will be the focus of the chapter conclusion.

Conclusion: Cognitive Ethology and Critical Posthumanism

How might critical posthumanist theory contribute to and in some cases challenge the conceptual frameworks currently in use by cognitive ethologists? Putting humanist assumptions into question is not enough. The theoretical and empirical choices made by cognitive ethologists must be understood, not only at the level of theory, but for what kinds of experiments, observations and interventions they make possible. The conclusion offers just a few potential sites from which such a comprehensive project might proceed.

Allen and Bekoff argue for an interdisciplinary approach to a naturalistic theory of mind. They point out that in many cases, philosophers do not adequately understand constraints that limit what kinds of fieldwork can be carried out, while scientists do not always understand philosophical theories of mind in sufficient detail. This is largely in accord with what Toadvine and Wolfe have to say about disciplines and cross-disciplinary interaction. From the perspective of the scientists, theories and empirical investigation must work together cohesively:

Potentially, philosophers have as much to learn from ethologists as vice versa. Philosophical theories of mind, insofar as they are empirically tractable, can provide suggestions for empirical investigation. In return, ethological research into cognition provides data points for the refinement of philosophical theories—for example, with respect to the importance or unimportance of language for mentality. (*Species* 13-14)

At the same time, what counts as empirically tractable is, in each case, a complex and multidimensional problem. As Allen and Bekoff point out, researchers have uncovered a variety of surprising and substantial differences in how human presence can affect the behavior of different species (*Species* 168). The presence of a human researcher, in field studies as much as in the lab, cannot be taken for granted as neutral or innocuous. Not only does human presence influence different species in different ways, but individuals of the same species may react with widely varying levels of stress to humans.

Moreover, as Frans de Waal points out with reference to his own research experience, researchers themselves may instill widely varying degrees of stress or comfort in their subjects, depending on their familiarity, experience, or body language (de Waal 129).

Allen and Bekoff also question whether there could ever be a simple, universal set of criteria for determining mentalistic dimensions of behavior (*Species* 166-167). There is no reason to suspect that the diversity of forms of life adhere to a single, linear scale of intelligence, for example (*Species* 180). An empirically tractable experiment that provides evidence for intelligence in one species, therefore, may prove inappropriate for another. Despite these difficulties in making minds empirically tractable, Allen and Bekoff argue that cognitive explanations are necessary, legitimate and ultimately more parsimonious than mechanistic accounts. They can increase explanatory power in many instances, they can generate new ideas that can be tested empirically, they can help evaluate existing explanations, help develop new predictive models, and lead to the reconsideration of old data (*Species* 138). Yet, they note that when it comes to cognition, focusing too much on the wrong question can often lead nowhere. Allen and Bekoff illustrate this concern with reference to the concept of consciousness. Parachuting a concept of consciousness into an explanatory account that already has a plausible mechanistic explanation, for example, can frame the account in a way that makes consciousness itself seem like an epiphenomenon. Cognitive ethologists hope to circumvent this fate by making mental phenomena like consciousness inextricable from rigorous accounts of nonhuman experience. They do this by showing not what something like consciousness is, but what it *does*. They look for behavioral evidence that warrants the attribution of conscious experience (*Species* 147). Allen and Bekoff attempt to drive a wedge between questions of the attribution of consciousness and questions about its subjective character or quality. This allows them to focus more closely on what role conscious experience might play in evolutionary theory. Evolutionary theory predicts that consciousness must have functions that affect evolutionary fitness (*Species* 140). Pointing to examples in which

consciousness is part of the best possible evolutionary explanation, while still difficult, is much easier and requires far less convincing if the argument can bracket the further, monumental task of trying to explain 'what it is like' for any particular organism. However, ethologists sometimes elide meaningful experience when they link function directly to evolutionary history (Balcombe 8). Such a wedge might lead to much more conservative accounts of nonhuman experience than would otherwise be produced. A critical posthumanist approach to meaning would draw these distinctions differently. This functionalist approach to consciousness, for example, would itself have to be refined within a process-oriented framework.

Instead of grounding consciousness in a narrow interpretation of language ability, cognitive ethologists expand the frame to include behavioral flexibility and the integration of information from multi-sensory sources. Behavioral flexibility can be linked to the ability of an organism to monitor its own performance. The integration of information from multi-sensory sources involves the separation of one stream of sensory information from the rest. Self-monitoring and autonomy from immediate stimuli are distinguished from language ability by Allen and Bekoff. Observation in the field and clever experimental apparatuses can provide evidence for these abilities in organisms who are considered to lack consciousness in a strict Cartesian frame. These two ways of expanding possible forms of evidence for consciousness are convincing because they are inclusive of many more species than strictly language-based approaches, they offer pathways for empirical experiment, they avoid the assumption that there is a single, linear test of consciousness, and they make no comprehensive claims about consciousness that would disqualify the innovation of new criteria in the future. However, the abilities they test for are still intimately bound up with a notion of consciousness indebted to the traditional image of the human outlined in the first section of the chapter. Self-monitoring and sensory integration, as they are described by Allen and Bekoff, are grounded in the ability of an organism to distinguish reality (their own representations of their experience) from appearance (what their senses

convey, which is often misleading). This ability depends on a narrow view of consciousness as the manipulation of mental representations as a way of gaining autonomy from sensory input.

One theme Allen and Bekoff cite for the investigation of consciousness is that of pain. They accept a distinction between conscious pain and physiological reaction to noxious stimuli in order to sharpen their distinction between functional and gratuitous attributions of consciousness: “If conscious pain does have functions, we suggest they include the ability of an organism to use the sensation as a fallible indicator of the urgency of responding in a way that will terminate the pain, rather than as an infallible indicator of the need for a response” (*Species* 151). Pain, in this scenario, is about getting one's priorities straight, and they suggest that this ability can be tested empirically. Pain differs from the noxious stimulus that causes it because it introduces a scale of urgency: the greater the pain, the more immediately it will be addressed. Pain gives the organism information, but it leaves room for the response to that information to be delayed. If an organism can be shown in an experiment to demonstrate the ability to act with a degree of independence from the immediate sensory information presented to them, this suggests that there is a level of autonomy in the organism that could be explained by the attribution of a conscious state. However, the distinction between pain and noxious stimuli needs to be examined in light of Wolfe's criticism of Dennett above. Dennett distinguishes pain from truly human suffering as a way of distinguishing human from nonhuman experience. Allen and Bekoff are not saying this; they are discussing the difference between bodily response to stimuli and the conscious experience of pain in a nonhuman animal. However, the view of consciousness they rely on, in which it acts primarily to place sensation at a distance, risks reintroducing a representationalist logic at the emergence of consciousness that relocates Cartesian dualism rather than displacing it.

Allen and Bekoff point out that vigilance and social play occupy a central place in their text because they are good examples to use when working through intentionality and representation (*Species* xiii). Intentionality and representation are historically important in part due to their contrast

with behaviorist stimulus/response frameworks. However, this opposition itself is not a radical enough challenge to Cartesian assumptions. The authors link the concept of intentionality to mental representations (*Species* 14). They say that intentionality means that mental representations are directed toward or about something. However, intentionality need not be tied to mental representations. Intentional behavior can be “about” something like a set of future possibilities without having to be mediated through static objects. This is what Evan Thompson, drawing on the phenomenological tradition, is quoted above as asserting. Thicker, more dynamic notions of intentionality become possible once it is dis-articulated from mental representations.

Allen and Bekoff follow the practice of grounding beliefs and desires in mental content. Any belief or desire is described as an internal state bearing content. Theorists work to construct descriptions of the content of the state, even though that content might be represented in a much different way by the animal under investigation (*Species* 68). Content-bearing internal states are important because they link behaviors to evolutionary functions. Functional explanations therefore seem dependent on a model of cognition that posits mental representations. But, are they dependent on representations because of something unique to representations/mental content, or because representationalism is the only current alternative to mechanistic stimulus/response models? Do vervet monkeys classify predators by their appearance or by their actions? Allen and Bekoff point out that, when looking at the kinds of mistakes infant vervets make, it might make more sense to think of the classification scheme as based on what the predator does rather than what it looks like (*Species* 121). Can alternatives to representation be articulated by focusing on the sequential character of behavioral patterns? Classifying predators according to what they are doing, rather than what they look like, implies a temporal relation to self and to the group as a whole at work in behavioral patterns that do not foreground the mediating role of representations.

Allen and Bekoff also make use of a scale of behaviors from stimulus-bound to stimulus-free.

Stimulus-free behaviors are those which cannot be attributed clearly to an outside stimulus. Internal processes can motivate behavior, and they are described as stimulus-free as well. Behaviorism is very invested in denying stimulus-free behavior, so it becomes a point of contention with cognitive ethology. One reason why this inside/outside dichotomy needs critical analysis is that there may not even be any such distinction. The notion that most behaviors are stimulus-bound, and that there may be ways of identifying behaviors in nonhumans that are stimulus-free, extends the line of reasoning that Griffin critiques in Chomsky. For Chomsky, echoing Descartes, human language is stimulus-free, and this ability to gain autonomy from the forces of the environment enables true consciousness to emerge. Looking for stimulus-free behaviors in nonhumans assumes that stimulus-free behavior is easy to identify in humans. Critical posthumanism disrupts these assumptions. In second-order systems theory as Wolfe describes it, for instance, inside and outside are determinations made by the organism as a system, and they are always made by the organism itself, whether the stimulus is coming from within or without (*What is Posthumanism?* 14-15; 113). There is no actual moment in time prior to the reception of a stimulus that can ever really be described as neutral or unmotivated. Organisms are already doing things when a stimulus registers, which suggests that they respond to it in that wider context. The scale from stimulus-bound to stimulus-free, from this point of view, harbours a radically passive view of nonhuman life inherited from Cartesian dualism.

The critical posthumanist perspective sketched here remains largely speculative and exploratory in the absence of workable solutions to the empirical problems it introduces. Yet there are convincing reasons to take seriously its potential applications for empirical work. The question of how to frame an experimental or observational situation should be revisited in light of critical posthumanist work on materiality, agency and intersubjectivity. Language must be more firmly displaced as the ground of meaning and situated among a wide variety of cognitive and communicative processes. Positing self-monitoring and integration of multi-sensory information alongside language as indicators of

consciousness are important interventions by cognitive ethologists. However, a theory of meaning that successfully challenges the residual Cartesianism inherent in the representationalism still in use here would open up a much wider conceptual space for thinking cognition differently. Cognition must be thought in terms of process rather than as a subject encountering and representing objects.

The study of nonhuman animal experience is inextricable from the treatment of nonhuman animals, although it is only one element in this much larger assemblage. The language of discursive formations was introduced above as one way of thinking this wider context. Cognitive ethologists are leading the charge of making these connections explicit:

The way we answer such questions and apply the findings may tell us much about ourselves as a species as well as having serious consequences for the other inhabitants of this planet. Thus, the way in which the research issues addressed in this volume are eventually resolved (or not resolved) has enormous political implications at many levels. This is probably something most of those working on cognitive aspects of animal behavior are aware of at some level, but typically do not address in their formal writings. (Allen, Bekoff, Burghardt xii)

Cognitive ethology shares many of the aims of critical posthumanism. Both offer a view of the study of nonhuman animal experience as an interdisciplinary enterprise that draws on a wide range of sources to observe, interpret and theorize meaningful experience. Perhaps the most useful aspect of critical posthumanism for cognitive ethology is the way it places human meaning-making practices more fully into question. Assumptions about human language and representational thought must be challenged as part of cognitive ethology's confrontation with the Cartesian legacy that continues to shape scientific practice. The following chapters explore these themes via close readings of key foundational figures for critical posthumanism.

Chapter 2: *Umwelt* and Autopoiesis: Self-Reference, Intersubjectivity and the Biological Sciences

The sun only shines on me from my sky...
—A Foray 198

Introduction

This chapter examines two ways of theorizing meaning in living systems that arise from research and experimentation within the biological sciences at different points in the 20th century. Jakob von Uexküll's notion of the *Umwelt* emphasizes how organisms experience only very particular elements of the world surrounding them, in accordance with their physiological structure and individual life history. For Humberto Maturana and Francisco Varela, organisms construct an environment as part of a self-maintenance process which consists in producing the elements of their own physiological structures. This process is termed autopoiesis. Both *Umwelt* and autopoiesis imply a kind of openness or access to the outside world that is only achieved by first closing off or excluding it; access to an outside world comes only by way of a recursive relationship to the self.

In the first half of the chapter, I discuss the influential writings of Uexküll, which offer an account of meaningful experience that anticipates many of the tenets of contemporary theories of self-organizing living systems (Sagan, “Umwelt after Uexküll” 4). Uexküll's *Umwelt* concept is challenging in part because it applies to the human as well as the nonhuman. The logic of openness within limits, when applied to the human, situates the human observer fully within the complex dynamic organism/environment relations being described. Where Uexküll runs into the most difficulties is when he invokes an unknowable plan of nature to explain the intricate relations of meaning that characterize life. Uexküll never fully accepts Darwinian evolutionary theory, which leaves him unable to situate the intricately entangled lives of living beings within an emergent evolutionary history. In the second half of the chapter I turn to Maturana and Varela who, writing several decades after Uexküll, are in a much better position to place a view of life as dynamic, recursive, self-referential, lateral relations firmly

within evolutionary history. Maturana and Varela also insist on implicating the human observer within the same autopoietic logic as the organisms they study. Doing so opens up a much broader basis for comparing human and nonhuman forms of meaning-making than a representationalist framework. I argue below that Maturana and Varela ultimately place too much emphasis on human language and subjectivity, undermining the potential autopoiesis holds for rethinking questions of meaning.¹¹ It is Uexküll who offers more resources for thinking differences among organisms in terms of how they live lives that are meaningful for them. Both *Umwelt* theory and autopoiesis offer crucial insight into how general meaning-making processes operate without relying on a subject representing external objects.

Uexküll as well as Maturana and Varela offer popular accounts of their ideas (*A Foray; Tree*) and seek a wide audience beyond their disciplinary homes. These literary accounts extend discussions of theoretical biology far beyond its disciplinary borders. One of Uexküll's goals in disseminating his ideas in this form is to garner popular support for an approach to biology that takes nonhuman meaningful experience seriously (Brentari 135). Uexküll also felt that the mechanistic and deterministic views he was arguing against were not only wrong for biology, but were in fact a morally corrupting influence on society, largely because he thought they led to a view of human life as contingent and meaningless.¹² For Maturana and Varela, their account of autopoiesis for a broad audience also has a strong claim to ethical implications which they attempt to make explicit. Situating the human observer within the autopoietic processes they describe makes it impossible to separate the knowledge one claims of the living world from one's actions within it: "It compels us to realize that the world everyone sees is not *the* world but *a* world which we bring forth with others. It compels us to see that the world will be different only if we live differently" (*Tree* 245). My readings of autopoiesis and *Umwelt* theory

¹¹ I focus on the co-authored works of Maturana and Varela because these texts are widely discussed within and beyond critical posthumanism. The later works of Varela, Evan Thompson and others take some of the key concepts of autopoiesis in new directions, but a detailed analysis of that literature is beyond the scope of this chapter.

¹² Uexküll was a public intellectual and often wrote in newspapers and other media on a broad range of topics. See Harrington for a discussion of Uexküll's often highly problematic attempts to apply his biological concepts to the political realm. Esposito places his 1920 essay *Staatsbiologie* in the context of 20th century biopolitical theory.

through the lens of critical posthumanism draw out the ethical implications of these theories somewhat differently. *Umwelt* theory and autopoiesis, I argue, offer support for building an understanding of valuing as a form of meaning-making. I argue that situating both human and nonhuman forms of meaning-making within recursive, self-referential processes helps to illustrate how ontological, epistemological and ethical questions are bound up together. Questions of representation are subordinated to questions of acting within specific experiential contexts, which situates epistemological questions within a much broader series of relations that I term value practices. I further contextualize these approaches with regard to critical posthumanism in the following section before moving on to discuss them directly.

Critical Posthumanism, Modern Biology and Meaning

Wolfe mentions Uexküll briefly in a dense and theoretically rich discussion of what it means to communicate, respond, and live together in shared multispecies environments (*Before the Law* 70). He credits Uexküll (via Noë) with the insight that there is no common environment within which all living beings operate and interact. Rather, an environment, as it exists for a particular organism, depends on that individual's physiological structure and what that structure makes meaningful for them. Instead of one common environment, there are myriad 'worlds' in partial overlap and partial isolation. These partially overlapping worlds are called *Umwelten* by Uexküll and autopoietic unities by Maturana and Varela. Such visions of life work through a complex dynamic of overlap and isolation, structure and change, stability and volatility. Members of the same species, because they are structurally very similar, have a lot in common in terms of the kinds of environmental features afforded them. At the same time, individual life experience, culture and tradition, and intra-species biological differences mean that environments proliferate and differentiate even among genetically similar groups such as families. Moreover, the same individual often undergoes such radical changes over the span of a lifetime that the relationship between organism and environment is better described in terms of

dynamic process than ontological identity. Envisioning the organism/environment relationship as a source of endlessly proliferating differences creates serious problems for the notion of a single, bounded and holistic organism. Is there such a thing as a discrete, unified individual? What are the forms of stability and crucial points of overlap among living beings that allow for reproduction, communication, shared life, and many other forms of entanglement? Symbiosis and hybridity seem to characterize life just as much as difference and opacity. *Umwelten* and autopoietic unities are two strategies for making sense of this dynamic of overlap and separation. One entry point into this dynamic can be made by paying attention to an organism's relation to itself.

One of the great benefits of second-order systems theories, writes Wolfe (*What is Posthumanism?* xxii), is that they place recursive, embodied, evolutionary and ontogenic processes at the forefront of the critique of humanism. Meaning does not arise only from human language. Rather, human language itself arises “...from fundamentally ahuman evolutionary processes of third-order structural couplings and recursive co-ontogenies linked in complex forms of social behavior and communication among so-called higher animals, which have themselves emerged from specific forms of embodiment and neurophysiological organization” (*What is Posthumanism?* xxii). For Maturana and Varela, for instance, autopoietic self-maintenance, linguistic domains, and human language constitute three distinct but interrelated conceptual strata. What attracts Wolfe to this conceptual scheme is that it resists reductionist logic: “None of these levels is reducible to the others; each has its own dynamics, its own evolutionary history, its own constraints and protocols” (*What is Posthumanism?* Xxiii). Distinguishing these processes prevents their reduction to a single domain and opens up more complex ways of connecting them. Language, for example, cannot be explained without recourse to the interaction of bodies as a generative structure, but it cannot be reduced to these bodies either. Without downplaying its radical uniqueness, human language becomes a contingent outgrowth of a more widespread process—the communicative social behavior which gives rise to linguistic domains—which is

itself a contingent outgrowth of autopoietic self-maintenance. Wolfe argues that this perspective, and especially the manner in which it conceptualizes meaning as not limited to or arising from consciousness, reason and reflection, allows for richer descriptions of the human:

It forces us to rethink our taken-for-granted modes of human experience, including the normal perceptual modes and affective states of *Homo sapiens* itself, by recontextualizing them in terms of the entire sensorium of other living beings and their own autopoietic ways of “bringing forth a world”—ways that are, since we ourselves are human *animals*, part of the evolutionary history and behavioral and psychological repertoire of the human itself. (*What is Posthumanism?* xxv)

While I agree with Wolfe that these conceptual domains refer to entangled yet distinct processes, in my reading Maturana and Varela do not adequately account for the middle domain. That is, they do not explain how meaning achieves a degree of separability from autopoietic self-maintenance that would enable descriptions of nonhuman meaningful experience. This is crucial, since it is this level which describes the “entire sensorium of other living beings” within which the human needs to be contextualized. Uexküll, I argue, offers help in this task.

Many of the key points raised by contemporary cognitive ethologists echo arguments put forth by Uexküll nearly a century ago, when he argued forcefully against Cartesianism in biology. His theory of *Umwelten* is meant to counter the tendency to place organisms within a Cartesian spatial grid, a single world perceived the same way by all. He saw this tendency as an anthropocentric residue caused by inappropriately applying models from physics to biology (Uexküll, “An Introduction” 109). Humans under the influence of Cartesian thought dis-articulate space from their bodies. Rather than space being something that is experienced dynamically and bodily, Cartesian thought proposes (in fact, it imposes) an impersonal space, stretching out in all directions and decentered from an experiencing subject. Objects in Cartesian space are to be comprehended strictly in terms of their extension, and all other

qualities, now deemed secondary, are treated with suspicion due to their association with unreliable sensory experience. Uexküll argues that mechanistic accounts of behavior should be replaced by laws analogous to those governing melody, harmony and counterpoint in music. Each organism has its own species-specific world, its *Umwelt*, but most organisms also originate in a duet and are imbricated in complex relationships with an environment and with other organisms throughout their lives. As much as the concept of *Umwelt* implies enclosure of an organism in its own meaningful world, it also implies that those worlds consist of meaningful relationships.

Uexküll was influenced by Karl Ernst von Baer, who advocated a teleological view of development that conflicted with Darwin's theory of natural selection (Buchanan, *Onto-Ethologies* 9-10). Uexküll was not satisfied with Darwin's theory, calling it a contradictory mix of mechanistic determinism and pure, ungoverned chaos. It should be noted that Darwin's evolutionary theory was not widely accepted until it was supplemented with the work in genetics pioneered by Mendel and reworked as Neo-Darwinism, a process that was not completed until near the end of Uexküll's life. In fact, as Carlo Brentari points out, Uexküll did show some acquiescence to evolutionary thought later in his life, abandoning his belief in the fixity of species, although he remained largely in opposition to what he understood to be its main tenets, insisting that species variation must be purposive or directed in some manner (Brentari 165). Uexküll's interpretation of Darwinian evolution in terms of extreme mechanism made it seem absurdly implausible to him. How can a spider, for example, just happen to randomly evolve to be able to build a web that can catch flies? Brett Buchanan describes the idea of conformity with plan favored by Uexküll as an attempt to find a middle path between an ordered view of nature dictated strictly by natural laws and a Darwinism that sees change in nature as the product of random variation (*Onto-Ethologies* 19). Uexküll also rejects a particular kind of teleology that would anthropomorphize nature and attribute to it goals that only humans would decode and benefit from. Nature, for Uexküll, conforms to a plan, but the purposes and ultimate design of this plan are unknown

and perhaps unknowable to humans.

Despite his misgivings regarding the aimlessness of natural selection, Uexküll's real target in his writings is the tendency in biology to veer toward mechanistic accounts of life. Organisms are fundamentally different from machines, Uexküll asserts, for two reasons. Organisms develop from inside out, or centrifugally, according to an innate schema, and are not shaped centripetally by outside forces. Organisms follow their own laws, which can be highly restrictive but which nevertheless are not imposed deterministically from without. The other, related difference between organisms and machines is that organisms are autonomous unities at each stage in their development. Buchanan explains that this opposition to mechanism allows Uexküll to draw a boundary separating biology from (classical) chemistry and physics. Biology, for Uexküll, must avoid sublating biological phenomena too quickly into the laws of physics and chemistry, because a variety of organizational forces, from the sub-organismic level to interspecies relationships, do not conform to linear causality. The metaphor of the melody, discussed below, illustrates this claim.

Uexküll argues that both chemistry and physics conduct their investigations by stripping objects of any significance or meaning which they might have for an observer. Physics deals purely with the properties of masses, while chemistry is concerned with the behavior of substances. This way of describing phenomena is fine for physics and chemistry, Uexküll argues, but it is absolutely wrong for biology because it excludes from the beginning the entire perceptual side of life, which should constitute virtually the whole of biology's subject matter: "The consequence of this was that scientists began to deal with the world in the way a deaf person deals with a street organ. The turning of the roller, the vibration of the tongues and the aerial waves, these things he can establish—but the tune stays hidden from him" ("The New Concept" 114). Uexküll wants to shift the inquiry into life away from a perspective that emphasizes outside forces acting on matter to elicit a reaction. For him, biology should be the science which asks how an organism perceives and responds to the world as it exists for them:

“Every animal is surrounded with different things, the dog is surrounded by dog things and the dragonfly is surrounded by dragonfly things” (“The New Concept” 117).

Uexküll’s desire to establish biology as the study of the world as it is subjectively experienced as meaningful has deep roots in German philosophy. Uexküll was heavily influenced by Immanuel Kant. Part of his project consists in extending to all animals many of Kant’s insights regarding the form and limits of human reason and perception. Uexküll writes in *Theoretical Biology*, for example: “The task of biology consists in expanding in two directions the results of Kant's investigations:—(1) by considering the part played by our body, and especially by our sense-organs and central nervous system, and (2) by studying the relations of other subjects (animals) to objects” (xv). For Uexküll, following Kant, our sense organs do not simply reveal an objective world to us. Instead, our own and every other organism’s access to reality is mediated by particular perceptual apparatuses. Uexküll follows Kant in shifting the focus of inquiry from the nature of the world itself to the structures and categories through which a subject may understand the world. For Uexküll, as for Kant, we simply do not have access to things-in-themselves.

Uexküll even goes so far as to argue that objects have no autonomous existence in themselves. An object is always something different for each experiencing subject. We create artifacts such as maps that seem to treat objects as objective things-in-themselves, but what we are really doing is combining a series of symbols that bring the *Umwelten* of those who have learned to decode those symbols into sync. As a result of this belief, Uexküll must maintain that the perceptual worlds of other animals are also ultimately inaccessible to humans, at least to a degree. Uexküll makes such assertions repeatedly. Human beings experience the world from a species-specific perspective, and can only access other beings and other objects in the world from this perspective, which places a priori limits on our knowledge of nature. Even the human has an *Umwelt*. This view raises the problem of solipsism and is

a point of contention with regard to how Uexküll should be interpreted.¹³

For Uexküll, the function of an object is much more important than its material form; we don't understand what a bell is unless we understand that it is for ringing; we don't understand what a ladder is unless we know it is for climbing. The bell is a ringing thing, but only once it is understood via the perceptual cues of the human observer. If we were to reduce the bell to a combination of mass and movement of sound waves, it becomes a set of quantities available for calculation, but we no longer have an understanding of the purpose or meaning of the bell. This purposiveness is hidden by modern science: "The influence of masses on each other became the domain of pure physics cleansed of all subjective impurities, and the science of the influence of substances on each other became the realm of chemistry" ("The New Concept" 113). Uexküll claims that science was not always dismissive of the perceptual side of things. He dates the shift toward the elimination of the perceptual cues of an observer to the time between Kepler and Newton. Kepler sought to understand the design of the perfect celestial spheres. He wanted to know more about God's plan. Instead, he showed that the planets do not move in perfect circles and paved the way for Newton, who elaborated the laws of gravity. Whereas Kepler looked for design, Newton looked only for material cause. God was no longer actively dictating how the universe would work; searching for a plan became meaningless. With Darwin, Uexküll argues, the perceptual side has been mostly eliminated from view and even the human becomes a contingent thing. It is against this interpretation of modern science that Uexküll works to bring meaning back into life.

Uexküll is critical of contemporaries like Jacques Loeb and his explanatory framework, which relies on tropisms (elementary movements made by organisms upon receiving a stimulus, like a plant leaning toward the sun), and he is particularly bothered by the American behaviorists. He argues that these authors contribute to a biology characterized by more and more expensive and elaborate experimental apparatuses and less and less thinking. For Uexküll, behaviorists assume that an organism

¹³ I will return to the problem of the human *Umwelt* below.

can freely enter into a relation with any object that is physically present, an assumption that informs their laboratory experiments. Uexküll argues that biology needs to account for such subject-object relations in specific contexts, in terms of the physiological capacities of the experiencing organism, and, in many cases, with reference to that subject's past experience and future needs. At the heart of this reformulation is the concept of the *Umwelt*.

Umwelten

Uexküll is most famous for his concept of the *Umwelt*. In one sense, an *Umwelt* is akin to a space or stage on which a life is played out (*A Foray* 144). It is built up by the sense organs, which determine how wide or narrow the space becomes. Uexküll describes the *Umwelt* of an organism as being like a soap bubble that perpetually surrounds it. The soap bubble has a double significance, as Buchanan explains (*Onto-Ethologies* 23). On one hand, it delimits the boundaries of a given organism's *Umwelt*; it constitutes the world as that organism perceives and lives it. On the other hand, it represents a boundary for the observer; it is a reminder that an organism's perceptual world is never entirely available for inspection.

Uexküll defines behavior as a combination of perception (*Merken*) and action (*Wirken*) that can only be comprehended by understanding the role of meaning in living systems as what ties perception and action together. Uexküll argues that perception and action are connected in a kind of feedback loop called the functional cycle: "In every functional cycle, the same perception-effect process is repeated. Indeed, one can speak of functional cycles as meaning cycles whose task is determined to be the utilization of carriers of meaning" (*A Foray* 150). As an organism gains experience in their *Umwelt*, the resources they are able to bring to new experiences are affected accordingly: "Since every action begins with the production of a perception mark and ends with the impression of an effect mark on the same carrier of meaning, one can speak of a functional cycle, which connects the carrier of meaning with the subject" (*A Foray* 145).

The *Umwelt* conveys the idea that the world as experienced from the point of view of the organism depends overwhelmingly on that organism's physiology and what that physiology allows for. Every species gathers, unifies, and projects stimuli in their own species-specific ways. This process engenders a wide variety of *Umwelten*, ranging from a single functional cycle processing only one stimulus to a multitude of interweaving functional cycles. At the basis of the *Umwelt* concept is the conviction that an organism is fundamentally incomparable to a machine. A stimulus does not dictate an organism's behavior in most cases. Stimuli must be noticed, they are often sought out, and the organism must respond to or interpret them in some way. Precisely what it means to notice or interpret a stimulus varies from organism to organism, and in many cases how a stimulus is received depends on what other activities the organism is engaged in. The organism/environment relationship is more sophisticated and deserves richer descriptions than strict mechanism and linear causality can provide. The organism/environment relation is best described in dynamic terms: "Every subject spins out, like the spider's threads, its relations to certain qualities of things and weaves them into a solid web, which carries its existence" (*A Foray* 53). All living organisms can be described, then, as a series of dynamic relations with those aspects of the external world that are meaningful for them. An organism can survive as long as these relations continue to be made successfully. Differences among organisms amount to variations on the kinds of relational threads that continually connect self and non-self.

Uexküll begins his analysis of meaning at the level of the cell. Each cell in a body expresses one receptor and one effector sign, and similar cells are grouped into organs. The organism as a whole coordinates these organs, allowing it to act as a unity. The functional cycle illustrates this action (*A Foray* 49). The differences among organisms have to do, at least in part, with the number of receptor and effector organs they have. Higher concentrations allow for more aspects of phenomena to register and find meaning for an organism. Despite differences in the fidelity of perception among organisms, however, the same fundamental, meaning-driven process holds for all of them (*A Foray* 51).

Uexküll provides many examples of how *Umwelten* are shaped by what an organism is able to make meaningful in an environment. His most well known case study is the tick. At a certain stage in the female tick's life, once she has completed her molting and copulated (*A Foray* 44), she climbs up a tree branch or shrub and waits. She finds her way to this location due to a sensitivity to light in her skin. Once a mammal is close enough for the tick to fall onto, she will let herself fall. She knows the mammal is present because the tick is sensitive to the scent of butyric acid, which emanates from the skin glands of all mammals. Once safely on a mammal, the tick finds a patch of relatively hairless skin. She does this with the help of her sense of touch and very refined sense of temperature. Once she makes contact with the skin, she bores her head into the skin tissue and extracts blood. Once she is full, she lays her eggs and dies. Much has been made of Uexküll's account of the simplicity of an organism with only three modes of relating to an outside world, yet Uexküll's description, I argue, is somewhat inconsistent. Although he describes the tick as an "impoverished structure" (*A Foray* 51) in which only three stimuli "glow like signal lights in the darkness" (*A Foray* 51), the tick *Umwelt* is not, upon closer inspection, so easily circumscribed. It is not that ticks really live in rich and diverse worlds. Rather, as he implies, his account only describes part of the life cycle of the female tick, and even in this limited view, the tick has more than three relations to the world: in addition to light sensitivity, scent and temperature, there is the oft-omitted yet crucial tactile sense. Even prior to copulation and molting, Uexküll points out, the tick can ambush and feed on cold blooded animals. How would the tick be able to experience cold blooded animals if she is only sensitive to the warmth of the sun, the smell of mammalian butyric acid and the temperature of mammal blood? The tick cannot be so easily corralled by three perception signs. Uexküll's truncated account does, however, have a strong rhetorical force. It successfully conveys the notion that the world is experienced in line with an organism's physiology, and especially in line with the actions that organism must perform to survive. The relations among physiology, environment, past experience and future action are the subject matter of Uexküll's theory

of meaning.

Uexküll argues that a theorist informed by mechanistic thought will outline the physiology of the tick and then stitch it together using the concept of reflex. A stimulus purportedly sets off a reliable and predictable course of action in the tick, known as the reflex arc: “The whole reflex arc works with the transfer of motion, just like any machine” (*A Foray* 46). Uexküll argues that this cannot be correct, because the individual cells in the reflex arc work by transferring stimuli, not motion. Stimuli move differently than inanimate objects in space. There is a process of translation at work in living organisms. A muscle, for example, does not perform anything like a transfer of movement. When stimulated in any way, it contracts. The optic nerve does not transfer light waves into the brain. It translates what stimulates it into the sensation of light. This process of translation troubles the continuity between organism and stimulus that is taken for granted by mechanistic thought. The implication is that the organism is not deterministically subjected to a world; each organism is akin to a subject interpreting a world. Uexküll will continue to employ a concept of reflex in certain cases, but even in such cases, there is no simple transfer of motion at work. Even a cell, he argues, only encounters the outside world on its terms, according to its own meaningful relations.

Uexküll makes a crucial distinction following his discussion of the tick: he is not concerned with how the butyric acid tastes or smells for a tick. He does not claim any special access to the qualities of tick experiences. Observation merely suggests that butyric acid is significant, and that it has become a perceptual mark for the tick (*A Foray* 53). He compares the tick responding to butyric acid to a gourmet putting raisins in a pie. We cannot say with absolute certainty what the raisins mean to the gourmet just by way of observation, but we can assume that they are meaningful. Uexküll suggests that tick and gourmet, as organisms that seek out perception signs that have biological significance for them, are engaged in the same process, albeit in their own, species-specific manner.

