

# Ecological Imagination

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Environmental thinkers recognize that ecological thinking has a vital role to play in many wise choices and policies; yet, little theoretical attention has been given to developing an adequate philosophical psychology of the imaginative nature of such thinking. Ecological imagination is an outgrowth of our more general deliberative capacity to perceive, in light of possibilities for thinking and acting, the relationships that constitute any object. Such imagination is of a specifically ecological sort when key metaphors, images, symbols, and the like used in the ecologies shape the mental simulations we use to deliberate—i.e., when these interpretive structures shape what John Dewey calls our “dramatic rehearsals.” There is an urgent practical need to cultivate ecological imagination, and an equally practical need to make theoretical sense of the imaginative dimension of ecological reflection.

## INTRODUCTION

Environmental thinkers have long recognized that ecological thinking has a vital role to play in private choices and public policies as we try to forecast and facilitate outcomes that will help us to negotiate increasingly complex systems, from economic systems to ecosystems. Yet, little direct attention has been given to theorizing about the imaginative dimension of such thinking. Ecological thinking is fundamentally imaginative, at least in the sense that it requires simulations and projections shaped by metaphors, images, narratives, symbols, and semantic frames. A fine-tuned ecological imagination is a capacity we already count on in our best environmental writers, educators, scientists, and policy analysts. In this essay, I very briefly explore the nature and function of imagination in deliberation; examine part of the conventional repertoire of English-language metaphors for conceiving ecosystemic interdependence; and contextualize ecological imagination as a type of relational imagination. I highlight the practical need to cultivate ecological imagination, but my primary aim is more basic and descriptive: to contribute to a philosophical psychology of the underappreciated imaginative dimension of ecological reflection, with special attention to its role in deliberation.<sup>1</sup>

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<sup>1</sup> The terms *ecological imagination* and *environmental imagination* have recently been used by some American scholars in the humanities, perhaps most notably the founder of “eco-criticism,” Lawrence Buell, and environmental historian, Donald Worster. Worster approaches ecological imagination as a matrix of cultural values (e.g., “the ecological imagination of Western pioneers”). Buell variously focuses on environmental imagination as the tell-tale feature of the literary genre probing the interface “between a poet of the environmental imagination”), as the imaginative

I have argued at length elsewhere<sup>2</sup> that deliberation (whether moral, scientific, or aesthetic) is imaginative in several senses, including the straightforward sense that it involves mental simulations shaped in part by metaphors and related cognitive structures. (Due to philosophical differences explained below, my usage does not parallel Emily Brady's Kantian typology in *Aesthetics of the Natural Environment* of metaphorical, exploratory, projective, ampliative, and revelatory imaginative modes.<sup>3</sup>) One of many practical upshots of this approach is that, oriented by such interpretive structures, I am able to zoom in on things, events, concepts, institutions, and persons without losing sight of their relational context—say, a child in relation to family, a sunrise in relation to the solar system, a statement in relation to its interpersonal, sociocultural, or literary context. This ability is morally significant. Many remediable moral failures stem from mal-development of our capacity to oscillate in imagination between things and their relations, as is painfully evident in our troubled dealings with complex social and natural systems. Examples are the familiar stock-and-trade of much environmental advocacy, from social and environmental costs of Wal-Mart's "everyday-low prices" to aesthetic disconnection from our industrialized food chain.

There is, of course, nothing uniquely ecological about the workings of this sort of relational imagination in moral life, save in the etymological sense in which the ecologies study the homes of biological organisms. In Confucian role ethics, for example, relational imagination is guided by metaphors of family and filial responsibility, not by ecological metaphors.<sup>4</sup> Classical American pragmatists, early French phenomenologists, and Japanese philosophers of the Zen-inspired "Kyoto School" (e.g., Nishida Kitarō and Nishitani Keiji) were among those skilled in a form of imaginative inquiry often discussed in hindsight as ecological. But they seldom framed relational connections in terms of organism-environment interactions that affect the distribution and profusion of organisms, and the tendency to refer to all thinking about interrelatedness as *ipso facto* ecological has contributed to the concept's vagueness. The haze is thickened by casual and literary references to most any environmental topic as ecological.

In order to circumscribe the topic somewhat, ecological imagination is treated herein as relational imagination shaped by key metaphors used in (although not

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life of those who produce such arts (e.g., "Whitman's environmental imagination"), or as the cognitive locus of a reader's freshly evoked awareness and concern for an endangered landscape. In this article, I approach the subject more from the standpoint of a philosophical psychologist and moral philosopher than a literary critic or social scientist. Lawrence Buell, *Writing for an Endangered World* (Cambridge: Belknap Press, 2001) and *The Environmental Imagination* (Cambridge: Belknap Press, 1996); Donald Worster, *The Wealth of Nature: Environmental History and the Ecological Imagination* (Oxford: Oxford University Press, 1996).

<sup>2</sup> Steven Fesmire, *John Dewey and Moral Imagination: Pragmatism in Ethics* (Bloomington: Indiana University Press, 2003).

<sup>3</sup> Emily Brady, *Aesthetics of the Natural Environment* (Tuscaloosa: University of Alabama Press, 2003), pp. 153–58.

<sup>4</sup> See Roger Ames's *Confucian Role Ethics* (Honolulu: University of Hawai'i Press, forthcoming).

necessarily originating in) the ecologies. Our deliberations enlist imagination of an ecological sort when these metaphors (some of recent origin and some millennia old) shape what John Dewey calls our “dramatic rehearsals.” So defined, the concept of ecological imagination is too broad to encompass in this essay. Therefore, I limit the focus to a subset of key metaphors used in the ecologies—those characterizing ecosystems. I explore how key metaphors that are used to make sense of ecosystemic relations are blended and linked to help define and guide the operation of ecological imagination. The adjective *ecological* is preferred here to *environmental* because, in addition to metaphoric richness, the latter dualistically connotes external surroundings whereas the former suggests a reflective biological organism stretching to notice the relationships that synergistically constitute it.

Three clarifications upfront will help to locate this inquiry within environmental ethics: (1) the theory roughed out herein is compatible with a range of positions regarding the sphere of value. Bryan Norton, Andrew Light, Paul Thompson, Gary Varner, and many others have demonstrated in this journal that convergences are possible among those with competing environmental value frameworks. In this pragmatic spirit, wrangling over first principles is here kept to a minimum—that is, an axiological commitment to ecocentrism is neither assumed nor implied by the topic.

(2) *Imagination* is value-neutral in this context. Unless joined to rigorous reflection about ideals and ends, such as ideals of ecological sensitivity and of democracy as a way of life, the mere exercise of imagination is unlikely to be ameliorative. Its cultivation is necessary, but not sufficient. The same must be said of ecological imagination. We are in great need of this cognitive capacity, but the mere exercise of ecological imagination cannot on its own tell us how we ought to act.

(3) Ecological imagination is not approached here as part of a deliberative procedure to solve environmental problems, but neither is it intended as a mere supplement to the important work of ethics. Philosophical ethics can proffer hypotheses that enlarge perceptions and, in Dewey's words, “render men's minds more sensitive to life about them.”<sup>5</sup> It is valuable only insofar as it renders this service. The quest for a single “right way to reason” about environmental ethics has been a distraction save as it has, almost by happy accident, enlarged perceptions. In our relational world, there is always some portion of the network of any moral situation that legitimately presses for consideration, yet is not spotlighted by our moral framework or conceptual schema—Dewey's own insensitivity to the abiotic environment in the quote above is perhaps a case in point. Ecological imagination renders us more sensitive to aspects of this relational network.

