

## THE INTERDISCIPLINARY CONSTRAINT ON ECOLOGICAL REASON

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Ecological reason consists of the forms and functions of rationality necessary for adequate ecologies of nature and society. In the larger project from which these remarks are abstracted, I attempt to articulate the normative and cognitive moments of ecological reason. Part of that account shows that the epistemological and practical aspects of the cognitive moment have interdisciplinarity as a necessary component. In what follows, I present some of these interdisciplinary considerations. But I must leave out two major elements. First, I will not be able to show a dual linkage between the substantive and functional moments of reason and regressive and anthropocentric tendencies in the use of ecological reason. Second, I do not have the space to provide support for the claim that genuine interdisciplinarity is necessary to move ecological reason beyond modernity's destructive anthropocentrism and beyond recent revivals of premodern, regressive holisms. Here, I first give a brief account of interdisciplinarity; second, I critique one of the strongest accounts of ecological reason to date by showing its specific interdisciplinary deficiencies; and third, I conclude with a suggestion about the practical implications of my mostly epistemological remarks.

Anthropocentric assumptions ask too little of ecological reason, and they do too much. Holisms that are more than local or heuristic demand too much of ecological rationality, and they can accomplish too little. Various forms of anthropocentrism and various attempts to reawaken holism have burdened ecological reason throughout environmental philosophy. A necessary step toward liberating ecological reason, toward empowering it, is to articulate how it is essentially interdisciplinary. While it is true that many writers at least refer to the interdisciplinarity of ecology and of environmental studies, they have not noted that the definition of ecological reason itself must incorporate interdisciplinarity. Genuine interdisciplinarity enables ecological reason to avoid modernity's anthropocentrism and premodernity's holism.

Reason has two basic modes, the substantive and the functional or

procedural. I take these to be moments of a nonfoundational reason, following Jurgen Habermas's reconstructive account of communicative reason. When it is foundational, substantive reason posits a metaphysical whole from which meaning is derived. When foundational, functional or procedural reason organizes elements and means into effective ensembles, given some goal or desired outcome. When foundational, these two modes together shackle ecological reason with modernity's all-too-human anthropocentrism and premodernity's cosmic holism. These linkages, taking functional rationality to be definitive of reason in general, make ecological reason anthropocentric; taking substantive rationality as reason's core results in regression to premodern holisms.

A particularly helpful discussion of ecological rationality—in "Ecological Rationality: Reason and Environmental Policy," by Robert Bartlett—can help us focus on the linked problems of asking too little and too much, the threats of anthropocentrism and cosmic holism. Bartlett defines ecological rationality, articulating both its *functional* and *substantive* moments. He hopes thereby to restore the balance between them and to ground sustainable ecologies of the environment and society.

For Bartlett, substantive rationality discovers technical means; it relates to the efficient achievement of a *single*, given goal; functional rationality relates especially to economic but in general to all institutional processes and structures, and attempts to maximize goods given a *plurality* of goals. On this basis, Bartlett offers a compound definition of ecological rationality: substantive ecological rationality focuses on actions that "produce, increase, or preserve . . . the capacity, diversity, and resilience of the biotic community" (Bartlett, 1986, p. 234); functional ecological rationality focuses on the "organization of actions consistent with, or leading toward fulfillment of" the "long-term life support capability" of the biosphere (pp. 232 and 234).

In my view, Bartlett's analysis of ecological rationality has two related problems that stem from interdisciplinary inadequacies. Moreover, these problems parallel what successful or genuine interdisciplinarity consists in. That is, because he fails to take interdisciplinarity adequately into account his definition of ecological rationality has two key shortcomings. To show this I must first characterize interdisciplinarity.

I call a *discipline* a body of knowledge or branch of learning characterized by intersubjectively accepted content and methods. At least three mutations are identifiable. First, *multidisciplinary* research or problem solving mingles disciplines but maintains their distinctness. Second, *interdisciplinary* teaching, learning, research, or problem solving integrates the categories of more than one discipline to create locally coherent outcomes that are sustained and substantial. Third, *metadisciplinary* group efforts overcome specialization and develop an overarching framework. (See Kockelmans, 1979.)

These three different possible developments suggest that one of the most significant characteristics of genuinely interdisciplinary theory and research is that they are "middle range," that they will not strive to become metadisciplinary syntheses but remain restricted in scope by the uniqueness of phenomena. (See Klein, 1990, p. 117.) The middle range characteristic of ecology is emphasized by Kristin Shrader-Frechette and Earl McCoy, who say that, "Ecology . . . is more empirically and theoretically underdetermined than many other sciences . . . [and so is characterized by a] bottom-up, case-study approach . . . rather than a top-down, hypothetical-deductive approach." They go on to argue that this is due, in part, to "the uniqueness and historical character of many ecological phenomena" (Shrader-Frechette and McCoy, 1993, p. 109.) A second characteristic of genuine interdisciplinarity is that the relations between disciplines will be "symbiotic" (Klein, 1990, p. 92) or "hermeneutic" (p. 94), that their categories communicate by reciprocally interpreting one another. A third characteristic is that new value and epistemological questions will be raised (p. 175).