To illustrate how *Umwelten* can differ radically from organism to organism, Uexküll discusses

how each individual is nestled in differential spatial and temporal relations: “Perception signs are therefore always spatially bound, and, since they take place in a certain sequence, they are also temporally bound” (*A Foray* 54). Effect space is the space of bodily movement. In humans, the semicircular canals are largely responsible for this spatial orientation. Since fish also have these canals they can be assumed to experience 3D space in ways analogous to humans (*A Foray* 56). Uexküll links this sense to the ability of an organism to find its way home, since leaving home produces internal changes that some organisms can track and reverse by retracing their movements until they are back where they began. The feelers of bees, he argues, perform a similar task. Tactile space concerns the differences in sensitivity in an organism's skin. Human tongues and fingertips are sensitive to much more information than the middle of the back, for example. Visual space is the third form of space discussed. Organisms have different visual fields. The farthest plane is the limit or horizon of visual space, and this is highly variable among organisms. Each of these three relationships to space occur in different ways for different organisms, and they can supplement or even interfere with one another. Getting around often means using more than one of these relations to space at once. Uexküll turns next to time. A moment is the smallest indivisible element of time that can be experienced. Moments are expressed in what he terms moment signs. Moment signs are different for different species. For humans, Uexküll argues with reference to cinematography, a moment lasts 1/18 of a second (*A Foray* 70). Studies on fish who consume fast moving prey suggest that they experience time more slowly than humans do (moments can last as little as 1/50 of a second), while snails, for example, lie at the other end of the spectrum (1/4 of a second). Pointing out the variability in how space and time are experienced disrupts narrow and artificial conceptions of space and time as homogenous. Space is not pure extension. It is experienced in several different ways by human bodies, and these experiences are different than those accessible to bodies with different organizations. Time is also something other than a constant pace. Different organisms can be said to live time differently once time is viewed in terms of

its role in meaningful experience. These reformulations offer glimpses of just how variable meaningful experience might be in the living world. They also show the necessity of supplementing theory with careful, rigorous scientific studies of nonhuman experience.

Each organism moves through its own time and space within its specific *Umwelt* and relates to a particular set of significant objects within it. An object's significance becomes part of the organism's functional cycle, which means that only significant aspects of objects are considered by an organism, and an object with no meaningful aspects is either not perceived at all or it is simply neglected (*A Foray* 144). Within an object itself, only those aspects or qualities that are significant for the organism encountering it will form a relation to it. The aspects of the object which do not have meaning constitute a counter-structure (*Gegengefüge*) that holds the significant parts of the object together while having no part in perception or action. In order to show how mistaken it is to refer to things simply as neutral, self-evident objects, Uexküll contrasts how humans and dogs both relate to a human house. If you saw your home and the objects it contains from a dog's perspective, you would most likely conclude that this is an incomplete description of your house, because a dog's experience of what is significant would omit too many things that have significance in the house for humans. Uexküll points out that a human description of a forest also leaves out most of what is significant in the forest for other organisms. Uexküll does not say this, but it is implicit that a dog who lives in a house with humans would also have a perspective on the house that would not be exhaustively describable from a human point of view. Any given dog who lives in a house would have their own familiar objects, routines and ways of orienting themselves within that space. To place the differences in meaningful relations formed within the house by a human and a dog into some kind of more/less hierarchical order, therefore, would be to ignore crucial self-referential, experiential dimensions of meaning.

The idea that objects are not available to all organisms in the same way contrasts sharply with the approach taken by behaviorism. From Uexküll's perspective, the behaviorist approach is useless

because one learns nothing by observing how a variety of different animals relate to the same object, such as a maze. No nonhuman animal simply encounters an object as such. He gives the example of a stone on a path that changes from a support tone to a throwing tone when the walker is confronted by an angry dog. Only an observer sees the object *as* an object, and no nonhuman ever seems to be a neutral observer:

The stone, which lies as a relationless object in the hand of the observer, becomes a carrier of meaning as soon as it enters into a relationship with a subject. Since no animal ever appears as an observer, one may assert that no animal ever enters into a relationship with an “object.” Only through the relationship is the object transformed into the carrier of a meaning that is impressed upon it by a subject. (*A Foray* 140)

What does it mean to be a neutral observer? In light of Uexküll's condemnation of modern science as a process of stripping objects of their meaningful relations, it is not clear to what degree he might privilege the sort of access enjoyed by this uniquely human observer. A neutral object could be seen as an index of a capability by which the human rises above their *Umwelt* to see things as they truly are. Or it could just as plausibly be an abstraction that would have great power within, yet dubious value outside of, specific problems encountered by certain forms of scientific inquiry. I will discuss human *Umwelten* in more detail below. For now, I look more closely at how the *Umwelten* of different organisms might come into contact. How does Uexküll think intersubjectivity?

Organisms, for Uexküll, are collections of components that form coherent wholes in relation to a building-plan (*Bauplan*). Whenever something becomes significant for an organism, it forms a relation or complement. Uexküll insists that in order to understand an organism, it must be studied in terms of its relations to others. Most beings, he argues, originate by way of intersubjective relationships. The male-female duet that drives sexual reproduction is one of the most pervasive in nature, but there are myriad other forms of interrelatedness that connect *Umwelten*. A trio is formed,

for example, when an insect plays the role of catalyst in the pollination of a plant. To illustrate the importance of intersubjective, meaningful relationships, Uexküll offers elaborate examples, one of the most instructive being his account of the relations between a spider and a fly. A spider's web, referred to as a meaning-utilizer, matches up exactly with the body of a spider's prey, the meaning-carrier: "The utilizer of meaning is so precisely attuned to the carrier of meaning that one can see the spider's web as a faithful rendering of the fly" (*A Foray* 158). The spider is able to spin its web to the exact measurements of a fly's body. More than that, it spins a web strong enough to resist the force of the flying insect. It also has the proper combination of tension and slack to accommodate the force of impact, and the combination of sticky circular threads and non-sticky radial threads allow the spider unhampered access to the trapped fly. Spiders' webs are usually found in the pathways favored by flies, and the threads are too fine to be detected by the eye of the fly. The mystery, for Uexküll, is how this image of the fly could be created by the spider: "It is indeed a refined picture of the fly which the spider produces in its web.

"But wait! The spider does not do that at all. It weaves its web before it has ever met a physical fly. The web can therefore not be a representation of the physical fly, but rather, it represents the *primal image* [*Urbild*] of the fly, which is physically not at all present" (*A Foray* 158-159).

For Uexküll, the fly constitutes a primal image, not in the sense of a representation but as a theme and a counterpoint for the web of the spider. The *Umwelt* of the fly is somehow part of the *Umwelt* of the spider. Uexküll argues that experience does play a role in shaping and transforming the *Umwelten* of at least some organisms. However, as it is for the spider, most of our relations to things we encounter in the world are formed because these things already matter to us in some way. When another living thing draws our attention, our *Umwelt* is found to be connected to theirs.

Musical metaphors enter into Uexküll's writings when he begins to explain how the *Umwelten*

of different organisms relate to one another and to their surroundings. Buchanan gives a tentative categorization of these metaphors, with the caveat that Uexküll's own use of terminology by no means remains precise or fixed throughout his work. Cells are referred to as living bells. They possess a kind of quasi-subjectivity, what Uexküll calls an ego-quality. These living bells produce a chime, and their chimes are able to link together to form rhythms. Organs are able to bring these rhythmic chimes into an order or a melody. The entire assemblage of cellular rhythms and organ melodies that comprise an organism is called a symphony. Two or more organisms acting in concert form a harmony. Nature as a whole forms a great composition. Buchanan underscores that this conception of nature does not contradict Uexküll's claim that nature is fundamentally unknowable. Rather, an interpretation of nature in terms of music is put forward as an alternative to the way nature is conceptualized by physics:

The biological world of animals and their environments consists of an artful play of interconnections, to the degree that one organism is necessary for the understanding of an other. The *Umwelten* of organisms are therefore not simply closed spheres, as if locking the organism within a self-concealed and isolated container. The animal is not an object or entity, but a symphony underscored by rhythms and melodies reaching outward for greater accompaniment. Individual *Umwelten* are necessarily enmeshed with one another through a variety of relationships that create a harmonious whole. (*Onto-Ethologies* 28)

Every organism has its *Umwelt*, yet the shape or style of each *Umwelt* can vary dramatically among species. How can such dramatic variation be expressed as iterations within the common conceptual space of the *Umwelt*? According to Uexküll, an organism's behavior is directed by what can become meaningful for them. Meaning depends on physiology, personal history, and relations with other organisms and objects in the wider environment. Meaningful experience only makes sense within this self-relational context, which would seem to make hierarchies among forms of life suspiciously abstract. There does not seem to be any common ground between two *Umwelten* that could be isolated

as a basis for comparing behaviors or capabilities. Nevertheless, Uexküll distinguishes between what he refers to as lower and higher animals. The next section of the chapter examines how Uexküll theorizes major differences among *Umwelten*.

Lower and Higher Animals

There are two groups of organisms who have the unfortunate designation of being “lower.” One group consists of those organisms described by Uexküll as having only one functional cycle. The paramecium, for example, experiences solely what Uexküll refers to as a hindrance tone whenever its momentum is impeded. The bacteria it eats, on the other hand, send the paramecium no stimulus. The paramecium only notices one characteristic, that of obstacle, among all the phenomena that comprise its surroundings. The Rhizostoma, a species of medusa, also has only one functional cycle. The only stimulus that affects this jellyfish is produced by its own movement. Uexküll calls Rhizostoma and similar organisms reflex animals: “In the medusa's environment, the same bell always tolls, and this controls the rhythm of life. All other stimuli are excluded” (*A Foray* 75). The other group of “lower” organisms have multiple appendages but lack any means of central control. Their organs are discreet entities. Any organ with its own reflex arc is termed a reflex person. A sea urchin consists of several reflex persons. The sea urchin is called a reflex republic, because it is comprised of individual reflex persons with no central command coordinating its movements. Its skin harbors a chemical called autodermin, and when two reflex persons come into contact (one of the sharp spikes and one of the vulnerable feet of the urchin), the autodermin reacts to inhibit the reflex, thus preventing self harm.

Those organisms Uexküll designates as “higher” are those which have multiple functional cycles connected by a nervous system. This organization permits them to make finer distinctions within their *Umwelten*. Form and movement are the two key emergent perceptual phenomena found in higher *Umwelten*, but they do not always occur together. Some organisms only perceive a narrow range of sizes, for instance, while others see objects only if they are moving at certain speeds. Uexküll moves on

to outline some of the features that emerge as *Umwelten* become more and more complex. Approaching this diversity within the common context of the *Umwelt* also makes for more interesting formulations of sameness and difference, comparability and incomparability.

In order to explain how *Umwelten* become more variable in more complex organisms, Uexküll introduces several new concepts: perception image, effect image, effect tone, search image and search tone. These concepts, while perhaps no longer on the ethological cutting edge, nevertheless help to conceptualize differences within the more general context of an organism as a set of meaningful relations that comprise an *Umwelt*. They also offer an early account of perception and action as bound up together in ways that confound passive and mechanistic formulations of nonhuman animal behavior.

The perception image is not a mental representation, but rather that which the sensory apparatus of an organism perceives, taken as a unity. Allen and Bekoff describe it above as the integration of information from multi-sensory sources. This is comprised of multiple sources of sensory information and not just (and not necessarily) vision. The effect image refers to the next action that takes place after a perception, insofar as it affects the perception image. In this way, the effect image superimposes future action onto perception. Effect tone refers to the perception and effect images together, as they coalesce in the perceived object. This is one way in which perception is entangled with action.

The search image and search tone describe other cases in which perception and action are bound up. The search image refers to an absent object; it is a provisional “image” (again, it is not necessarily a visual image) of a specific object that is not present. The search tone, meanwhile, is a provisional “image” of a nonspecific object that is not present. If you are looking for a chair, for example, a search image would correspond to a specific chair, while a search tone would correspond to any chair nearby.

For the hermit crab, any object within a certain spatial schema becomes significant. Uexküll argues that the sea anemone can take on a variety of meanings for the hermit crab, depending on the crab's mood. Mood here refers to environmental circumstances or context relative to the organism as

experiencing subject. A crab's mood determines whether the sea anemone has a protective tone, a dwelling tone or a feeding tone. The effect image—what the crab needs to do with the anemone most urgently—is the second aspect of meaning which completes the perception image. Mood links the human, the hermit crab, and a vast range of organisms with more than one functional cycle, according to Uexküll, because it enables a multiplicity of functional cycles to act as a unity:

Even in this very human case, just as with the hermit crab, the subject's mood is crucial for which effect image gives a tone to the perception image. Effect images can only be required in cases where central effect organs are present that control animals' actions. All animals that operate in a purely reflective manner, such as the sea urchin, must be excluded from this category. But for other cases, as the hermit crab proves, the influence of mood is felt far down in the animal kingdom. (*A Foray* 95)

Search images and search tones are ubiquitous in the *Umwelten* of higher animals. The search image, Uexküll says, “wipes out” the perception image (*A Foray* 113). In other words, what is seen is conditioned by what one is doing or wants to do. The search tone extends this idea. Organisms are often looking not for a particular object but a particular function. The search tone implies that what is most significant in an *Umwelt* is sometimes what is *not* there, and it also implies that a subject can hold a perceptual image of an absent object.

Uexküll offers a series of descriptions of phenomena that depend more and more on a subject's meaningful experience. The familiar path, for example, is a common feature in many higher *Umwelten*. For humans, they may be comprised of cues from vision, the coordinate system and orientation steps. For other animals, they may be grounded in entirely different senses. Uexküll criticizes behaviorist approaches for failing to adequately conceptualize these practices by which other animals orient themselves in their ecological contexts. Maze experiments, for example, by ignoring this context, fail to understand what they are asking of a given animal. Uexküll points to the cross-species negotiations

involved in guide dog training as an example of the practical importance of understanding a familiar path properly. He cites observations on jackdaws, rats and fighting fish to show how different animals employ strategies to make familiar paths for orienting themselves: “All in all, one could say that the familiar path works like a streak of a more fluid medium in a more viscous one” (*A Foray* 102). Home and territory are closely related to the familiar path for Uexküll. These concepts all refer to ways of negotiating a space meaningfully. Looking only at an organism's physiology will not explain them. Neither will a strict focus on the physical space an organism inhabits. Certain ecological features may offer better locations for a home, but it takes a meaning-making being to turn a space into a meaningful place. Territory works the same way: “Territory... represents an exclusively subjective product, the presence of which even the most detailed knowledge of the surroundings offers no explanation at all” (*A Foray* 103).

Uexküll describes behaviors that emerge in higher *Umwelten* as being driven more by meaningful experience than by the immediately present external environment. For a sea urchin, the perception of a fish is so rudimentary that it seems clear why the urchin sometimes responds to a cloud or ship as if it were a fish. In more complex *Umwelten*, Uexküll argues, this explanation is too simple. While the sea urchin can only attach the same effect image to a range of perceived objects (they always give the same answer, no matter what the question), complex *Umwelten* associate a range of effect images with a single perception (they can give many answers to the same question). While *Umwelten* of lower animals act to reduce complexity, the *Umwelten* of higher animals increase it. At the same time, it must be kept in mind that all *Umwelten* are, by definition, reductions of environmental complexity. No organism has access to the world as it exists beyond the confines of an *Umwelt*. Experience enriches life, but it can only operate on the set of organism/environment and organism/organism relations an *Umwelt* already affords.

To explain what makes *Umwelten* possible, Uexküll does not turn to evolutionary history.

Instead, he posits an over-arching plan of nature within a relatively static, harmonious world. The plan of nature drives development and spins the intricate mesh of melodic relations entangling *Umwelten*. The plan of nature, in other words, is what makes the spider's web “fly-like.” I discuss this aspect of Uexküll's work and the problems it raises in the next section.

Nature's Plan

Uexküll compares a dog and a starfish. When a dog runs, we say that the dog moves its legs. When a starfish moves, we should say that the legs move the starfish. This is because a dog has a central nervous system whereas a starfish does not. The legs of a starfish are isolated from any central control, and for Uexküll, this means that the success of the starfish as a coherent organism must be explained with reference to a plan. The plan is the melody-like force that provides harmony of movement in a starfish and harmony of development in all organisms, and it also accounts for the ways in which organisms are able to interact. He refers to nature's plan as an orchestra without a conductor; it is what makes meaningful relations possible. Meaning in life is akin to harmony in music because it acts between individuals, conditioning their relationships:

Meaning in the natural score takes the place of harmony in the musical score, which works as a conjunction or, more precisely put, a bridge in order to unify two natural factors with each other. For, as any bridge has its feet on both sides of the river, which it connects as point and counterpoint with each other, these are linked to each other in music through harmony and in Nature through the same meaning. (*A Foray* 188-189)

The difference between nature understood in terms of melodic and harmonic relations, on one hand, and the mechanistic, contingent account of evolution he associates with Darwinism, on the other, is clear in Uexküll's discussion of the tick. From the Darwinian perspective as Uexküll understands it, there is no basis other than random chance for explaining how something like butyric acid could become relevant to the tick *Umwelt*. We have to say that it was a completely random set of

circumstances that led to the tick being sensitive to butyric acid, which just happens to be a scent common to all mammals, who just happen to have warm blood, which the tick needs. Uexküll is not willing to accept that this complex, intricate web of relationships arose simply by chance, but in his time period he has access to few alternatives. He argues that there must be laws of nature that explain how relationships like that between the tick and mammal could have possibly taken shape. Simple *Umwelten* like that of the tick must hold clues that would lead to an understanding of the laws of nature. These laws, Uexküll believes, govern the living world like a great composition or musical score:

When we are able to put together a theory of the music of life, these simple examples will become the basis. They are like the etudes that a beginner learns to play on the piano with one finger.

As only a few keys of the whole keyboard are used in the simple etudes, the simple *Umwelten* contain only a few perceptual cues.

When we have convinced ourselves of these basic facts, we will go further and try to explore ever richer *Umwelten*. (“The New Concept” 120)

Uexküll finds support for his musical theory of life in an experiment by Hans Spemann (*A Foray* 152-154): frog brain cells were inserted into the mouth of a triton. The cells obeyed the “building melody” of the triton, so they became a mouth. However, being tadpole cells, they grew into a tadpole mouth rather than a triton mouth. While the cellular material itself is frog, the context remains triton. Uexküll compares it to an orchestra in which all the violins are replaced by horns: they go on to play the same tune, but the tonal quality is completely different.

For Uexküll, there is a crucial difference between living matter and the organizational forces—melodic relations that Uexküll sometimes calls meaning rules—that act on it. These organizational forces are not adequately accounted for by evolutionary theory, and they are denied outright by

mechanistic approaches to life. Hans Driesch's experiments on sea urchins provide another illustration of these melodic forces:

Only with the demonstration provided by Driesch that a sea urchin germ cell cut in half became not two half, but two whole sea urchins of half the size, opened the way for a deeper understanding of the technology of Nature. Everything physical can be cut with a knife—but not a melody. The melody of a song played on a free carillon of living bells remains unchanged, even if it only controls half the number of bells. (*A Foray* 194)

Experiments like these suggest the independence of form and structure: if the structure is altered, the meaning rule will still organize it in the same way. The meaning rule conditions the development of matter, ensuring the formation of the necessary organ in the necessary place. The meaning rule is meant to solve the riddle of development. How can an acorn contain within itself the ability to become an oak tree, navigating future weather patterns and the myriad entangled lives that interact with it over the years? No matter how far back in time one goes, Uexküll argues, the same problems are faced. Piling on more evolutionary history does not clarify the issue:

In no case will we be able to speak of a causal linkage of external effects upon an object in its pre-existence or post-existence; only when cause and effect meet at the same place at the same time can we speak of a causal link. There is also no chance of finding the solution to the problem if one looks for it in the remote past. An acorn of a million years ago presents the same problems to our understanding as it will a hundred thousand years from now. (*A Foray* 169)

Uexküll argues instead that this process obeys the same laws as musical composition. Meaning factors are in a relation of counterpoint to meaning utilizers. A composition theory of nature is therefore necessary for understanding the development of form. Uexküll argues that meaning rules compose cross-species relationships as well. A spider knows how to build a web to catch flies, for instance, because melodic and harmonic meaning rules somehow intervene across species. Nature, for

Uexküll, is not a history but a single great composition repeating on a loop.

In Uexküll's composition theory of nature, at least two tones are necessary to form a harmony. The canopy of the oak and the rain, for example, work together to form the common meaning rule “capturing and distributing the liquid to the root tips” (*A Foray* 173). A similar harmonious relation is found between the octopus (as subject) and sea water (as carrier of meaning). The octopus is constructed from the incompressibility of water. Swimming is the meaning rule that connects octopus and water in a contrapuntal relation. In both examples, there are mechanical relationships (the oak canopy mechanically distributes the raindrops to the roots; the octopus swimming sac operates mechanically on the water), but these only occur within a broader and more complex set of meaningful relations. For a spider, the web is a meaning utilizer tuned to the fly as meaning carrier. The origin of this relationship between meaning utilizer and meaning carrier can only be explained, according to Uexküll, by way of nature's plan: “This utilizer of meaning is so precisely attuned to the carrier of meaning that one can see the spider's web as a faithful rendering of the fly” (*A Foray* 158).

Uexküll argues that spider webs are perfectly attuned to catching flies, yet the spider makes the web before it can ever experience a fly (that is to say, it is not learned behavior). Uexküll describes development as following a “primal score” that controls the space and time in which an organism grows. He argues that part of the fly's primal score affects the spider's score, and this is what makes the spider's web fly-like. The primal images or melodies are assembled according to a meaning plan. For Uexküll, these musical metaphors come far closer to comprehending nature than deterministic visions of organisms tumbling blindly into incredibly intricate relationships: “Meaning is the pole star by which biology must orient itself, not the impoverished rules of causality which can only see one step in front or behind and to which the great connections remain completely hidden” (*A Foray* 160).

This mysterious composition of nature is great for the spider, but what about the fly? For the fly, there is seemingly no harmony or cohesion of any kind to be associated with the fact that they can

be preyed upon by spiders. Uexküll calls this kind of relation a sufferance of meaning. There is no meaning rule in this case that works in the interest of the fly. The fly is simply a victim of meaningful relations. Uexküll could use these cases to introduce contingency back into his theory, without abandoning life entirely to random variation as he accuses Darwinism of promoting. However, Uexküll is not satisfied with leaving these relations of the sufferance of meaning at the margins of nature's plan. For him, nature *is* a plan, and the logic necessitating relations of sufferance at the individual level must be resolved at the species level. Suffering due to the action of meaningful relations is recovered in its significance as the regulator of population numbers. It is well known that, for many species, far more offspring are created than are able to survive. This situation could be interpreted as a competition for survival, which in turn drives populations to retain only the healthiest or best adapted individuals. Random variations that arise from time to time might become advantages under fortuitous conditions, leading to speciation. However, Uexküll interprets this over-production and sufferance not as driving variation, by way of competition, toward some unknown and unplanned future, but as a form of homeostatic regulation: "It is hardly a matter of the survival of the fittest, but rather, of the survival of the normal in the interests of an unchanging further existence of the species" (*A Foray* 185).

Insisting on a static view of life, and forcing life to serve a rigid holistic design, marks the point at which Uexküll ceases to anticipate contemporary theories of self-organization and developmental systems and instead begins to resemble contemporary creationism. Nature's plan makes evolutionary emergence and change virtually impossible to think. It also encroaches on the autonomy of organisms. Uexküll criticizes claims of goal-directed behavior in organisms, arguing that it is extremely rare. Only the "highest" mammal species, according to him, exhibit what could be considered goal-directed behavior. In some cases, nature's plan even acts to disrupt lives and cause unnecessary complications.

For the most part, all animals behave in accordance with nature's plan, and this works well for them, whether at the level of individual or species. However, nature's plan operates according to its

own logic, and this logic sometimes interferes with what should be an organism's goals. In several cases Uexküll discusses, animals seem locked into certain relations of significance which prevent visual cues from taking precedence when such a shift would seem to be both physiologically possible and beneficial. A hen, for example, will respond to the cries of a chick by pecking aggressively near it. When the chick is covered by a glass bell, however, so that it is visible but not audible, the hen will pay no attention. Uexküll does not explain why, in this example, he is privileging the visual cue over the auditory cue. The auditory cue seems to have information the hen needs in order to interpret the situation. Uexküll assumes that, for the hen, visual cues should override auditory cues when this would be advantageous, an assumption for which he gives no justification. These cases are difficult to reconcile with Uexküll's claim that nature's plan is an example of neither vitalism nor mechanistic materialism, but "Nature's all-controlling conditions of order..." (*A Foray* 92).

Uexküll reiterates his criticism of evolutionary theory by attacking the concept of gradual progress of life forms. Uexküll cannot think of life in terms of harmonic relations and accept change over time simultaneously. He does acknowledge different eras of life on Earth, but he sees them as mere variations within a general consistency. What remains active, binding the living world together throughout its history, is meaning conceived in terms of order:

Environments were certainly simpler at the beginning of the world-drama than they were later. But, in them, each carrier of meaning faced a recipient of meaning. Meaning ruled them all. Meaning bound changing organs to the changing medium. Meaning bound food and the consumers of food, predator and prey, and, first and foremost, males and females in amazing variety. Everywhere there was a progression, but nowhere progress in the sense of the survival of the fittest, never a selection of the better by a planlessly raging battle for existence. Instead, a melody reigned which entwined life and death. (*A Foray* 196)

When Uexküll theorizes phenomena underlying meaningful experience, especially organismic

development and cross-species lateral relations that entangle *Umwelten*, he rejects evolutionary explanations in favor of a compositional plan of nature which governs by way of meaning rules. This notion of meaning is in a transcendent relation to the living. It is therefore a different concept than the meaning-making activity that engenders meaningful experience, although the relations between them are difficult to untangle. The theory of autopoiesis offers an alternative account of what underlies meaningful experience, one articulated with evolutionary history. Before moving on to autopoiesis, however, it is important to revisit the human/nonhuman distinction as it manifests in *Umwelt* theory.

Human *Umwelten*

How does Uexküll theorize the human *Umwelt*? Can humans rise above the limitations implied in the *Umwelt* concept in order to access reality itself? Uexküll's Kantian approach to life would suggest that humans are indeed limited in important ways. The plan of nature offers another limit to the human *Umwelt*. The composition of nature, in its entirety, is inaccessible:

The role Nature plays as an object in the various environments of natural scientists is highly contradictory. If one wanted to sum up its objective characteristics, only chaos would result. And yet, all these different environments are fostered and borne along by the One that is inaccessible to all environments forever. Forever unknowable behind all of the worlds it produces, the subject–Nature–conceals itself. (*A Foray* 135)

Uexküll's plan of nature is problematic. Yet even if Uexküll's plan is abandoned in favor of contemporary theories of evolutionary and self-organizing processes, and these theories are found to possess much greater explanatory power than Uexküll's, such an increase in explanatory power could not be justifiably explained as crossing a threshold from the human *Umwelt* into a realm of unconditionally objective knowledge. Increases in scientific knowledge, that is to say, still occur within the human *Umwelt*: “We can certainly get closer to all things through the use of increasingly precise apparatuses, but we do not gain any more sensory organs thereby, and all the properties of things, even

when we analyze them down to the smallest details—atoms and electrons—will always remain only perception marks of our senses and ideas” (*A Foray* 207). Humans, Uexküll states, have an advantage over other animals in that we can “...broaden the compass of inborn human nature” (*A Foray* 199). We humans can make prosthetic extensions of our organs, deepening and broadening their range. No other animal seems to be able to do this in quite the same way as humans. This difference can be interpreted either as a difference in degree or as a difference in kind. What it is not, I argue, is evidence of a human ability to escape the limits implied by the *Umwelt* concept. Brentari argues, however, that Uexküll creates a false equivalence between the *Umwelten* of humans and nonhumans. He sees this as a mistake or possibly an oversight in *A Foray* (Brentari 155). Brentari acknowledges that Uexküll shows only a gradual differentiation of *Umwelten* that leads from the nonhuman to the human (Brentari 153). Human *Umwelten* simply enable a larger share of significant variables to attach to any given object. Brentari rejects this assumption.

For Brentari, humans must have the ability to transcend the relations of meaning described by the *Umwelt* concept (Brentari 155). Otherwise, he argues, human knowledge, and science in particular, would lose the capacity to describe reality: “Not only does it neglect—or at least implicitly declare illusory—the conscious will of the scientist to find an objective and universally shared truth, but it will also result in the complete equivalence of results from individual research, which cannot be verified with reference to anything extra-subjective” (Brentari 155). In this formulation, scientific objectivity is a norm which acts as a crucial bulwark against extreme relativism. This conviction leads Brentari to privilege Uexküll's discussion of the neutral object in *A Foray* as suggestive of a uniquely human capability that would place human semiosis atop a hierarchy of the living. Organisms can be ranked, Brentari argues, on the quality or richness of meaning they are capable of discerning:

The centrality that the concept of meaning assumes in *A Theory of Meaning* brings Uexküll to reconsider the existence of living organisms as a continuous valorization of

meanings. In this light, a ranking of semantic receptivity by living things can be drafted: the re-perceived meanings, in other words, is minimal in plants, sees a significant increase in animals and is at its highest in man. Besides being able to assume the role of disinterested observer (and thus to “valorize” object components that are different from those that fall into the functional circle of feeding, reproduction, and self-preservation), human beings can also understand the meaning that an object component assumes for other human beings and other living organisms. (Brentari 160)

I disagree with four of Brentari's points. First, I argue that *Umwelten* cannot be transcended, even in humans, as Uexküll makes clear. *Umwelten* are radically modifiable, and this is perhaps especially true for human *Umwelten*. However, there is no location beyond meaning-making processes from which the human can be purely disinterested and therefore gain a commanding view of meaningful relations in themselves (see Haraway, “Situated Knowledges” 190 for a powerful argument that all perceptual systems are engaged in active translation from a specific and partial location; they are never transcendent). Mastery over the subjective/objective binary assumes a unique human ability to transcend corporeal, ecological and semiotic limits. The critical posthumanist critique of humanism places precisely these abilities radically into question. The kinds of shared meaning that the sciences engender deserve more careful consideration, and the concept of autopoiesis offers one potential reformulation of this problem. Discussions in the chapters below offer others. Second, I do not interpret Uexküll's discussion of the neutral object as the key to human exceptionalism. It is true that Uexküll describes the observer as uniquely human, but, as I argue above, it is not clear what privilege or status he confers on this observer. Autopoiesis below and phenomenology in Chapter 3 both offer more probing discussions of the status of the observer. The third point on which I disagree with Brentari concerns the hierarchical scheme according to which organisms can be ranked in terms of their receptivity to meaning. This scheme is closely related to the biosemiotic approach and

conceptualizations of meaning in terms of semiosis (Brentari's text is part of the Springer *Biosemiotics* series). I will revisit the concept of semiosis at length in chapter 4. I also disagree with Brentari on a fourth point. He implies in the above quote that humans have a special ability to discern the meaning that an object has for other humans and for nonhumans. Nonhumans, by implication, cannot observe others and construct new meaningful relations from those observations. While this might be true for some animals, it is not an ability unique to humans. Uexküll argues for some degree of nonhuman *Umwelt* plasticity.

Uexküll looks for instances of intra-specific variability among nonhumans, citing the learning abilities of guide dogs to tune into features of human *Umwelten* as an example. There are problems with this strategy, as Brentari points out. For one, the examples look at domesticated or trained animals. These examples cannot eliminate a human influence rather than a spontaneous or gradual increase in the *Umwelt's* complexity that is wholly the work of the dog. Contemporary cognitive ethology, however, can provide examples of intra-specific differences that are not dependent upon the mediating influence of humans.¹⁴

Ultimately, Uexküll stakes his critique of mechanism and behaviorism on the conviction that an organism is not simply subjected to, but must actively engage, interpret or contextualize a stimulus in some way. Meaningful experience is not directed primarily toward building and communicating accurate representations of an outside world, but toward successfully living in it. When an organism interprets a stimulus, in other words, the context in which that stimulus is interpreted is the ongoing life and needs of the organism itself. The next section lays out some of the most important features of the autopoietic theory of life developed by Humberto Maturana and Francisco Varela. Autopoiesis joins *Umwelt* theory in opposing Cartesian assumptions that posit a subject who passively receives and represents information from an outside world. For Maturana and Varela, Like Uexküll, the world is

¹⁴ de Waal (51-53) discusses problems related to identifying and defending evidence of intra-specific difference.

something that takes form according to the physiological structure and self-relational nature of the experiencing organism. For Maturana and Varela, however, there is no over-arching plan of nature guiding development and behavior. Autopoiesis is compatible with an evolutionary framework, which makes it more amenable to contemporary life science than Uexküll's approach. However, despite their claim that cognition is co-extensive with life itself, Maturana and Varela at times seem to reserve meaning and subjectivity for only a small sub-section of life.

Autopoiesis: Bringing Forth a World

Early in his essay “Biology of Cognition,” Humberto Maturana states one of the central problems concerning the biology of the organism: what makes the parts of an organism function together as one unity? He formulates this problem with reference to Ludwig von Bertalanffy, who, in turn, cites Uexküll as one of the precursors of biological systems theory (von Bertalanffy 232). von Bertalanffy describes the organism as a unity whose parts are subordinated to the whole. Maturana wonders what causes this unity to happen, and whether it is a property of the organism's organization. It is normal to say that an organism forms some kind of rudimentary representation of their environment by gathering information and storing it in the nervous system. But what exactly is gathered, coded and stored? Maturana proposes a theory of cognition that sheds light on the kind of organization that engenders everything from simple behaviors to conceptual thinking, language, and self-consciousness (*Auto* 6). He frames the problem in the following way: cognition is a biological phenomenon and must be studied as such; cognition must be explained in terms of both function and process. Maturana and Francisco Varela propose to describe cognition as the ongoing process of bringing forth a world, rather than in terms of forming representations of an outside world thought to be separate from the organism. They argue that experience is tied irrevocably to physiological structure: “We do not see the “space” of the world; we live our field of vision. We do not see the “colors” of the world; we live our chromatic space” (*Tree* 23). Knowing, therefore, cannot be the result of grasping and storing accurate

representations of external reality in the mind. What takes place in cognition must always be considered in terms of physiological structure, organization, and individual history. They ground their investigation in the aphorism that all knowing is doing, and all doing is knowing: “This circularity, this connection between action and experience, this inseparability between a particular way of being and how the world appears to us, tells us that *every act of knowing brings forth a world*” (*Tree* 26).