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<sup>5</sup> John Dewey, *Reconstruction in Philosophy* [MW], in *The Collected Works of John Dewey*, ed. Jo Ann Boydston, 37 vols. (Carbondale: Southern Illinois University Press, 1969–1991), 12:91–92. All references to Dewey are to *The Collected Works*. Each reference is further labeled as an “Early Work” (EW), a “Middle Work” (MW), or a “Later Work” (LW).

## THE NATURE AND FUNCTION OF IMAGINATION IN DELIBERATION

In October 2005 *The Wall Street Journal* ran a story on island vacations in an age of warming climate.<sup>6</sup> Avoid Sri Lanka and especially Sulawesi, Indonesia, the *Journal* counseled. Instead, pleasure seekers should hop a jet to Easter Island, which has not been blemished by eroding beaches and dying coral reefs that are putting a damper on sunbathing and snorkeling. Although it is unlikely that many *Journal* readers see global ecological crises mainly in terms of vacation planning, the article illustrates moral perception that needs supplementation and expansion beyond the speck of commodifying self-interest around which most daily consumer concerns orbit. In our global economic milieu, expanding affluence sanctifies the innocence of consumers, an innocence purchased by ignorance of the environmental, social, and interspecies hazards posed by our "business as usual" behaviors.

Conditions demand that we extend perception deeper into the sociocultural, natural, and interpersonal relationships in which we are embedded. Science-based ecological literacy has become vital to this effort. But even the most thorough knowledge about complex systems will overwhelm rather than enhance moral intelligence if that knowledge is not framed by *imagination* in a way that relates one's individual biography to one's encompassing environment and history.

Imagination is here understood not as a faculty but as a function. In Wallace Stegner's words in *Angle of Repose*, imagination is our means for shaping definite contours, lines, and forms "out of the fog of consequences" that is our future and our past.<sup>7</sup> Ecological thinking enters deliberation as a function of this sort of imagination. Before turning to a discussion of ecological imagination, it is essential to better understand (or at least to stipulate) what imagination *is* and *does*, particularly given dramatic variability among Western theories of imagination.

What *is* imagination? Cognitive scientists studying the neural synaptic connections we call imagination define it helpfully as a form of "mental simulation" shaped by our embodied interactions with the social and physical world and structured by projective mental habits like metaphors, images, and narratives.<sup>8</sup> Mental simulation is perhaps the most accurate technical description of imagination from a cognitive standpoint because neuroscience reveals that imaginative cognitive processes piggyback on the same neural connections involved in physical interactions. Seeing a birch tree activates the same neural region as dreaming about it; hiking on Vermont's Long Trail activates the same neural region as rehearsing or remembering

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<sup>6</sup> Jacob Hale Russell and Jess McCuan, "Global Climate Change Island Guide," *Wall Street Journal*, 29 October 2005. Bill McKibben, public presentation, Green Mountain College, September 2006. Cf. Bill McKibben, *Deep Economy* (New York: Macmillan, 2007), chap. 3.

<sup>7</sup> Wallace Stegner, *Angle of Repose* (New York: Penguin, 1971), p. 444.

<sup>8</sup> George Lakoff, *The Political Mind* (New York: Viking Press, 2008), p. 241. For a bibliography of research on imagination in cognitive science, see George Lakoff and Mark Johnson, *Philosophy in the Flesh* (New York: Basic Books, 1998). More recently, see Mark Johnson, *The Meaning of the Body* (Chicago: University of Chicago Press, 2007).

the walk.<sup>9</sup> Imagining a landscape simulates a physical encounter. For example, imagining the southeastern Utah landscape with Terry Tempest Williams in *Red* strengthens synaptic connections in the same neural region that would be involved in a direct sensorial encounter.

Because imaginative experience is of the same stuff as physical interactions, the way imaginative habits develop along definite lines through our embodied interactions is no more (or less) mysterious than any other neurally instantiated habit. This does not imply that everyone simulates in the same way. To the contrary, the capacity for fine-grained mental simulation is an achievement that can be nurtured by education.

What does imagination *do*? Despite the eulogizing of imagination by Adam Smith and David Hume, Enlightenment faculty psychology, following the lead of Plato's low appraisal of imagination in the *Republic* and *Ion*, is responsible for imagination being mostly ignored even by those who urge that moral theories must be psychologically plausible. It is conceived as a limited capacity prone to frivolous fantasy and opposed to reason, and hence of little relevance to practical issues. So it is relegated to a subsidiary role in cognitive life or, transfigured by Romanticism, admired on a pedestal as a "godlike power that enters into the world on the wings of intuition, free of the taint of contingency and history."<sup>10</sup> In philosophy of mind, our flickering imaginations are thought at best merely to form a pre-intentional "background" for rational thought.<sup>11</sup>

In contrast, Dewey's work offers a powerful resource for framing a theory of imagination that is compatible with contemporary cognitive research. Perhaps the term *imagination* should be jettisoned as hopelessly entangled in Enlightenment mistakes, but Dewey chooses instead to reconstruct the concept to accord with a functional psychology. More than a capacity to reproduce mental images, Dewey highlights imagination's active and constitutive role. "Only imaginative vision," Dewey urges, "elicits the possibilities that are interwoven within the texture of the actual."<sup>12</sup> Only through imagination do we see actual conditions in light of what is possible, so it is fundamental to our best scientific, aesthetic, and moral thinking. Imagination on this view is a concrete cognitive capacity as ordinary for humans as nest building is for birds or dam building for beavers. It is not something one can "lack," as in a memorable passage from *Anne of Green Gables*: "'It's easy for you because you have an imagination,' retorted Diana, 'but what would you do if *you* had been born without one?'"<sup>13</sup>

<sup>9</sup> Lakoff, *The Political Mind*, 240–41. For a general survey of work on the embodied basis of meaning, see Raymond Gibbs, Jr., *Embodiment in Cognitive Science* (New York: Cambridge University Press, 2005).

<sup>10</sup> Jonathan Levin, *The Poetics of Transition* (Durham, N.C.: Duke University Press, 1999), p. 87.

<sup>11</sup> John Searle, *Intentionality* (Cambridge, U.K.: Cambridge University Press, 1983). See chap. 5, "The Background." For a critique of Searle's account of imagination, see Mark Johnson, *The Body in the Mind* (Chicago: University of Chicago Press, 1987), pp. 178–91.

<sup>12</sup> Dewey, *Art as Experience* [LW], in *Collected Works*, 10:348.

<sup>13</sup> Lucy Maud Montgomery, *Anne of Green Gables* (New York: Grosset and Dunlap, 1908), p. 290.

Dewey distinguishes the imaginative, which is interactively engaged and rooted in problematic conditions, from the imaginary, which is subjective and given to fanciful wanderings. By framing imaginative experience as interactively engaged rather than self-absorbed, Dewey addresses what Emily Brady regards in "Imagination and the Aesthetic Appreciation of Nature" as a "danger of self-indulgence in the imaginative subject," coupled with wayward tendencies toward "irrelevant imaginings."<sup>14</sup> To clarify her ideal of "imagining well" to avoid self-indulgence, Brady turns to the Kantian notion of disinterestedness as a guideline. Yet, it is difficult to free disinterestedness from its dualistic Kantian legacy in order to square it with the embodied, engaged fullness sought in twentieth-century philosophies of experience such as Dewey's or Maurice Merleau-Ponty's. Brady calls for "preventing the irrelevance of shallow, naïve, and sentimental imaginative responses" in aesthetic appreciation. But to do so she prescribes that we skillfully "clip the wings of imagination" to keep "imaginings on track," betraying a lingering Kantian suspicion of imagination that is counter to the general spirit of her fine work.<sup>15</sup> Flightless imagination shunted down a designated "track" merely supervenes *upon* experience. It lacks courage to engage present circumstances and stretch. Imaginative experience, on Dewey's view, intervenes *in* experience, permeating "deeply and widely."<sup>16</sup>

Dewey's theory suggests a fundamental role for imagination in reflective life that extends beyond the conventional dualism, echoed uncritically by Stuart Hampshire in *Innocence and Experience*, that imagination "leaps and swerves" while rational intellect advances "by rule-guided steps."<sup>17</sup> For Dewey, imagination, disciplined through education, yet very much in flight with unclipped wings, "supplements and deepens observation" by affording "clear insight into the remote, the absent, the obscure."<sup>18</sup> Imagination, amplified by art and science, extends perception deep into the place and time in which we live.