Some interdisciplinary projects fail to reach mid-level characteristics; others fail to sustain that level. Some are too highly structured from the top down; others get lost in a wealth of empirical detail. Interdisciplinarity comes from substantively privileging concrete problems over pre-determined forms or objectives for research; conversely, relying procedurally on institutional, top-down leadership rather than on researchers' bottom-up motivations results in epistemological stagnation, or worse, regression to multidisciplinary (Klein, 1990, p. 63). Interdisciplinarity emerges when disciplines are more than merely cooperative, and yet have not fused to become a new discipline. Ecological rationality is thus constrained: disciplinary cooperation alone will always be inadequate, but the complexity of ecological phenomena, among other factors,

militate against disciplinary fusion. Interdisciplinarity is neither multi- nor metadisciplinary.

Of course, many ecologists and others urge that environmental studies, and ecology itself, be considered interdisciplinary in a stronger sense: that it be fully integrative, or metadisciplinary. For example, Lynton Caldwell, a political scientist who has written widely on environmental policy, argues that environmental studies should strive to develop a genuine "gestalt" or "paradigm" that would differentiate it from "a multidisciplinary collage" on the one hand and from all the "basic sciences" from which it is "intrinsically different" on the other (Caldwell, 1983, pp. 247 and 254; see also Caldwell, 1992). In this way, Caldwell hopes that environmental studies would achieve the status of a "metadiscipline."

What leads so many in the environmental movement to espouse metadisciplinarity? Like Caldwell, they accept the false dichotomy all forms of interdisciplinary inquiry are forced to face: that they be either merely multidisciplinary, or be wholly metadisciplinary. Caldwell claims that the need for broad understandings of widespread, complex phenomena can only be satisfied by tightly integrated, transdisciplinary outcomes and approaches (Caldwell, 1994, p. 9). But he acknowledges that an important motive in arguing for metadisciplinarity is rhetorical as opposed to conceptual, political as opposed to epistemological. He thinks mere interdisciplinarity, anything less than metadisciplinarity, is not weighty enough to counter the social-political status quo in policy debates or scientific reductionism in theory debates. Whatever the merits of this rhetorical motive, the epistemological point remains: ecological inquiry and environmental practice have been limited both by too strong metadisciplinarity and by too weak multidisciplinaryity.

It is at this point that Bartlett's (1986) approach becomes potentially very fruitful precisely because he tries to balance functional and substantive modes of ecological rationality. In other words, he recognizes the need to avoid privileging either a unitary substantive reason that issues in metadisciplinarity, or a simply plural functional reason that issues in multidisciplinaryity.

But there are two crucial shortcomings in Bartlett's account. In the first place, at the *substantive* level he *extracts* unmodified models of rationality from

policy studies; he does nothing more to these borrowed concepts than to add the label "ecological." The substantive moment of ecological reason does not emerge from friction with concrete problems. In this sense, his approach is merely multidisciplinary. Secondly, he posits, from the top of the institutional ladder, as it were, the *functional* primacy of ecological rationality. The functional moment of ecological reason is not rooted in a genuine diversity of inquirers and outcomes. In this sense, his approach strives for metadisciplinarity. Bartlett's substantive rationality deficit arises from insufficient interdisciplinarity with reference to concepts and categories; his functional rationality deficit arises from insufficient interdisciplinarity with reference to organizational arrangements and practical priorities.

Let us look at each problem a little more closely. In borrowing definitions without modification by and for the new context, the concepts remain unchanged and the context is unchanged by them. But genuine interdisciplinarity cannot be merely additive; it will tend toward the integrative, but without requiring integration (Klein, 1990, p. 56). Bartlett's borrowing merely juxtaposes, and so is multidisciplinary, not interdisciplinary. In effect, there is no symbiosis or hermeneutic translation between categories that originate in different disciplines.

Bartlett's second problem, the functional rationality deficit, consists in his claim that ecological rationality is not just "different from" (p. 234) but is "more fundamental" (p. 235) than social, economic, or political rationalities. The goals and methods of ecological rationality should have precedence over the goals and methods of social, economic, and political rationalities. This corresponds to counter-productive institutional leadership. But Bartlett's supposed primacy of ecological rationality is not based on good reasons.

He says that ecological rationality is most fundamental because ecology's object domain is conceptually global and its methodologies and modes of practice are holistic. In effect, two aspects of ecology's *substantive* rationality are supposed to establish that it has functional or procedural priority. For this argument, Bartlett relies on the geological temporal scale (p. 231) and the broad spatial scope of ecology's widest conceivable object domain, the biosphere.