Maturana and Varela illustrate the point that internal relations drive behavior by focusing critically on representationalist explanations of visual perception. It is commonly thought that images impinge on the retina and are then transformed into representations in the nervous system. They argue instead that, when a retinal image reaches the LGN (lateral geniculate nucleus), it comes into contact with many other neurons. These neurons influence what gets translated and sent to the cerebral cortex, to the degree that describing vision as any kind of distillation of an outside world into the cerebral cortex is misleading and untenable. They argue that learning and memory are not primarily about 'taking in' information about the world. This unnecessarily presupposes a representationalist model of cognition underlying behavior. Behavior, rather, is primarily a relational phenomenon.

Maturana and Varela ground their theory in rigorous scientific investigation. They are highly original, yet their emphasis on the role of the body in bringing forth a particular kind of world resonates with Uexküll's descriptions of the variability of space and time, and with the phenomenological approach discussed in the next chapter. The intimate relationship they lay out between cognition and action echoes but also extends in a radically constructivist direction what Uexküll says about objects having effect tones tying perception to a field of possible actions: “...cognition does not concern objects, for cognition is effective action; and as we know how we know, we bring forth ourselves” (*Tree* 244). Drawing on two key texts by Maturana and Varela,¹⁵ I examine the concept of autopoiesis

¹⁵ The first part of *Autopoiesis and Cognition* consists of the essay “Biology of Cognition,” of which Maturana is the sole author. When I refer to Maturana only, I am citing this essay. The essay “Autopoiesis: The Organization of the Living,” co-authored with Varela, makes up the second part of this book. The other text I discuss is *The Tree of Knowledge*.

by way of the following questions: What makes a living system autopoietic? How do these systems relate to what is outside them? How do Maturana and Varela describe major differences among them? Finally, how do they theorize the observer?

Autopoietic Unities

Living beings, argue Maturana and Varela, are characterized by autopoietic organization. That is to say, they are constantly self-producing: “A living system defines through its organization the domain of all interactions into which it can possibly enter without losing its identity, and it maintains its identity only as long as the basic circularity that defines it as a unit of interactions remains unbroken” (*Auto* 9-10). They use the cell as a model for describing the relations that engender autopoietic organization. The molecular components of a cell need to be dynamically related in a network. This network produces components that reproduce the network that produced them. Autopoiesis is thus a form of autonomy characterized at once as an organized structure and as a process: “The being and doing of an autopoietic unity are inseparable, and this is their specific mode of organization” (*Tree* 49). Organization refers to the relations that define an autopoietic unity. These relations determine the arrangement of the components of the unity which comprise its structure. Thus, two humans, for example, are very similar in terms of organization but they do not share structure.

In contrast to Uexküll, Maturana and Varela define living beings in a mechanistic fashion:

Our approach will be mechanistic: no forces or principles will be adduced which are not found in the physical universe. Yet, our problem is the living organization and therefore our interest will not be in properties of components, but in processes and relations between processes realized through components. (*Auto* 75)

Maturana and Varela position themselves between a reductive focus on the components of living systems and an approach like Uexküll's which relies on unobservable forces acting from without. They define an autopoietic machine as a unity comprised of a dynamic network of processes of production

that produce the machine's own components (*Auto 76*). This distinguishes living beings from both human-made machines and inorganic forms like crystals. Autopoietic machines are unique among machines in several ways. They subordinate any change which may affect them to their ongoing process of self-maintenance. They have an identity or coherence that exists independently of an observer. They maintain this identity because their own operations specify their boundaries. They do not have inputs or outputs but adjust themselves when perturbed. Finally, they are not simply open or receptive to just any environmental stimulus; the structure of an autopoietic machine determines what kinds of perturbations it can register.

Living beings are described as self-referential systems whose organization continually brings them back toward the same internal state. At the same time, their circular organization orients them toward the future, because the system needs certain interactions that happened before to happen again or else it disintegrates: “Every interaction is a particular interaction, but every prediction is a prediction of a class of interactions that is defined by those features of its elements that will allow the living system to retain its circular organization after the interaction, and thus, to interact again. This makes living systems inferential systems, and their domain of interactions a cognitive domain” (*Auto 10*).

Cognition, Maturana and Varela argue, is effective action. An effective action is one which acts to maintain autopoietic organization. How does meaningful experience enter this circle? Despite the use of the term cognition, the basic idea of autopoiesis as described so far sheds no light on what is happening when a dog perceives a squirrel, for example. What it does assert is that, whatever is happening when a dog perceives a squirrel is somehow an outgrowth of the dog's body continually striving to maintain the relations that make it possible to keep existing as that dog. And this implies that what we see when we look at the dog's behavior as an observer will perhaps differ dramatically from the view of the dog conceived as an autopoietic system. Maturana and Varela will stress the point that the view of the observer of a system is different from the reality that the system itself inhabits.

Interactions between an autopoietic system and its outside are divided by Maturana into classes, and all classes of interactions together form a niche. The niche is a recursive, inferential process: “Thus for every living system its organization implies a prediction of a niche, and the niche thus predicted as a domain of classes of interactions constitutes its entire cognitive reality” (*Auto* 11). The environment, on the other hand, is the niche of the observer, and this is what forms the context for observation. So, the niche of an organism appears as its environment for the observer. The organism, as autopoietic system, is not in a position to comprehend all aspects of the environment that an observer observes. But the niche of an organism also cannot be made fully transparent from outside of this process. Niche and environment allow for only partial overlap. What appears to an observer as behavior, therefore, must also be seen as a system adjusting itself to compensate for some kind of disruption:

Therefore, every structural change occurs in a living being necessarily limited by the conservation of its autopoiesis; and those interactions that trigger in it structural changes compatible with that conservation are perturbations, whereas those that do not are destructive interactions. Ongoing structural change of living beings with conservation of their autopoiesis is occurring at every moment, continuously, in many ways at the same time. It is the throbbing of all life. (*Tree* 100)

What does an autopoietic system look like from the inside? In observing the action of an organism like an amoeba, they argue, it is clear that there is a correlation being maintained internally between a sensory surface and a motor surface. For the amoeba, these surfaces are the same, and their coupling is therefore immediate. The same process occurs in bacteria with flagella, and is called chemotaxis. For metacellular¹⁶ organisms, the nervous system emerges as the point of interface

¹⁶ “We speak of metacellulars when we refer to any unity in whose structure we can distinguish cell aggregates in close coupling. Metacellularity is present in all the major kingdoms of living beings: monera, protoctists, animals, plants, and fungi. Metacellularity has been a structural possibility from the earliest history of living beings” (*Tree* 87). Maturana and Varela also describe metacellulars as second-order autopoietic systems.

between sensory and motor cells. They describe this process using the hydra, who has one of the simplest nervous systems among organisms. The hydra's behavior results from the dynamic relations that can be formed between sensory and motor surfaces. It should be kept in mind, however, that autopoietic organization and its maintenance take priority over both sensory and motor surfaces, thus forestalling any simple, linear stimulus-reaction interpretation of the relations between these surfaces. Neurons are the cells that connect sensory and motor surfaces. Synapses are connection points that join neurons with each other and with other cells. This basic architecture is universal for all organisms with nervous systems. Organisms with nervous systems differ from those who lack them only in the form and size of the connections between sensory and motor surfaces they are able to make:

This is the key mechanism whereby the nervous system expands the realm of interactions of an organism: *it couples the sensory and motor surfaces through a network of neurons whose pattern can be quite varied*. The mechanism is eminently simple. Once established, however, it permits many different realms of behavior in the phylogeny of metazoa. In fact, the nervous systems of varied species essentially differ only in the specific patterns of their interneuronal networks. (Tree 159)

In their discussion of behavioral domains in *The Tree of Knowledge*, Maturana and Varela describe an experiment on a frog in which the frog's eye was surgically altered 180 degrees.¹⁷ When the other eye was covered, the frog would strike at its prey 180 degrees in the wrong direction. This suggests to Maturana and Varela that organisms are, in an important sense, cut off from any notion of a surrounding world:

This experiment reveals in a very dramatic way that, for the animal, there is no such thing as up and down, front and back, in reference to an outside world, as it exists for the observer doing the study. There is only an *internal correlation* between the place where the retina receives a

¹⁷ "That is, if the prey is below and in front of the animal, the frog will now shoot out its tongue backward and up" (*Tree* 125).

given perturbation and the muscular contractions that move the tongue, the mouth, the neck, and, in fact, the frog's entire body. (*Tree* 125-126)

This and other similar experiments, Maturana and Varela claim, provide “...direct evidence that the operation of the nervous system is an expression of its connectivity or structure of connections and that behavior arises because of the nervous system's *internal* relations of activity” (*Tree* 126). The nervous system is usually modeled as an instrument that collects information and forms representations. This implies that it is a passive recipient of what the surrounding world imprints on it. But since the nervous system is structurally determined, it cannot be affected directly by the outside world in a strictly deterministic way; it must interpret or translate what impacts it, and it must do so in the context of its own autopoietic organization. So the surrounding world can only trigger changes in the nervous system, never dictate them.

The nervous system is a mechanism that keeps structural changes in a metacellular organism within certain parameters: “In other words, the nervous system's organization is a network of active components in which every change of relations of activity leads to further changes of relations of activity” (*Tree* 164). The nervous system has plasticity, which in this context means that it is in constant structural change. In its general organization, a nervous system is invariant, following the developmental path toward a species-specific form. The changes occur in the local characteristics and dynamics of the synapses, and these changes can drastically affect the whole network (*Tree* 168). Maturana and Varela argue that in order to understand how the nervous system functions in its structural dynamics, we have to give up on the idea of an external world that would act as a fixed point of reference independent of ourselves as observers: “The fact remains that we are continuously immersed in this network of interactions, the results of which depend on history. Effective action leads to effective action: it is the cognitive circle that characterizes our becoming, as an expression of our manner of being autonomous living systems” (*Tree* 241).

As observers, we can interpret this organism/environment relationship as a series of representations given by the environment or as a goal-directed process initiated by the organism. Both are inadequate. Maturana and Varela suggest a middle path between a representationalist framework that denies the particular structural characteristics of nervous systems, and a solipsistic model that puts all agency on the nervous system and denies the outside world. They advocate thinking this dichotomy in terms of the organism/observer difference. As observers, we can focus on either the internal dynamics of the nervous system, or we can look at the interactions between the organism and its environment. Both are 'correct', and the confusion between them is only an artifact of being in the position of an observer. Representations are only invoked to explain the gap between these two perspectives. The gap separating an observer from the autopoietic system they observe makes it difficult to think of organism/environment relationships in terms of either semiosis or represented information. Concepts like coding and transmission of information are not part of autopoiesis because they do not refer to the processes that comprise it. Maturana rejects descriptions of genetic and nervous systems as coding or representing information. These systems instead code processes, which specify changes in the organism. They create a bounded domain within which cognition happens:

A cognitive system is a system whose organization defines a domain of interactions in which it can act with relevance to the maintenance of itself, and the process of cognition is the actual (inductive) acting or behaving in this domain. *Living systems are cognitive systems, and living as a process is a process of cognition.* This statement is valid for all organisms, with and without a nervous system. (*Auto* 13)

Thus far, Maturana and Varela give a view of organisms as profoundly isolated from their surroundings, immersed in their own self-referential activity, encountering an outside world only to the extent that it nudges the ongoing autopoietic process into adjusting itself back into a homeostatic state. Like the capability of warm-blooded animals to maintain their body temperature at a relatively

consistent state as long as the outside climate remains within a certain range, Maturana and Varela give a view of life as a series of mechanical, regulative processes. How do they account for evolution, reproduction and communicative relationships among living beings?

Coupling

The autopoietic unity and its surrounding world form a series of relations that engender a degree of stability: they affect each other in a process the authors refer to as reciprocal perturbation. Each of these systems, organism and world, triggers structural changes in the other. They also refer to this set of relations as structural coupling. However, two autopoietic unities can also become linked or coupled in their ontogenies if the ways in which they interact become stabilized, or recurrent. Structural coupling therefore refers to any coupling between two autopoietic unities or between one unity and their surrounding world. Adaptation is an unavoidable result of the necessity of structural coupling between organism and world. Every ontogeny is an individual history of structural change. They call this history structural drift. Both organism and world are subject to structural drift: “This drift will appear to an observer as having been “selected” by the environment throughout the history of interactions of the living being, as long as it is alive” (*Tree* 103). From considering each individual case of ontogeny and reproductive change, repeated over millions of years, linked together over many generations, it becomes possible to see how life evolved a rich diversity of forms via relatively simple processes.

Conceiving evolution in terms of structural drift leads to an important point. There is no way, for Maturana and Varela, to make comparisons between so-called better and worse adaptations. Being alive, they argue, is the only real mark of adaptive success outside of the projections of an observer. The past forms the present, but it is not easily derived from it. The world brought forth in recursive action hides itself:

Biologically there is no way we can put in front of us what happened to us in obtaining the regularities we have grown accustomed to: from values or preferences to color qualities and

smells... all we can do is generate explanations, through language, that reveal the mechanism of bringing forth a world. By existing, we generate cognitive “blind spots’ that can be cleared only through generating new blind spots in another domain. (*Tree* 242)

Since autopoiesis concerns the ability of an organism to remain living by reproducing its components, the production of offspring is not a fundamental necessity for an autopoietic system to exist. Maturana and Varela give the example of a mule as an autopoietic system that cannot reproduce. Evolution and reproduction are not necessary for system maintenance, but they are necessary for the development of the wide variety of cognitive domains that exist on Earth.

Social phenomena, for Maturana and Varela, appear whenever a group of organisms can align some of their actions: “We call social phenomena those phenomena that arise in the spontaneous constitution of third-order couplings, and social systems the third-order unities that are thus constituted” (*Tree* 193). All social phenomena generate a particular internal phenomenology in which every individual ontogeny is part of a network of co-ontogenies. Each individual has to be structurally coupled in reciprocity with the rest. Maturana calls honey bee societies third order self-referring systems, because each individual bee is a self-referring, or second order system (the individual cells comprising the first order), that is integrated into the third order project of maintaining the hive. Third-order couplings are necessary for the continuity of organisms with sexual reproduction, since these organisms have to come into contact for the gametes to cross-pollinate. These couplings are relatively universal in animals, from social insects to humans. In social insects, such couplings take place via the exchange of chemical substances (trophallaxis). Insect third-order couplings are characterized as more rigid than those of vertebrates due to body morphology (*Tree* 188).

In a discussion of Maturana and Varela, Wolfe points out that one of the major innovations of their work is the break it enables with representationalism (Wolfe, *Animal Rites* 2003). Communication is a specific type of behavior, and does not have to do with content being transmitted from one

individual to another: “We call *communication* the coordinated behaviors mutually triggered among the members of a social unity” (*Tree* 193). For bees and other social insects, communicative behaviors are pre-formed. For some organisms, however, communicative social behaviors have to be acquired. They define these behaviors as cultural: “Those behavioral patterns which have been acquired ontogenically in the communicative dynamics of a social environment and which have been stable through generations, we shall call *cultural* behaviors” (*Tree* 201). When two organisms with sufficiently dense neural tissue (and the plasticity that this purportedly enables) interact over time, these interactions can become recurrent: “... and only with reference to that specific ontogeny, in its various degrees of contingency and uniqueness, can we understand the behavior of such animals” (Wolfe, *Animal Rites* 82). In order to maintain these phenomenal domains, organisms communicate.

Insects such as ants, which communicate chemically, do not vary in their ontogenies to a degree at which the communication itself must increase in complexity. Organisms that can give rise to more complex and variable communicative couplings, however, produce what Maturana and Varela term linguistic domains. Language itself appears when these linguistic domains gain sufficient complexity that they start allowing for linguistic distinctions about linguistic distinctions. Linguistic domains are fluid and ephemeral, then. What is crucial for Wolfe here is that the difference between linguistic domains that lead to language and those that do not is a difference in degree but not in kind: “It is not an ontological distinction, in other words, even if it is a phenomenological one” (*Animal Rites* 83). Humans, if they develop in sufficient isolation from other humans, can fail to enter into linguistic domains, and many animal species are easily able to do so, although they will not engage in recursively describing their descriptions to anywhere near the degree of humans. One interesting point that Maturana and Varela make is that this situation should change over time, since linguistic domains are always possibilities in the evolutionary drift of nonhuman phylogenies. What is crucial for Wolfe here is the way these thinkers create a space between language and species that allows for comparison of

both the similarities and differences between and among humans and nonhumans. What remains unclear, however, is exactly how social phenomena which give rise to communicative behaviors can engender meaningful experience. When, in other words, does a nervous system become a subject?

Language, Agency and the Observer

Maturana begins “Biology of Cognition” with a description of the observer. The observer is subject to all of the same rules and laws as the organism under observation. The observer takes the organism as the entity to observe, but the environment in which it lives is also taken into view. So the observer can talk about the organism, the environment, or both together. When two organisms form a social coupling, it is communicative and can be either inborn or acquired. For an observer, both can appear teleological, which is why the observer's point of view is not reliable: “Both instinctive and learned behavior can appear to an observer as coordinations of action, and both can be described by an observer in semantic terms as if what determines the course of the interaction were the meaning and not the dynamics of structural coupling of the interacting organisms” (*Tree* 206-207). Instinctive and learned behaviors differ in terms of the structures that make them possible. In the case of learned social couplings, they are dependent on particular histories or experiences: “We call such learned communicative behavior a *linguistic domain*, because such behaviors constitute the basis for language, but they are not yet identical with it” (*Tree* 207). Linguistic domains, they argue, arise as a result of cultural drift, in a social system, and have no pre-established design. Their form is sort of like a side-effect of structural drift: “The process is one of behavioral transformation contingent on conservation of the social system through the behavior of its components” (*Tree* 209).

Humans are unique for Maturana and Varela in that their linguistic domains make possible, via the linguistic coordination of actions, the domain of language. Language allows for linguistic distinctions, but it also enables linguistic distinctions about linguistic distinctions, dis-articulating the domain of language from the actions it coordinates: “In other words, we are in language or, better, we

“language” only when through a reflexive action we make a linguistic distinction of a linguistic distinction. Therefore, to operate in language is to operate in a domain of congruent, co-ontogenic structural coupling” (*Tree* 210). The key feature of language for autopoiesis is that it allows language users to describe themselves. Language generates the observer, which allows for the generation of the self, which operates in language with other selves; the self consists of linguistic distinctions of oneself in a linguistic domain: “In this way, meaning arises as a relationship of linguistic distinctions. And meaning becomes part of our domain of conservation of adaptation” (*Tree* 211). Consciousness is also described by Maturana and Varela as a new phenomenon made possible by human social life and linguistic coupling (*Tree* 223). Situating consciousness, the self and meaning within language, however, creates a serious limitation for thinking nonhuman lives as meaningful by way of autopoiesis. If meaning is simply the recursive process of making linguistic distinctions about linguistic distinctions, then what Wolfe sees in the above quote as a break with representationalism actually cedes very little—neither meaning, nor consciousness, nor the self—to the nonhuman. Maturana and Varela define behavior as something an observer sees: “Behavior is not something that the living being does in itself (for in it there are only internal structural changes) but something that we point to” (*Tree* 138). There is a gap, therefore, between what we describe as an organism's behavior and any possible experience that organism might have, and that goes for ourselves as well. Humans can observe themselves via language, which engenders consciousness, but there does not appear to be any analogous process available for nonhumans.

In the afterword to *The Tree of Knowledge*, Varela summarizes their argument. There are two fundamental concepts outlined in the text that concern the biology of knowing. The first argues that representationalism is wrong. They argue that all formulations of representationalism have a common denominator: “... that knowledge is based on acquiring or picking up the relevant features of a pre-given world that can naturally be decomposed into significant fragments” (*Tree* 252-253). Autopoiesis

is supposed to offer a great advance over representationalism precisely by formulating a concept of meaning as what entangles organism and environment. Cognition is a process which involves more than just taking in aspects of a static world:

This puts the burden of knowledge on pre-given items in the world and leaves no place for the creation of the significance and meaning proper to the autonomy of the living. When these living qualities are put back into our field of view, what we conclude is not the mere negation of representationism—namely, that the organism invents or constructs its own world at whim—but, more interestingly, that animal and environment are two sides of the same coin, knower and known are mutually specified. (*Tree* 253)

Autopoiesis points to a form of autonomy in the living that is cognitive, in the sense that an organism acts in accordance with its own organization, but mechanistic in the sense that it operates well below any threshold of awareness or conscious agency. The significance and meaning that infuses the living world with autonomy seems, for most organisms, to belong primarily to the closed nervous system. This is not a form of meaning which would make meaningful experiences possible:

To envisage an alternative, nonrepresentationalist viewpoint requires that the autonomy of the living being be given its full place, and this is why the book begins by tracing autonomy back to its very roots, to cellular autopoiesis. The same kind of constructive circularity and internal organization (what we call operational closure) is manifest at the levels of the organism and of the nervous system. This neuronal closure specifies a manner of relation to the medium which entails not picking or processing information, but specifying what counts as relevant, the key point in this alternative viewpoint. (*Tree* 253)

Tracing autonomy from the single cell “all the way up to the human” (*Tree* 254) closes a gap left open in traditional reductionist neuroscience, which exists between the observer and the phenomena they observe. Varela claims that their approach might be more appealing to those in the

social sciences and humanities because it creates a continuum among the work of scientists and the lives of those they study; all are based on the same explanatory principles. What remains unclear in this theory is that, rather than opening up a space in which the differential forms of meaning-making that populate the living world can be described, meaning—and the self, consciousness, thought and the observer—are reserved for human language. For Maturana and Varela, humans live in a species-specific world; we are one example of the kind of autopoietic systems we observe. Human language and knowledge are not supposed to escape this fundamental limitation. Language is a closed system in that it is only able to work recursively on its own descriptions. Yet, rather than articulating it with other meaning-making systems that might be more widespread beyond the human, Maturana and Varela place human meaning completely within language: “We human beings are beings only in language. Because we have language, there is no limit to what we can describe, imagine, and relate” (*Tree* 212).

To situate meaning, the self, and consciousness only within human language makes it difficult to pinpoint what is distinct about pre-linguistic behaviors like social communication and linguistic domains that truly distinguishes them from the more primordial process of autopoietic maintenance. Linguistic domains are described as ontologically open to the possibility of language, yet the acquisition of language seems to require a leap across an abyssal gap. Autopoiesis jettisons representationalism, but it does so by making meaning relatively unimportant. In one sense, the relationship between an autopoietic unity and its environment is an autonomous, cognitive process. Organisms do not passively receive information but select those aspects which they require to maintain their autopoiesis, and in this way they are autonomous. In the other sense, the process of autopoiesis seems to be a strictly mechanistic process that lies beneath any form of awareness or sentience. The impression that organisms are devoid of meaningful experience is compounded when Maturana and Varela situate meaning and the emergence of the self only in human language. There is a gap between the process that comprises any autopoietic system and the meaning-making that emerges in human

language, and it is in this gap that an understanding of nonhuman animals as living lives that are meaningful for them would be described.

Conclusion

For Uexküll, action informs perception. He makes a crucial point about perception in his discussion of higher *Umwelten*, a point that does not get enough consideration. Uexküll argues that, especially when trying to understand an animal that is physiologically very distant from the human, it is essential to try to discern what kinds of effect tones accompany the perception of an object. What an organism perceives is not understood without also understanding something about the actions that that organism can perform. Uexküll argues that action informs perception, it is there at the beginning, and is bound up with perception to a degree that cannot be eliminated. Organisms perceive their surroundings, at least partly, as acts, an insight that complicates representationalist theories of meaning:

If we want to use effect images for the portrayal of environments of animals who are farther away from us, we must keep in mind that these images are acts of animals which are projected into environments, which confer meaning upon perception images only through the effect tone. For the presentation of things important for life in the environment of an animal, we shall therefore have to provide their sensuously given perception image with an effect tone in order to fully grasp its meaning. Even in those cases where there is not yet a spatially articulated perception image, as with the tick, we may yet say that, in the case of the only three meaningful stimuli which the tick receives from its prey, the meaning connected to these stimuli—falling off, running around, and boring in—comes from the effect tones. The selecting activity of the receptors, a sort of main gate for the stimuli, certainly plays the leading role, but only the effect tone connected with the stimuli confers infallible certainty upon it. (*A Foray* 94)

Thinking about perception in this manner, Uexküll argues, is the only way to make sense of nonhuman meaningful experience. An organism that can only perform a few actions will only perceive a few

objects. The number of things a body can do will increase the amount of phenomena a body can interact with and experience.

Experience is a major driver of perceptual complexity in many *Umwelten*. Each new experience makes possible new perception images with new effect tones. Dogs living with humans increase their repertoire of meaningful objects, but do not approach anything close to the number of objects in a human house that are significant for the human inhabitants. The diagrams comparing human, dog and fly views of a room are meant to illustrate this. They do, however, work backwards from the human by process of elimination, which fails to grasp what is significant for creatures other than humans. They are also ocularcentric, even anthropocularcentric. For the tick, there is only one kind of mammal, one irreducible type. Uexküll calls this a common denominator. There are real animals in the tick *Umwelt* that only exist as abstractions for humans:

In our human environment, there is no mammal-in-itself as intuitable object, only as a notional abstraction, as a concept which we use as a means of analysis but never encounter in life. With the tick, this is completely different. In its environment, there is a mammal that is composed of few properties but thoroughly intuitable, one which corresponds exactly to the tick's needs, since these few properties serve the tick's abilities as counterpoints. (*A Foray* 179)

The group of animals designated as mammal, at least from the perspective of humans, only comes into view via the history of physiological study and categorization practices. For ticks, there are mammals, they are not abstractions, and there is nothing gained by further differentiating them into sub-categories. Yet the tick way of living can be too easily interpreted as a loss or diminishing of the world relative to human experience. However, there is no ground in the *Umwelt* framework for privileging the fidelity enabled by an organism's perceptual systems over the successful actions an organism performs in that environment. Such a value hierarchy is simply an arbitrary fixation on human sensory apparatuses and the accounts of the world that they most easily afford. There is no justification outside

of human (or perhaps mammal) experience for such distinctions. I am not advocating for ticks here, but situating valuing within human meaning-making.

Autopoiesis adds an evolutionary, temporal explanation for many of the themes Uexküll describes with reference to nature's plan. Contemporary knowledge of complex, self-organizing systems fills in more of these gaps (see for example Sagan, "Umwelt after Uexküll" 18-19). Developmental systems theory (DST), for instance, shakes our understanding of life processes out of a narrow focus on genes. Theories of evolution and development are being broadened, opening up the possibility that nonhuman perceptual and social worlds might take on new significance: "Our basic claim is that biological thinking about heredity and evolution is undergoing a revolutionary change. What is emerging is a new synthesis, which challenges the gene-centred version of neo-Darwinism that has dominated biological thought for the last fifty years" (Jablonka and Lamb 1). According to Susan Oyama, genetic influences are assigned far too much importance among the driving forces of ontogeny, despite the acceptance of some environmental component being necessary in each case.¹⁸ The prevalence of information metaphors in contemporary biology, Oyama claims, leads to the minimization of context sensitivity and developmental contingency when studying genetic factors in development: "As long as the DNA is thought of as containing information about developmental outcomes, it will seem sensible to inquire whether outcomes occur because they are represented in the chromosomes" (Oyama 3). A trait that is seen as represented in the DNA appears to be part of the inner essence of that organism, making other influences seem like deviations and interference. DST turns this relationship on its head. For example, rather than assuming that development is programmed or preformed in genes, DST describes it as a dynamic process informed by genetic, epigenetic, social, and cultural factors: "The life cycle of an organism is developmentally constructed, not programmed or preformed. It comes into being through interactions between the organism and its surroundings as well

¹⁸ See also Lewontin.

as interactions within the organism” (Oyama 4).

Rather than focusing on super- or sub-organismic selection, DST retains the Darwinian focus on the organism, not by excluding other factors but by expanding the understanding of an organism: “Organisms are viewed by DST's proponents as self-organizing processes rather than as discrete, hard entities on which “forces” impinge. Developmental resources often lie beyond the traditional boundary of the ontologically hardened organism—in the environment, for example, and especially in that part of the environment of some species that can be called cultural” (Depew and Weber 241-242). An organism conceived as a dynamic process does not develop through strict adherence to a set of instructions in the DNA but is rather an ongoing process of construction. For DST, experience must be taken together with strictly genetic explanations of evolution and ontogeny. For a theory of meaning, what is needed is more detailed focus on what, via experience, enable the forms of meaning-making that, as Depew and Weber argue, play a role in ontogeny for at least some species. Autopoiesis suggests that communication engenders these domains, yet communication may also be understood as nothing more than the syncing up of behavior, which is itself a series of adjustments made by the nervous systems of organisms to maintain their organization. It is difficult in this scenario to think of organisms, especially language-less nonhumans, as anything more than effects of autopoietic self-maintenance.

This difficulty is compounded when Maturana and Varela claim that the self, the observer, consciousness and meaning emerge only from language. This is insufficient in itself, as Wolfe points out (*What is Posthumanism?* 37). Further explanation is required in order to prevent linguistic domains from collapsing back into the mechanism of autopoiesis. One such explanation is explored by John Mingers. For Mingers, linguistic domains are fundamentally symbolic. Organisms who are capable of learning must learn to interact by way of symbols:

The consensual domain is thus a domain of arbitrary and contextual interlocked behaviors.

Much animal behavior involves coordinating actions of this type, e.g., courtship, nest-building. Some may be instinctive, e.g., the dance of bees, but most is learned through the structural drift of the organism through its life. This learned consensual behavior Maturana terms linguistic, although it is not yet language. It is distinguished by its symbolic nature—i.e., that the action stands for something other than itself. For an observer, such coordinating conducts can be seen as a description of some feature of the organism's environment. (Mingers 78)

Human language would simply be the recursive application of this symbolic process back on itself: “Language itself only emerges when the nervous system can interact with its own symbolic descriptions. Once this level of abstraction has been reached—i.e., the description of a description—the entire space of language is opened up, as is the observer and the self-conscious self-observer” (Mingers 78). Yet if there is no self and no observer prior to language, it remains unclear what it means to claim that social vertebrates learn how to manipulate symbols.

Between the relation of the nervous system to itself that comprises the process of autopoiesis, and the emergence of the self in language, there is a gap. Without elaborating on the sense of self that is active in linguistic domains, autopoiesis is missing a crucial component necessary for a theory of meaning that can ground meaningful experience. For Maturana and Varela, social insects differ from more complex animals because their ontogenic possibilities are relatively fixed. They do not have to coordinate their behaviors, because their behaviors are already pre-coordinated. Humans are relatively free to make and share descriptions of the world, and we enjoy a relation to ourselves that is mediated by language. But when it comes time to describe the social realm as it exists beyond insects and humans, we find that, for Maturana and Varela, our ascriptions of intentionality to their coordinations of behavior are to be understood merely as an effect of being in the position of the observer.

Chapter 3: Phenomenology and Animality

We must understand life as the opening of a field of action.
–Merleau-Ponty, *Nature* 173

Introduction

Phenomenology has a long history of reflection on nature and nonhuman meaning beyond the subject/object epistemological distinction (Painter and Lotz 4). In this chapter I look closely at how Heidegger and Merleau-Ponty engage with the biological sciences of the early 20th century in their attempts to articulate a phenomenologically inspired ontology of the organism. Both phenomenologists' engagements with modern biology take place in lecture courses, and both turn to Uexküll, among others, for help in negotiating an understanding of life that avoids the extremes of vitalism and mechanism. In their lecture courses (Heidegger, *Fundamental Concepts*; Merleau-Ponty, *Nature*), Heidegger and Merleau-Ponty discuss animals and animality patiently and explicitly, and both also comment extensively on the relationship between phenomenology, ontology and science.

Heidegger is a crucial figure for contemporary animal studies and critical posthumanism.¹⁹ As I argue below, he offers a view of nonhuman animal life that resonates in many ways with those expressed in the last chapter. Unfortunately, however, his work does more to cast doubt on the viability of a concept of nonhuman meaning than to push it forward. For Heidegger, meaning is precisely what is lacking in nonhumans. This view of meaning follows from Heidegger's thesis demarcating world-forming humans from poor-in-world animals and worldless stones.

Merleau-Ponty engages in a dialogue with the biological sciences in order to put forward a view of life as interrogative and expressive. He builds on Uexküll's concept of melodic relations to describe development and behavior as future-oriented, as complex multispecies entanglements, and in some

¹⁹ See Buchanan's discussion of *Mitsein* ("Being with Animals"), Wolfe's discussion of enframing (*Before the Law*) and Elden's discussion of *logos* for just a few examples of Heidegger's continuing importance in the conceptual overlap between animal studies and critical posthumanism.

cases as dream-like or proto-cultural. His concept of strange kinship is particularly useful for contemporary theory, as I discuss (with reference to Kelly Oliver) in the conclusion.

Merleau-Ponty's view of nonhuman animal life differs from Heidegger's in many ways, despite their common methodological starting point and shared interest in Uexküll and other key figures in the biological sciences of the early 20th century. One important difference between the two concerns how they see the relationship between science and philosophy. For Heidegger, one of the tasks of philosophy is to articulate the metaphysical assumptions and insights upon which the sciences rest, but which they themselves are not in a position to unearth. For Merleau-Ponty, the relationship between science and philosophy is one of mutual influence across disciplines with very different methodological orientations. While Heidegger seeks to clarify what the sciences can only hint at vaguely, Merleau-Ponty approaches the sciences as a distinct and productive set of strategies for making sense of the living world that both shape and must be shaped by the very different focus of philosophical inquiry.