For Dewey and fellow classical pragmatists Charles S. Peirce and William James, imaginative experience is born of troubled or ambiguous situations. On this view, impulsion toward action persists when we are brought up short by perplexing circumstances. This disruption evokes deliberation, which is (descriptively) an indirect, reflective mode of action that substitutes for overt action by placing before us, in Dewey's words, "objects which are not directly or sensibly present, so that we may then react directly to these objects, . . . precisely as we would to the same objects if they were physically present."<sup>19</sup> Deliberation, Dewey says, is "a kind

<sup>14</sup> Emily Brady, "Imagination and the Aesthetic Appreciation of Nature," in Allen Carlson and Arnold Berleant, eds., *The Aesthetics of Natural Environments* (Peterborough, Ontario: Broadview Press, 2004), pp. 164–65.

<sup>15</sup> Brady, "Imagination and the Aesthetic Appreciation of Nature," p. 166.

<sup>16</sup> Dewey, *A Common Faith* [LW], in *Collected Works*, 9:13.

<sup>17</sup> Stuart Hampshire, *Innocence and Experience* (Cambridge: Harvard University Press, 189), p. 126.

<sup>18</sup> Dewey, *How We Think* [LW], in *Collected Works*, 8:251.

<sup>19</sup> Dewey, *Human Nature and Conduct* [MW], in *Collected Works*, 14:139.

of dramatic rehearsal" in imagination. If only one alternative for dealing with a problematic situation were to present itself, we would act on it without hesitation. But when alternatives contend with one another as we forecast the consequences of acting on them, the ensuing tension or suspense sustains deliberation.<sup>20</sup>

There is an obvious evolutionary benefit of a neural adaptation that enables experimental simulation: "An act overtly tried out is irrevocable, its consequences cannot be blotted out," Dewey observes. "An act tried out in imagination is not final or fatal. It is retrievable."<sup>21</sup> Dramatic rehearsal, then, is a capacity for crystallizing possibilities for thinking and acting and transforming them into directive hypotheses. By means of this capacity, actual and potential relations (including past lessons and as-yet-unrealized potentialities) "come home to us and have power to stir us."<sup>22</sup> Whatever else may or should be involved in moral deliberation, it must at least be compatible with these psychological operations, which are fundamentally imaginative.

We should expect carefully vetted research on a capacity that has become so essential to Earth's biota. Yet environmental philosophers have given insufficient attention to imagination. As Ronald Hepburn cautions in "Contemporary Aesthetics and the Neglect of Natural Beauty," "When a set of human experiences is ignored in a theory relevant to them, they tend to be rendered less readily available as experiences. . . . The experiences are felt . . . as off-the-map; and, since off the map, seldom visited."<sup>23</sup>

#### THE METAPHORICAL CONSTRUCTION OF ECOLOGICAL IMAGINATION

I earlier defined *ecological imagination* as a form of mental simulation organized by metaphors used in the ecologies. Doing so partially mitigates the vagueness of the notion, but unless some of these metaphors are spelled out concretely and specifically, I have merely substituted one vagary for another. To further limit the scope, I focus mostly on a sampling of metaphors for ecosystems and trophic relations commonly used by biologists who study the interactions of communities of organisms and their physical environments.<sup>24</sup> These metaphors provide powerful tools, though not the only or even necessarily the most important tools, for shaping our perception of relationships that characterize complex systems. A much-needed

<sup>20</sup> Dewey, *How We Think* [LW], in *Collected Works*, 8:200. For a book-length treatment of Dewey's theory of imagination, see my *John Dewey and Moral Imagination*. On dramatic rehearsal in Dewey, see chap. 5, "Dramatic Rehearsal." Dramatic rehearsal is one phase or function of the deliberative process. But this function is so essential for Dewey that it lends its name to the whole process.

<sup>21</sup> Dewey, *Human Nature and Conduct* [MW], in *Collected Works*, 14:132–33.

<sup>22</sup> Dewey, *A Common Faith* [LW], in *Collected Works*, 9:30.

<sup>23</sup> Ronald Hepburn, in *The Aesthetics of Natural Environments*, ed. Allen Carlson and Arnold Berleant (Toronto: Broadview Press, 2004), p. 45.

<sup>24</sup> The ecologies cannot, of course, be reduced to a natural science affiliated with biology. Nonetheless, ecology as a natural science is the conventional prototype for reflection on ecosystems.

critique of these metaphor-rich models, along with a more encompassing study of ecological metaphors, is beyond the scope of this essay.

There is a siren lure to unifying concepts and organizing principles; yet it is important to avoid overstatements about the scope of ecological imagination. Ecological metaphors do not afford the best conceptual framework for deliberations about all relationships. I have argued elsewhere, for instance, that improvisational art metaphors are especially valuable for framing the nuanced moral discriminations needed to guide interpersonal interactions.<sup>25</sup> Still, artistry metaphors are, on their own, less apt for highlighting the way individuals perceive and respond to natural systems. My limited focus in this section is not primarily the prescriptive one that we should use our understanding of ecosystems to imaginatively engage environmental problems, but the descriptive point that when we do so, we rely on a rich fund of metaphors for ecosystems.

All metaphors both highlight and hide matters we should reckon with if we are to ameliorate situations. As George Eliot observes in *The Mill on the Floss*, "It is astonishing what a different result one gets by changing the metaphor!"<sup>26</sup> Our sense of who we are, how we understand situations and systems, how we relate to others and to nonhuman nature, and what we see as possible courses of mediation all depend significantly on the stable metaphors and other imaginative structures that we inherit, share, and live by.<sup>27</sup> Importantly, conceptual possibilities available under one metaphor may be unavailable under another. For example, a physician or medical researcher dramatically rehearses one set of possibilities for medical diagnosis, treatment, and research if he or she conceives the body as a machine with highly specific, detachable parts that can break down and require localized adjustment, repair, or replacement. But he or she simulates different possibilities if he or she conceives the body as a homeostatic organism that adapts in a more general and coordinated way to disturbances so as to preserve functional equilibrium in its overall system. The homeostatic metaphor opened new avenues for inquiry in twentieth century medicine. "The emergence of the new metaphorical structuring," Mark Johnson asserts, "opened up new questions, made possible new discriminations, and suggested new connections."<sup>28</sup>

Empirical tools from a branch of cognitive science, variously called cognitive semantics or cognitive linguistics, can disclose some of the rich—albeit tangled and often incoherent—ways we conceive ecosystems. What is revealed is that the

<sup>25</sup> See Fesmire, "The Moral Artist," in *John Dewey and Moral Imagination*, chap. 7.

<sup>26</sup> George Eliot, *The Mill on the Floss* (New York: Century Co., 1909), p. 205. For example, ecologist Tom Wessels' *The Myth of Progress* is a page-turning study of economic systems as ecosystems. His main premise is that both are instances of complex systems and as such they behave in the same general way. A question that is missing in the book, however, is a basic one to be asked of any set of metaphorical entailments: what is highlighted and what is hidden? Tom Wessels, *The Myth of Progress: Toward a Sustainable Future* (Burlington: University of Vermont Press, 2006).