But ecology simply has no general and predictive theorems describing the

geological long-term. We do not even have a determinate understanding, that is, beyond informed common sense, of the large-scale ecological effects of global warming. Lacking appropriate content, substantive ecological rationality cannot ground Bartlett's claim about the primacy of functional ecological rationality.

Bartlett adds an explicit appeal to ecology's status as a natural, not a social, science to legitimate the priority of ecological rationality over the others because it "derives from logic inherent in natural processes" (p. 230). That is, because ecology reflects and results from the nature of reality it must be more authentic than the competing modes of reason. But this counter-productively perpetuates the Cartesian ethos in an anti-Cartesian science. Similarly, the reference to geological time attempts to prioritize by reference to distant origins. The false premise is that older is more authentic. The solar system is bigger and older than the biosphere, but it does not follow that astronomy is more fundamental than or have priority over biology.

What about holism as substantive support for functional priority? Ecology's alleged general holism, which is widely contested within the discipline, cannot without begging the question contribute to, much less establish, the priority of ecological reason over other forms of rationality. Nor would the primacy of ecological rationality follow from the holistic nature of its object domain. Any such appeal to holism is a *non sequitur*.

Bartlett offers another priority argument, one common in the literature. The multi-dimensional stability of the biosphere is a necessary condition both for the continued functioning of the object domains of many other disciplines as well as for those inquiries themselves. Therefore, it is claimed, ecological reason is more fundamental than other modes of reason. Clearly, any society or economy or political system requires an intact biosphere for its continued existence. But an ontologically necessary condition implies neither a more fundamental area of inquiry nor a more basic mode of reason. Consider that when there are two necessary conditions that depend on two categorially different sorts of "object," the studies of their domains may be equally fundamental. For example, if there were no modern economy, then there would be no modern administrative apparatus for society; but equally, no modern political institutions and bureaucracies, no modern economy. Neither discipline, economics or political science, is more fundamental, nor is either of their rationalities more

fundamental. So the priority of ecological reason over others has not been shown, nor may we assume that that priority could or should be shown. Of course, self-interested, prudential considerations are always relevant. But from that it does not follow that ecological reason has priority over all other kinds of consideration.

Hypotheses are best kept at a level that represents the unique phenomenon under study; they are unlikely to be transferrable as laws to other phenomena. So holism must remain at best contextual. But data that support rich hypotheses must be generated by borrowing from a variety of approaches. So pluralism must remain at least a methodological requirement.

In conclusion, consider the nature of well-established disciplines like literature or chemistry or psychology. Even they are not actually unitary, for each consists of congeries of several local, heuristic holisms. Within them, methods, hypotheses, and categories are widely and effectively, and often tacitly, shared through transformative or hermeneutic borrowing. Knowledge production is only weakly bound by the supposed preexisting unity of disciplinary content; administrative centralization is often a stronger force in defining disciplinary unity. This is why pluralism permeates contexts of theory or knowledge generation. But even in subsequent contexts of justification, knowledge articulation does not occur within the boundaries of *actually* unitary disciplinary discourses. As vehicles of inquiry, discursive domains are practical, shifting formations, not tight, timeless achievements. I would add that tropes of unity for disciplines often arise from ongoing competition between inquirers and their paradigms; they are rarely if ever reflections of actually and fully integrated results. After all, who actually commands the entire range of physics, or biology, or geography, or literature?

I am sure the reader now sees this epistemological irony: since the *practice* of ecology requires the simultaneous effectiveness of local holisms and proliferating pluralisms, then ecology as interdisciplinary is paradigmatic of disciplines insofar as they are discursive formations, not simply unitary bodies of knowledge. We see a similar dual reciprocity between theory and practice, pluralism and holism, in Val Plumwood's call for a "web" model for environmental activism. She argues that both an "oceanic view of the movements as submerged in a single great movement" and a view that treats movements "as isolated from other struggles" should be avoided. "The dilemma is created by

setting up a choice between viewing liberation struggles as a shifting multiplicity only fortuitously connected (as in poststructuralism), versus viewing them as a monolithic, undifferentiated, and unified system. . . . A good working model which is easily visualized and which enables such an escape from the one/many dilemma is that of oppressions as forming a net or web" (Plumwood, 1994, p. 214). Plumwood's web is analogous to my argument for practical and conceptual parity among the rationalities that ecological reason must contend with.

Transformative borrowings and parities of heuristic holisms constrain ecological reason by making it genuinely interdisciplinary. Ecological reason is necessary for nonanthropocentric societies in sustainable environments, but genuine interdisciplinarity is necessary for the adequate development of the cognitive dimension of ecological reason.

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