How does phenomenology differ from the scientific approaches to self-reference, access to an environment beyond the self, and intersubjective relations with other organisms explored in the previous chapter? The prosthetic extensions of human *Umwelten* described by Uexküll and the heavily qualified role of the observer described by Maturana and Varela imply that the human is ultimately one biological system among others, and that human access to the world cannot simply be taken for granted. Phenomenology looks carefully at the form of human experience itself, offering highly insightful and instructive accounts of “what it is like” (Nagel) from within one of these biological systems. Phenomenology produces accounts of subjectivity, intersubjectivity, alterity, opacity, and a great many other phenomena that concern both human and nonhuman experience. Because it takes human meaningful experience as its starting point, however, phenomenological insight into nonhumans depends on the kind of access afforded by its method.

The critique of naturalism is a constitutive aspect of phenomenology. Scientific naturalism,

according to Thompson (“Review”), is the view that science offers the best description of reality. It has both ontological and methodological aspects. Physicalism is the ontological belief that everything can be reduced to physical presence. The methodological component argues that the methods of empirical science give the most accurate and authoritative understanding of reality and therefore must be privileged. Importantly, Thompson argues that naturalism is neither a scientific thesis nor a necessary conclusion of scientific work but a philosophical position extraneous to any particular scientific enterprise.

Phenomenologists argue that methodologically, naturalism cannot examine the foundations of its own position. If consciousness is viewed as a biological property of an organism, for example, humans must therefore account for the fact that human consciousness is a prerequisite for detecting the appearance of consciousness in any organism at all. Naturalism also overlooks the life-world, the intersubjective context in which meaning operates. Nature is always disclosed to the knower within a world, or a complex of meaningful relations. One must begin with the world and with meaning and work through the implications of this meaning-structure. But because this world of meaning is always initially a human world, any phenomenological exploration of nonhuman experience is complicated from the start.

Is the phenomenological method a viable way of understanding nonhuman meaningful experience, or do the insights of phenomenological investigation find their utility only as complementary elements within a different epistemological and/or ontological context? While I do not offer definitive answers to this question, I argue that phenomenology has a great deal to offer a critical posthumanist theory of meaning. The next two sections consist of close readings of Heidegger's and Merleau-Ponty's lecture courses, focusing especially on those sections that engage with biological and ethological knowledge. In the conclusion, I put these readings back into discussion with critical posthumanism.

Heidegger: *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*

Heidegger's Method

Heidegger begins his lecture course by offering a provisional definition of world as “within the whole” (*Fundamental Concepts* 5). Finitude is our being driven to this whole, while solitude or individuation is the nearness to the whole brought on by finitude. Metaphysics is about developing these vague concepts through careful, painstaking attention. A fundamental attunement, in this case profound boredom, is the phenomenon that allows for pursuit of a deeper understanding of these concepts. Why not be more precise or more clear? For Heidegger, philosophy is first a question of method, and his lecture course is meant as a pedagogical example of the inseparability of philosophical method and results. Heidegger is insistent on the fact that philosophy is irreducible to science. In fact, he places philosophy alongside art and religion, while science is characterized as merely a kind of servant to philosophy. While science collects facts and relates them in a relatively straightforward way, a proper philosophy tries to stay with a particular phenomenon, gradually sinking into a more primordial and profound understanding of it in its essence. Miguel de Beistegui explains how Heidegger distinguishes philosophy from the sciences, both in method and in rank, insulating his metaphysical framework from the sciences by a very selective engagement with empirical evidence:

What Heidegger is seeking, therefore, in some aspects of zoology and biology from the beginning of the last century is the empirical *confirmation* of the essentially metaphysical thesis regarding the poverty-in-world of the animal. The specific manner in which Heidegger interprets carefully chosen developments in zoology and biology is crucial here. For this turn to science is entirely contained within the discussion of animal life, and thus within the metaphysical difference established at the outset between animal life, understood in terms of world poverty, and human life, understood in terms of world constitution. In other words, the turn to zoology and biology is ultimately not allowed to threaten the metaphysical distinction

itself, not allowed to overflow into the essentially metaphysical characterization and destination of the human. (Beistegui 112)

In articulating his view of metaphysics in its independence from the sciences, Heidegger makes a firm distinction separating humans from all other animals. Metaphysics, whenever one tries to grasp it in its essence, withdraws behind the question of what it is to be human. Heidegger argues that metaphysics is not like linguistics or zoology, which offer courses full of facts about language or animals that are to be collected, written down, remembered, or interpreted in relation to other facts. It is only by way of the human itself that metaphysics can proceed. The method of philosophy is directed inward; understanding only arrives via a strict adherence to *Dasein*.²⁰ For this reason, Heidegger cautions against attempts to saddle philosophy with scientific facts, moralizing principles, or any demand for utility. To demand these kinds of results from philosophy is already to abandon a truly philosophical method. Philosophy only happens beneath the level of pre-formed conceptual structures and discursive conventions upon which something like a science rests: “The non-philosophizing human being, including the scientific human being, does indeed exist, but he or she is asleep” (*Fundamental Concepts* 23). Heidegger elaborates on the particularity of the philosophical method as he practices it:

In the sciences our listening takes us a step forward every hour; each day gives us a further cluster of notes and a few more sheets. Yet *we* have less each day, each hour we make less progress and have instead increasingly approached a standstill. Not only that, but we have perhaps worn through the ground we were standing on to begin with, we have perhaps reached a place that is groundless, and begun to float, entered an *attunement*. (*Fundamental Concepts* 160)

A fundamental attunement is akin to a mood or feeling. Traditionally, moods and feelings were treated as relatively unimportant and derivative in comparison to other mental phenomena like thinking

²⁰ *Dasein*, or “being-there,” is Heidegger's term for human existence. He discusses this concept extensively in *Being and Time*.

or willing. Heidegger argues that, in addition to the everyday flux of feelings, there are more fundamental or primordial moods underlying experience, which have a very particular ontological priority. A fundamental attunement is a kind of pre-attitude or base layer that colors *Dasein*, shaping how we are 'there' in the world with others. We cannot simply bring a fundamental attunement to consciousness the way we can recall a fact, Heidegger argues, because this would destroy or cut off what is essential in it. A fundamental attunement is like a melody; it sets the tone for how we are in the world. Because it lies in a conditioning relationship to human consciousness, a method is needed that somehow allows this structuring phenomenon to come into view. Heidegger says that we have to inhabit a fundamental attunement, or let it inhabit us.

The fundamental attunement that Heidegger tries to tune into in this lecture course is boredom. The German word for boredom is *Langeweile*, or "long while," and has to do with *Dasein's* relation to time. Profound boredom gathers together three phenomena: *Dasein* in relation to things as a whole (world), possibility for *Dasein* in this relation (individuation), and the rupture between things as a whole and possibility (finitude).

Heidegger's primary goal is to shed light on what the concept of world means. He lays out three possible paths of approach to this concept. In *Being and Time*, he pursues the concept of world via a phenomenological study of human *Dasein*. He adds to this the possibility of a historical approach that would trace how the idea has been taken up throughout the history of philosophy. Finally, he describes the present lecture course as a comparative approach. The course is an attempt to understand how *Dasein* is related to world by comparing it to a nonhuman animal's relation as well as a stone's relation (or lack of relation). Heidegger claims that there is not enough time in this seminar to even begin to follow along the path taken in *Being and Time*. Instead, he will try the comparative route. His initial claim is that the human is world-forming, while the animal is poor-in-world and the stone is worldless. It will become clear, however, that this initial claim regarding human/nonhuman difference is in fact

dependent on his earlier account of *Dasein* (McNeill 237). Prior to any attempt to understand nonhuman animal being, Heidegger has already sketched out its limits via his account of *Dasein*.

Heidegger claims that the initial tripartite thesis he puts forward is in fact an intuitive, immediate way of formulating the problem of world in a comparative fashion. On one hand, Heidegger asserts, there must be some kind of essence of the animal, and another essence of humanity, but also an essence of the living that separates animals and plants from nonliving objects. On the other hand, he cautions that it is not at all clear what kind of method is appropriate for obtaining access to these essences. Physiological knowledge, animal psychology, and other forms of scientific knowledge already presuppose the essences that philosophy seeks to clarify. If they did not, they would never be able to delineate their objects of study in the first place. Heidegger believes that these sciences are ill-equipped to turn back and recursively examine their fundamental assumptions. It takes a rigorous, sustained phenomenological meditation to carefully draw them out. Heidegger's method is not, therefore, interested in speculating from scientific studies. Rather, it is more like an excavation in search of making explicit what must be left unsaid so that a science can function.

Heidegger claims that every science is susceptible to moments of progression and regression, dictated by the quality of questioning they pursue. Sciences are also historical because the fundamental position a science takes with respect to its domain tends to change from time to time. Heidegger is satisfied with the biology of his time because it seeks independence from physics and chemistry. This drive to independence suggests that the biological sciences have some kind of access to the domain of life itself, an access more direct and fundamental than any attempt to understand nonhuman animals by grafting a human psychology onto physiological knowledge: "For if we follow this path we shall fail to address the question from the perspective of the animal, and simply misinterpret in turn what has already been misinterpreted and distorted by the physico-chemical perspective, employing a psychology crudely adopted from the human domain" (*Fundamental Concepts* 189).

How does new research in the sciences relate to the fundamental metaphysical orientation that serves, in Heidegger's opinion, as its ground? These two spheres have some mutual independence according to Heidegger, so that stagnation in one area does not entirely impede progress in the other:

We cannot separate metaphysics and positive research, playing them off against one another in this manner. They are not two consecutive phases of a production process. The relation between them cannot be established in a rationalized, technical sort of way, as if science and metaphysics simply represented two branches of a single industrial concern, the former supplying the facts and the latter providing the fundamental concepts. (*Fundamental Concepts* 189)

Instead, Heidegger sees their inner unity as a matter of fate: a science needs leaders who have an original solidarity with the most elementary aspects of their fields, and their contemporaries must be able to recognize and support these leaders and allow them to “be-there.” Apart from this internal coherence within a science, there must be an inner readiness for cooperation between that science and metaphysics, in which both are turned toward what is essential in their subject matter. For Heidegger, the positive signs coming out of biology in its search for independence are overshadowed by a mutual indifference between philosophy and science. The two fields see themselves as far apart in their concern, and they see this distance as a good thing. Heidegger seems to suggest, on the other hand, that their divergence from one another is a sign of their divergence from what is essential. Their becoming aligned in shared focus on the essential seems to be a matter of fate because no one force from either domain can bring about this alignment.

Heidegger begins by positing, via his tripartite thesis, an abyssal distinction between human and animal, while simultaneously questioning how it is possible to make such distinctions. How is it possible to determine the essence of life? How are living beings accessible? These questions have to be pursued in a circular fashion:

In the course of our comparative considerations both of these questions must be left open, but that also means that we must always have some answer ready, however provisional and tentative, in order to guide us as we pursue our comparative considerations. On the other hand, these comparative considerations can and must ultimately make some contribution toward the clarification and possible answering of these questions. (*Fundamental Concepts* 179-180)

The concept of transposition marks the mode of human access to nonhuman animals in Heidegger's course. Is it possible to transpose oneself into another animal? What about a stone? Heidegger points out that, at least under the influence of the modern philosophical concept of the isolated individual subject, it is already questionable whether we can transpose ourselves into another human, and it is not clear to what degree we can ever be successful in our attempts (*Fundamental Concepts* 206). What is the being of nonhuman animals insofar as they might permit or resist human access to them? Heidegger claims that we already know, in each particular case, something about how we might access a specific being. Transposing oneself into another being means going along with that being, in a way that lets it be both what it is and how it is: "Such going-along-with means directly learning how it is with this being, discovering what it is like to be this being *with* which we are going along *in this way*. Perhaps in doing so we may even see right into the nature of the other being more essentially and more incisively than that being could possibly do by itself" (*Fundamental Concepts* 202).

By transposition, Heidegger means neither actual transference into another being, nor simply a thought experiment in which we imagine what it is like to be another being. In some sense, we humans already know it is possible to transpose ourselves into another living being in a way we would not be able to do with a stone. Heidegger distances himself from idealism and much of modern philosophy since Descartes in refusing to see the human as an isolated consciousness that must then find a way out of itself and connect with others. *Dasein* is with others (*Mitsein*) from the start. Heidegger implies that we are also somehow already with other animals as well. We must simultaneously study ourselves and

trace the behavior of another organism in order to understand its being.

Heidegger's Thesis

Following this excursion into the relation between the sciences and metaphysics, Heidegger turns back to the claim that the animal is poor-in-world, while the human is world-forming. At first, this claim seems like one of degree. It might seem as though world-forming means having access to more beings than poor-in-world animals do. This is untenable for several reasons. For one, falcons have better eyesight than humans, while dogs have a better sense of smell (*Fundamental Concepts* 194). So, some animals seem to have more access to the world in some respects than humans. Heidegger also asserts that humans can sink lower than any animal, which suggests a different kind of comparability between human and nonhuman animal being than any straightforward hierarchy of degree (*Fundamental Concepts* 194). Stuart Elden points out that *logos*, which gives rise to human speech, also gives rise to a particularly dangerous form of calculation (enframing, regulating, controlling, exploiting, turning beings into objects, etc. See Heidegger, *Basic Writings* 307-342). Making the world into something calculable is an aspect of *logos* that finds a powerful expression in Cartesian thought (Elden 284). Elden suggests that this form of calculation is what Heidegger has in mind when he claims that humans can sink lower than any animal (Elden 285).

There is thus no clear hierarchy of degree between humans and other animals, according to Heidegger. Neither is there any obvious hierarchy internal to animality separating “higher” from “lower” animals. This is not necessarily a good thing for animals, however. Heidegger is not trying to argue against privileging some animals over others—great apes or mammals over birds and fish, for example—out of a benevolent concern for arbitrarily devalued species. Instead, he is trying to corral all animals together into one homogeneous group in order to drive home the point that there is but one single animal essence: “Every animal and every species of animal as such is just as perfect and complete as any other. Thus it should be clear from everything we have said that from the outset this

talk of poverty in world and world-formation must not be taken as a hierarchical evaluation”

(*Fundamental Concepts* 194).

Heidegger begins to clarify what being poor might mean. Being poor means being deprived, and there are two senses in which animals might be deprived that are different than the sort of “having access to fewer beings” he just eliminated from consideration. Being poor in the sense of being deprived can relate to being poor in mood, similar to a state of melancholy, or it can mean poor in the sense of meagre, like a partially blocked water tap. Heidegger wants us to keep both of these senses in mind as he begins to look more closely at animality. Heidegger continues to circle around the problem of animal poverty by turning back to the concept of world. If being poor means being deprived, does that mean that the animal in fact has no world? Is the animal then the same as a stone? For Heidegger, the animal is caught between the human and the inorganic material object; it somehow has a world and also does not have it. He introduces the example of a lizard sunning itself on a rock in order to once again draw out the different ways in which humans, animals, and inanimate objects relate to world:

The stone is without world. The stone is lying on the path, for example. We can say that the stone is exerting a certain pressure upon the surface of the earth. It is 'touching' the earth. But what we call 'touching' here is not a form of touching at all in the stronger sense of the word. It is not at all like *that* relationship which the lizard has to the stone on which it lies basking in the sun. And the touching implied in both cases is above all not the same as *that* touch we experience when we rest our hand upon the head of another human being. (*Fundamental Concepts* 196)

Heidegger goes on to explain that the rock clearly has no intentional relation to what it is in contact with, where it sits, what happens to it, and so forth. The lizard, on the other hand, seeks out the warm rock in a deliberate manner. It relates to things, Heidegger explains, and so has some form of access to them, even if it will never ponder the mineralogical makeup of the rock upon which it sits. In the above

quote, it is still possible to follow Heidegger and see something close to an *Umwelt* theory. The lizard does not touch in a human way, one might say. Lizards have lizard ways of touching, perhaps, and we can push this distinction to the point at which we might need a new term for touching that marks this difference:

One is tempted to suggest that what we identify as the rock and the sun are just lizard-things for the lizard, so to speak. When we say that the lizard is lying on the rock, we ought to cross out the word 'rock' in order to indicate that whatever the lizard is lying on is certainly given *in some way* for the lizard, and yet is not known to the lizard *as* a rock. (*Fundamental Concepts* 198)

Is Heidegger simply worried about anthropomorphism? He stresses that the rock is not accessible to the lizard *as* a rock. A blade of grass is not accessible *as* a blade of grass for the beetle that crawls along it. Up to this point, despite the terminology of poverty, Heidegger could still be read as ultimately putting forward a somewhat tortuous argument cautioning against anthropomorphism. He could be suggesting that animals are simply poor in *human* access to the world, in the sense that humans are poor in the kind of access to the world afforded by a hawk's eyes or a dog's nose. This is ultimately not the case, however. A metaphysical understanding of animality goes far beyond the limits of an *Umwelt* theory that would merely stress the incommensurability of lizard and human worlds. The animal, for Heidegger, is an intertwining of the extremes of having a world and not having a world. His method is built around circling and delving down into the depths of the original, intuitive tripartite thesis he put forward. It seems that he is unwilling or unable to change course at this point and modify his original assumption. Instead, he takes it as axiomatic that the human is world-forming, and that this world-forming constitutes an essential difference between humans and all other animals.

We humans already know from everyday experience, Heidegger claims, that we transpose ourselves into animals, and even plants (*Fundamental Concepts* 210). We can transpose ourselves into the animal, but that does not mean that the animal has a world. Where are we transposed to in that

case? The animal is poor in world; it is deprived of something. We cannot say exactly what this is, because we do not yet understand world. These are the premises from which Heidegger proceeds. To move forward, he claims, an understanding of the essence of animality is necessary. The sciences help in this task, but only if their results are given a careful metaphysical interpretation. Once animality is comprehended more adequately, a clearer idea of what “world” means will be possible. Then we will finally be in a position to understand why the animal is poor-in-world.

Heidegger characterizes being with animals as a one-way street (in which only humans have access), but not without significantly complicating his argument. In reference to domestic animals such as the dog, Heidegger chooses his words very carefully (*Fundamental Concepts* 210). The dog, for Heidegger, belongs to the house, it is domesticated, and it is with us in some way. We enable the dog to live in the house, for example. We enable domestic animals to move through our spaces. They are not 'with' us, but we are 'with' them. Dogs live but do not exist; they feed but do not eat. The dog, for its part, is entirely passive in Heidegger's account. There is no sense in which an animal must negotiate a human environment. There is no sense in which the dog must actively learn to be 'with' humans. We *keep* the dog with us, it does not *stay* with us. There is a carefully crafted attempt here to place as much distance as possible between the free human and the behavior of the animal, which seems at this point to be passive, unreflective, and perhaps even mechanistic.

The Organism

Heidegger devotes a great deal of his lecture, however, to showing how the animal is not in fact like a machine at all. He claims first that the organism, rather than the cell, is the basic unit of life, and that the unity of the organism is its primary quality. He strives for a middle road between mechanistic and vitalistic conceptions of the organism. While vitalism, at least in its modern iteration, is dismissed outright as a meaningless theory that merely relocates the essence of life rather than explaining it, mechanism is given much more careful consideration. Heidegger lays out a series of distinctions

between organisms, organs, machines, equipment and instruments. The most important result for understanding animality is the claim that an organ, unlike an instrument, is subordinate and ontologically subsequent to the unity of the organism and its capabilities. To understand this relationship better, Heidegger argues, we might look at lizards and dogs and some more of the animals that have the largest variety of capabilities. Heidegger argues that, in fact, it is better to study the simpler, unicellular organisms in order to see clearly how organs serve capabilities. Heidegger will draw on Uexküll and other contemporary biologists at this point for scientific evidence. It is implied here, given his tripartite thesis, that unicellular organisms are at base the same as dogs in their essence, and that human bodies and their organs are not comparable to animal organs.

Tiny unicellular creatures demonstrate the way in which organs are subordinate to the capabilities of the organism, because in some of these creatures, the organs are ephemeral arrangements: “The tiny protoplasmic creatures are structureless and formless. They display no firm animal shape at all and that is why we describe them as polymorphic creatures. They have to form their necessary organs individually in each case, only to destroy them again in turn. Their organs are therefore temporary organs” (*Fundamental Concepts* 224).²¹ Of course, just because they might not last long does not mean these organs are any different functionally than the relatively more permanent organs of dogs, and for that matter, it does not alone make them different from human artifacts like hammers. Both have the character of in-order-to: intrinsic possibilities they offer for particular applications. What differs, for Heidegger, is the way in which they offer these possibilities. A piece of equipment such as a hammer is made according to a plan of use, and it has a finished quality. An organ, on the other hand, serves a capacity, and the capacity serves the organism.

Something capable is not planned, but regulates itself. It drives itself toward what Heidegger

²¹ Some of the empirical details Heidegger draws on in his discussion of unicellular creatures have changed significantly since the time of his lecture course. Similar issues arise in Merleau-Ponty's and Uexküll's work. For the most part, these details do not affect the larger points the authors make, so a lengthy discussion of their relationship to recent science would detract from the argument in most cases. Exceptions that have a significant impact on the theoretical concepts, such as Uexküll's problematic interpretation of Darwinian evolutionary theory, are identified when they arise.

terms its “capability for...” (*Fundamental Concepts* 228). Capability is instinctually driven. Drive, in turn, has a dimensional—ongoing, striving—character, and can never be said to be finished or completed in the way that a hammer, once made, is finished. An organism is characterized by a fundamental drive that activates a whole series of driving forces. This self-driving movement always anticipates a possible range of action in a way that is not conscious, soul-bearing, or purposive: “The regulation which always lies embedded in the capacity as such is thus a structure of instinctually organized anticipatory responses in each case which prescribes the sequence of movements that arises as soon as the capacity comes into play” (*Fundamental Concepts* 229).

Heidegger gives another example from the life sciences of his time to illustrate the organ/organism relation. Researchers were able to recover an image from the retina of a glow worm. Can this image tell scientists what the glow worm sees? Heidegger argues that it cannot, because the eye of the glow worm is shaped by a capacity which cannot be understood unless something is known about what kind of environment or sphere of concern the glow worm inhabits. An isolated eye sees nothing. What is essential is not what the glow worm sees, but *how* it sees. We also cannot compare the animal's seeing to our own, because human seeing has a different manner of being than an animal capacity, which relates back to the whole organism: “This capability articulating itself into capacities creating organs characterizes the organism as such” (*Fundamental Concepts* 235).

Behavior

Heidegger characterizes animal life as behavior. Humans do not behave but comport ourselves toward things. The difference is in the instinctual drive that underlies animal behavior:

Capability is instinctual, a driving forward and maintaining oneself in being driven toward that which the capacity is capable of, toward a possible form of behaviour, a drivenness toward a performance of a particular kind in each case. The behaviour of the animal is not a *doing and acting*, as in human comportment, but a *driven performing* [Treiben]. In saying this we mean to

suggest that an instinctual drivenness, as it were, characterizes all such animal performance.

(*Fundamental Concepts* 237)

Behavior, Heidegger asserts, should not be thought in terms of an organism's perceptual relationship with an outside world. Behavior is instead directed inward; the animal is absorbed in itself: "Behaviour and its forms are not something which radiate outward and allow the animal to run ahead along certain paths. Rather behaviour is precisely an *intrinsic retention* and *intrinsic absorption*, although no reflection is involved" (*Fundamental Concepts* 238). Heidegger terms this self-absorption captivation [*Benommenheit*]. What kind of relation to what is outside itself does the animal possess? Heidegger turns to bees in order to understand behavior more precisely. He turns away from domestic animals and animals like primates because he wants to avoid examples of behavior that would appear confusingly similar to human comportment. He resolutely refuses to entertain any possibility of common ground between humans and other animals. Likewise, bees and great apes, he implies, share the same animal essence that homogenizes them and distinguishes them from humans.

The bee lands on the flower and drinks the honey. When the honey is no longer present, the bee flies away. But, is the honey ever present for the bee? Or is the bee's behavior just a kind of driven performing? What governs the bee's behavior, if not the presence-at-hand of the honey? Heidegger mentions the infamous bee abdomen experiment as evidence that the bee does not stand in any kind of subject-object relation to the honey. Rather, the bee is taken by the honey by way of its instinctual being driven. This is very clearly an entirely passive notion of animality. When the bee has an abdomen, it can be satiated by enough honey. Then its instinctual feeding activity is inhibited. If it has had its abdomen cut out, it does not stop drinking the honey. It is no longer a unity. The organism is the unity of its capacities, and it is these capacities that drive its behavior. Driven activity is what Heidegger means by behavior. Once the normal bee is satiated, the instinctual drive changes into a drive to fly back to the hive. The behavior of an animal is a constant loop of actions that are driven

along. This seems to suggest that there are no peaks and valleys in the animal's affective life, and thus no interiority at all: “The flight back to the hive is just as captivated as was the sucking, it is merely another form of captivation, i.e., another case of the bee's behaviour” (*Fundamental Concepts* 243).

Heidegger is adamant that the animal has no world, but he is also clear that the animal has no environment. At most, he refers to a “so-called environment” (*Fundamental Concepts* 248) or “something resembling a surrounding environment” (*Fundamental Concepts* 253). The animal has no ability to experience being. It is suspended between itself and its environment, but even this is not really adequate, since it relates to neither of these things in any clear way. The more we separate the animal from itself and its surroundings, the more difficult it becomes to describe what is happening with it. The instinctual drives of the animal are said to form a ring that encircles it:

Instinctual drivenness as being driven from one drive to another holds and drives the animal within a *ring* which it cannot escape and within which something is open for the animal. Yet while it is certain that all instinctual behaviour is a relating to..., it is just as surely the case that in all its behaviour the animal is incapable of *ever properly attending to something as such*. (*Fundamental Concepts* 249)

Behavior is eliminative, and this eliminative aspect of behavior is its fundamental character. It is not really meant in a positive or negative sense. Rather, it is the upshot of not being able to attend to beings as such. Behavior is a kind of rejection of things in a way that opens up a very circumscribed set of quasi-affective relations. Capability is open for a stimulus that disinhibits that capability: “Capability for... and thus behaviour itself is open for such occasions, for stimuli, for that which initiates, i.e., disinhibits the capacity for... in such and such a way in each case” (*Fundamental Concepts* 254). The way in which the animal opens itself to its outside has a non-mechanistic quality: “Since capability for... thoroughly governs the animal's specific manner of being, a being such as the animal, when it comes into relation with something else, can only come upon the sort of entity that '*affects*' or initiates

the capability in some way” (*Fundamental Concepts* 254). Nothing else gets in.

The disinhibiting ring of an animal should be thought of in two ways. On one hand, it is akin to a sphere; it binds the animal, but in a way that frees up certain activities or a certain slice of the world in the form of a series of prompts. On the other hand, the ring is a network of drives that has an internal coherence and relational structure. Both of these senses are grounded in the morphological structure of the animal. Heidegger is adamant that every animal is fundamentally a self-relation that precludes the possibility of relating to things outside itself in the way familiar to humans: “The behaviour of the animal, contrary to how it might appear, does not and never can relate to *present-at-hand* things singly or collectively. Rather, the animal surrounds itself with a *disinhibiting ring* which prescribes what can affect or occasion its behaviour” (*Fundamental Concepts* 255).

Beistegui likewise describes Heidegger's abyssal separation between human and animal as the animal's inability to ever be present to things. Animals do not relate to things in either a present at hand or ready to hand manner: “Rather, things as such, or in their being, are refused to animals, and this precisely to the extent that animals are absorbed by things” (Beistegui 114). Animals are only ever captivated or taken by things: they are, in a way, controlled by those aspects of their surroundings that release behaviors:

The organism is primarily this capacity for self-encirclement, on the basis of which all its other capacities emerge. This is where its ability to be affected or stimulated is located. It is through this “ring” that the organism is bound to its environment, with which it interacts. And the life of the animal is precisely nothing other than the struggle (*Ringen*) to maintain this encircling ring. As such, this ring is not to be understood like “a rigid armor plate fitted around the animal,” but as the very life of the animal. It is within this ring, which circumscribes the totality of its instinctual drives, that its struggle for preservation, reproduction, and maintenance takes place. (Beistegui 115)

Heidegger reiterates once more that he calls the animal poor in world because of the necessarily anthropocentric perspective from which animal life must be approached. The essence of life can only become accessible if it is treated in a deconstructive fashion: “But this does not mean that life represents something inferior or some kind of lower level in comparison with human Dasein. On the contrary, life is a domain which possesses a wealth of openness with which the human world may have nothing to compare” (*Fundamental Concepts* 255). But if this is truly how Heidegger feels, why does he take the trouble to insist on one single animal essence, and why does he describe this essence as poor-in-world and not as poor-in-world *from our human perspective*?

Heidegger lays out six structural characteristics of captivation (*Fundamental Concepts* 259-260). Captivation means having no relation to beings. Animal perception is not fundamental perception. Beings are withheld from animals. Withholding is the first characteristic of captivation. The second characteristic concerns how animals are taken with things. Animals have access to things, but not as beings, largely because they have no language. More precisely, they have no language because they have no access to beings. Absorption is the third characteristic. Captivation is an absorption in instinctual drives. The animal is driven activity. Along with being taken and being absorbed, animals are open to things in a very specific manner. The animal has an intrinsic encircling ring within which it can be affected. Encirclement is the next characteristic. The animal struggles with its encircling ring and its absorbed activity. Finally, captivation is the necessary foundation or condition for all behavior. This status of captivation as necessary condition is one of the dogmatic elements pushing Heidegger toward an anthropocentric gathering of all animals under the label poor-in-world.

Meaning

Heidegger concludes his interpretation of the essence of the organism by claiming it is incomplete. At this stage, there is only a vague comprehension of the metaphysical character of life. What has been left out of his account is the degree to which all life is motion or process:

“Captivation is not a static condition, not a structure in the sense of a rigid framework inserted within the animal, but rather an intrinsically determinate motility which continually unfolds or atrophies as the case may be. Captivation is at the same time motility, and this belongs to the essence of the organism” (*Fundamental Concepts* 265). Motility points toward questions of history, species history, and death. Yet death is also another vantage point from which to see the abyssal gap between human and animal: “Because captivation belongs to the essence of the animal, the animal cannot die in the sense in which dying is ascribed to human beings but can only come to an end” (*Fundamental Concepts* 267).

Upon completing his ultimately provisional interpretation of the organism, Heidegger revisits his initial claim that the animal is poor-in-world. The concept of world refers to beings in their accessibility. In one sense, the animal stands alongside humans as having access to something. But in captivation, the animal has that which disinhibits, a “... *not-having of world in the having of openness for whatever disinhibits*” (*Fundamental Concepts* 270). Heidegger never carefully considers that there might not be a single clear distinction between humans and all other animals. This refusal is directly related to his understanding of meaning. For the human, meaning has to do with understanding beings as beings, in their essence. The animal only ever gets driven along by its internal structural dynamic. In the as-structure of human meaning, beings manifest as the beings that they are. Humans attend to these beings by letting them be or not letting them be, as Buchanan explains:

It is only due to the transcendent character of our being that we can be said to have a world: the world *is*, not as an existent thing out there but as the meaningful horizon in which we comport ourselves as human *Dasein*. Thus our ability to be in the world is dependent on our being able to relate to other things in their being because we can step out of ourselves. (“Being with Animals” 277)

For the nonhuman, there is no possibility of access to beings as they are, outside of captivation. Thus, for Heidegger, there is no meaning for the animal. Although it can be powerful and insightful,

Heidegger's thought in this lecture course is of limited utility for a critical posthumanist concept of meaning. Meaning, for Heidegger, is precisely what nonhumans lack:

The unarticulated sounds that animals produce by themselves indeed indicate something; animals can even reach agreement among themselves, as we are accustomed to saying—though inappropriately. Yet none of these utterances that animals by themselves produce are words: they are merely ψόφοι, noises. They are vocal utterances (φωνή) that lack something, namely *meaning*. The animal does not mean or understand by its call. (*Fundamental Concepts* 307)

There are aspects of Heidegger's account that are relevant for critical posthumanism, but they remain underdeveloped in his thought. How might captivation or self-relation change if organismic motility and history are conceived differently? How might such a reconfiguration lead to a more radical re-conception of species difference and similarity? Heidegger leaves these questions somewhat open:

However ready we are to rank man as a higher being with respect to the animal, such an assessment is deeply questionable, especially when we consider that man can sink lower than any animal. No animal can become depraved in the same way as man. Of course in the last analysis this consideration itself reveals the necessity of speaking of a 'higher' in some sense. But we can already see from all this that the criterion according to which we talk of height and depth in this connection is obscure. May we talk of a 'higher' and a 'lower' at all in the realm of what is essential? Is the essence of man higher than the essence of the animal? All this is questionable even as a question. (*Fundamental Concepts* 194)

The next section turns to Merleau-Ponty's lecture courses collected in *Nature*. I discuss the first lecture briefly, but focus primarily on the second course of 1957-58. It is this course which finds Merleau-Ponty engaged most thoroughly with the biological sciences of his time in pursuit of a new understanding of the organism. This lecture course offers an important complement to his later work and concepts such as flesh, chiasm, interanimality and strange kinship.

Merleau-Ponty: *Nature*

The Concept of Nature

Nature, in a sense, is the auto-production of meaning. It has a meaning and an interior, but that meaning is not posited by human thought. In one sense it is the other of human meaning; but only in an anthropocentric sense in which thought begins with human meaning and only discovers later that there are other kinds of meaning that do not call out to the human. In a more primordial sense, nature is the soil from which we emerge. It is behind us and ahead of us; it carries us. This makes nature difficult to grasp conceptually, but it is difficult in a way that is very amenable to Merleau-Ponty's approach to philosophy, as Glen Mazis points out: "This position parallels those that Merleau-Ponty had articulated in regard to the body, the sensible world given in perception, and the source of artistic, interpersonal, and linguistic expression: there are levels "below" or "outside" or in "excess" of instituted sign systems that can be fathomed partially, ambiguously, but quite tellingly" ("Merleau-Ponty's Concept" 224).