<sup>27</sup> See George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: University of Chicago Press, 1980), and Mark Johnson, *Moral Imagination* (Chicago: University of Chicago Press, 1993).

<sup>28</sup> Johnson, *Moral Imagination*, p. 35.



contours and horizon of ecological imagination are marked out by metaphors, many of which are blended and linked to form complex models. The analysis in this section follows George Lakoff and Mark Johnson's usage of the terms *metaphor* and *image schema*, along with their naming conventions and their empirical methodology of analyzing conventional language. Whereas metaphorical imagination for Brady in *Aesthetics of the Natural Environment* is exemplified by novel comparisons such as "Ship Rock is a free form gothic cathedral,"<sup>29</sup> for Lakoff and Johnson most metaphors we use are conventionalized, and they operate as cross-domain conceptual mappings, not elliptical similes, rhetorical flourishes, or literal comparisons. They ferry (*meta-pherein*, to ferry across) content and logic from a source domain over to a target domain, structuring understanding and experience of the target. Image schemas, in turn, provide metaphor's scaffolding. They are prelinguistic gestalt structures that arise directly from sensori-motor interactions.<sup>30</sup>

The assertion that ecological imagination is structured by metaphors can be elaborated as a weak or strong claim. The weak claim states with some precision what many environmental thinkers have tacitly recognized at least since Leopold: ecological thinking is aided (or hindered<sup>31</sup>) by elliptical similes that illustrate complex theories in a way that (a) makes them relevant to policy making and (b) strategically aids theoretical reflection itself by enabling the theorist to notice something he or she did not anticipate.<sup>32</sup> This weak claim is relatively noncontroversial because it is compatible with the idea that academic training in the ecologies could in principle allow us to replace all these metaphors without semantic remainder with precise literal or mathematical descriptions. On that view, ecological metaphors are for the most part linguistic ornaments, and the weak claim implies that theorizing about ecological imagination in deliberation is valuable mostly for those studying environmental rhetoric or literary exposition or perhaps the process of explanatory inference.

The strong claim is that metaphors play an indispensable, irreplaceable, and unavoidable role in shaping ecological thought. A coherent inquiry is organized along the lines highlighted by a metaphor (or, as is often the case, a tangled inquiry along the lines of conflicting metaphors). Possibilities not highlighted are overshadowed by the brilliance of focal alternatives. On the strong claim, the rule of metaphor applies no less to a team of marine ecologists making sense of intraguild predation in a kelp forest community than to a general reader digesting a popular description of their work in *National Geographic*, or an environmental journalist describing the impact of reckless development policies on that community, or a creative writer

<sup>29</sup> Brady, *Aesthetics of the Natural Environment*, p. 153.

<sup>30</sup> On image schemas, see Johnson's *The Body in the Mind*.

<sup>31</sup> See Matthew K. Chew and Manfred D. Laubichler, "Perceptions of Science: Natural Enemies—Metaphor or Misconception?" *Science* 301 (2003): 52–53.

<sup>32</sup> For major historical positions on metaphor, including a concise critique of the classic "comparison theory," see the introduction to Mark Johnson, ed., *Philosophical Perspectives on Metaphor* (Minneapolis: University of Minnesota Press, 1981).

evoking its endangered web of life. Different metaphors will be active to different degrees for these groups, but none can make sense of this marine ecosystem independent of imaginative simulations shaped in part by metaphors. Moreover, the same sort of imaginative simulation used by scientists, journalists, and writers to understand this ecosystem is often relevant to our daily moral grappling with other complex systems.

An adequate defense of the strong claim would require a comprehensive study of the topography of ecological simulation, including a critique of the idea that quantitative approaches in theoretical ecology offer metaphor-free precision.<sup>33</sup> The limited analysis that follows supports the modest assertion that the weak claim is inadequate. Still, there is need in the future for studies of ecological thinking that more comprehensively reveal and appraise the role ecological metaphors play in organizing deliberative simulations about complex systems.

Table 1 is a rudimentary list of some conventional metaphors by which English-language environmental writers make sense of ecosystemic relationships (e.g., web, network, community, organism, economic system) and trophic relations (e.g., energy flows, chains, cycles). As the following analysis reveals, these metaphors are often blended together, and they are further organized by image-schematic gestalt structures such as center-periphery, containment, up-down, balance, and part-whole. This analysis is intended to be suggestive rather than authoritative. For the sake of a manageable focus, I analyze a sampling of metaphors conventionally used by biologists, interspersed with some well-worn favorites from Leopold. Table 1 additionally lists some metaphors less common in contemporary biology, such as ecosystems as field patterns in which fields may be either optical (with objects as foci) or physical (operating in the space between particles or entities, as with Arthur Tansley's projection of field theory in physics onto ecology in the 1930s).<sup>34</sup>

In robust reflection on ecosystems, ecological metaphors are blended to increase logical space for conceiving the operations of natural systems. Consider this simple example from the U.S. Geological Survey:

A food chain is simply "who eats what." A food web weaves together many food chains to form a complicated network of feeding relationships. Many animals eat more than one thing, and each link in each chain is important and integral to the entire system. Pictured here [not included] is an example of a marine food web in Alaska. Notice that this food web illustrates the relationships between producers (plants that

<sup>33</sup> The role of metaphor in theoretical ecology does not bear on the import of ecological imagination for moral deliberation, but it is relevant to supporting the strong over the weak claim regarding the fundamental role of metaphor in ecological thinking. A standard guide to theoretical ecology is Ted J. Case's *An Illustrated Guide to Theoretical Ecology* (Oxford: Oxford University Press, 2000). For an introductory study of the embodied and metaphor-rich basis of mathematics, see George Lakoff and Rafael Núñez, *Where Mathematics Comes From* (New York: Basic Books, 2000).

<sup>34</sup> See J. Baird Callicott's "The Metaphysical Implications of Ecology," in *Nature in Asian Traditions of Thought: Essays in Environmental Philosophy*, ed. J. Baird Callicott and Roger Ames (Albany: State University of New York Press, 1989).

TABLE 1: SOME METAPHORS IN ECOLOGICAL IMAGINATION

<ul style="list-style-type: none"> <li>• Ecosystem as Web</li> <li>• Ecosystem as Net or Network</li> <li>• Ecosystem as Woven Fabric/Tapestry</li> <li>• Ecosystem as (Biotic) Community</li> <li>• Ecosystem as Economic System</li> <li>• Ecosystem as Container</li> </ul>	<ul style="list-style-type: none"> <li>• Ecosystem as Field Pattern</li> <li>• Ecosystem as Intertwining/Interlacing Rope or Strands</li> <li>• Ecosystem as Whole</li> <li>• Ecosystem as Biological Organism or Superorganism</li> </ul>
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make their own food using chlorophyll and the sun's energy) and consumers (animals that eat producers and other animals).<sup>35</sup>

This passage is worth remarking upon only because its metaphors are so commonplace and familiar. It blends webs, chains, and networks with trophic niches as economic guilds (producers, consumers, and decomposers). An up-down image schema is invariably presupposed, as in zebra mussels "inserted themselves in the lower trophic levels and thus disruption percolates up through the food chain."<sup>36</sup> A trophic level is itself typically defined metaphorically as "a level in a food chain to which a particular feeding group belongs"<sup>37</sup> These metaphors are not merely linguistic ornaments. They operate together to form part of the metaphorical logic of ecological thinking.