Merleau-Ponty turns to the sciences to add more empirical specificity to the philosophical approaches to nature. However, consulting the sciences from a philosophical standpoint is not at all a simple or clear matter. Merleau-Ponty claims that there is no possibility of importing a concept of nature directly from the sciences. This is not because such a concept would not translate reliably from one disciplinary context to the other, but because the sciences are not particularly invested in or positioned to develop such concepts. Instead, Merleau-Ponty wants to use scientific studies to eliminate false notions of nature, a task much more suited to the sciences. The division of labour between these disciplines rests on the pragmatic focus of the sciences: "The concern of the philosopher is to see; that of the scientist is to find a foothold. His thinking is directed by the concern not of seeing but of intervening" (*Nature* 86).

Merleau-Ponty argues that the philosopher who tries to push through to new concepts myopically will succumb to gnosis eventually, and he cites Heidegger as an example of this. It is fine to

be dissatisfied with a narrowly functionalist concept of speech, for example. But in the effort to show how entangled and shaped in advance humans are by language, the philosopher risks putting too much stock in the hidden wisdom of etymologies. Besides this risk, there is another reason why philosophy of nature needs the sciences. For Merleau-Ponty, nature must be approached via experience, since it is too all-encompassing to be harnessed from concepts. The sciences offer methods for grasping phenomena with precision: “If Nature is an all-encompassing something we cannot think starting from concepts, let alone deductions, but we must rather think it starting from experience, and in particular, experience in its most regulated form—that is, science” (*Nature* 87). There is one more reason to engage science. This has to do with changing attitudes within the sciences themselves since the turn of the 20th century. Merleau-Ponty argues that the sciences are now interested in asking why their objects are the way they are and not otherwise. Science concerns itself with its objects' being-thus. Merleau-Ponty will take advantage of these qualities in his discussion of animality in the second lecture course.

Animality: The Tendencies of Modern Biology

At the turn of the 20th century, the problem of life was dominated by the materialism/vitalism dichotomy. By the time Merleau-Ponty was writing, the situation was more complex. Concepts like 'innate' and 'acquired' come to necessitate a dialectical rather than a substantialist approach to life (*Nature* 139). Arnold Gesell and Catherine Amatruda, for example, describe the development of the embryo using the concept of behavior, and they describe behavior as a second body grafted on to the developing organism. Behavior and development are wrapped up together, both within the organism under study and in the conceptual vocabulary used to describe it. Merleau-Ponty calls this a mutation of biological concepts (*Nature* 140).

To begin to understand what this entwining of development and behavior indicates, Merleau-Ponty first considers the American biologist G. E. Coghill and his 1929 study of axolotl behavior and development, *Anatomy and the Problem of Behaviour*. The axolotl learns to swim as a direct result of

its development: “If the animal knows how to swim, it is because it matures and because the rhythm of the movement of swimming is not different from the very rhythm of cephalo-caudal maturation” (*Nature* 141). The different phases of biological organization, Coghill shows, are related to the tasks the organism has to fulfill. How does the rhythm of development match up perfectly with these tasks? Coghill illustrates how development is a dynamic process from which behaviors emerge, a process in motion prior to the development of a central nervous system: “The first behaviour of the animal is thus organized under preneural gradients: the nervous system emerges from a preneural dynamic” (*Nature* 143). Development is dynamic and bound up with behavior. The dynamic also drives and conditions the individual structural elements of the organism, as philosopher Véronique Fóti explains: “The system is not only dynamic (Coghill rejects a static anatomy) but also flexible, in that the different specialized functions of the nerve cells are not inherent to them but result from their placement in the context of the polarities and gradients that Coghill traces in organismic development” (Fóti 61). The totality of the organism is not observable or reducible to its constituent parts, but is found in the pre-neural dynamic that drives development. For Merleau-Ponty, Coghill shows that physiological development does not occur locally, with each organ first, eventually becoming integrated as the organism matures. The organism as a whole is emergent. However, this totality of the organism is resistant to description in purely physiological terms: “What status must we give totality? Such is the philosophical question that Coghill's experiments pose, a question which is at the center of this course on the idea of nature and maybe the whole of philosophy” (*Nature* 145).

Merleau-Ponty develops this notion of a development/behavior dynamic by turning to the work of Gesell and Amatruda, authors of the tellingly titled *Embryology of Behavior: The Beginnings of the Human Mind* (1945). Gesell and Amatruda define the body as a kind of circumscription of space. The organism defines a space in which events will have an organic signification. For Merleau-Ponty, in contrast to Heidegger, an organism is not settled into its environment in any kind of harmonious,

smoothly functioning, clockwork-like manner. Gesell and Amatruda, he argues, show rather that behavior and organismic structure are in a relation of asymmetry. Merleau-Ponty compares the asymmetry of the body's relation to the world outside it to that of language as described by Saussure: “The sign is a separation of signs; it is diacritical (Saussure). The acquisition of a formal language [*langage*] of which the body would be the spoken language [*langue*]: just as language designates only in relation to other signs, so too can the body designate an object as abnormal only in relation to our norm, only as rupture in relation to its position of rest” (*Nature* 146).

In her discussion of expression in Merleau-Ponty's philosophy, Fóti summarizes the main tenets of Gesell and Amatruda's work (Fóti 63). The organismic body is defined as a take or point of view on the world. On one hand, the body is like a sketch of behavior. The development of the body anticipates future behavior: you can read future behavior on the emerging body. Development makes no sense unless it is oriented toward a future. Fóti explains that for Gesell and Amatruda, this orientation toward the future in behavior emerges from lower or earlier developmental levels of organization in the organism, not from outside of it. Merleau-Ponty thus describes behavior as a spiral: “If this is the case, then every motor theme of embryonic life can be considered as a theme that will be elaborated at a higher level in postnatal life” (*Nature* 148). On the other hand, behavior is like a second body grafted onto the natural body, or a body in need of a corporeal double. For Merleau-Ponty, behavior emerges (in a more contemporary, non-linear sense of emergence) from organismic structure: “We touch here on a profound understanding of the notion of the living body: the body is a system of motor powers that crisscross in order to produce a behavior” (*Nature* 148).

For Merleau-Ponty, Coghill, Gesell and Amatruda build an understanding of the entwinement of development and behavior that problematizes mechanistic assumptions: “The notion of behavior in Coghill and Gesell puts back into question the natural tendency to express the organism as a functioning of a machine” (*Nature* 150). Behavior is not a collection of facts held together by the

structure of the organism. Nor does it mean that function is independent from and prioritized over an organism's organs. In Darwinian evolutionary theory, function is determined by the outside, because the external environment dictates what functions an organism will have. If the axolotl does not learn to swim, for example, it will simply not exist. It is different for Coghill, Gesell and Amatruda: “Behavior is neither a simple architectural effect nor a sheath of functions; it is something that is ahead of functioning, which carries a reference to the future, which is beyond the immediate possibles and cannot immediately realize all that it already sketches out” (*Nature* 151). The organism is a project.

For these biologists, development is neither blind machine-like determinism, nor vitalist, goal-oriented, or determined from outside the organism. Rather, the organism unfolds due to some kind of form, and in anticipation of its own future being. The organism has a form, yet it is also somehow out of equilibrium: “We must avoid two errors: placing the phenomena of a positive principle (idea, essence, entelechy) behind us, and not seeing the whole of the regulative principle. We must place in the organism a principle that is either negative or based on absence” (*Nature* 155). The organism is out of equilibrium, but getting back to equilibrium never means returning to an earlier state: “The directing principle is neither before nor behind; it's a phantom, it is the axolotl, all the organs of which would be a trace; it's the hollowed-out design of a certain style of action, which would be that of maturation; the arising of a need would be there before that which will fill it. It is not a positive being, but an interrogative being which defines life” (*Nature* 156). Fóti argues that the relation between the totality of the organism and the behaviors which emerge over time is a relation of expression rather than mechanism (Fóti 62). The role of expression becomes clear in the second part of the course, but it is implicit in the way Merleau-Ponty approaches the question of totality or unity in the developing organism. Totality is never positive or complete, but always driving toward a future, as Fóti points out: “Expression now can clearly not function as the realization or concretion of anything pre-given but will have to be thought in terms of sheer divergence, difference, or perhaps natality” (Fóti 62).

Animality: The Study of Animal Behavior

Merleau-Ponty focuses more directly on early 20th century studies of animal behavior in the second part of the 1958-59 course. He offers philosophical interpretations of anti-mechanistic, anti-Cartesian aspects of these works, moving chronologically from Uexküll (1909; 1934) through E.S. Russell (1946), Robert Hardouin (1946) and Adolf Portmann (1952), to Konrad Lorenz (1953). Through these reflections, Merleau-Ponty continues to work out a view of life as expressive.

Merleau-Ponty introduces the concept of *Umwelt* as what marks the difference between the world as it exists in itself and the world as a subject experiences it. The *Umwelt* is the world to which the animal addresses itself, not consciously so much as through behavior. For Merleau-Ponty, Uexküll anticipates the concept of behavior as what orients an animal toward an *Umwelt* (*Nature* 167). The *Umwelt* emerges once an animal is able to receive stimuli as signals. Consciousness emerges from this context as one form of behavior.

Merleau-Ponty is quick to point out how Uexküll challenges a Cartesian understanding of animality. While Descartes opposed mechanistic animal and bodily life to the incorporeal human consciousness, the notion of *Umwelt*, like behavior, cuts across this dualism: “Behavior includes elementary organization (embryology), and physiological, instinctive organization, or behavior properly called. We must allow for an *Umwelt* at the level of the organ, at the level of the embryo, just as it is necessary to allow for activities of consciousness” (*Nature* 167-168). Yet even as he challenges crude human/nonhuman or mind/body dualisms, Merleau-Ponty divides animality up in his analysis into lower animal-machines, organized lower animals, and higher animals. The animal-machines are determined by their structure rather than by interaction with an outside. Following Uexküll, Merleau-Ponty refers to this structure as a *Bauplan*. The *Bauplan* is what orders the physiological makeup of the organism as well as its behavior. For these simple organisms, the *Bauplan* is sufficient for directing all of the actions they need to perform to survive. Animal-machines have the characteristic of having no

unifying center. The urchin, for example, is called a reflex republic by Uexküll because its limbs are not united in a central nervous system. These animal-machines have a very tenuous connection to the outside world; the animal-machine has no relation to itself that would engender a unified *Umwelt*.

Instead, an animal-machine has multiple partial *Umwelten* at the level of the organ:

The starfish: it has pincers close to its mouth in order to feed itself, but these pincers function on their own account. The animal pinches everything found in its way; it would pinch itself if nature had not used a subterfuge by covering its skin with a chemical product that exercises an inhibitory effect. Thus there is no unity of the living being which unfurls itself toward the outside. Phenomena of behavior are sewn together: it is a collective animal. (*Nature* 169)

Merleau-Ponty gives the amoeba as an example of an organized lower animal. In these organisms with no stable structure, the *Bauplan* is constantly recreated. The amoeba is an organism undergoing “continuous birth” (*Nature* 170), as opposed to the animal-machines, which adhere to the structure they are born with. Merleau-Ponty, like Heidegger and Uexküll, sees something significant in the transformative nature of the amoeba as it is described in early 20th century biology: “The functioning of an anatomical structure is easy to understand; the functioning of protoplasm is much more prodigious” (*Nature* 170). Whereas in the animal-machines the *Bauplan* determines all actions, in the organized lower animals the protoplasm acts more like a regulator, allowing a greater variability of response. The lower animals are described as secure in their *Umwelten* in a way that seems to challenge the Darwinian perspective:

The urchin is not abandoned to a hostile exterior world; it does not lead a brutal battle for existence. It lives in an *Umwelt* that represents oft-dangerous things, but to which it is so well adapted that it lives truly as if there were only a world and only an urchin. Hence the anti-Darwinian idea of a tolerance of animal forms, and the refusal to classify animals as if their behavior and their organism represented more and more perfect solutions to the same problem.

In a sense, all species are so adapted. For Darwin, life is endlessly menaced by death; for Uexküll, there is a solidity of superstructures, a shuffling of life. (*Nature* 171)

Merleau-Ponty shows how Uexküll opposes a Darwinian view of life as a constant struggle among organisms. Instead, he proposes that the vast share of existence for most organisms is solitary, or at least peaceful, and devoid of other organisms (Uexküll called it survival of the normal). Is behavior oriented toward mastery of an environment in the face of constant threat, or is it better understood as shaped and molded by an *Umwelt* which provides separation and protection, which brings order to an otherwise chaotic and hostile world? In higher animals, the *Umwelt* is no longer a closure that blocks most stimuli from outside, but a way of opening the animal to its surrounding world. The nervous system, described as a *Gegenwelt* or counter-world, enables the emergence of a kind of dialogue with the *Umwelt* which allows these animals to respond to and shape it to some extent. The external world is a world of signs rather than causes:

For the medusa, stimuli demand a response defined in advance by the structure of the organism; for higher animals, they are given to neural elaboration and translated in a linguistic system of the nervous system. Between the exterior world and the living organism, there is an insertion of a whole that orders, coordinates, and interprets: the nervous system is a mirror of the world [*Weltspiegel*]. (*Nature* 171)

Merleau-Ponty argues that the nervous system allows for the development of interpretation and even the manipulation of symbols. This is not something which emerges only with the human, or even in particularly human-like organisms. Merleau-Ponty interprets Uexküll's discussion of mood or search tone as the beginnings of culture:

The crab uses the same object (the sea anemone) to different ends: sometimes for camouflaging its shell and protecting itself thus against fish, sometimes for feeding itself, sometimes, if we take away its shell, for replacing it. In other words, there is a beginning of culture. The

architecture of symbols that the animal brings from its side thus defines within Nature a species of preculture. The *Umwelt* is less and less oriented toward a goal and more and more toward the interpretation of symbols. But there is not a break between the planned animal, the animal that plans, and the animal without plan. (*Nature* 176)

How do humans fit into this hierarchical scheme Merleau-Ponty employs? The human *Umwelt* is the site of a more drastic openness than that offered by the *Gegenwelt* of the higher animal: “The human *Umwelt* is an open field, and Uexküll is not tempted to close its *Umgebung* in on the human subject. The human universe is not the product of freedom in the Kantian sense, that is, event-based freedom which is attested to in a decision; it is, rather, a structural freedom” (*Nature* 178). This seems to imply a form of radical openness of the human *Umwelt* that I would not attribute to the *Umwelt* concept. However, it is not clear from this context exactly what Merleau-Ponty means by “structural freedom.” Moreover, the remainder of this course brings ethology, partly via analogies with human life, closer to an understanding of nonhuman meaningful experience, working steadily to problematize dualistic, mechanistic accounts of nonhuman behavior, development and evolution.

Merleau-Ponty follows Uexküll in foregrounding similarities between human and nonhuman that may reveal deeper continuities. He compares an animal's relation to its *Umwelt* to oneiric (dream) consciousness in humans. An *Umwelt* haunts the animal from a distance, in a way analogous to how human dreams are structured by elements that appear in the dreams only indirectly (*Nature* 178). The *Umwelt*, Merleau-Ponty argues, implies that organisms are not simply caused by the world outside them, but neither are they entirely autonomous from it. Rather, he says that the *Umwelt* haunts nonhuman meaningful experience, entangling organism and environment in such a way that this relational context occasions behaviors that cannot be reduced to either organism or environment (*Nature* 178). Glen Mazis points out that Enlightenment thought in its Cartesian manifestations conceives of dream consciousness as a turn away from the rational and its grasp on reality. Merleau-

Ponty rejects this view and the appearance/reality dichotomy underlying it. For Merleau-Ponty, nonhuman life harbours a capacity to respond within a relational context made up of elements that cannot then be parsed back out into organism or environment: “In opposition to a rationalist positivism, Merleau-Ponty articulates in *La Nature*, how increased capacity to learn and respond creatively to the environment among animals, working up to the human level (as a continuous and open-ended unfolding of animality) is a matter of entering ambiguity, plasticity, and multiplicity, rather than clarity, distinctness, and unity” (Mazis, “Merleau-Ponty’s Concept” 234). Meaningful experience is a crucial aspect of this realm of expression: “Merleau-Ponty states we must recognize that animals live a world of sense, in which expression and relation are part of the atmosphere of their lives, a sense of being “surrounded” and “in the midst of” better represented by the vortex of a dream rather than the sense of objects arrayed in a Cartesian space” (Mazis, “Merleau-Ponty’s Concept” 240).

For Merleau-Ponty, the *Umwelt* brings together the activity that creates organs and the activity of behavior, providing a bridge between the material processes that form a living subject from outside it and the lived experience or perspective of that subject from within: “The notion of *Umwelt* is destined to join what we usually separate: the activity that creates the organs and the activity of behavior, lower as well as higher. From animal-machines to animal-consciousness, there is everywhere an unfurling of an *Umwelt*” (*Nature* 173). When it comes to providing a philosophical interpretation of the *Umwelt*, he follows Uexküll in rejecting a vitalist principle in favor of a musical metaphor. Merleau-Ponty finds an understanding of the non-teleological and non-mechanistic structure he seeks in the figure of the melody:

When we invent a melody, the melody sings in us much more than we sing it; it goes down the throat of the singer, as Proust says. Just as the painter is struck by a painting which is not there, the body is suspended in what it sings: the melody is incarnated and finds in the body a type of servant. The melody gives us a particular consciousness of time. We think naturally that the past

secretly the future ahead of it. But this notion of time is refuted by the melody. At the moment when the melody begins, the last note is there, in its own manner. In a melody, a reciprocal influence between the first and the last note takes place, and we have to say that the first note is possible only because of the last, and vice versa. It is in this way that things happen in the construction of a living being. (*Nature* 172)

The *Gegenwelt* of the higher animal is comprised of the *Merkwelt* and *Wirkwelt*. The input of stimulus from, and the output of action on, an environment are joined in a feedback loop. The *Merkwelt* and *Wirkwelt* are like two languages which lead an organism along a path, allowing it to interpret a situation and maintain a particular style of behavior. Merleau-Ponty emphasizes the irreducibility of meaning to either organism or environment. Meaning is only discernible in the organism/environment relation in its full context, in a relation of complexity beyond linear causality. The *Umwelt* concept makes it possible to understand the organism not merely as a passive receiver of stimuli, but as an active, dynamic, meaning-driven process:

There is no stimulation from the outside that had not been provoked by the animal's own movement. Each action of the milieu is conditioned by the action of the animal; the animal's behavior arouses responses from the milieu... Between the situation and the movement of the animal, there is a relation of meaning which is what the expression *Umwelt* conveys. The *Umwelt* is the world implied by the movement of the animal, and that regulates the animal's movements by its own structure. (*Nature* 175)

For Darwinian thinking, Merleau-Ponty argues, the *Umwelt* is self-evident and needs no further explanation, since it is simply the collection of phenomena most suited to survival in a particular milieu. The organism we observe exists because it is the way it is. Merleau-Ponty argues that this way of thinking hides the problem posed by the *Umwelt*. In Darwinian thought, the actual world is what determines the possible:

Yet the exterior world exists only *partes extra partes*; it would engender the whole of behavior by the summation of elements. But each of its elements is in no way the only one possible. It is necessarily that the whole is taken into account. Taken in isolation, moreover, it is useless; it realizes a vital adaptation only as an element of a whole. The arrangement of an *Umwelt* thus cannot be a fortuitous arrangement. (*Nature* 175)

This does not mean that there is an essence belonging to a species that would determine its behavior. Positing an essence, Merleau-Ponty argues, necessitates either imagining behavior as always consciously goal-oriented, or else positing a transcendental force which directs the animal from outside. The *Umwelt* should be thought neither in terms of substance nor in terms of force acting from outside: “With the living being, a milieu of events appears, which opens on a spatial and a temporal field. This surging-forth of a privileged milieu is not the manifestation of a new force. The living being works only with physicochemical elements, but these subordinated forces join the unseen relations between them. We can at this moment speak of an animal” (*Nature* 177).

Merleau-Ponty is critical of Uexküll's notion of an over-arching plan of nature directing organismic development. He is much more interested in thinking the animal in terms of a melody which sings itself, finding this metaphor sufficient: “In brief, it is the theme of the melody, much more than the idea of a nature-subject or of a suprasensible thing, that best expresses the intuition of the animal according to Uexküll” (*Nature* 178). The melodic relations themselves are in no need of a plan of nature that would lie beyond these relations: “We must admit in the very fabric of physical elements a transtemporal and transspatial element of which we do not take account by supposing an essence outside of time” (*Nature* 176).

Merleau-Ponty turns next to Scottish biologist E.S. Russell and his 1946 text *The Directiveness of Organic Activities*. Russell explores the relations between physiology and behavior, comparing the action of tissue repair to the construction of a dwelling, for example. Behavior is physiological activity

directed outward, whereas internal processes are akin to behavior directed inward: “Between these two activities, there is something common that we would have to define approximately as a behavior, and as a behavior that never comes to the mastery of its own themes” (*Nature* 179). Merleau-Ponty cites several studies that highlight a fuzzy boundary between physiological reaction and interpretation or choice; between linear causality and points at which such causality fails. These studies point to something that both belongs to the organism and is displaced in relation to it: “The organism is not defined by its punctual existence; what exists beyond is a theme, a style, all these expressions seeking to express not a participation in a transcendental existence, but in a structure of the whole. The body belongs to a dynamic of behavior” (*Nature* 183).

Merleau-Ponty moves on to Hardouin's 1946 text *Le Mimétisme Animal* and his discussion of mimicry, considering animals that resemble their surroundings and those which resemble other animals. Merleau-Ponty points out that while the general rule for animals is to resemble their surroundings, there are enough exceptions to this reasonable arrangement that the deviations cannot all be ascribed to chance. Neither do all cases of mimicry conform to notions of adaptation and strict utility in line with what Merleau-Ponty calls Darwinian ideology: “Life is not only an organization for survival; there is in life a prodigious flourishing of forms, the utility of which is only rarely attested to and that sometimes even constitutes a danger for the animal” (*Nature* 186).

Merleau-Ponty builds on these themes in his discussion of Adolf Portmann. Portmann's work starts from the claim that it is a prejudice to approach the organism by studying the interior without also studying the exterior. Anticipating Foucault's assessment of the life sciences in *The Order of Things*, Merleau-Ponty points out a bias toward seeking the most true and the most real in the hidden depths of the organism. Mechanistic notions of animal life are highly amenable to this myopic focus on the interior, while a consideration of external appearance and form is more liable to give the impression of an organism as something closer to a work of art. The difference between interior and exterior,

Merleau-Ponty explains, can be seen in the way explanations of nonhuman animal life are conceptualized and categorized, and especially in what gets left out of those conceptualizations.

Interior and exterior denote two perspectives on the organism that should be complementary. When exterior appearance is ignored, or when it is explained via the interior, an essential perspective is lost:

“There are two ways to consider the animal, as there are two ways to consider an inscription on an old stone: we can wonder how this inscription was traced, but we can also seek to know what it means.

Likewise we can either analyze the processes of the animal under a microscope, or see a totality in the animal” (*Nature* 187).

Merleau-Ponty urges an approach to animal appearance as if it were akin to a language. A study of the rich array of variations in sexual display within a species, for instance, must seek to understand what and to whom this display is signifying. Most of what is significant about sexual selection is lost if it is viewed only in terms of utility. Expression emerges and flourishes throughout life, only glimpsed in the lower animals but proliferating in higher animals. Organs break free from their utilitarian function in higher animals, taking on an expressive value, or value of form. Again, Merleau-Ponty compares animal display to human oneiric consciousness to describe this relational context that cannot be traced back to the purely functional:

What the animal shows is not utility; rather, its appearance manifests something that resembles our oneiric life. In a certain sense, the sexual ceremony is probably useful, but it is useful only because the animal is what it is. Once they are there, these manifestations have a meaning, but the fact that they are this or that has no meaning. Just as we can say of every culture that it is both absurd and the cradle of meaning, so too does every structure rest on a gratuitous value, on a useless complication. (*Nature* 188)

Portmann helps Merleau-Ponty to show that behavior can be confined neither to a logic of utility nor to teleology. Mimicry shows an internal relation between animal morphology and milieu, but

this relation is driven by something other than expediency or the pursuit of a goal. Portmann and Niko Tinbergen give examples of mimicry that seem to have a negative effect for the organism, necessitating a change in behavior to compensate. If utility is refused as a sufficient explanation, without then claiming that the organism has a conscious relation to its own morphogenesis, how can the complex relations that make something like mimicry possible be accounted for? Merleau-Ponty characterizes life as the power to invent the visible, positing a relation between interior and exterior that would, for example, connect appearance to the capacity to see:

The fact that there is a relation between the exterior aspect of the animal and its capacity for vision seems to prove it: the animal sees according to whether it is visible. This leads us back to the same philosophical considerations. Just as earlier there was a perceptual relation before perception properly so-called, so too is there here a specular relation between animals: each is the mirror of the other. This perceptual relation gives an ontological value back to the notion of species. What exists are not separated animals, but an inter-animality. (*Nature* 189)

The last thinker of animality to whom Merleau-Ponty turns in the second lecture course is Konrad Lorenz. Merleau-Ponty summarizes the importance of Lorenz: he values behavior equally to morphology; he is not reductive in his understanding of behavior; he privileges observation over experimentation; and he wishes to avoid anthropomorphism in his descriptions of animal behavior. Lorenz sees instinct as being independent from any object; that is, instinct is not goal-oriented. Behavior is closely related to morphology, and instinct as well as intentional behavior are bound up in this complex. There is object-focused behavior, such as when, for example, a heron builds a nest. However, it would be too mechanistic to posit a “nest-building” instinct as the sole explanation for what happens to lead the bird to build the nest. The instinctive aspect, for Lorenz, is more like a tension or passion that seizes the heron, and the nest materials represent a way to resolve or relieve that tension: “The tension meets the object not so much because it is directed toward it as because it is a

means capable of resolving the tension, as if the object intervened like a point of contact that is in the animal, as if it brought to the animal the fragment of a melody that the animal carried within itself, or came to awaken an a priori that provoked a reminiscence” (*Nature* 191-192).

Once again, Merleau-Ponty replaces mechanistic language with a dreamlike state evocative of artistic creation in his descriptions of instinct: “Thus a sort of reference to the non-actual, an oneiric life, is manifested in these instinctive activities in a pure state. Even if these acts are produced most of the time by reference to an object, they are something altogether different from reference to an object, i.e., they are the manifestation of a certain style” (*Nature* 192).

Merleau-Ponty argues that adaptation requires a one-way cause-effect relationship between the external environment and the organism, and for this reason, it cannot accommodate the insights of Lorenz. By insisting on a concept of instinct as arising from both the morphological requirements of the organism and the stimuli of a surrounding environment, Merleau-Ponty opens up a space in the organism-environment relation for expression and the affective life of the organism: “Instinct is before all else a theme, a style that meets up with that which evokes it in the milieu, but which does not have goals: it is an activity for pleasure” (*Nature* 193).

Lorenz identifies three types of innate stimulus triggers. There are some triggers which have a precise relation to the animal's behavior. There are some triggers that have only a partial relation, or that open onto a range of possible responses. These triggers act less like deterministic forces than like lures, inviting compulsive behavior: “There is an oneiric, sacred and absolute character of instinct. It seems that the animal both wants and does not want the object. The instinct is both in itself and turned toward the object, it is both an inertia and a hallucinatory, oneiric behavior, capable of making a world and of picking up any object of the world” (*Nature* 193). In the third form of trigger, the organism is not seized by a stimulus so much as it seeks out and discriminates between essential and inessential aspects of its environment. At this point instinctive activity can turn into symbolic activity. Formerly

instinctual activities become means of communication: “In the duck, the behavior of taking off in flight–squatting and then projecting the head upward–quickly becomes a sign for training the young” (*Nature* 195).

Merleau-Ponty ends his second course with some critical remarks on the ethologists he has discussed. Lorenz, Uexküll and the others provide evidence and conceptual insights that lead toward an understanding of animality that avoids teleological and mechanistic ontologies, but they remain silent on the topic of animal consciousness. More importantly, they fail to establish a coherent explanation of the activity that projects an *Umwelt*, an explanation that would be a collaboration between organism and environment that engenders a new relational context rather than a reduction of either side to the other. In the absence of this ontology, Cartesian mechanistic philosophy will continue to ground the ethological paradigm. Lorenz alludes to experiential and anecdotal evidence which suggests that anyone who lives and works with animals is compelled to believe they are conscious (*Nature* 199). Yet, he will not venture an opinion on the matter because he does not have a conceptual foothold to prevent such a discussion from sliding into anthropomorphic projection. A new ontology is necessary for ethology, and it is up to a philosophy in close contact with ethology to develop it.

Merleau-Ponty anticipates cognitive ethology in that he sees Lorenz's refusal of animal consciousness as detrimental to working out an understanding of the symbolic nature of instinct. Cognitive ethology would benefit from Merleau-Ponty's description of the organism as an active, dynamic and out-of-equilibrium process that is not bound by a quasi-Cartesian notion of consciousness worked out in narrowly conceived terms of a subject's access to objects. Cognitive ethology, on the other hand, has provided the empirical data to update Merleau-Ponty's comparative study of human and nonhuman meaningful experience.

Conclusion: Living in a Meaningful World

Kelly Oliver argues that both Merleau-Ponty and Heidegger turn to Uexküll because his work

opposes Cartesian subject/object dualism. Ultimately, they take Uexküll in opposite directions, however: where Heidegger sees *Umwelt* theory as too anthropomorphic, Merleau-Ponty criticizes it as a reduction of the richness of animal worlds. Heidegger argues for a radical separation of organism from world, while Merleau-Ponty sees what he calls strange kinship: continuity via a lateral, rather than simply evolutionary, relation between human and nonhuman, grounded in embodiment. Oliver points out that the differences underlying Heidegger's emphasis on separation and abyss and Merleau-Ponty's focus on kinship and continuity become clear by looking at how each thinker defines behavior. Heidegger makes a sharp distinction between nonhuman behavior and human comportment. Merleau-Ponty, in his later work, sees behavior as something common to humans and other animals. Differences among human and nonhuman behavior amount to variations in style or theme. How behavior is conceived phenomenologically holds great importance for a critical posthumanist theory of meaning:

For Heidegger, if language is essentially what separates man and animal and opens the human to Dasein, then Merleau-Ponty locates the fundamental dynamics of meaning on the levels of perception and behavior. Language and culture are not cut off from the animal body but resonate with it in a formal or figurative sense. For Merleau-Ponty, behavior becomes richer and acquires meanings that set up and prefigure linguistic meaning. Already in behavior we find futural projections, responsivity, interrogative gestures, imitation, imagination, interpretation, expression, pleasure, and ultimately, even *logos* and culture. (Oliver 212)

Oliver explains that in Merleau-Ponty's view, the nonhuman animal is no longer held captive, but is instead immersed in and fascinated by the world. Merleau-Ponty sees behavior as like a language: it is meaningful and does not so much aim at objects as interpretation and communication: "Behavior possesses its own *logos*, and animality is the *logos* of the natural world. As such, language is not a rupture from the natural world but a continuation of it. For Merleau-Ponty, life is meaningful and there is only meaning in the living" (Oliver 213).

Oliver also points out that while for Heidegger instincts are oriented toward self-preservation, for Merleau-Ponty they are oriented toward pleasure. Merleau-Ponty refers to this as animal culture. Heidegger encircles nonhuman animals in rings of instinct, concluding that they are unaware of objects or of themselves. Merleau-Ponty has them geared toward pleasure and communion instead, which complicates any simple human/nonhuman distinction. On Oliver's reading, the perceptual object ceases to be the point of rupture between human and animal: "Whereas Heidegger insists that animal behavior is not object oriented because animals are incapable of recognizing objects, Merleau-Ponty maintains that it is not object oriented because it goes beyond any such mechanistic causal relationships toward richer relationships between responsive beings" (213-14).

Oliver helps shed light on what Merleau-Ponty describes as the imaginary dimension of instinct. Rather than being akin to a mechanistic force, instinct is described by Merleau-Ponty as a fetish. An instinct does not aim at a real object, but at an image (or perhaps, in Uexküll's language, an effect tone):

Merleau-Ponty describes the substitution of image for real partner as a type of displacement that signals the protosymbolic nature of animal rituals and ceremonies. The imaginary dimension of animal behavior also indicates that the relation between the environment and the animal is not one of strict cause and effect insofar as various objects or images can evoke the same responses. (Oliver 216)

This idea of the imaginary dimension of instinct opens another avenue alongside an evolutionary framework dominated by utility. The imaginary dimension introduces the logic of affective experience:

From these examples, Merleau-Ponty concludes that instinct is useful or functional in a Darwinian evolution of adaptation to outside circumstances as well as in the meeting of inside and outside that takes us beyond any mechanistic explanations of behavior and toward the excess of symbolic meaning. The rituals and ceremonies of sexuality and of taking nourishment exceed what is merely necessary for survival. In fact, in some cases they may be detrimental to

survival. (Oliver 214).

Oliver points out that Merleau-Ponty discusses animals largely as an effect of his research into how human consciousness is grounded in the body.²² She traces in *Animal Lessons* how philosophy has continuously employed nonhuman animals as foils and mirrors in its efforts to understand the human: “In his work, the concept of animality and examples of individual animals serve to reinforce his notions about the role of perception and behavior in man. By identifying the prefiguration of language and culture in animal behavior, Merleau-Ponty's thesis that human language and culture are grounded in perception and behavior becomes more compelling” (Oliver 209).

Merleau-Ponty's discussion of the biological sciences reinforces his rejection of a view of organisms as merely passive recipients of stimuli. Organisms are dynamic processes who remain “out of equilibrium” with their environments; they constitute points of view on the world. It is now necessary to build a better understanding of how the concept of instinct in classical ethology opens onto a realm of meaning. Instinct, Oliver explains, engenders the semiotic. It also engenders the oneiric, which is tied to the affective, the pleasurable, and the intensive aspects of organism/environment relations. These qualities are positioned in opposition to an evolutionary theory that insists solely on relations of utility. The semiotic and affective dimensions of organism/environment relations are explored in the next chapter.

²² See also Smyth. See Westling (72-73; 87) for a view that challenges the human-focused interpretations of Merleau-Ponty's engagements with the sciences of nonhuman animal experience offered by Oliver and Smyth.

Chapter 4: Semiosis and Expression

The perception by organisms of their surroundings is, from the beginnings of life, already embedded in their survival project, their corporeal intentionality.

-Hoffmeyer, *Biosemiotics* 311

Introduction

The first half of this chapter discusses the work of John Deely and Jesper Hoffmeyer, two important theoreticians of biosemiotics. The second half considers the work of Gilles Deleuze, undertaken together with Felix Guattari, as it works toward a theory of expression via an encounter with modern ethological studies. The biosemiotic focus on signs and the Deleuzian focus on expression are important for several reasons: both place much of their emphasis on the mid-point or mediating process of the organism/environment relation, both take sub-organismic processes seriously, and both offer wide-ranging accounts of life in its evolutionary and relational dimensions that confound any neat separation of the organic and the inorganic. I argue below that both biosemiotics and Deleuzian metaphysics offer a number of insights for thinking a critical posthumanist concept of meaning. I will also offer critical accounts of both approaches.

Organisms form relations with aspects of their surrounding environments and with other organisms. These relations include a wide range of possible sensory experiences. Biosemiotics formalizes organism/environment and organism/organism relations into a system of meaning, a semiosis of the living. This allows for a measure of precision to be applied to descriptions of nonhuman interpretative and communicative acts, but it often relies on a sharp distinction between human and nonhuman forms of semiosis. Symbolic thought is described as grounding the emergence of a uniquely human autonomy from immediate environmental context, a separation made possible by the abstractive power of a largely self-contained and recursive network or system of symbols. Some of the most influential biosemiotic approaches, including those discussed here, remain committed to a form of

representationalism. As I have argued above, representationalism does not adequately think meaning in terms of process. I will highlight how the commitment to representationalist assumptions limits the biosemiotic view, and point out some of the ways biosemiotic thought works against these limitations.

Deleuze and Guattari offer a conceptual scheme that largely avoids sharp distinctions between human and nonhuman. For them, creativity and even artistry are not the privilege of human symbolic thought. However, they also work to draw attention away from the language of subjectivity, agency, and holistic notions of the organism as a coherent entity. One effect of this strategy is that it is unclear how to employ their concepts to discuss meaningful experience in its many varieties. In my reading of Deleuze and Guattari, I focus primarily on the chapter “Of the Refrain” from their text *1000 Plateaus*. In this chapter they engage in detail with post-WWII ethology (up to the late 1970's) in their efforts to describe how life is affected by its interactions with expressive qualities, forces and intensities that drive diversification and defy evolutionary accounts that tie adaptation and behavior to relations of strict utility. They seek to distance themselves from the phenomenological approaches discussed in the last chapter. As a result, they draw more attention to the complex and volatile inorganic forces that shape life. Because they largely avoid locating subjectivity, selfhood, meaning and other markers of intentionality in their accounts of organismic life, however, they complement but do not displace phenomenological studies of nonhuman meaningful experience. Deleuze and Guattari discuss Uexküll favorably in their work and offer their own interpretation of melodic relations. They have less use for the *Umwelt* concept, and they do not offer a view of life commensurate with autopoiesis. Both of these concepts, for Deleuze and Guattari, are too evocative of closed, bounded, static living systems.²³

Deely and Hoffmeyer put forward their own, semiotic interpretations of boundedness. Uexküll, along with C.S. Peirce, is one of the most crucial foundational figures for biosemiotic thought, and both Deely and Hoffmeyer discuss the *Umwelt* concept in detail. Peirce was a philosopher with a strong

²³ For a detailed discussion of Deleuze and autopoiesis within the broader context of Deleuze's philosophy as a whole, see Pearson (168-170).

interest in science, and Uexküll was a scientist with a strong interest in philosophy. Biosemiotics is an interdisciplinary field all the way down, and this diversity of thought remains a constitutive aspect of the field. Deely is a philosopher and Hoffmeyer is molecular biologist. Both see semiosis as a process describable only by way of sustained cross-disciplinary engagement. In the first part of this chapter I will outline the fundamental logic of sign relations as put forward by Deely before moving on to show how Hoffmeyer situates this framework within living systems.

John Deely on Semiosis

For John Deely, meaning is best considered by way of the concept of semiosis. Participation in semiosis links meaning-making practices across species. Human language is one, albeit qualitatively unique, form of semiosis among many others. However, understanding meaning is not as simple as positing a phenomenon called semiosis and building up a theory from there. Because we are humans who encounter the world as meaningful, asking how meaning works would appear in the first instance to necessitate a thorough examination of human capacities for meaning-making. Deely argues that human meaning evolved out of a more common and more general structure of experience which can only be derived through a recursive examination of anthroposemiosis, followed by a comparative study with other organisms—especially those far removed from the human. For Deely, recovering the full view of semiosis in the natural world comes through a process of elimination, starting with the uniquely human and subtracting it to see what is left over (23). While starting with human meaning-making seems logical, Deely will have to justify his problematic claim that nonhuman meaning can be accounted for by subtracting from the uniquely human form.

Deely derives his description of signs from C. S. Peirce. Peirce suggests that phenomena in general can be classed into a tripartite scheme. Firstness corresponds roughly to pure, immediate quality. Secondness refers to that same quality, only now in relation to anything else. Even a first impression is a second, for instance, being subsequent to that pure, initial firstness which acts as

occasion for the impression. Thirdness is what brings first and second into relation. Deely's semiotic framework corresponds roughly to Peirce's scheme. Pure, brute existence in itself is described as the realm of things. An object, on the other hand, is said to be a thing as it exists for someone in contrast with a wider perceptual field from which it stands out. Finally, a sign is that which points to something else which is not itself. A sign designates a relation. Deely describes the sign as subordinate to an object to which it points.

The differences among things, objects and signs always refers to the context in which they are discussed. Signs, for example, are invisible and elusive, because they always hide behind the things and objects they represent: "Things can represent themselves within experience. To the extent that they do so, they are objects and nothing more, even though in their becoming objects signs and semiosis are already invisibly at work" (Deely 53). The being or ontology of a sign, therefore, is relational. Relations are the fuel that drives semiosis: "The actual being proper to the sign is the being of an ontological relation taken up into the experience of an organism, whether directly from the biological heritage of that organism (so-called "instinctive notions") or culled rather from individual experience, where it serves to connect objectively perceptual and sensory elements" (Deely 67).

Deely outlines two types of representations. An object, as a representation of itself, is termed a transcendental relation by Deely, while a sign must also be an ontological relation: "In the sign, the transcendental element of the relation—the representational factor—is merely fundamental, that is, the foundation or ground whence springs the ontological relation to something else—the significate or signified. And it is in this relation to another that the sign formally consists" (76). In Deely's framework, a representation grounds and founds a relation. In the case of something that is a representation of itself, the grounding representation and what that representation points to are the same. In a proper sign, these levels never coincide. A sign is a representation that has an additional quality that extends beyond itself.

Objects, as things which are interpreted in some way by an organism, are always the result of sign processes. Signs are therefore distinct from objects, and since objects are only accessible via interpretative activity, semiosis is a necessary precursor to any access to objects. But objects are only partially identical with real things in the world. The semiotic activity that transforms a thing into an object is an interpretative activity, which is to say that it is not a mechanistic activity. There is leeway, in other words, between things and their manifestation as objects. So the class of all objects contains real things but also mistaken and, at least in the case of humans, fictional things. Humans learn very early in life the difference between what they know and what they do not, Deely argues, precisely when desires or expectations are thwarted. Humans are able to discern the difference between objects and things because we fail to master the realm of things via our experience of objects. Things resist assimilation. This apprehension of the loosening of bonds between things and objects is an important prerequisite for human language, Deely claims. Humans, in other words, are able to make creative and productive use of this gap between objects and things. For nonhumans, this distinction never becomes apparent in itself, independently of any particular instance, because it is always embedded too deeply in a nonhuman animal's immediate needs and environmental context:

Now these finite minds called animals are perforce distinguished by awareness of what surrounds them. Were that not the case, of course, they could neither find nor look for food, not to mention sex and shelter. Yet they are not, as animals, interested in what surrounds them for its own sake but much rather (wholly and only, in fact) for their own sake. So a twofold necessity manifests itself at the heart of zoösemiotics: animals need to be aware of something of what really surrounds them in order to be able to survive, but they need to be aware of those surroundings not for what the surroundings themselves are but for what they can provide that meets the needs and desires of the animals to survive and thrive. (Deely 217)

What separates humans from other animals, Deely argues, is the ability to detach sign relations from

immediate environmental circumstances: "... the arrangement of such items according to what they signify and provide as the content of significance to experienced objects—is, we shall see, the key to the higher level process of linguistic semiosis, which, as we shall also see, draws the line between human life forms and the other animals" (80). Humans are qualitatively different from nonhumans, Deely argues, because we have become able to detach the sign relation from any particular environmental circumstances and use it elsewhere. This is how language becomes a modelling system as well as a communication medium: "Once the relation of signification has been grasped on its own, as distinct from a particular object signifying another particular object signified, it becomes possible to detach that relation from any particular objective sign vehicle and, taking this invisible content itself as the basis for further representations, to attach it, instead, to some other object" (Deely 87).

Deely argues that from the perspective of *Umwelt* theory, the uniqueness of humans lies in the way in which the human *Umwelt* is open to the world and able to change and adapt to new circumstances. It is the semiotic understanding of language as a modelling system that enables this openness. All living beings have some ability to recognize relations among objects, but nonhumans are not equipped to distinguish those relations from the objects they relate, Deely asserts, and they are not able to detach the relations or the objects related from their own immediate circumstances and needs. Human language and culture emerge, according to Deely, from the capacity to recognize and manipulate pure relations:

At the heart of the difference between the human *Umwelt* and the *Umwelt* of other cognitive organisms is the "idea" in this specifically semiotic sense: the relationship itself that constitutes signification is grasped in its proper being at once imperceptible and distinguishable both from a given signified and from a given sign-vehicle—and therefore as detachable from any given vehicle and attachable to any other vehicle, as well as directable to some other object, or to the same object only, in its new attachment. This difference makes for the

possibility of a text as such. (89)

Humans, Deely argues, are uniquely able to create texts. A text can be any physical structure that is made to embody an idea. Culture in its entirety is a network of signs “...whose lattice of articulations is chosen at critical nodes...” (Deely 89). Some of these choices become naturalized or conventionalized through the habits of humans, and the relative stability of the network within the otherwise shifting movement of signs leads Deely to refer to human cultural evolution as a Lamarckian process. Deely explains how three cultural texts—technological objects, artistic works, and literature—constitute three different relationships between signs and matter. They are all cultural texts because they are in principle readable as evidence of a species-specific human *Umwelt*:

But, whereas the objective relations embodied in the technological device *directly* relate *also* to its physical constitution *as such* in order for it to function as an instrument, the objective relations embodied in an artistic structure dominate the physical constitution of the whole in quite another fashion. Finally, the objective relations constitutive of the literary work tend to be a variable relatively free in respect to their embodiment, that is, their sensorially accessible base. (Deely 90)

For Deely, human culture emerges as a result of the dynamics of ideas and codes. While ideas are imperceptible relations of signification grasped apart from the terms related, codes are what enable these ideas to be physically manifested and communicated. Codes name the correlation of an idea with some physical object existing outside of a brain. Deely describes stipulability—the ability to specify—as the gateway to freedom, in that the sign relation, freed from any concrete material context, enables the human to invent new relations at will, at least in thought. The code necessitates that this power of invention be given up, that relations become fixed in their attachment to the physical world, so that they might be communicated to another. The physical world, and communication itself, becomes a bottleneck that severely constrains human freedom.

For Deely, the ability to manipulate relations in thought opens up possibilities not contained in the human biological heritage. Human language, over time, is able to “achieve a semiotic preeminence by virtue of being independent of any specific purpose, in order to be, in the context of communication, at the service of every other purpose. Language as a communication system—as a publicly available coding of the Umwelt—is thus the objective reflection of the freedom of the intellect as a growth in time” (Deely 94-95). Deely describes this process as working against the deterministic forces of biological heredity and environmental constraint. Although it can never close itself off from these forces entirely, the work of language enables some degree of choice in what reality will ultimately be. Codes are what put distance between the human collective and mechanistic determination.

From this interpretation of human semiosis, Deely can now, by process of elimination, claim to show the full range of semiosis as it exists throughout the universe. Humans are unique, Deely argues, because we can grasp the relations that constitute semiosis and manipulate signs in order to achieve autonomy from the natural world. But the relations themselves that constitute semiosis are real and pre-exist all living things. Semiotic relations inhere in things and in natural processes, even if there is no living organism to interpret them. Deely terms this kind of semiosis virtual: “Semiosis is the process whereby phenomena originating anywhere in the universe signify virtually in their present being also their past and their future and begin the further process of realizing these virtualities especially when life intervenes and, within life, when cognition supervenes” (132-133).

Physiosemosis is distinguished from zoosemosis in that the semiotic relations among inanimate things are entirely virtual. Real ontological relations exist among things, and these relations lay the groundwork for zoosemiotic, and ultimately, anthroposemiotic relations. Virtual semiotic relations put into play the past and future of the things they relate, but they remain virtual, because these inanimate things do not in any way exploit those relations. They also remain virtual in the sense that once a being with a sophisticated enough relationship with semiosis comes along, they can recover

or “read” these relations to learn something about the past (or predict the future). Deely likes to use the example of a dinosaur bone that enables the scientist to gain new knowledge of Earth's history.

Phytosemiosis, or plant semiotics, differs from physiosemiosis in that plants can turn chance events toward the future. That is to say, they can take what impinges on them and put it to use for their benefit, or for the benefit of their conspecifics. Deely is undecided about whether phytosemiosis is actual or, like physiosemiosis, merely virtual. The difference between virtual and actual in this case can be recast as the difference between communication and signification. Plants communicate, but they perhaps do not signify. In order to signify, Deely argues, a being must be conscious. Thus, plants can be inserted between inanimate objects and nonhuman animals in a hierarchy of semiotic processes: “There seems to me a basic sense in which semiosis is hierarchical, a series of irreducible levels or zones that are integrally actualized only in the final layer that folds back, as it were, and assimilates the previous levels into itself so as to give them their final being as semiotic” (Deely 133).

Deely extends meaning-making far beyond human culture. His discussion of human semiosis is problematic, however, for many of the reasons already discussed in the critical engagement with humanism recounted above: his method presumes that human meaning-making differs from nonhuman forms in that it grounds human freedom from environmental and bodily immediacy; it homogenizes all forms of nonhuman meaning-making, limiting any pathway to a deeper understanding of differences among them; and anthroposemiosis is conceived as the culmination of semiosis rather than as one kind of semiosis. The nested hierarchical structure of semiosis leads Deely to claim that all other forms of semiosis can be uncovered by process of elimination from human semiosis.

Biosemiotics is an interdisciplinary encounter between the humanities and biological sciences, however (Favareau 49-50), and Deely's perspective is more concerned with sign logic than with living processes. For another view of sign processes more firmly grounded in the biological sciences, I turn to the work of Jesper Hoffmeyer.

Hoffmeyer: Semiosis and Freedom

Hoffmeyer uses the example of a hare standing up in a field to alert a fox of its presence to make a point about the limits of Neo-Darwinist accounts of behavior. He argues that, while Neo-Darwinism is correct to assume that the form of this encounter probably evolved to save both hare and fox the energy that would be lost in a chase that the hare will easily win under normal circumstances, it is incorrect to assume that genes account for all of the decision-making that characterizes the behavior of the mammals in question:

The Neo-Darwinist explanation would require us to delegate to their genetic apparatus the whole burden of anticipating the outcome of all and every future communicative situation these animals may encounter. But why would evolution equip mammals with brains containing billions of extremely energy-costly nerve cells if such brains were not allowed to make any decisions not already anticipated by the genes? (*Biosemiotics* xiii)

What is missing from this picture is the role of meaningful experience: “Living creatures are not just senseless units in the survival game; they also experience life (and perhaps even “enjoy” it as we say when human animals are concerned)” (*Biosemiotics* xiii).

Hoffmeyer argues that Cartesian thought has de-semiotized nature. Hiding sign processes and interpretation from an understanding of dynamic living systems drives a wedge between nonhuman animals and their environments. As a result, modern scientific ontology cannot account for meaningful experience. Hoffmeyer argues that living beings do not simply react to stimuli, but strive to keep living. Biosemiotics helps to explain this striving and the behaviors to which it gives rise. Doing so introduces alongside natural selection a concept of natural play—a kind of freedom of action running alongside the constraints of natural lawfulness. Interpretation is key to understanding natural play: “It is not enough to sense; organisms must also create functional interpretations of the myriad of sensory stimulations so that these do not become isolated incoming impulses but are integrated into a form that the body

understands and can act upon appropriately” (*Biosemiotics* 19).

Interpretation is also the key to understanding agency in living systems. Life itself has agency, and this agency is expressed by Hoffmeyer as life's having a survival project. Theorizing organisms as “senseless units in the survival game,” as he describes the Neo-Darwinian view in the quote above, denies the active, agentic dimension of meaningful experience. In currently hegemonic descriptions of life, the DNA of an organism has been given too much credit. If evolutionary history can be described as a survival game, the individual organisms which comprise the game pieces can participate in this game directly.

Hoffmeyer argues that it is in fact the semiotic action of the cell membrane that expresses a future-orientation, and this orientation to the future, found in each cell and again at each level of systemic organization in multicellular organisms, engenders life's agency (*Biosemiotics* 32). For Hoffmeyer, meaning is not something that emerges with language or even cognition. To illustrate how much is left out of a narrow focus on cognition, even in human meaningful experience, Hoffmeyer gives the example of a slap in the face, which initiates a chain reaction, only a part of which involves conscious interpretation. For many theorists, what happens between the physical stimulus and the conscious reaction is a simple mechanical transfer of information. For Hoffmeyer, however, there is already a process of interpretation at work:

Thus, beneath the conscious (mental) semiosis (here, the perception of a slap as a sign that one has incited anger in another person), a complicated set of altogether unconscious biosemiotic (bodily) processes takes place. The generation of meaning starts in the skin many milliseconds before the brain brings forth a conscious interpretation. Biosemiotics attempts to analyze this sequence of events that traditionally has been considered a simple causal signalling process in no need of interpretive modulation. (*Biosemiotics* 23)

Hoffmeyer's biosemiotics situates consciousness as one extension of biological organization and

interaction found throughout nature. Mind is not an ontological category apart from the body.

Discussions of interpretation usually occur with reference to a self, and for Hoffmeyer, a body gives rise to many selves, at many scales. The problem of the self is formulated by Hoffmeyer as a problem of reference, and he draws on Merleau-Ponty to make a point about the corporeal nature of the self. Although Hoffmeyer cautions against an interpretation of phenomenology that would be opposed to a naturalist view, he sees in Merleau-Ponty's corporeal notion of the intentional self a basis for ascribing agency to life, finding in corporeality a common denominator in the experience of self and other. The self, conceptualized as a self-referential system directed toward its exterior, suggests that there is no one true, single, central self: "The self exists only insofar as that which is inside contains an intentionality toward or reference to that which is outside—an *aboutness*, as it is often called. But this outward reference rests upon a corresponding inward reference, such that one could say that other-reference presupposes self-reference" (*Biosemiotics* 26). The concept of semiotic emergence is meant to clarify the notion of a dynamic self that continually emerges in time from more primordial, corporeal semiotic processes. The conscious self is emergent, continuously arising from a complex corporeal matrix: "*The person is thus not a stable being but rather a constant becoming*. The critical point is to recognize the emergent autonomy of various levels of organization" (*Biosemiotics* 28).

In order to lay out his vision for biosemiotics, Hoffmeyer draws on a broad and diverse set of sources that span many academic disciplines, advocating for a rigorous but bold mixing of disciplinary knowledge. Hoffmeyer is not interested in simply speaking as a scientist whose work might be found to have broader implications for humanistic knowledge: "Rather, "interdisciplinary scholarship" only becomes fruitful when we collectively take the risk to confront problems in *the ways those problems may be seen* within disciplines *other* than our own" (*Biosemiotics* xvi).

I will introduce some more of Hoffmeyer's key concepts below. Understanding how Hoffmeyer takes up Deely's Peircean interpretation of semiosis outlined above will help clarify themes like

natural play, striving, interpretation, agency, semiotic emergence and self-reference, all of which for now appear well suited to a critical posthumanist concept of meaning.

Evolution and Causality

Hoffmeyer argues that organisms strive to live, that they have a survival project and are not simply pawns in the evolutionary survival game. Organisms are more than just responses or reactions to stimuli. This means that mechanistic, efficient causality cannot accommodate a view of life as striving, agentic and purposeful, but such a reformulation must be differentiated from the sort of purposeful or goal-directed behaviors that ground vitalist descriptions of life. Hoffmeyer claims that Peirce offers a solution to this dilemma: “The essence of this solution, as we shall see, is that on the one hand, natural laws are not absolute, because they themselves are products of an ongoing evolution, and on the other hand, humans' cognitive processes in the deepest sense are of the same kind as all other processes in nature” (*Biosemiotics* 40). Peirce argues that natural laws exist because things have a tendency to form habits or regularities, which Hoffmeyer interprets as an early articulation of the notion of self-organization in living systems. Peirce turns what was in his time a pillar of modern scientific ontology—the idea of an ordered universe—on its head, arguing that chance and indeterminacy are the norm, and that it is stability and regularity which must be accounted for. Organisms have evolved strategies for noticing and taking advantage of these regularities.

Peirce places natural laws within a cosmic evolutionary process by rethinking causality. Invoking purpose in nature is too anthropomorphic if “purpose” is thought in the way it is typically used when discussing human behavior, so Peirce adopts the Aristotelian term final cause. A final cause is defined by Peirce as the general form of any process which tends toward an end state (*Biosemiotics* 40). Final cause is akin to Uexküll's melodic relation; it cannot be comprehended piece by piece. Efficient causes, which give rise to regularities, are still crucial for semiosis, however. Hoffmeyer refers to the role of interpretation in living systems as semiotic causality. Semiotic causality works in

tandem with efficient causality, since interpretation, habit formation and anticipation of the future all rely on and exploit efficient causality.

Hoffmeyer agrees with Deely that some kind of nascent semiosis (what Deely calls virtual semiosis for a future interpreter and physiosemissis in the absence of an interpreter) is at work in purely physical, inorganic processes. To account for these processes, the realm of final causes can be left to the side in favour of efficient causality. The living world introduces melodic relations and complex behaviors which necessitate explanations in terms of final causes, while the human world is largely inexplicable without final causes. The gradual overtaking of efficient causality by final causality parallels the gradual emergence of more and more complex forms of semiosis. For Hoffmeyer this growth in complexity is understood as a form of agency he terms semiotic freedom:

One should therefore distinguish between the kinds of semiotic processes that occur in physical, biological, and psychological systems. Semiotic freedom is much more pronounced in the latter two than in the former. In dealing with purely physical systems, one can in almost all cases get away with disregarding the semiotic dimension, with no lack of explanatory sufficiency. But this quickly becomes absurd if human nature is one's concern. Biology falls somewhere between these two. (*Biosemiotics* 84)

Terrance Deacon's *The Symbolic Species* is a key source for Hoffmeyer's understanding of the semiotic dimension of evolution from a Peircian perspective.²⁴ It is Deacon who places Peirce's icon/index/symbol sign framework into a temporal, evolutionary perspective, so that human language is no longer understood as discontinuous with the rest of nature. A particular instance of a common phenomenon, language is a symbolic form of semiosis that emerges from a complex dynamic of iconic and indexical sign processes found throughout the natural world. These more primordial forms of

²⁴ The Deely/Hoffmeyer/Deacon biosemiotic framework I describe in this chapter is influential (See Kohn for one important example of the application of a biosemiotic perspective to anthropology). In a recent article co-authored with Frederik Stjernfelt (Hoffmeyer and Stjernfelt), Hoffmeyer appears to distance himself somewhat from Deacon's account situating icons, indexes and symbols as successive semiotic phases in an evolutionary framework. This development does not yet provide answers for the main critical points I lay out below, however.

interpretation are ubiquitous throughout the nonhuman world: an icon is an object that evokes another object by way of resemblance. An indexical sign is further removed from this relation; an index is an effect or impression left by an object. Finally, a symbol has no necessary, direct relation to any real object, but only to an abstract symbolic system. Think of the Canadian flag, for example. The object in the middle of the flag is iconic of a maple leaf, while the action of the flag on a post is indexical of the wind direction and speed. The flag itself is a complex symbol that references an entire nation, among myriad other objects, emotions, relationships and historical events. The symbolic meaning of the flag is only accessible to humans, according to this framework. All other species, in all of their cognitive and communicative activity, rely on complex combinations of iconic and indexical signs.

According to Hoffmeyer, organisms strive to live. They do so by taking advantage of regularities that form in a fundamentally chaotic universe. From these building blocks, Hoffmeyer constructs an account of human and nonhuman meaningful experience. Before moving on to see how Hoffmeyer theorizes meaningful experience, I will give a better sense of what I consider to be some important advantages and disadvantages of the biosemiotic perspective. I have been critical of attempts to attribute to humans an ability to transcend the limitations implied by the concept of the *Umwelt*. Human symbolic thought, according to Deely, can grasp the form of sign relations themselves, apart from any object they relate. For Deely, this makes language into a universal modelling system, freeing human semiosis from the bodily and environmental constraints that severely limit the agency of all other organisms. For Brentari, it enables access to reality itself and thus grounds scientific knowledge. Both formulations are problematic for critical posthumanism, because they allow for a single qualitative distinction to demarcate human from nonhuman. Hoffmeyer, as I mention in the introduction, is open to the same criticism. I find a great deal of value in Hoffmeyer's work as recounted above—especially the descriptions of natural play, striving, agency and self-reference—as well as his descriptions of experience and self-organizing systems described below. I argue below however

that the semiotic framework with which these themes are articulated must, at least from a critical posthumanist perspective, be revised.

Experience and Virtual Reality

To describe organismic life in terms of semiosis, Hoffmeyer combines Uexküll's *Umwelt* concept with that of the ecological niche. An ecological niche is a set of conditions—space, food, temperature, etc.—in which a species is able to live. The *Umwelt* is described by Hoffmeyer as the ecological niche viewed from the individual organism's perspective. For Hoffmeyer, the *Umwelt* is projected to the outside (*hinausverlegen*) by the organism, which means that every organism is engaged in the creation of what he calls virtual reality: an internal model of an outside world. Hoffmeyer names Uexküll as the first serious scientific thinker of virtual reality: “Animals unconditionally and throughout their lifetimes conjure up internal models of the outer reality that they have to cope with. And these virtual realities apparently may sometimes entail an interactive aspect, too, since it is known that almost all vertebrate animals do on occasion dream” (*Biosemiotics* 174).

Hoffmeyer argues that humans are unique in part because they are able to partially see through this virtual reality, while other animals are absorbed in theirs. Language allows humans to share their virtual realities and realize that something exists beyond them. While this claim is in need of some revision from a critical posthumanist view, Hoffmeyer's formulation of virtual reality conveys the crucial idea that meaningful experience is widespread throughout the nonhuman world:

We need to take care to express things correctly here, and it may be a problem that language simply does not readily provide us with the appropriately subtle words. A tick waiting for butyric acid to reach its sense organs hardly has any experiences (as this term is normally understood). In fact, my guess would be that it is about as interactive as a computer in standby position. But in the moment its receptors catch the signal *butyric acid* in intensities that exceed the lower threshold value, a reflex-like movement occurs in it, immediately causing it to drop

down upon (what turns out to be) its prey below. Now even in this very split second, the state of the tick probably does not rise to the level of what we might call an experience, but here one might perhaps imagine the presence of some glimpse-like state of feeling—a *let go* impulse. On one level, of course, it is pointless to discuss unanswerable questions such as this. I do mention it here, however, because the question of the evolutionary history of *experiential* existence has huge theoretical implications, and raises the natural-science question: What might be the *function* of an experiential world? In other words, what good is having experiences in a biological sense? (*Biosemiotics* 179)

What good is experience? Cognition, and the experience to which it gives rise, provides what Hoffmeyer calls holistic control. Bodies have emotional reactions as a way of staying focused in a world that is rapidly changing: “Such emotional reactions are accompanied by measurable alterations in the physiological and biochemical preparedness of the body” (*Biosemiotics* 180). Holistic control builds relations between inside and outside. Rather than separating stimulus and response, holistic control enrolls both into a more complex arrangement. Holistic control, Hoffmeyer argues, entangles perception and action, allowing organisms to focus as a united whole: “Here we are talking about a kind of correlation—or *calibration*—that is unique to the individual's life history and cannot, for that reason, be encoded in the “innate manual” of the genome. And this is precisely where and why *experience* enters the picture” (*Biosemiotics* 180). Calibration between the environment and organism, perception and action, gives rise to beings with a perspective on their surrounding worlds: “The holistic control function is an emotionally anchored focusing of our brain processes. It has nothing to do with directly *controlling* the processing of the infinite multiplicity of input that the brain receives, but only deals with *establishing an overarching directional perspective*” (*Biosemiotics* 181). In other words, what replaces and complicates the gap between stimulus and response in meaningful experience is a perspective built up in part from those meaningful experiences. Hoffmeyer calls experience an

interpretant, which is Peirce's term for that which both relates a sign to an object, and is affected by it.²⁵

Hoffmeyer suggests that organisms whose nervous systems are not complex enough to model the world of experience nevertheless have analogous holistic markers. From plants to fungi to bacteria, organisms have receptors that act as holistic markers guiding behavior, and for this reason they can all be said to possess some degree of what he calls semiotic freedom. Experience would then have “primitive” parallels throughout the living world. This suggests a difference between meaning and meaningful experience: organisms that cannot be said to properly experience the world still employ meaning, but perhaps their holistic markers are not as plastic as those organisms with nervous systems.

How an experience affects a nonhuman animal's life is part of biology, even though, Hoffmeyer argues, scientists cannot directly study what those experiences are like. The semiotic niche concept is able to help in this task. The semiotic niche includes everything that the ecological niche does, but it also includes the interpretative challenges an organism faces. The semiotic niche is therefore, in Hoffmeyer's framework, the external counterpoint to the *Umwelt*. In an evolutionary context, survival depends on whether an *Umwelt* is up to the challenges posed by the semiotic niche it inhabits.

Differences among organisms concerning what types of semiotic activity in which they can participate are described by Hoffmeyer as variations in semiotic freedom. Semiotic freedom is defined as the depth of meaning that a species is capable of apprehending and, in some cases, communicating. Hoffmeyer claims that depth of meaning most likely cannot be quantified, but it nevertheless seems intuitively clear to him that different messages contain different depths. He explains this line of reasoning in the following passage:

Thus, the saturation degree of nutrient molecules upon bacterial receptors would be a message with a low depth of meaning, whereas the bird that pretends to have a broken wing in an attempt to lure the predator away from its nest might be said to have considerably more

²⁵ See Kohn 33-34 for a helpful discussion of the interpretant.

depth of meaning. In talking about semiotic freedom rather than semiotic depth, then, I try to avoid being misunderstood to be claiming that semiotic freedom should possess a quantitative measurability; it does not. But it should also be noted that the term refers to an activity that is indeed free in the sense of being underdetermined by the constraints of natural lawfulness.

(Biosemiotics 187)

Hoffmeyer argues that, at some point in evolutionary time, morphological complexity was eventually surpassed by semiotic competence for social interaction, cooperation, and deceit. The anatomical side of evolution was surpassed by the semiotic side: “And, indeed, as soon as one puts on one's semiotic glasses, the evolutionary trend towards the creation of species with more and more semiotic freedom becomes so obvious that one may wonder how it can be that it was never suggested” *(Biosemiotics 188)*. Semiotic freedom is based on the ability of organisms to 'read' other organisms and environmental regularities. Any pattern that is discernible can become a sign that can be used as the basis for the establishment of further behaviors. Hoffmeyer calls this process semethic interaction (*semeion* = sign; *ethos* = habit). The example of the hare and the fox in the introduction to *Biosemiotics* (recounted above) is an example of semethic interaction. Semethic interaction patterns create complex webs of ecological and biogeographical stability that Hoffmeyer terms ecosemiotic interaction structures, which vary in terms of their susceptibility to modification. When they become relatively fixed, they place constraints on development: “The situation, in other words, has a matrix-like structure with multiple interdependent relationships binding populations of many different species into a shared interpretive universe or motif” *(Biosemiotics 195)*. Semethic interaction leads to species becoming woven into a “fine-meshed global web of semiotic relations” *(Biosemiotics 190)*. Hoffmeyer argues that symbiosis is unthinkable without semethic interaction. Semethic interaction is also at work on the sub-organismic level, and Uexküll's contrapuntal duets are likewise re-interpreted as examples of semethic interaction *(Biosemiotics 193)*. Through these complex relational structures, semiosis acts

recursively on evolution, making semiotic freedom an increasingly valuable commodity: “Thus, to the extent that the living world is engaged in an open-ended and nonsettled exploration of relationships between systems at many levels of complexity, it can truly be said that nature does, in fact, exhibit play-like behavior” (*Biosemiotics* 197).

Hoffmeyer sees semiotic freedom as a dynamic movement of play and constraint. Each higher level of semiotic freedom is built on a restriction of freedom at the lower levels. In a multicellular organism, for example, the individual cells are highly constrained in their activities in comparison to a single-celled organism. The dynamic of play and selection is constitutive of evolution: “Selection acts to settle things—i.e., to fix behaviors, morphologies, or genetic setups—thereby putting an end to some element of ongoing play in the system while simultaneously providing for the beginning of whole new kinds of play” (*Biosemiotics* 197). Hoffmeyer gives the example of ants who grow and harvest fungi: what began as one species of fungi-farming ant evolved into two hundred, many of whom have become so specialized that they cannot survive without the exact species of fungus they grow: “So here, the long, slow, interactive processes of natural selection may finally have resulted in the total crystallization of the relations from the open form of *play* to the closed form of *ritual* (or as it has sometimes been called, *instinct*)” (*Biosemiotics* 197).