Trophic relations are mentally simulated as cycles, (energy) flows, (food) chains, and the like. Nutrient cycling is often further elaborated in terms of a circulatory system or feedback loop, as in "These systems all have parts that can interact with other parts . . . , allowing these systems to loop, or feed back on themselves."<sup>38</sup> Energy flows are always directional, up or down, as in a "trophic cascade." The ubiquitous food-chain metaphor is always blended with an up-down image schema (with energy flowing up or down). From a standard discussion of phytoplankton in food chains: "This energy is carried up the food chain as one animal eats the next."<sup>39</sup> The up-down flow between food chains is sometimes conceived as a trophic pyramid, as in the familiar image of a "biotic pyramid" central to Leopold's land ethic: "The pyramid is a tangle of chains," Leopold writes, and land is "a fountain of energy flowing through a circuit" of food chains that are "the living channels which conduct energy upward" to the "apex of the pyramid."<sup>40</sup> This conceptual

<sup>35</sup> "Food Web," Alaska Science Center, USGS: Science for a Changing World ([http://alaska.usgs.gov/science/biology/seabirds\\_foragefish/marinehabitat/index.php](http://alaska.usgs.gov/science/biology/seabirds_foragefish/marinehabitat/index.php)).

<sup>36</sup> From Great Lakes Environmental Research Laboratory, [http://www.glerl.noaa.gov/res/Task\\_rpts/2002/nsmason10-1.html](http://www.glerl.noaa.gov/res/Task_rpts/2002/nsmason10-1.html).

<sup>37</sup> Oswald Schmitz, *Ecology and Ecosystem Conservation* (Washington: Island Press, 2007), p. 156.

<sup>38</sup> Wessels, *The Myth of Progress*, p. 7.

<sup>39</sup> "Phytoplankton," Alaska Science Center, USGS: Science for a Changing World ([http://alaska.usgs.gov/science/biology/seabirds\\_foragefish/marinehabitat/index.php](http://alaska.usgs.gov/science/biology/seabirds_foragefish/marinehabitat/index.php)).

<sup>40</sup> Aldo Leopold, *A Sand County Almanac* (New York: Ballantine Books, 1966), pp. 252–54.

blending and at times odd mixing of metaphors and schemas holds at the level of professional precision. Technically, food chains together form "food webs," trophic levels are levels in a food chain, and energy "flows" between trophic levels through chains.

Scientific journals are replete with ecological metaphors. For example, the metaphor of ecosystems as biotic communities is typically blended with other metaphors, such as this representative quote from *Ecology* that combines community and machine metaphors with an up-down schema: "This study demonstrates that a combined physiological-demographic approach increases our ability to critically evaluate the potential impact of a predator on community structure and enables us to define underlying mechanisms that drive or constrain top-down forcing in dynamic ecosystems."<sup>41</sup> A community technically refers to systems with a high level of mutualism and self-organization, but it is also the most common defining metaphor for an ecosystem as "the biotic community together with the abiotic environment in which it is set."<sup>42</sup>

In both technical and popular writing, a thread-fabric metaphor for ecosystems (e.g., "ecosystems are carpets that unravel when cut into fragments"<sup>43</sup>) is often mixed with other part-whole metaphors, such as piece-puzzle. Metaphors are frequently mixed (falling short of more harmonious "blending") when they share an underlying image schema, and this predictably leads to some dissonance, as in the ubiquitous "unraveling webs." A typical article in *Biogeochemistry* runs: "If the effects of a tree on soil result from direct selection to improve a tree's fitness, then a 'tight-weave' pattern should result from intimate connection and control among the interacting parts of the ecological puzzle."<sup>44</sup> Or picture "the unraveling of entire marine ecosystems up and down the food chain."<sup>45</sup>

The part-whole schema is so pervasive that it seems little more than a literal description, as in this passage: "Seabirds and fish are just two parts of the Alaskan marine ecosystem. Other living organisms, such as free floating, planktonic plants and animals, are part of the marine food web as well."<sup>46</sup> But the schema can be less explicit. For example, just as dramatic roles are parts of whole dramas, so members of ecosystems can be grouped according to functional roles, as in "A functional

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<sup>41</sup> Terrie M. Williams, James A. Estes, Daniel F. Doak, and Alan M. Springer, "Killer Appetites: Assessing the Role of Predators in Ecological Communities," *Ecology* 85, no. 12 (2004): 3373.

<sup>42</sup> Michael Begon, Colin Townsend and John Harper, eds., *Ecology: From Individuals to Ecosystems*, 4th ed. (Oxford: Blackwell, 2006).

<sup>43</sup> David Quammen, *The Song of the Dodo* (New York: Touchstone, 1997), p. 11.

<sup>44</sup> Dan Binkley and Christian Giardina, "Why Do Tree Species Affect Soils? The Warp and Woof of Tree-Soil Interactions," *Biogeochemistry* 42, no. 1 (1998): 94.

<sup>45</sup> "Troubled Seas," *New York Times*, 14 November 2006 (<http://www.nytimes.com/2006/11/14/opinion/14tue3.html>).

<sup>46</sup> "Marine Habitat," Alaska Science Center, USGS: Science for a Changing World ([http://alaska.usgs.gov/science/biology/seabirds\\_foragefish/marinehabitat/index.php](http://alaska.usgs.gov/science/biology/seabirds_foragefish/marinehabitat/index.php)).

grouping is made up of species sharing similar ecological roles."<sup>47</sup> Interdependent parts of systemic wholes may be in equilibrium or balance with each other, or to the contrary they may be locked in an ongoing struggle for existence. In this way, metaphors characterizing the part-whole relationship can create a conceptual tension that affects the overall framing of the system as well as one's philosophy of nature more generally. For example, in *The Science of the Struggle for Existence*, Gregory Cooper recently explored Darwin's unresolved conflict between part-whole metaphors of static balance and dynamic struggle.<sup>48</sup>

The part-whole schema is elaborated in most metaphors for ecosystems and is necessary for the concept of emergent properties, in which properties of the whole emerge through relationships and cannot be inferred from complete knowledge of individual parts. The metaphor of ecosystems as machines is an exception, since a functioning machine is the sum of its detachable and replaceable parts. Aside from concepts like "rivet species,"<sup>49</sup> the machine metaphor is typically used to make the simple rhetorical point that wholes do not function well without missing parts. This superficial usage keeps dissonance with the concept of emergent properties beneath the surface, as in Leopold's remark in "The Round River": "To keep every cog and wheel [of the land mechanism] is the first precaution of intelligent tinkering. . . . We do not yet recognize the small cogs and wheels."<sup>50</sup> Or "Marine ecosystems are like machines that have evolved to work with all of their pieces, that is, species. If they lose some of these pieces, the system may malfunction. . . . Who would board a plane that has missing parts, even if they do not know what these parts are for?"<sup>51</sup>

Perhaps more commonly, machine metaphors are invoked as antitypes to the metaphor of ecosystems as biological organisms in which parts are organically unified with the whole, as in "ecosystem health" and "ecosystem decay." Frederic Clements, for example, defined an ecosystem as an integrated being that "arises, grows, matures, and dies . . . comparable in its chief features with the life history of an individual plant."<sup>52</sup> The organism may be a victim of injury so that divergent frameworks for ecological restoration arise as competing prescriptions. Should there be active public participation in the healing process? No, say William Throop and

<sup>47</sup> "Food Web," South Atlantic Fishery Management Council (<http://www.safmc.net/Ecosystem-Management/FoodWeb/tabid/55/Default.aspx>).

<sup>48</sup> Gary Cooper, *The Science of the Struggle for Existence: On the Foundations of Ecology* (Cambridge: Cambridge University Press, 2003), p. 61.