From Animal to Human

For Hoffmeyer, what decisively separates the human from the nonhuman world is that humans are aware of the difference between experience and the world itself, or what Deely terms the difference between things and objects. It is interesting that Hoffmeyer resorts to the language of dreams to describe this difference, since Merleau-Ponty also describes nonhuman cognition as dream-like. Perhaps unsurprisingly, for Hoffmeyer the difference between objects and things is grounded in and ensured by language:

What happened to the people who, in our distant prehistory, gradually wrested the idea of a self-

subsisting reality from its omnipresent embeddedness in their own experienced worlds, may perhaps rather be compared to the awakening from a dream. Our magic and unquestioned belonging in the world was challenged and made fragile by the unavoidable separation of speech from what is spoken about. (*Biosemiotics* 266)

Hoffmeyer draws on Deely's work to put forward the following binary: for humans, the world is self-subsisting and individual experience-independent, whereas for nonhumans, the world is mind-dependent and individual experience-dependent. From this point of view, the task becomes one of explaining how such a radical divergence is possible given what is known about recent evolutionary history. Hoffmeyer turns to Deacon for a theory of the emergence of human language that will provide an evolutionary interpretation of Deely's human/nonhuman distinction.

The alarm calls of vervet monkeys are referential, but, Deacon argues, they are referential in a different sense than when words are used by humans. Human language is classified by Deacon as symbolic reference, while the alarm calls are examples of indexical reference. Infectious laughter, crying and ritual chanting are held up as human analogs to vervet alarm calls. These actions are group behaviors, they each have something they refer to, but that referent may not and need not be known by all participants. The expression is separable from any strong ties to its referent, and this means that when someone laughs or a vervet monkey repeats an alarm call, it is not necessarily indicative of advanced cognitive capabilities. Deacon argues that the differences between symbols, indices and icons correspond to levels of interpretative capability. A child, he argues, will gradually learn to supplement iconic understanding with indexical recognition, before developing an ability to manipulate symbols. Nonhuman animals are all locatable somewhere on a hierarchy ranging from the most rudimentary uses of iconic signs up to the margins of symbolic thought (Deacon 74-75).

Deacon claims that all nervous systems process iconic and indexical sign relations. This allows for a variety of forms of consciousness, differentiated quantitatively according to their semiotic

processing power. But human brains, by developing the ability to process symbols, mark a qualitative difference from all other animals:

The formal characteristics of the interpretation process, whether iconic, indexical, or symbolic, will define the elements of a creature's conscious universe. So the development of an unprecedented form of representation—symbolic representation—while not the origin of consciousness, has produced an unprecedented *medium* for consciousness. (Deacon 449)

Thinking meaning this way drives a sharp anthropogenic wedge into an otherwise shared semiotic ground which gives rise to a variety of forms of consciousness. Moreover, making iconic and indexical sign processes into a ubiquitous, nested hierarchy seems to preclude the possibility that nonhuman animals may have innovated their own novel semiotic strategies: “We live most of our concrete lives in the subjective realm that is also shared with other species, but our experience of this world is embedded in the vastly more extensive symbolic world” (Deacon 450). The rigid distinction separating the human from the nonhuman, as well as the nested hierarchical relations among sign processes that purport to account for all possible nonhuman semiosis, both derive from a representationalist understanding of interpretation: “If consciousness is inevitably representational, then it follows that a change in the nature of the way information gets represented inevitably constitutes a change in consciousness” (Deacon 449).

Biosemiotic accounts of meaning-making processes differ dramatically from mechanistic explanations for nonhuman animal behavior. They also offer a vocabulary of iconic and indexical sign processes with which to ascribe intentionality to a wide range of nonhumans. However, the view of semiosis as organized into a nested hierarchy and described in terms of ever greater degrees of freedom from natural lawfulness runs into several problems from the perspective of critical posthumanism. For one, it too hastily precludes the emergence of novel semiotic processes throughout the nonhuman world. Empirical studies would benefit from a more open-ended understanding of semiosis. Hoffmeyer,

Deely and Deacon each attempt to account for all extant forms of semiosis, and the conceptual clarity of a complete system of semiosis is perhaps not a worthwhile goal.

Another problem with the biosemiotic view is that, despite taking meaning in nonhuman life seriously, the representationalist notion of semiosis as the freedom constituted by the distance one's interpretative capabilities affords from bodily and environmental immediacy fails to break with many of the main tenets of Cartesian dualism. The following passage illustrates clearly how biosemiotics can perpetuate links between representation, autonomy, mind/body dualism, and the mythical struggle over nature and the body that purportedly earns the human its exceptional status:

Symbolic analysis is the basis for a remarkable new level of self-determination that human beings alone have stumbled upon. The ability to use virtual reference to build up elaborate internal models of possible futures, and to hold these complex visions in mind with the force of the mnemonic glue of symbolic inference and descriptive shorthands, gives us unprecedented capacity to generate independent adaptive behaviors. Remarkable abstraction from indexically bound experiences is further enhanced by the ability of symbolic reference to pick out tiny fragments of real world processes and arrange them as buoys to chart an inferential course that predicts physical and social events. The price we pay for this is that our symbolically mediated actions can often be in conflict with motivations to act that arise from more concrete and immediate biological sources. Arguments in support of the classic notion of free will frequently cite this capacity to use reason (that is, symbolic reference and model-building) to overcome desire and compulsion. One might respond that calling some actions “free” and others not oversimplifies what is really only a matter of the degree of the strengths of competing compulsions to act, some compulsions arising from autonomic and hormonal sources and others from our imagined satisfaction at reaching a symbolized goal. But there is an important sense in which these competing compulsions are not equal. (Deacon 434)

Deacon describes bodily compulsions as “bottom-up” processes for producing action, and he characterizes them as largely unfree, rigid and mechanistic (Deacon 434). Symbolic processes, on the other hand, are non-linear, chaotic, unstable, recursive and nearly infinitely flexible (Deacon 434). This view of the human at war with itself is more than a little evocative of Agamben's description of the anthropological machine.

Purporting to account for all possible forms of semiosis in advance, and privileging the human as the apex of an evolutionary semiotic process, suggests a normative split within biosemiotics between the desire to show meaning and experience at work in nature, and a competing desire to conserve the exceptional status of the human. This is one final aspect of biosemiotics that is problematic for critical posthumanism. Although he does not agree that animals are merely machines, Hoffmeyer defends the Enlightenment notion of the human as radically free. He argues against attempts, such as Tom Regan's, to charge the doctrine of human rights with speciesism. He agrees with Deely that humans are able to distinguish the objects of their consciousness from things as they are, and he agrees with Deacon that symbolic semiotic processes distinguish humans from all other animals:

Biosemiotics is therefore prevented from endorsing the reductive position that sees the human being as nothing but one more animal absolutely indistinguishable from all the other animals in any important sense. For by being linguistic creatures—and, perhaps what is even more primary, by setting up symbol-based communal cultures—humans come to acquire a semiotic freedom that is unparalleled anywhere else in the animal kingdom. (*Biosemiotics* 309)

As Hoffmeyer states, it is not that humans are semiotic, but *how* they are semiotic which constitutes the difference between human and nonhuman. This difference is historical, in that semiotic freedom increases over time, yet it is also an effect of natural, recursive processes working on human brains. The doctrine of human rights, he adds, should be seen as defending a collective historical experience, not a natural human essence. Yet this historical experience is grounded in an evolutionary

process that seems to find its natural culmination in the human. The human becomes both a natural result of the emergence of semiotic freedom and a great historical achievement. Semiosis seems to imply a natural hierarchy of the living in which what has value is what is most human-like:

We nevertheless must care for the living creatures of this Earth, because they are all expressions (albeit more or less pronounced) of the general tendency of the evolutionary process to create life forms with semiotically controlled life histories—and in this semiotic expressivity, we cannot but recognize the relatedness of these life forms to ourselves. It follows from this that our responsibility to other living creatures must be gradated according to a scale that reflects the sophistication and complexity of the semiotic individuation that individuals of a given species are biologically able to attain. (*Biosemiotics* 332)

Hoffmeyer foregrounds the idea that organisms do not passively receive stimuli, but are in fact engaged in a survival project that can be characterized as a kind of striving. This suggestion of an active striving that precedes any passive reception of stimuli is undercut, however, by the representationalist framework adopted by biosemiotics. Hoffmeyer's discussion of holistic markers complicates the active/passive binary, but this is not developed sufficiently to correct for the ultimately passive nature of semiotic activity as interpretation of an outside world by way of representations. Representation is perhaps not a problem at lower levels of organization, such as the cell, which, Hoffmeyer argues, gives rise to a kind of proto-self. Once at the level of the organism, however, the representationalist understanding of interpretation too quickly turns into a nested hierarchy of interpreters. The variability within the general process of making value distinctions which lies at the heart of a semiotics of lived experience is itself allowed to become the criteria of value in the living world. Since the human is cast as the culmination of all that can be identified as semiosis, a natural hierarchy of the living is read into evolutionary history.

Deleuze and Guattari do not rely on a problematic representationalist framework. Concepts such

as affect, becoming, and expression cut across any possible division between phenomena in the world and their accessibility to organisms. I will suggest an alternative danger, however: in minimizing human/nonhuman animal distinction altogether,²⁶ they may not be able to help work through differences among forms of meaning-making. Meaningful experience, as it has been conceived so far throughout the dissertation, does not seem to be of any clear conceptual value for Deleuze and Guattari, at least as it is outlined in their engagement with classical ethological thought in the “Of the Refrain” chapter of *1000 Plateaus*, which I discuss next.

Deleuze and Guattari: Affect and Becoming

Deleuze and Guattari seek to push past phenomenological descriptions of the lived body in order to discern the ontological processes that animate organisms (Buchanan, *Onto-Ethologies* 151). Elizabeth Grosz points out that for Deleuze and Guattari, sensations, affects and intensities should not be associated primarily with experience or the lived body as phenomenology conceives it, but with the forces of the earth. Sensations, affects and intensities connect bodies with forces from outside them that cannot be experienced directly (*Chaos, Territory, Art* 3).

For Deleuze and Guattari, the concept of the organism is a misleading reification of the living. It makes into a static, autonomous and coherently bounded object what should be thought instead as a dynamic nexus of forces, only some of which find temporary consistency and cohesion. A multiplicity of factors contribute to the actualization of an organism. Rather than searching for an essence of the organism, therefore, Deleuze and Guattari focus on the processes through which living forms grow, change and ultimately dissipate. Buchanan points out that Uexküll is not a central figure for Deleuze and Guattari (*Onto-Ethologies* 155). However, Uexküll and his work are associated by Deleuze with the concept of affect and the figure of Spinoza (Deleuze, *Spinoza* 124), which both occupy a central place in Deleuze's work, both that written with Guattari and that written on his own. It is through the

²⁶ An approach theorized, for example, as “Indistinction” in Calarco (*Thinking Through*).

concept of affect that, as Buchanan argues, Deleuze engages with Uexküll's work and with the discipline of ethology more generally. Deleuze and Guattari draw on several of Uexküll's famous examples in their writings to help articulate their own theory of life. They value Uexküll's insistence on the importance of understanding relations among organisms. Uexküll's accounts of the spider and fly, the tick and mammal, and the wasp and orchid help them to highlight the complex relations among heterogeneous organisms in their efforts to articulate their own theory of life as a dynamic, creative, and productive force.

Decades of research into evolutionary biology separate the understanding of biological processes accessible to Deleuze and Guattari from that available to Uexküll. Nevertheless, Deleuze and Guattari are in broad agreement with Uexküll about what evolution still needs to account for. Both camps stress the importance of relations among heterogeneous species, and both see communicative and interactive aspects of life as key components missing from Darwin's framework. By the time Deleuze and Guattari are writing, these components are starting to be addressed within a revamped evolutionary context:

If there is originality in neoevolutionism, it is attributable in part to phenomena of this kind in which evolution does not go from something less differentiated to something more differentiated, in which it ceases to be a hereditary filiative evolution, becoming communicative or contagious. Accordingly, the term we would prefer for this form of evolution between heterogeneous terms is "involution," on the condition that involution is in no way confused with regression. Becoming is involutory, involution is creative. To regress is to move in the direction of something less differentiated. But to involve is to form a block that runs its own line "between" the terms in play and beneath assignable relations. (*Plateaus* 238-239)

Deleuze and Guattari emphasize lateral, communicative or contagious relations that creatively transform organisms. They describe relations among the spider and fly, for example, in terms of blocks

and lines, as a way to emphasize this involutory agency. The concept of becoming highlights the interactive and communicative side of the living world. A becoming, they argue, is not a correspondence or resemblance between organisms, nor is it an imitation of or identification with a particular type of organism. Neither is it an evolutionary progression or regression. Finally, it is not the work of the human imagination. They refer to a becoming as a block of becoming, and they assert the reality of this block of becoming apart from the terms that it brings together. A becoming is a relationship that transforms those who enter into it.

Deleuze and Guattari turn to Uexküll for one of the most evocative examples of a becoming: “There is a block of becoming that snaps up the wasp and the orchid, but from which no wasp-orchid can ever descend” (*Plateaus* 238). What do they mean when they claim that the becoming between a wasp and an orchid snaps the two up? Understanding how Deleuze and Guattari conceptualize the relations between two organisms like a wasp and orchid helps to explain why they find an affinity with Uexküll, and it also makes clear where their accounts diverge. Deleuze and Guattari insist that a becoming always involves a pack or multiplicity: “What would a lone wolf be? Or a whale, a louse, a rat, a fly” (*Plateaus* 239)? At the same time, they assert that a pack need not be a group of animals, but that a single animal is itself already a multiplicity: “What we are saying is that every animal is fundamentally a band, a pack. That it has pack modes, rather than characteristics, even if further distinctions within these modes are called for. It is at this point that the human being encounters the animal” (*Plateaus* 239-240)?

Becoming is closely related to the concept of affect. Deleuze and Guattari describe affect as an effect of the power of the pack that throws the self into disarray. Determining the multiplicity inherent in the animal is part of a project of breaking down the categories through which the world has traditionally been parsed. Rather than understanding an organism by describing its characteristic features, Deleuze and Guattari propose to count its affects. To find an affect, one must focus on how an

animal interacts with the environment that surrounds it. A relation between an organism and its environment is not all that an affect is for Deleuze and Guattari, but it is in such a relation that an affect will be found. This emphasis on an organism's relations with its environment shows why they find value in the work of Uexküll:

In the same way that we have avoided defining a body by its organs and functions, we will avoid defining it by Species or Genus characteristics; instead we will count its affects... A race-horse is more different from a workhorse than a workhorse is from an ox. Von Uexküll, in defining animal worlds, looks for the active and passive affects of which the animal is capable in the individuated assemblage of which it is a part. (*Plateaus* 257)

A workhorse is more similar to an ox than to another type of horse, they argue, because of the relations it has to its surroundings, and because of the actions it performs. The workhorse and the ox are bred to work, while the race-horse is bred to run. For Deleuze and Guattari, there is something more fundamental about the connections and boundaries formed by these dispositions than there is about physiological or genetic similarities and differences. To understand an animal is to know what it does.

Deleuze and Guattari argue that a relation between an organism and something outside it forms an autonomous entity: the two terms of the relation are dropped, and something remains. They break down the organism and rename it a haecceity: relations of movement and rest among a set of particles that have the ability to affect and to be affected by other collections or assemblages of particles. For them it is crucial to account for processes at the molecular level, where organic, inorganic, temporal, and other degrees of what they refer to as intensity are able to intermix, and boundaries between heterogeneous phenomena are continually broken down and reformed on what they call the plane of consistency. Eugene Holland describes the plane of consistency as the sum total of all virtual potential in the cosmos (Holland 21). It is inadequate, for Deleuze and Guattari, to think organisms in terms of a subject for whom an environment is encountered. Organism and environment must be thought in terms

of temporary stabilizations of dynamic relations among many heterogeneous phenomena, all interacting on the same ontological level or plane. Organisms and environments must be conceived from the vantage point of the plane of consistency: “The plane of consistency contains only haecceities, along intersecting lines. Forms and subjects are not of that world” (*Plateaus* 263). To build the world of distinct organisms back up from this molecular perspective is to see traditional descriptive categories as somewhat arbitrary and reductive:

Climate, wind, season, hour are not of another nature than the things, animals, or people that populate them, follow them, sleep and awaken with them. This should be read without a pause: the-animal-stalks-at-five-o’clock. This becoming-evening, becoming-night of an animal, blood nuptials. Five o’clock is this animal! This animal is this place! (*Plateaus* 263)

Although such a radical reformulation of organismic being may yet spur innovative new research in nonhuman animal studies, Deleuze and Guattari have been criticized for valorizing a very narrow concept of the nonhuman animal, and for devaluing companion animals particularly (Berland 236-237; Haraway, *When Species Meet* 27-30). Some of their claims about nonhumans are problematic. While I do not want to dismiss, qualify or explain away these problems, I will suggest that such claims are less about nonhumans and more about what Oliver calls animal pedagogy; a form of instrumental manipulation of the nonhuman to open new pathways for human thinking.

One potential site of confusion in the writing of Deleuze and Guattari concerns the difference between describing becomings in human/nonhuman relations and the related yet very different task of inciting becomings in their human readers (see Deleuze, *Spinoza* 130). There is, in other words, a potential conflation of the merely descriptive and the performative that perhaps obscures the intentions behind some of their more uncharitable accounts of human/nonhuman animal relations. In some of their claims, they seem to divide animals into those species worthy of thought and attention and those too contaminated by human contact, or who have too close a resemblance to humans, to be anything

but a hindrance to innovative thinking. At other times, they seem to claim that it is our manner of conceptualizing and interacting with them, and not particular types of animals themselves, which can be either harmful or beneficial for thought: “Are there Oedipal animals with which one can “play Oedipus,” play family, my little dog, my little cat, and then other animals that by contrast draw us into an irresistible becoming? Or another hypothesis: Can the same animal be taken up by two opposing functions and movements, depending on the case” (*Plateaus* 233)?

Humans undergo becomings, and they can even become-animal. For a human to become-animal, Deleuze and Guattari repeatedly insist, is not to engage in imitation. To become-animal is to enter into relations with the world as another animal would. It is not an attitude or belief one must have: a becoming-animal will be worthless if it is disingenuous (only because then you would be a human self-consciously pretending to be an animal), but it is less a frame of mind or intention than a forging of relations with one’s surroundings: if you pick up a shoe with your mouth, you are not just pretending to be a dog; you are picking up pieces of dog actions and then using them to respond to the world as it is presented to you.

Deleuze and Guattari seem to value animals insofar as they can be used as vehicles that remove humans from familiar structures and perspectives on life. They seem to detest companion animals because, for them, these animals are too often anthropomorphized, metaphorized, and otherwise made human. This would be disastrous for their thought, since it would burden the animal with a subjectivity that is not its own, eliding the distinct inhumanity for which they value animals in the first place. The second type of animal they find troublesome is the animal as it has traditionally been classified by science. They are the animals that are neatly contained within a grid that links all of life in a great series. Finally, the only animals acceptable for Deleuze and Guattari are those “affect animals” that destabilize the other two forms through which we conceive of animals. These three categories of animal refer to three different attitudes or sets of assumptions with which one approaches animals:

We must distinguish three kinds of animals. First, individuated animals, family pets, sentimental, Oedipal animals each with its own petty history, “my” cat, “my” dog. These animals invite us to regress, draw us into a narcissistic contemplation, and they are the only kind of animal psychoanalysis understands, the better to discover a daddy, a mommy, a little brother behind them (when psychoanalysis talks about animals, animals learn to laugh): *anyone who likes cats or dogs is a fool*. And then there is a second kind: animals with characteristics or attributes; genus, classification, or State animals; animals as they are treated in the great divine myths, in such a way as to extract from them series or structures, archetypes or models... Finally, there are more demonic animals, pack or affect animals that form a multiplicity, a becoming, a population, a tale... Or once again, cannot any animal be treated in all three ways? (*Plateaus* 240-241)

Deleuze and Guattari's puzzling parsing of animals is severely reductive and unfair. It almost certainly is a commentary on human behavior and has very little to do with nonhuman animals. Beyond its dismissive and hyperbolic tone, what is being suggested? Since Oedipal relations have to do with human auto-affection (they label these relations narcissistic), and scientific studies and myths are classed together as the search for models or archetypes, these purportedly pathological practices are both aiming to settle, contain, and assure. They are both strategies for making the world familiar. Demonic or affect animals stand in opposition to the first two categories because they are disruptive, they are not unified wholes, they change or run off in different directions, they refuse to confirm or reflect an image of the human in control and at home in the world. Every individual, whether human or nonhuman, is a multiplicity that constantly forms relations with other multiplicities at a variety of scales, continually becoming other. One way of forming relations is via the concept of affect. Affect, Deleuze and Guattari explain, is less about what a body is than what it can do. Affect refers to a body's ability to affect things and be affected by them. Importantly, affecting and being affected are not

separable in any straightforward manner. To affect another is to be affected oneself. Likewise, being affected is a means of affecting. Affects are phenomena like light, temperature and scent, which are measured in terms of intensity rather than extension: “The range of temperature, speeds, or light, are a matter of degree that cannot be added or divided without changing the nature of the thing” (Buchanan, 2009, 157). An intensity cannot be divided, as Cartesian extensive properties can, without becoming something different. Buchanan argues that it is not simply light, heat or scent that the tick is affected by, but specific intensities of light, a single scent, a very narrow range of temperature: “The affective relation is therefore not between the tick and the mammal, but between a sensory organ and light, scent or heat” (*Onto-Ethologies* 157).

Affects are becomings. Ethology must therefore replace the concept of behavior with that of becoming. Ethology would then be the study of “the circumstances that determine how or whether such relations may be successfully entered” (Buchanan, *Onto-Ethologies* 159) and the composition of relations or capacities between things. Through the composition of its relations, a body can join larger and more powerful bodies. Deleuze and Guattari are drawn to Uexküll's *Umwelt* theory for the direct links it establishes between sensory surfaces and intensities, as Grosz explains:

For Uexküll, the music of nature is not composed by living organisms, a kind of anthropomorphic projection onto animals of a uniquely human form of creativity; rather, it is the *Umwelten*, highly specifically divided up milieu fragments that play the organism. The organism is equipped by its organs to play precisely the tune its milieu has composed for it, like an instrument playing in a larger orchestra. Each living thing, including the human, is a melodic line of development, a movement of counterpoint, a symphony composed of larger and more complex movements provided by its objects, the qualities that its world illuminates or sounds off for it. Both the organism and its *Umwelt* taken together are the units of survival (*Chaos, Territory, Art* 43).

Grosz follows Deleuze and Guattari in foregrounding change over stability, expression over function, and expenditure over conservation. The importance placed on the creative power of life to constantly transform itself into new configurations leads these theorists to focus more on the individual aspects comprising an organism's *Umwelt* rather than pursuing a holistic picture of the organism itself. The organization of sound is one particularly important sensation-generating expression that comes up often in Deleuze's and Guattari's discussions of animals. Music, and the arts in general, as Grosz describes them, are also related to the work of Uexküll in that they are said to consist of harmonic relations between an organism and its surroundings. Grosz describes the arts as a coupling of two disparate orders: those of bodily affects or percepts, and those of the cosmological order. Organisms inhabit an *Umwelt* comprised of the affective relations between their organs and the aspects of their surroundings that animate them. To understand these affective relations in more detail, I look closely at Deleuze and Guattari's discussion of the refrain.

The Refrain

Grosz explains that, for Deleuze especially, life maintains and perpetuates itself by isolating and extracting the elements that it needs from out of chaos. All living things, from the cell to the human, are assemblages of molecules that extract what they need from their surroundings. They also carry the past around with them, which allows them to develop simple responses to stimuli into creative and interpretive interactions: "This incipient memory endows life with creativity, the capacity to elaborate an innovative and unpredictable response to stimuli, to react or, rather, simply to act, to enfold matter into itself, to transform matter and life in unpredictable ways" (*Chaos, Territory, Art* 6). The manner in which life extracts elements from chaos is described by Deleuze and Guattari by way of the concept of refrain.

Deleuze and Guattari begin their discussion of the refrain by offering three examples. The first example is that of a child humming to themselves. The act of humming is the establishment of order

within what would otherwise be an unordered or chaotic mix of noise and silence. The human child creates stability in the auditory realm in a way analogous to another animal making themselves a den in a forest. For Deleuze and Guattari, this is not an analogy, however. The same process of establishing some stability or order from disorder is at work, whether it happens in sound or on the forest floor. This example illustrates the work of creating a centering or ordering point. The second example refers to the home as a space organized around the center of order. They explain that a space is made from a heterogeneous group of components gathered together to act as a base from which some task can be performed. These components act to mark a territory: “Radios and television sets are like sound walls around every household and mark territories (the neighbor complains when it gets too loud)” (*Plateaus* 311). The third example is the task that one prepares for in the territorialized space. The territorialized space is opened, not so that chaos can flood in and undo the territory, but so that what is made or conserved in the territory can be put into contact with chaotic forces so that something new is made, or expressed differently. Deleuze and Guattari will develop each of these examples of refrains into a complex theory of expression. In all three examples, Deleuze and Guattari talk about forces. There are forces of chaos, forces of the earth, germinal forces, interior forces of creation, working forces, forces of the future, and cosmic forces. Besides forces, there are components: landmarks, sonorous and vocal components, radios and televisions, rhythms, harmonies, gestures. Understanding the refrain means making sense of forces and components. Deleuze and Guattari explain that the three aspects of a refrain outlined in the examples are not to be thought in terms of succession. They are not individual moments, but different aspects of the refrain that exist in different degrees, depending on the example. They claim that sometimes, there is a giant black hole of devouring chaos upon which one can only hope to fix a temporary point. Sometimes instead of a spatial territory, one establishes a temporal consistency or pace. What is at work in each refrain is a play of chaos and order, forces of the earth and components.

Deleuze and Guattari give several more examples of refrains: bird songs, Greek modes, and

Hindu rhythms are all refrains. Refrains can take on amorous, professional, social, liturgical and cosmic functions. Refrains are naturally associated with land and the natal (earth; origin). They are bases from which more elaborate expressions can emerge: “A musical “nome” is a little tune, a melodic formula that seeks recognition and remains the bedrock or ground of polyphony (*cantus firmis*)” (*Plateaus* 312). Grosz describes a refrain as a small capture of melodic and rhythmical fragments that form the content of music. Music, for Grosz as well for Deleuze and Guattari, deterritorializes or escapes from a refrain in order to be. Refrains are rhythmic regularities that bring a minimum of order, an order of safety that protects the body with the rhythms of the earth itself. What is essential for Deleuze and Guattari is that sound, in the form of a refrain, has this functional role, and that a form of expression such as music can only arise when that function is abandoned or put at risk.

A refrain, therefore, has the function of creating a space of consistency or stability within which energy is conserved for some further action. It creates a space that is organized or accounted for so that attention can be marshalled for something else. Wolves, for example, will pick a concealed point and make a den, then use their scent to mark a boundary around the den delineating their territory. Within this relatively safe and organized space, they will give birth to pups, who gradually emerge out of the den, and eventually beyond the territory. In this way, a refrain serves a function. It makes a territory. The question guiding Deleuze and Guattari, as well as Grosz, is the question of how living beings break out of these stable patterns and into a kind of creative interaction with the world. For Deleuze and Guattari, this question has more relevance than the debate over whether animals interact mechanistically or have an interpretive capacity, or even whether we can draw a clear boundary separating humans from other animals:

Again, it is not certain whether we can draw a dividing line between animals and human beings:

Are there not...musician birds and nonmusician birds? Is the bird's refrain necessarily territorial, or is it not already used for very subtle deterritorializations, for selective lines of

flight? The difference between noise and sound is definitely not a basis for a definition of music, or even for the distinction between musician birds and nonmusician birds. Rather, *it is the labor of the refrain*: Does it remain territorial and territorializing, or is it carried away in a moving block that draws a transversal across all coordinates—and all of the intermediaries between the two? (*Plateaus* 301-302)

The problem of the refrain cuts across any clear human/nonhuman distinction. Music can be said to emerge in the nonhuman world if a sonorous refrain has what they call a deterritorializing effect. Grosz argues that the most fundamental of the arts is not music, however, but architecture, because artistic practices are, in the first instance, processes of framing. What is framed in the process of framing is chaos itself: “The frame separates. It cuts into a milieu or space. This cutting links it to the constitution of the plane of composition, to the provisional ordering of chaos through the laying down of a grid or order that entraps chaotic shards, chaoid states, to arrest or slow them into a space and a time, a structure and a form where they can affect and be affected by bodies” (*Chaos, Territory, Art* 13). Framing is the precondition for expression: “The earth can be *infinitely* divided, territorialized, framed. But unless it is in some way demarcated, nature itself is incapable of sexualizing life, making life alluring, lifting life above mere survival. Framing is how chaos becomes territory. Framing is the means by which objects are delimited, qualities unleashed and art made possible” (*Chaos, Territory, Art* 17). The frame is a dynamic configuring of inside and outside:

This boundary is not self-protective but erotico-proprietorial: it defines a stage of performance, an arena of enchantment, a *mise-en-scène* for seduction that brings together heterogeneous and otherwise unrelated elements: melody and rhythms, a series of gestures, bows, dips, a tree or a perch, a nest, a clearing, an audience of rivals, an audience of desired ones. (*Chaos, Territory, Art* 48)

To better understand how refrains work, it is necessary to look more closely at their components and

the ways these components relate to one another. Milieus and rhythms are what get extracted from chaos, and these in turn give rise to expressive qualities that enable the formation of a territorial refrain.

Territory and Expression

Deleuze and Guattari assert that from chaos, milieus and rhythms emerge. Milieus have several characteristics: they are defined in relation to a component, they move in relation to or over one another, and they are vibratory, which is to say, they are characterized by repetition: “Every milieu is vibratory, in other words, a block of space-time constituted by the periodic repetition of the component” (*Plateaus* 313). Ronald Bogue offers a helpful illustration of the four aspects or types of milieu which belong to organisms (Bogue 17-18). For an amoeba, the external milieu consists of its surrounding liquid medium, while its organelles make up the internal milieu. The cell membrane controls exchanges between inside and outside, comprising the intermediary milieu, while its relations to energy sources form its annexed milieu. For an amoeba to exist, its milieus have to be reliable, or stable. Repetition therefore is, in one sense, stability. Deleuze and Guattari describe this periodicity of the milieu as a code. Every milieu, therefore, is coded. At the same time, since they interact and interfere, enable or transform one another, milieus are continually engaged in transcoding or transduction:

It has often been noted that the spider web implies that there are sequences of the fly's own code in the spider's code; it is as though the spider had a fly in its head, a fly “motif,” a fly “refrain.”

The implication may be reciprocal, as with the wasp and the orchid, or the snapdragon and the bumblebee. Jakob von Uexküll has elaborated an admirable theory of transcodings. (*Plateaus* 314)

Deleuze and Guattari distinguish periodic repetition, which forms or codes a milieu, from relations of transcoding that join these milieus together. Transcodings are not periodic, but rhythmic. Uexküll's contrapuntal relations between spider and fly are a good illustration of rhythm: the relations between

the organisms themselves are rhythmic relations. Any time there is communication or coordination between milieus, there is rhythm where there would otherwise be chaos.

Deleuze and Guattari elaborate on the distinction between rhythm and periodic repetition, or meter. Rhythm, unlike meter, is not primarily regularization or dogmatic consistency. Rather rhythm is akin to a trajectory through milieus, tying them together. Repetition is more like a vehicle or medium upon which rhythm works: “A milieu does in fact exist by virtue of a periodic repetition, but one whose only effect is to produce a difference by which the milieu passes into another milieu. It is the difference that is rhythmic, not the repetition, which nevertheless produces it: productive repetition has nothing to do with reproductive meter” (*Plateaus* 314). Whenever there is transcoding, they argue, there is surplus value, or bridging; what they call the constitution of a new plane or basis for further interaction. This idea is similar to Uexküll's notion of contrapuntal relations. For Deleuze and Guattari, however, these types of relations are important because they act as new starting points for the emergence of even more complex phenomena, such as territories.

Territories arise from rhythms and milieus. Something called territorialization happens to milieu components and their relations, in other words, causing territories to emerge. For an amoeba, their milieus perhaps cannot enter into the complex rhythmic relations that would give rise to a territory. But for other animals who do form territories, this is such a crucial aspect of their lives that, for Deleuze and Guattari, an animal that is territorial is defined by territorialization (*Plateaus* 314). The major difference between territories and milieus, Deleuze and Guattari argue, is that territories are expressive. Territorialization is described in ways analogous to indexical semiosis. An object in an environment becomes related to other phenomena in a way that places strict functionality at arms length. Territories point to the emergence of what looks very much like meaning:

It is by essence marked by “indexes,” which may be components taken from any of the milieus: materials, organic products, skin or membrane states, energy sources, action-perception

condensates. There is a territory precisely when milieu components cease to be directional, becoming dimensional instead, when they cease to be functional to become expressive. There is a territory when the rhythm has expressiveness. What defines the territory is the emergence of matters of expression (qualities). (*Plateaus* 314-315)

Expression is therefore closely related to the creation of a territory and opposed to the functionalism that dominates Neo-Darwinian and classical ethological explanatory frames. Balcombe and Hoffmeyer both point out that evolutionary explanations for behavior often have the effect of masking the role of meaningful experience in living systems. Deleuze and Guattari, by making a distinction between the merely functional and the expressive and illustrating expression through territorial behavior, are perhaps engaged in a similar or complementary effort. A clearer understanding of expression is necessary, however. How do expressive qualities emerge from milieu components? What the role is played by the territorial animal in this process?