<sup>49</sup> Rivet species are "species that have unique but complementary functional roles in an ecosystem." Oswald J. Schmitz, *Ecology and Ecosystem Conservation* (Washington, D.C.: Island Press, 2007), p. 156.

<sup>50</sup> Leopold, *A Sand County Almanac*, pp. 190, 196.

<sup>51</sup> Script News, "Accelerating Loss of Ocean Species Threatens Human Well-Being," 2 November 2006 (<http://scrippsnews.ucsd.edu/Releases/?releaseID=757>).

<sup>52</sup> Quoted in Callicott, "The Metaphysical Implications of Ecology," p. 55.

Rebecca Purdom in *Restoration Ecology*: "Damaged wilderness should be allowed to heal itself."<sup>53</sup>

Most ecological metaphors find their source in human artifacts. Architecture offers some especially rich and widely used sources, perhaps most notably "keystones" (parts of arches) and the epistemic possibility of "collapse." The subdiscipline of landscape ecology, for example, includes many artifice metaphors, such as "landscape mosaics" that consist of patches, matrices (the dominant landcover), edges, corridors, and barriers.<sup>54</sup> The concept of an "ecological mosaic" or "landscape mosaic" is prominent in ecological studies of "patchwork ecosystems," and puzzle pieces are commonly used to characterize whole-part relations. These metaphors are blended in scientific ecology. A keystone species, for example, is one on which an entire web of energetic interactions is based.

Of course, ecological thinking also frequently involves novel, unconventional metaphors. These metaphors are in the minority, despite the common tendency to take novel comparisons as exemplars of metaphorical imagination, as with Brady above. Novel ecological metaphors may be literary, as in Paul Shepard's widely quoted claim that "The epidermis of the skin is ecologically like a pond surface or a forest soil, not a shell so much as a delicate interpenetration. It reveals the self ennobled and extended . . . as part of the landscape and ecosystem."<sup>55</sup> In scientific, ethical, and policy analysis, novel metaphors are deliberately recommended for their utility. For example, a *Conservation Ecology* article explores a novel entailment of the metaphor of ecosystems as biological organisms: "The notion of using the concept of the immune system as a guide to developing long-term sustainable policies for managing ecosystems is appealing. The immune systems we see today have stood the test of time. They are clearly successful systems for dealing with invasions of dangerous and unwanted microorganisms."<sup>56</sup>

Unconventional metaphors may vie for primacy with conventional ones in a process that puts flesh on the skeletal vagaries of Thomas Kuhn's idea of paradigm-driven normal science, anomalies, crises, and revolutions. Fervent calls for metaphorical shifts are commonplace in ecology. For example, Daniel Botkin's *Discordant Harmonies* is a controversial critique of the assumption that stability is the norm of ecosystems. His title frames trophic relations in terms of musical performances ranging from harmonious to discordant. To make his case, Botkin rejects the pervasive metaphor of a "balance of nature" characterized by stability and homeostatic equilibrium and proposes instead the metaphor of bounded spaces in which natural systems persist or fluctuate within boundaries.<sup>57</sup>

<sup>53</sup> William Throop and Rebecca Purdom, "Wilderness Restoration: The Paradox of Public Participation," *Restoration Ecology* 14, no. 4 (2006): 293-499.

<sup>54</sup> *Landscape Ecology*, ed. Richard Forman and Michel Godron (New York: Wiley Press, 1986).

<sup>55</sup> Paul Shepard, "Introduction: Ecology and Man—A Viewpoint," in *Ecology: The Subversive Science*, ed. Paul Shepard and Daniel McKinley (Boston: Houghton Mifflin, 1969), p. 2.

<sup>56</sup> Brian Walker, "Ecosystems and Immune Systems: Useful Analogy or Stretching a Metaphor?" *Conservation Ecology* 5, no. 1 (2001): 16.

<sup>57</sup> Daniel B. Botkin, *Discordant Harmonies* (Oxford: Oxford University Press, 1990).

System boundaries may take the shape of a simple container, as in “mitochondria in the cell, the cell in the organism, the organism in the ecosystem, the ecosystem in the biosphere.”<sup>58</sup> A schema of bounded spaces is implicit in the concept of an invasive species. In popular environmental discourse, boundaries may be nests, spaceships (with life-support systems), or the like. The amount of normal persistence or variance within boundaries is controverted.

Metaphors, as Stan Godlovitch and others have observed, can allow us to anthropomorphize or biomorphize nature so that we see there what we wish to see. How tight, slack, localized, or stable physical relationships may be is an empirical issue. Super-empirical speculation about butterflies in China very likely exaggerates the case as much as atomism minimizes it. Yet, a theory of ecological imagination is as relevant to James Lovelock-style biosphere-as-superorganism theorists as to his detractors, who are as at ease with disjunctions between things as with conjunctions. Among the detractors, Godlovitch observes from an “acentric” perspective that Gaian-type views often use familiar metaphors to anthropomorphically “extend wishful fantasies of harmony and interconnectedness.”<sup>59</sup> Godlovitch does not appear to recognize, however, that an organization of avenues for thinking and acting would be largely unavailable if metaphorical understanding did not mark it out, so deconstructive suspicion of metaphors on its own is inadequate for environmental ethics or aesthetics. What we most need is wisdom in metaphorical understanding.

On a related note, metaphors structure much of the logic of the metaphysical debate between our common-sense “object ontology” (compatible with a mechanistic, linear-sequential, and reductive philosophy), and the “field ontology” often identified with ecological thinking.<sup>60</sup> Ecological metaphors mercifully offer an antidote to the alienating separateness of atomistic ontologies. For this reason, ecological metaphors are often appropriated by metaphysical idealists who conceive nature on analogy with a self-organizing mind. On such a view, ecological imagination might be misconceived as a kind of immediate perception of a harmonious whole. Whatever merit there may be in such superempirical views, ecological imagination as explored here is a form of mental simulation, shaped in part by metaphor, that plays out in the synaptic connections that form neural circuits. It is an educable capacity, and its operations are in principle explicable.

The stated focus of this section has been to define the concept of ecological imagination by revealing its metaphor-rich contours. The point has been to better understand ecological imagination as it already operates, not to critique its operations or prescribe how it should operate, and certainly not to create a new environmental virtue from scratch. I turn next to a brief study of ecological imagination as a type

<sup>58</sup> Wessels, *The Myth of Progress*, p. 12.

<sup>59</sup> Stan Godlovitch, “Ice Breakers: Environmentalism and Nature Aesthetics,” in Carlson and Berleant, *Aesthetics of Natural Environments*, p. 114.

<sup>60</sup> On object vs. field ontology, see for example Roger Ames, “‘The Way is Made in the Walking’: Responsibility as Relational Virtuosity,” in *Responsibility*, ed. Barbara Darling-Smith (Lanham, Md.: Lexington Books, 2007), chap. 2.

of relational imagination, but let me first spotlight the need for more critical and normative work.

As is by now apparent, evaluation and criticism of key metaphors is implicit (and often explicit) in the tangled bank of controversies marking the ecologies today.<sup>61</sup> Engaging these manifold controversies is beyond the pretensions of a single essay. The foregoing takes a modest step in advancing philosophy's project of "intellectual disrobing," better enabling us to critically inspect intellectual habits of ecological thought to see, in Dewey's words, "what they are made of and what wearing them does to us."<sup>62</sup> We cannot entirely bypass the metaphorical structures that fund our ecological simulations. They do some of our environmental thinking for us and so must be examined, evaluated, and criticized. Reason giving, the gold standard for moral deliberation in environmental ethics courses, is an important and ill-developed capacity. But it is not the only vital dimension of wise deliberation. We also need to focus more on imaginative simulation, especially on the role of metaphor. With a greater knowledge of the variety of these organizational tools as well as their inner workings, we are supplied an inroad to better disclosing cognitive processes. Ecosystemic metaphors inform conduct and policy making, so critical awareness and redirection of them promotes more intelligent dramatic rehearsals while opening a wider door for artfully cultivating ecological imagination in education.

#### ECOLOGICAL IMAGINATION AS RELATIONAL IMAGINATION

Michael Pollan observes that "proper names have a way of making visible things we don't easily see or simply take for granted."<sup>63</sup> Ecological imagination names a vital cognitive capacity that tends to be taken for granted in the sustainability movement. This capacity taps our more general deliberative capacity to perceive, in light of dramatically rehearsed possibilities for thought and action, the relationships that constitute any object on which we are focusing. Relational perceptiveness can thereby enter into practical, aesthetic, and scientific deliberations so that we understand focal objects through connections distant in space and time. As explored in the foregoing section, imaginative rehearsals are specifically ecological when key frames, images, metaphors, narratives, and the like used in the ecologies organize mental simulations and projections. The sort of imaginative simulation used by scientists and environmental writers to understand an ecosystem is often relevant to our dealings with other complex systems, wherever moral deliberations must forecast shock waves that will spread irrevocably through invisible and overlapping tendrils.

"We grieve only for what we know," Leopold wrote.<sup>64</sup> Leopold is speaking here

<sup>61</sup> See, for example, Joel Hagen, *An Entangled Bank: On the Origins of Ecosystem Ecology* (New Brunswick: Rutgers University Press, 1992).

<sup>62</sup> Dewey, *Experience and Nature* [LW], in *Collected Works*, 1:40.

<sup>63</sup> Michael Pollan, *In Defense of Food* (New York: Penguin, 2008), p. 28.

<sup>64</sup> Leopold, *A Sand County Almanac*, p. 52.



of lost biodiversity, but the observation can be generalized. By situating us within relational fields of dizzying complexity, the ecologies dilate perception and open us to enjoyment and bereavement on a wider scale.<sup>65</sup> This notion is too familiar to bear more than a few passing examples: Darwin observed that a variety of flowering clover in England was linked to the population of cats in that region via intermediaries of bees that pollinated the clover, human-made barns in which the bees nested, mice that ate the nests, and cats that ate the mice. Change any population variable and the effects ripple through the system. Such relational interplay is a fundamental fact of our shared existence. Due to relational continuities of this sort, as Garrett Hardin famously observed, no action has a singular result. Although above-ground we see trees as individuals, they form network communities in which individuals are root-grafted to each other and share energy through mycorrhizal fungi, so logging often kills non-targeted trees. Annie Dillard thus urges of ecological relationships: "Keeping the subsoil world under trees in mind, in intelligence, is the *least* I can do."<sup>66</sup>

The terms *bee*, *bird*, or *tree* signify not only an object one can point to at a simple location, but also "an organized integration of complex relationships, activities, and events which incorporate a whole transactional field."<sup>67</sup> Because human choices and policies are themselves part of this transactional field, we tend toward irresponsibility whenever imagination fails to shuttle back and forth between things and those relationships relevant to intelligently mediating the situation at hand. As Gary Paul Nabhan observes, "We, as humans, have not been given roots as obvious as those of plants."<sup>68</sup> We cannot respond to what we do not perceive, so cultivating ecological imagination can help us to deal more responsibly with the global scene of human impact on the natural environment and our aesthetic disconnection from encompassing natural and social relationships. A fine-tuned ecological imagination is not a panacea for the sort of aesthetic insensitivity that leads the quickest of us, in George Eliot's words, to "walk about well wadded with stupidity."<sup>69</sup> But it can make dramatic rehearsals more trustworthy as we appraise possible avenues for acting with an eye to systemic effects.

Imagination is essential to the emergence of meaning, a necessary condition for which is to note relationships between things. For example, many migratory songbirds I enjoy in summer over a cup of coffee in my home state of Vermont are declining in numbers in part because trees in their winter nesting grounds in Central America have been bulldozed to plant coffee plantations. This awareness

<sup>65</sup> Recall Leopold's refrain in "The Round River," in the context of invisible wounds inflicted upon land: "One of the penalties of an ecological education is that one lives alone in a world of wounds." Leopold, *A Sand County Almanac*, p. 197.

<sup>66</sup> Annie Dillard, *Pilgrim at Tinker Creek* (New York: HarperCollins, 1998), p. 96.

<sup>67</sup> Thomas Alexander, *John Dewey's Theory of Art, Experience, and Nature: The Horizons of Feeling* (Albany: State University of New York Press, 1987), p. 109.

<sup>68</sup> Gary Paul Nabhan, public presentation at Green Mountain College, September 2007.

<sup>69</sup> George Eliot, *Middlemarch* [1871–72] (London: Penguin Books, 1965), p. 226.

amplifies the meaning of my cup of coffee. "To grasp the meaning of a thing, an event, or a situation," Dewey notes, "is to see it in its relations to other things."<sup>70</sup> Or as Johnson recently put it, "The meaning of something is its relations, actual or potential, to other qualities, things, events, and experiences."<sup>71</sup> Meaning is amplified as new connections and relationships are identified and discriminated, and this amplification operates as a means to intelligent and inclusive foresight of the consequences of alternative choices and policies.

Rachel Carson made a plea for marrying this general sort of imaginative foresight with ecological perceptiveness when she dedicated *Silent Spring* in 1962 to Albert Schweitzer, opening the book with his words: "Man has lost the capacity to foresee and to forestall. He will end by destroying the earth."<sup>72</sup> Schweitzer and Carson fathomed the stakes of starving imagination of the relationships, especially ecological ones, that portend what is happening. We end up, Shepard laments, childishly carving our "own version of reality into the landscape like a schoolboy initialing a tree."<sup>73</sup>

William James calls the often-observed and forgotten relational field the horizon, penumbra, or fringe, a profoundly influential concept in the development of twentieth century philosophies from phenomenology and hermeneutics to modern Japanese philosophy,<sup>74</sup> as well as a central influence on the development of the field of ecological psychology.<sup>75</sup> From the standpoint of James's foreground-background and focus-field model of experience, the lifeworld comes in a mosaic of directly experienced natural and social relations, and *awareness* of this horizon could fund more meaningful, value-rich, and responsive lives. James denounced philosophy's historic neglect of the horizontal field as "a monstrous abridgment of human life."<sup>76</sup> We must learn to look out of the corners of our eyes to compensate for an excessive will to impose conceptual and practical schemes on experience — i.e., to compensate for "pragmatism" in the narrow, vulgar sense, which was as vilified by classical pragmatist philosophers such as James and Dewey as it was by Martin Heidegger. Failing this, John McDermott claims we suffer in techno-industrial societies from "spiritual anorexia," a moral, aesthetic, and intellectual starvation for horizontal relations that make life significant.<sup>77</sup> James's therapy for relation-starvation, his "radical empiricism," aims in part to respect experience through "the re-instatement

<sup>70</sup> Dewey, *How We Think* [LW], in *Collected Works*, 8:225.

<sup>71</sup> Johnson, *The Meaning of the Body*, p. 265.

<sup>72</sup> Quoted in Ara Paul Barsam, *Reverence for Life* (Oxford: Oxford University Press, 2008), p. x.

<sup>73</sup> Shepard, *Ecology: The Subversive Science*, p. 5.

<sup>74</sup> See, for example, Kitarō Nishida, *An Inquiry Into the Good* [1911] (New Haven: Yale University Press, 1990), p. 4.