Colorful birds and fish are employed by Deleuze and Guattari as examples to illustrate expressive qualities. Color is described as a membrane state: caused internally but functioning externally, it acts as a hinge between inside and outside. As long as color is tethered to a specific action, it remains rigidly functional and transitory (sexuality, aggression and flight are the examples Deleuze and Guattari provide of color being relatively fixed in terms of both function and life context). It becomes expressive when it acquires two things: temporal consistency (in the case of aggression, for example, the color of the aggressor is no longer tethered to an immediate and fleeting threat) and a spatial range (the color becomes aligned with a specific place to be defended as one's particular territory). Once color becomes expressive, it takes on new functions. Deleuze and Guattari argue that the fact that something like color can take on new functions associated with the marking of territory implies that it has become expressive. They refer to the territorializing mark as a signature. Anything used to mark a territory is an example of a quality that has become expressive. Expression has to do

then with what enables the reorganization of functions. This scheme implies an account of evolution in which behaviors like territory formation must develop at a later phylogenetic stage, taking up a pre-existing quality like color and putting it into a new context. Something happens to a component of an already established behavioral repertoire to cause it to become the occasion for a new set of behaviors that are removed or abstracted from the more basic, more functional behaviors, and which may even make that earlier repertoire more difficult or less sure of success. The bright colors of a territorial fish could make it more difficult for that fish to escape detection by predators, for example. This suggests a greater degree of complexity in the life of the territorial animal: when qualities become expressive, there are more concerns to balance and negotiate. At the same time, expression does not seem to be something an animal achieves through some sort of conscious effort. In the case of territorial fish, it has become part of their ontogeny. Expression, then, does not necessarily imply meaningful experience.

Territory-producing expressiveness, they argue, precedes any new function that occurs within a territory. The qualitative mark that designates a territory, in turn, precedes the territory itself. Territorialization, via the production of a qualitative mark, comes first, and it is this process which leads to the production of a territory:

Territorialization is an act of rhythm that has become expressive, or of milieu components that have become qualitative. The marking of a territory is dimensional, but it is not a meter, it is a rhythm. It retains the most general characteristic of rhythm, which is to be inscribed on a different plane than that of its actions. But now the distinction between the two planes is between territorializing expressions and territorialized functions. (*Plateaus* 315)

They contrast this position with that of Lorenz, who makes territory the product of the evolutionary trajectory of an aggressiveness instinct turned intra-specific. Intra-specific aggression in this case would have the evolutionary benefit of spreading out a population. Deleuze and Guattari oppose this argument. For them, the becoming-expressive of rhythm or melody, described now as the emergence of

proper qualities like color and odor, is the territorializing factor which organizes the functions that can be carried out within a territory.

Deleuze and Guattari now suggest that the process that produces territory can be called art. Grosz locates the emergence of artistic expression at the intersection of (not necessarily human) bodies and the forces of the earth. Art is a practice that, like other practices of living things, uses forces of the earth to generate intensity; art is one way among others that life enables matter to become expressive: “Art is the regulation and organization of its materials—paint, canvas, concrete, steel, marble, words, sounds, bodily movements, indeed *any* materials—according to self-imposed constraints, the creation of forms through which these materials come to generate and intensify sensation and thus directly impact living bodies, organs, nervous systems” (*Chaos, Territory, Art* 4).

What is possessed as territory comes as a result of expression: “These qualities are signatures, but the signature, the proper name, is not the constituted mark of a subject, but the constituting mark of a domain, an abode. The signature is not the indication of a person; it is the chancy formation of a domain” (*Plateaus* 316). They argue that to like something like a color involves aligning it with one's identity: “Take anything and make it a matter of expression. The stagemaker practices *art brut*. Artists are stagemakers, even when they tear up their own posters. Of course, from this standpoint art is not the privilege of human beings” (*Plateaus* 316). At the same time, however, Deleuze and Guattari argue that expression is not something that either a human or a nonhuman *does*. They seem to relegate subjectivity, emotion and meaningful experience to the realm of stimulus and response, like when a non-territorial fish flushes with color when threatened:

What we wish to say is that there is a self-movement of expressive qualities. Expressiveness is not reducible to the immediate effects of an impulse triggering an action in a milieu: effects of that kind are subjective impressions or emotions rather than expressions (as, for example, the temporary color a freshwater fish takes on under a given impulse). On the other hand,

expressive qualities, the colors of the coral fish, for example, are auto-objective, in other words, find an objectivity in the territory they draw. (*Plateaus* 317)

Expression, they argue, has its own autonomy. Expressive qualities interrelate. What they express is the relation of the territory they create with the interior and exterior milieus: internal impulses and external circumstances. They connect organism and environment. To illustrate this expressive quality of matter, they draw on another famous example cited by Lorenz, the courting movements of the stickleback: “Its zigzag is a motif in which the zig is tied to an aggressive drive toward the partner, and the zag to a sexual drive toward the nest; yet the zig and the zag are accented, or even oriented, differently” (*Plateaus* 317). The stickleback's courting movements take components from both aggressive and sexual behaviors, but do something new with them. But this process is one of past behavioral fragments finding a new arrangement in a new context in dialogue with other components outside them. The new arrangement finds consistency, but it is formed beneath and between the sticklebacks, not via their behavior as communicating organisms.

Ritualization is the term used by ethologists to describe the transfer of a behavior pattern from one context to another (Burghardt, *Genesis* 79), but Deleuze and Guattari argue that this concept does not adequately account for how qualities in a territory are related to one another. Intensifying the imbrication of musical and ethological concepts, they describe territories as having motifs and counterpoints. They call the stickleback's courting behavior a motif rather than a ritual. Territorial motifs organize patterns of drives or internal milieus, while territorial counterpoints form relations to external qualities in the territory. The stickleback dance summarizes how Deleuze and Guattari view life as myriad complex, dynamic relations that confound the notion of a unified, bounded organism:

The stickleback's zigzag dance is, then, is a territorial motif that organizes internal impulses (a combination of aggressive zig and sexual zag) and a territorial counterpoint that responds to external circumstances (female's presence, season and time of day, carbon dioxide

level around the nest). The zigzag dance is a refrain, a configuration of elements that have been decoded from their milieu functions and recoded with new territorial functions. Rather than serving simply as a placard or poster, a mere signature of the male stickleback's possession of its territory, the zigzag dance expresses the relations of internal and external components to the territory. (Bogue 21-22)

Autonomy and Consistency

The stickleback dance, as a grouping together of heterogeneous components that take on a kind of coherence or consistency, could be described as an assemblage. Sometimes, Deleuze and Guattari say, a territorialized function, like the song that a bird sings to mark out a territory, can become autonomous from this function and serve as the basis for a new assemblage. A male bird, for example, may alter their song by lowering its intensity when courting a female. The modified song creates a new, autonomous assemblage that forms and coheres within the territory and as part of it. For animals who mate for an extended period of time or who live in social groups, a further assemblage emerges, and the social group or mate may displace the territory altogether. They explain these differences by distinguishing between milieu groups and couples, territorial groups and couples, and social groups and love couples. In the first case, they argue, there is no individual recognition, while in the second category there is recognition inside the territory. In the third category, there is recognition that is independent of place. In this third category, the group or lover becomes autonomous from place.

To further illustrate these differences, they give the example of Australian finches that express what ethologists call vestigial behaviors: the males no longer help in the building of the nest, but offer the females grass stems or merely peck at the grass. For Deleuze and Guattari, nesting behavior "takes wing" from the territorial assemblage in this case to become a component for the courtship assemblage: "The fact that the grass stem has an increasingly rudimentary function in certain species, the fact that it tends to cancel out in the series under consideration, is not enough to make it a vestige, much less a

symbol. A matter of expression is never a vestige or a symbol. The grass stem is a deterritorialized component, or one en route to deterritorialization” (*Plateaus* 324-325). The grass stem is a vector that links assemblages together: “It is as though forces of deterritorialization affected the territory itself, causing us to pass from the territorial assemblage to other types of assemblages (courtship or sexuality assemblages, group or social assemblages). The grass stem and the refrain are two agents of these forces, two agents of deterritorialization” (*Plateaus* 325). Deleuze and Guattari place their analysis at a distance from ethological theory as well as any “pre-cultural” or proto-symbolic interpretation of behavior. What makes the grass stem into a vector from one assemblage to another is the complex interplay among all the components and forces at work. From this point of view, it is difficult and arbitrary to focus on the actions of one finch and ascribe any special status to it that would warrant an investigation into its experience.

What holds a territorial assemblage or several different assemblages together? The question of consistency within and among assemblages provides another point of encounter between Deleuze and Guattari and ethology. Tinbergen, they argue, offers a hierarchical, arborescent model of consistency. In the central nervous system of an organism, an automatic operation releases an appetitive behavior in search of a particular stimulus. Upon encountering the stimulus, a second operation is put into action, and so on. Deleuze and Guattari argue that this account is too reliant on binaries like inhibition/release and innate/acquired, which risks reintroducing “... souls and centers at each locus and stage of linkage” (*Plateaus* 328). To escape these dualisms, they develop a rhizomatic or decentralized model of consistency. The functional center is replaced by coordination among multiple centers with no overarching organizational force. Rather, organization happens from within the cellular and molecular groupings themselves: “This represents a whole behavioral-biological “machinics,” a whole molecular engineering that should help increase our understanding of the nature of problems of consistency” (*Plateaus* 328). Life does not develop from a center to an exterior, or from exterior to interior, but

“from discrete or fuzzy aggregate to its consolidation” (*Plateaus* 328). For Uexküll, meaning rules are what serve to give form to matter. For Deleuze and Guattari, by contrast, consistency is not a question of how matter is given form. Rather, form and matter are replaced by a richer and more complex concept of materiality in relation to inorganic forces: “It is no longer a question of imposing a form upon a matter but of elaborating an increasingly rich and consistent material, the better to tap increasingly intense forces” (*Plateaus* 329).

Matters of expression take on consistency, which enables them to reorganize functions and gather forces. What makes poster or placard develop into full blown motif and counterpoint? How do heterogeneous elements become bound up and consolidated with one another? It is the introduction of a form of relation among heterogeneous elements characterized as machinic that enables this process:

A color will “answer to” a sound. If a quality has motifs and counterpoints, if there are rhythmic characters and melodic landscapes in a given order, then there is the constitution of a veritable *machinic opera* tying together orders, species, and heterogeneous qualities. What we term machinic is precisely this synthesis of heterogeneities as such. Inasmuch as these heterogeneities are matters of *expression*, we say that their synthesis itself, their consistency or capture, forms a properly machinic “statement” or “enunciation.” The varying relations into which a color, sound, gesture, movement, or position enters in the same species, and in different species, form so many machinic enunciations (*Plateaus* 330-331).

In addition to the motifs and counterpoints that matters of expression are able to form, Deleuze and Guattari ask what inhibitors and releasers act on them. Ethology, they argue, is mistaken when it conceives of these factors in terms of binaries, or when it mixes them together in a hierarchy or tree of behaviors. It is not behavior of the individual, but assemblages at multiple scales, which is the starting point for understanding the specificity of any action under study. They claim that a machine is released any time a territorial assemblage is deterritorialized by a movement. A machine is described as what

inserts itself into an assemblage that is being deterritorialized and draws variations and mutations from it. Effects like these are machinic rather than mechanical. Machine effects or machinic statements enable passage or relay. They are distinguished also from symbols and the imaginary. A machine opens a territorial assemblage of a species to another assemblage, or it may produce closure, when pathways are suddenly blocked, leading to inhibition. They refer to this as entering a black hole. Black holes can lead to new connections and processes, or they can lead nowhere.

Deleuze and Guattari claim that matters of expression also find consistency in the molecular, which leads them into a discussion of the molar and molecular levels and their interrelations that touches on emergence and self-organization. Individual atoms may accumulate in ways that limit or constrain their individuality. This happens at both the molecular and molar levels. They argue, however, that atoms can also interact in ways that allow them to retain their individuality inside a molecule, which allows individuals to interact or “communicate” across orders. This culminates in a distinction between two kinds of populations: one group moves toward increasing homogeneity and probable states, while the other moves toward less probable states. The intramolecular forces that produce a molar form can be either mechanical, linear, arborescent; or indirect and machinic, non-mechanical and non-localizable bonds. The first are subject to chemical conditions of action/reaction, while the second are better described in terms of discernment or discrimination rather than bonding. These are ways of distinguishing between two tendencies of atomic matter: stratified systems and self-consistent aggregates. Consistency pertains to elementary particles just as much as complex life forms:

There is a coded system of stratification whenever, horizontally, there are linear causalities between elements; and, vertically, hierarchies of order between groupings; and, holding it all together in depth, a succession of framing forms, each of which informs a substance and in turn serves as a substance for another form. These causalities, hierarchies, and framings constitute a stratum, as well as the passage from one stratum to another, and the stratified combinations of

the molecular and the molar. On the other hand, we may speak of aggregates of consistency when instead of a regulated succession of forms-substances we are presented with consolidations of very heterogeneous elements, order that have been short-circuited or even reverse causalities, and captures between materials and forces of a different nature: as if *a machinic phylum, a destratifying transversality*, moved through elements, orders, forms and substances, the molar and the molecular, freeing matter and tapping forces. (*Plateaus* 335)

Machines drive processes of stratification and destratification, which all take place between the plane of consistency (the total of all virtual potential in the cosmos; all possible becomings) and the plane of organization (all existing stratifications). Stable being is temporary, and, as Holland argues, it requires “thickening agents” (Holland 56). Coding and territorialization are two of them.

Life, Deleuze and Guattari argue, is a gain of consistency or a surplus value. It is both a complex system of stratification and a disruptive aggregate of consistency. At this point, Deleuze and Guattari offer a definition of ethology:

“Ethology” then can be understood as a very privileged molar domain for demonstrating how the most varied components (biochemical, behavioral, perceptive, hereditary, acquired, improvised, social, etc.) can crystallize in assemblages that respect neither the distinction between orders nor the hierarchy of forms. What holds all the components together are *transversals*, and the transversal itself is only a component that has taken upon itself the specialized vector of deterritorialization” (*Plateaus* 336).

What remains difficult to identify in the work of Deleuze and Guattari is the contrast between the strategies they employ to place autonomy and creativity on the side of the expressive qualities of matter itself, understood within a context of melodic and contrapuntal relations among heterogeneous crystallizations of temporal and spatial regularities, and their descriptions of nonhuman animals as artists. Calling nonhuman animals creative and artistic evokes an image of a subject who practices

meaning-making, yet this kind of subjectivity is painstakingly avoided in Deleuze and Guattari's engagement with ethology. It is perhaps not the organism who is autonomous and artistic, but only expressive qualities in their proliferating variations. It is, after all, not the subject of lived experience that sensation affects, Grosz claims. Sensation is an unmediated event that directly transforms bodies: "Sensation impacts the body, not through the brain, not through representations, signs, images, or fantasies, but directly, on the body's own internal forces, on cells, organs, the nervous system. Sensation requires no mediation or translation. It is not representation, sign, symbol, but force, energy, rhythm, resonance" (*Chaos, Territory, Art* 73). This formulation would seem to make meaningful experience superfluous. Yet Grosz writes extensively about living beings acting, being creative, putting themselves at risk in the service of expression, etc. But what good is it to say affect involves both affecting and being affected if one cannot really say *who* is affecting or being affected, or how this process is at least partially directed?

Conclusion

Deleuze and Guattari set up roadblocks directly in the middle of some of the most familiar pathways along which human/nonhuman distinctions have traditionally been established. They intervene in ethological debates by opposing their concept of territorialization to the understanding of territory offered by ethologists such as Lorenz. For Lorenz, food, sex, fear and aggression are the primary drives at work in the animal world. These drives underly and generate phenomena like territory in a mechanistic fashion. Deleuze and Guattari seem to be opposing their theory to the mechanism still at work in Lorenz, as Bogue explains: "According to this familiar mechanistic, stimulus-response model, territoriality is simply a random outgrowth of the primary drives that has proved to possess survival value. Birdsong, far from being an animal art form, is merely an instinctual communicative signal at the service of the drives of sex and aggression" (57-58). Deleuze and Guattari offer an alternative to the cognitive ethological approach examined in the first chapter, which attempts to think

agency by inserting a representationalist form of conscious agency into some of these mechanistic processes, by considering nonhumans as artists who act creatively in their surrounding worlds. What exactly constitutes an artist, however, is not at all clear. What Deleuze and Guattari oppose to functional accounts of behavior is certainly nothing that resembles a traditional humanist subjectivity. This strategy is helpful for diverting thought away from anthropocentrism, but it is not yet a sufficiently detailed basis for thinking nonhuman animal experience in its specificity: “Birds are musicians, but so are crickets, ticks, atoms, and stars” (Bogue 75).²⁷

Deleuze and Guattari argue that aggression is not the cause of territorialization. None of those primary drives, or functions, explain the territory. The territory is what explains the reorganization of those drives/functions. Bogue argues that what is at stake is an entirely new understanding of nature, one in debt to Uexküll and Raymond Ruyer particularly. While Ruyer provides insight into the developmental side of nature, Uexküll offers a way of describing complex, and especially inter-specific, relations non-mechanistically. Uexküll's theory of meaning is re-described by Deleuze and Guattari as a theory of transcodings in which milieu components become melodies in counterpoint, one serving as motif for the other. Organisms are not related in cause-effect relationships, but melodic ones. Yet Deleuze and Guattari never touch on the *Umwelt* concept (Buchanan, *Onto-Ethologies* 176-177), which is what allows Uexküll to articulate a general form of meaning-making in which milieu components become significant for an organism who, as a unified whole, can be said to have a perspective on the world.²⁸

Bogue argues that Deleuze and Guattari re-describe meaning in terms of affects, and that this shift only reinforces Uexküll's point about the inseparability of milieus and their inhabitants. While both Deleuze and Guattari and Uexküll conceive of milieu components in terms of melodies, Deleuze

²⁷ Evernden (44-45) and Livingston (92-94), in contrast, discuss processes such as territorialization as forms of extended subjectivity.

²⁸ See Sellbach and Loo for an alternative account of the *Umwelt* in Deleuze.

and Guattari go beyond analogy or metaphor to identify the temporal relations that melody alludes to:

Deleuze and Guattari, like von Uexküll, speak of milieu components as “melodies,” thereby emphasizing the organization of pragmatic and developmental patterns as temporal unfoldings that possess a thematic coherence. But they stress as well the role of differential rhythms and periodic metrical repetitions in the construction of milieus; hence, by isolating the characteristic common to sonic and nonsonic motifs—the temporal disposition of their elements—they provide a literal rather than a figurative means of speaking of milieu components. (Bogue 62)

Re-describing melodic relations in terms of spatial and temporal consistencies brings Uexküll's work more in line with contemporary scientific theories of self-organization and away from the all-controlling plan of nature Uexküll relies on to explain the emergence and maintenance of life's complex mesh of relationships. Biosemioticians such as Hoffmeyer also, in a different manner, link Uexküll to theories of self-organization. While Hoffmeyer and biosemiotics in general offer a variety of conceptual tools—indexical and iconic signs foremost among them—to describe how organisms make meaningful relations with their environments, Deleuze and Guattari offer less specific concepts able to address this crucial theme. What Deleuze and Guattari offer instead is an account of life that in no way places the human at its peak. They offer the groundwork for a radical departure from a view of life burdened by the distinction between mechanistic nonhumans and rational, self-possessed, meaningful human existence.

Conclusion

A critical posthumanist theory of meaning should be described in terms of process rather than with reference to content, whether content here refers to objects encountered by a subject, or mental representations of objects. Meaning-making processes arise in a wide variety of organisms in radically different ways. Differential styles of meaning-making are not easily placeable into a hierarchy of value. These aspects of a critical posthumanist theory of meaning can also be formulated as questions:

1. What is meaning-making in general?
2. How should the different manifestations of this general process be theorized?
3. How is human meaning-making situated within these processes?

Chapter 1 describes, in broad strokes, the perspective of critical posthumanism as it pertains to questions of meaning. In order to move past Cartesian dualism, it is necessary to put into question the traditional figure of the human and the central role of mental representations in accounts of meaning-making. Cognitive ethology has a great deal in common with, and in fact heavily influences, the understanding of life and animality as it takes shape in critical posthumanist discourse. At the same time, critical posthumanism can help push cognitive ethology further away from Cartesian dualism, especially by placing sometimes unexamined assumptions regarding human meaning-making into question.

Why is Jakob von Uexküll a foundational figure for critical posthumanism? Starting with this question, chapters 2, 3 and 4 trace a line from Uexküll's *Umwelt* theory, through autopoietic systems theory, phenomenology, biosemiotics and Deleuzian metaphysics. If critical posthumanism, as I have presented it, has so far played primarily a critical role in telling us what to avoid in order to displace Cartesian anthropocentric humanism, the Uexküllian line I have been following is one attempt to gather resources that will help in the construction of a new understanding of meaning. I conclude by summarizing some of the most important aspects of a critical posthumanist concept of meaning.

Process

What is meaning-making in general? Meaning must be understood in terms of process and not in terms of a subject encountering an object. If meaning could be said to have a theme, if it is a process that has a purpose in the Peircean sense described by Hoffmeyer, it is not primarily that of determining what things in an environment are for an organism. Rather, such encounters occur only within a more primordial process, that of determining how to act. Uexküll argues that organisms do not encounter objects in a contextual void. Rather, they live in meaningful worlds, they have orientations toward themselves and their surrounding worlds, and they actively search out rather than passively receive stimuli. Organisms do not therefore encounter stimuli in a neutral manner, as if there were no dynamic, complex web of relationships—to self and the body, to relevant environmental features, to past experience and future needs—through which the same stimulus may be experienced in many different ways. Maturana and Varela see life as a process in which organisms are unified sets of relations engaged in the act of re-creating their own components. Autopoiesis is the dynamic process of self-maintenance by way of self-creation that gives an organism autonomy as a unified whole, and which also gives it autonomy from any deterministic, passive relation to an outside environment. In the process of autopoiesis, organism and environment are both in constant states of transformation. Meaning does not arise in a representation, but only within a self-relational context. A living system is an ongoing process that, by maintaining its organizing relations, constantly alters its structure.

For Merleau-Ponty, organisms can in many cases be conceptualized as out of equilibrium with their surroundings as well as themselves. Animality is not comprehensively explained by way of relations of utility, and seamless organism/environment integration is rare. In thinking about the nonhuman world, much more consideration needs to be given to the expressive, multimodal relations that give rise to what he calls pre-cultural behaviors. Moreover, these relations are not simply different ways in which an outside world prompts an organism to respond: “There is no stimulation from the

outside that had not been provoked by the animal's own movement" (*Nature* 175). Even Heidegger points out that motility is a key aspect of animality that has not yet been given its proper place in accounts of organismic life. When Heidegger says that an animal is nothing but its drives, he is describing one, albeit somewhat meagre and gloomy, concept of dynamic, self-referential process. Nonhuman animals, for Heidegger, are never blank slates upon which a stimulus can impinge to elicit a reaction mechanistically. Rather, they consist of relationships among their own drives.

For biosemiotics, process is described as semiosis. Hoffmeyer describes life as fundamentally a kind of striving. The self emerges within this striving as a property of complex, self-referential systems. Selves arise at multiple scales in a living being, meaning that each organism is itself a dynamic semiotic ecology. For Deleuze and Guattari, the organism is more process than structure. But this process, for them, is driven by the expressive qualities of matter itself rather than anything an organism, as a unity, might do. Although they describe some nonhumans as artists who are occasionally able to break dramatically with strictly mechanistic relations, they do not elaborate on how meaning-making might play a role in these transformations. Their concern with avoiding many of the themes pursued by phenomenologists leads them away from such questions. Nevertheless, they offer an important corrective to accounts that would place too much emphasis on the holistic organism and too little emphasis on the sub-organismic interactions through which inorganic forces animate matter. From this perspective, they add complexity to theorizations of organism/environment relations.

Through my reading of these foundational texts, some key themes can be drawn out that deserve consideration when thinking meaning as a process. Perception and action, or affecting and being affected, are bound up together. Meaning often forms a complex, nonlinear relationship between past and future experience. There is a self-relational nature of meaning-making. Every bounded organism is also sub-organismic multiplicity of such recursive relations in living systems. Finally, meaning should be conceived as geared to action rather than to external objects or their representations.

1: What affects an organism and what that organism affects are entangled, and taking this entanglement seriously is instructive. Separating meaning into binaries like perception/action or stimulus/response, while often necessary, is always at least partially reductive, de-contextualizing, and incomplete. Representationalism remains compelling as long as the problem of meaning is conceived as a question of how an object might impinge on the senses of an organism. This way of framing the problem cuts off much of the context in which an organism might be said to encounter an object. It creates the illusion that an organism can ever encounter an object in isolation, or in a neutral, unmotivated state.

2: One of the most important of these contexts is an organism's relationship to its past and future. What processes are already underway that might condition how a stimulus is received? When Uexküll discusses mood, for example, he describes how a hermit crab might react to the presence of a sea anemone. The crab will behave toward the sea anemone differently, according to what needs are most pressing for the crab. The pressing needs come first, in other words, not the anemone. Those needs are a relation to future behavior that drives present action. The present action is likewise informed by the recent past (whether the crab has eaten recently, for example).

3: Meaning emerges from self-relation. An organism is a dynamic construction of the relation between inside and outside which, through its relationship to itself, provides a context within which the world becomes accessible. This relation is a dynamic rather than static structural understanding of an organism. An organism is more than a way of holding together its organs; it is an agenda. Heidegger argues for the precedence of the whole over individual organs: an isolated eye cannot see anything. Maturana and Varela point out that what the eye sees is constructed by the autopoietic system itself.

4: There are multiple, ephemeral selves at different levels of biological organization. Self-relation does not occur only at the level of the holistic organism. An organism is an ongoing production of self comprised of other selves. The term “self” points to this dynamic relationship, which need not

be conscious in any straightforward or familiar sense of that term. Hoffmeyer discusses this idea by working the insights of Merleau-Ponty into a contemporary biosemiotic framework (*Biosemiotics* 26). Recursive, self-referring relations also come up in different ways in Uexküll, when he talks about “higher” animals being collections of functional cycles. What is categorized as human consciousness is one self-relational process among others that together comprise human meaningful experience. Whether or not other organisms have analogous processes to human consciousness should not be the only basis for thinking selfhood.

5: Meaning is not, at the most basic level, about finding out what things are. It is about acting. Human language in particular, and human meaning-making in general, are often described as unique in that they allow access to more of the great many different sorts of phenomena which can be experienced. Human meaning-making enables more features of phenomena, more connections among these phenomena, and more variable responses to any given experience than the meaning-making systems of all other animals. The perceived differences in scale that separate human and nonhuman meaning-making can make any comparability between human and nonhuman experience seem marginal and misleading. What I hope to communicate by foregrounding action over content is that, beyond this radical expansion of meaningfulness that distinguishes the human, a facility with meaning-making often described somewhat vaguely as “richness,” there are more fundamental ways of understanding meaning that, if given proper emphasis, may engender a view of meaning-making that brings the similarities among human and nonhuman forms of meaning more clearly into focus.

Conceptualizing Differences Among Meaning-Making Practices

A concept of meaning must have a particular conceptual structure. It must be broad enough to account for the vast, open-ended variety of forms of meaning-making, while simultaneously accounting for, rather than eliding, the differences among them. An analogous concept might be self-propulsion. How a fish, bird, kangaroo or deer propel themselves varies radically, but these radically different

styles can all be gathered under the umbrella of a concept of self-propulsion. A concept of meaning-making needs to resemble this concept of self-propulsion on a formal level. If dynamic process is the general form of meaning, that general form manifests in radically different ways depending on phylogeny, physiology, past experience and present environmental context. Ethological and cognitive ethological studies do the difficult work of describing these differences in meaning-making processes. Critical posthumanism can offer conceptual insight into how these proliferating differences can be thought together.

Uexküll's concept of the *Umwelt* offers one strategy for understanding how meaning-making can take on such different shapes. Yet the *Umwelt* concept is altogether too vague, as Allen points out. Fortunately, Uexküll has a great deal to say about investigating individual species differences. He outlines how space and time are experienced differently by different species, how objects take on different meanings at different times for the same organism, and how increasing complexity, conceived as a network of functional cycles, enables a wide variety of forms of meaning-making practices to emerge. In this context, the *Umwelt* acts as a reminder that these differences arise within a self-relational context that complicates any attempt at straightforward comparisons among organisms.

The post-Uexküllian theories, as I read them, have had more mixed results in this task. Biosemiotics offers a number of concepts helpful for describing different forms of meaning-making: indexical and iconic signs are part of a rich vocabulary for describing sign processes that can be useful for ethology. Anthropologist Eduardo Kohn, for example, finds a great deal of utility in the biosemiotic framework for innovating new approaches to the nonhuman in anthropology. Hoffmeyer, Kohn, Deely and Deacon ascribe to a representationalist form of semiosis, however, which clashes with the critical posthumanist perspective. How might sign processes be thought in ways that are more amenable to a critical posthumanist view?

Autopoiesis, while avoiding representationalism, has not yet adequately accounted for the

middle ground between general autopoietic dynamics and human language. Linguistic domains are interesting, but not sufficient for fleshing out this aspect of meaning, an aspect crucial for describing nonhuman meaningful experience. When John Mingers addresses this problem, for example, he falls back on the language of sign processes. Deleuze and Guattari, like autopoiesis, seem to have a lot to offer a very general understanding of meaning-making and very little in terms of specifics. They describe what seem to be behaviors of organisms, yet upon close inspection, the organism itself gives way to sub-organismic relations with external inorganic forces.

The phenomenological approaches, especially that of Merleau-Ponty, offer methodological and conceptual insights that could be further developed for phenomenological accounts of nonhuman meaningful experience. Lestel, Bussolini and Chrulew, for instance, draw on phenomenological theorizations of intersubjectivity to describe ethology as a relational science integrating biology and evolutionary theory into a framework constructed in line with the ethical and creative resources of the social sciences and humanities. Shared life, they argue, is the condition from which both dialogue and auto-affection emerge. They argue for a philosophical ethology, or field philosophy, grounded in a cross-species extension of a phenomenological understanding of intersubjectivity.

Ultimately, the most compelling approach to working out a rigorous understanding of difference within a general theory of meaning-making processes may emerge, not so much via this Uexküllian lineage, but at the intersection of current cognitive ethological study and the contemporary critical posthumanist critique of humanism. The Uexküllian approach does address another key theme, however, that brings together questions of inter-specific and intra-specific difference and similarity, the critique of humanism, and ethological study. That is the question of how we humans are to see ourselves as implicated within these meaning-making practices.

Meaning-Making as Value Practices

The divisions between lower and higher animals in Uexküll and Merleau-Ponty, while opening

up space for understanding differences among forms of meaning-making, are problematic for their hierarchical language. Andreas Hejnl points out that new developments in the study of evolutionary relationships among animals are changing the metaphors used to think these relations. Contemporary cladistic analyses of molecular sequences, he argues, destroy notions of hierarchical and increasingly progressive understandings of evolution. Evolution does not necessarily move from simpler to more complex or in one direction, there are no higher and lower animals, and humans are not situated at the apex of the evolutionary process. Reshaping thought in light of these developments, Hejnl argues, may change what forms of life get privileged in conservation efforts, for example: “Rethinking relations among organisms and the metaphors we use to describe them can shift how we value other beings—and thus change how we aim to protect our natural environment” (Hejnl G92).

How does thinking meaning in terms of process help in this effort? I will suggest two ways in which rethinking meaning changes human value practices. The first is the refusal of the ability, critiqued throughout the dissertation, of human meaning-making to transcend the limitations facing all organisms differentially. The second concerns what human value practices might be, and what specific limitations they might face, in the absence of this transcendental ability.

Uexküll raises the problem of human access to nonhuman *Umwelten*. Must humans, as Brentari, Deely and Hoffmeyer seem to suggest, be seen as having the ability to transcend their *Umwelten*? Is such a view a necessary precondition for scientific objectivity? I argue that it is not, and that it is the commitment to representationalism and a Cartesian view of human meaning-making that create this impression. To transcend the human *Umwelt*, I argue, is to transcend the bodily and ecological context in which meaning-making operates. One of the most persistent claims made about human language is that it can be stimulus-free or context-free, able to operate as a modelling system with very little constraints. The idea that language allows meaning to escape all context and become a universal modelling system is too much to claim for the human. In the absence of an unconditional, unmotivated

access to reality that would separate human from nonhuman, how might valuing be re-conceived?

I take valuing to be a ubiquitous form of meaning-making, in that it is part of the self-referential, dynamic, action-oriented processes in which organisms are constantly engaged. Rather than a transcendental realm of value that could be uncovered or discovered, therefore, there is perhaps a vast ecology of value practices comprising the living. Human valuing is one ongoing, permanently unsettled iteration of this process. Describing the living world as an ecology of continually shifting value practices might sound at first like a call for an ecocentric or biocentric value system, and it is, but with one crucial caveat. If the human is positioned as one among other forms of meaning-making, and if human meaning-making does not ultimately break through to a realm of knowledge within which a natural hierarchy of value could be discovered, then there is not and could never be a single system of value. Valuing is a precarious practice that is never free from corporeal and environmental context. And yet, as meaning-making beings, valuing practices are not something one can choose to engage in or disengage from. They can only be made and remade with more or less care. This is one sense in which, as Wolfe says: “We *must* choose, and by definition we *cannot* choose everyone and everything at once. But this is precisely what ensures that, *in the future, we will have been wrong*” (*Before the Law* 103). No matter how the boundaries demarcating forms of life are drawn, that is, they are always done within complex ethical, political and ecological situations that are constantly shifting. They will have to be redrawn again and again, which is why valuing is a practice rather than the disclosing of a transcendental order. As Barad writes, “Different material intra-actions produce different materializations of the world and hence there are specific stakes in how responsiveness is enacted. In an important sense, it matters how the world comes to matter” (“Invertebrate Visions” 240). Thinking valuing in this way also suggests that, for a critical posthumanist concept of meaning, humanism can be conceived in terms of the precarity of human value practices. Value distinctions have to be made, but then they have to be unmade and remade. Posthumanism will always, therefore, have to be critical.

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