<sup>75</sup> See Harry Heft, *Ecological Psychology in Context: James Gibson, Roger Barker, and the Legacy of William James's Radical Empiricism* (Mahwah, N.J.: Lawrence Erlbaum, 2001).

<sup>76</sup> William James, "The Sentiment of Rationality," in *The Works of William James*, ed. Frederick H. Burkhardt, Fredson Bowers, and Ignas K. Skrupskelis (Cambridge: Harvard University Press, 1975).

<sup>77</sup> John J. McDermott, *Streams of Experience* (Amherst: University of Massachusetts Press, 1986), pp. 128–31. Cf. Dewey's *Experience and Nature* [LW], in *Collected Works*, 1:392.

of the vague," i.e., attentiveness to the perceptual horizon.<sup>78</sup> In contrast with the idea that social and natural relationships are entirely discovered, found, *given*, James recognized that we create relationships as well as find them. But the relationships we create are not alien impositions from outside. They are possibilities of situations that we actualize through imaginative engagement.

The propulsive momentum of prevailing social habits—from teaching to tests to fast food culture—tends too often toward shrinking and contracting the horizon of everyday experience. For example, many elements of our food system exemplify a paucity of ecological imagination, so much so that E. O. Wilson worries we have become contented with an anaesthetized way of life analogous to the unfortunate animals in concentrated feeding operations.<sup>79</sup> Pollan explores this concern in books such as *The Omnivore's Dilemma*, which aims to recover relationships and connections that have been obscured by our industrialized food chain.<sup>80</sup> Such writing, shot through with ecological metaphors, reveals the power of ecological imagination to confer significance upon otherwise mechanical and superficial experiences, marking the way for critical assessment and redirection of individual and institutional practices.

Our food system also illustrates one of the many ways contemporary educators are cultivating ecological imagination. Dewey observed that we all learn in concentric circles of increasing abstraction. Children in his "laboratory school" at the University of Chicago at the turn of the last century learned mathematics and economics through a carefully designed curriculum that included cooking in the school kitchen. Today, children at the Martin Luther King, Jr. Middle School in Berkeley, California plant, nurture, and harvest food in a schoolyard garden, cook it in the school kitchen, and consume it in the dining hall. This activity is not super-added onto the "real" curricular work at the school; it is thoroughly woven into the curriculum. Through an ongoing rhythm of doing and reflection these inner-city children learn, for example, about the recycling loop of growth, maturity, decline, death, and decay. As part of the curriculum, they also experience the aesthetic, moral, and intellectual value of noticing and tracing the hidden ecological relationships wound up with everyday food choices.<sup>81</sup>

Because physical interactions with an environment activate the same neural regions as imaginative simulations of that environment, these children are continuously

<sup>78</sup> William James, *The Principles of Psychology* (New York: Dover), vol. 1, p. 254. Cf. James, "The Thing and Its Relations," in *Essays in Radical Empiricism*. A central thesis of James's *Essays in Radical Empiricism* is that we also directly experience discontinuities, equally real, and we must be equally open to disjunctions as to conjunctions.

<sup>79</sup> E. O. Wilson, *The Creation* (New York: W.W. Norton, 2006), p. 26.

<sup>80</sup> Michael Pollan, *The Omnivore's Dilemma* (New York: Penguin, 2006), p. 10.

<sup>81</sup> In 2006 and 2008 presentations at the Terra Madre international gathering of slow food communities in Turin, Italy, representatives of Green Mountain College in Vermont presented a college-scale version of Berkeley's edible schoolyard. Concerning the Green Mountain College model, see Philip Ackerman-Leist, *UpTunket Road: The Education of a Modern Homesteader* (White River, Vt.: Chelsea Green Publishing, 2010).

developing their capacity for ecological simulation in the garden, in the kitchen, in the dining hall, and in the brick-and-mortar classroom. They explore, for example, how food cycles in the garden intersect with larger natural systems: the water cycle, the cycle of seasons, and the like. In this way, these children learn that every action has systemic consequences, and they are more likely to become the kinds of people who habitually take a measure of responsibility for these consequences.<sup>82</sup> It may make more intuitive sense to them that we need to restore streams, understand our watersheds, strive for environmental justice, forge partnerships with farmers, and celebrate our aesthetic engagement with a living landscape. Examples of this sort led John Elder to remark that “in the next chapter of the environmental movement, the focus will be food. It will serve the inspirational role that wilderness served in the previous chapter.”<sup>83</sup>

Earth’s 6.8 billion people, and the billions to join us, will determine much of the near future of terrestrial life. We will simultaneously determine the extent to which we will share dwindling natural resources, or continue through military means to enforce a disproportionate distribution of environmental burdens and benefits. Seeing beyond simple relations of consumers to commodities requires us to awaken dormant imaginative capacities so that we better notice relevant features of our physical and social environments in our deliberations.<sup>84</sup> We must help each other become more context-responsive in our dramatic rehearsals by perceiving and responding to the relations that inhere between things, events, concepts, and persons, and particularly to ecological relationships.

Even amid rising global awareness of the unplanned systemic effects — such as global heating — that radiate from our actions, it has become increasingly difficult for ordinary citizens to give coherent and positive meaning to the relationships that twine us up with each other and with biotic systems.<sup>85</sup> Our greatest contemporary challenge is to intelligently negotiate the complex systems in which these relationships inhere, from economic systems to ecosystems, in our private choices

<sup>82</sup> Response to this “complex of relations,” Fritjof Capra observes, leads to an “emotional relation to the natural world.” Fritjof Capra, in *Ecological Literacy*, ed. Michael K. Stone and Zenobia Barlow (San Francisco: Sierra Club Books, 2005). On the Edible Schoolyard Project, see: [http://www.edible-schoolyard.org/cla\\_eco.html](http://www.edible-schoolyard.org/cla_eco.html). A free packet titled *Getting Started: A Guide to Creating School Gardens as Outdoor Classrooms* can be obtained at: <http://www.ecoliteracy.org/publications/getting-started.html>. On ecological education and ethical responsibility, see David Orr, *Ecological Literacy* (Albany: State University of New York Press, 1992).

<sup>83</sup> John Elder, personal communication, July 2007. In contrast, economist Steven Blank writes that for industrialized nations “doing agriculture is like a Ph.D. doing child’s work — we can do it, but it is a waste.” In agreement with Blank, Thomas Dorr, former U.S. Undersecretary for Rural Development in the administration of George W. Bush, stated that the ideal scale for future farms is “about 200,000 acres of cropland under a single manager.” Vermont would be reduced to five farms. In McKibben, *Deep Economy*, pp. 56–57.

<sup>84</sup> Cf. Buell, *Writing for an Endangered World*, pp. 18–22.

<sup>85</sup> On this now-familiar theme, see Robert Bellah, Richard Madsen, William M. Sullivan, Ann Swidler, and Steven M. Tipton, *Habits of the Heart*, 2d ed. (Berkeley: University of California Press, 1996), and Robert Putnam, *Bowling Alone* (New York: Touchstone Books, 2001).

and public policies. Refinement of ecological imagination can help to reinvest our natural interconnections and thereby contribute to wiser perception of the complex nature of environmental problems, cultivated empathy for those affected by our choices, imaginative probings for technical and communal solutions, sensitivity to cultural traditions, and rich aesthetic responses to natural and cultural landscapes. Meanwhile, perception of relational networks can bring meaning and a renewed sense of responsibility to what would otherwise be no more than the “flickering inconsequential acts of separate selves.”<sup>86</sup>

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<sup>86</sup> Dewey, *Human Nature and Conduct* [MW], in *Collected Works*, 14:227.