The Very Idea of an Ecological Worldview

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Spring 2021

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In environmental philosophy, it has often been argued that adopting a new ecological worldview is necessary in order to generate environmentalist social change in response to ecological crisis. I introduce the analytical category of metascientific stance (tacit assumptions about the nature, practices, goals, and place of the sciences in society) in order to discuss the popular model of worldview clash in this article and contrast it with other models of science-environmentalism relation. I argue that its frequent combination with an epistemological holism, often implying antirealism, is entirely at odds with an environmental philosophy that recognizes the real asymmetrical dependence of humankind on the nonhuman. Moreover, it assumes a questionable metaethical relation between worldview and action. I examine three essential tensions in the worldview clash model for environmentalism and argue that because the very idea of a worldview has deep roots in Modernist dualism and anthropocentrism, it is a fundamentally flawed way of framing environmentalist action.

1. The Clash of Worldviews as a Metascientific Stance

By the 1980s, it became conventional for many environmental philosophers and environmentalists to contrast an "ecological worldview" with "the Modern scientific worldview"—where the latter was taken to be an expression of Cartesian dualism, atomism, mechanism, and reductionist materialism. The mechanistic worldview was regarded as one of the central causes of the ecological crisis, along with anthropocentrism and the instrumentalization of nonhuman nature. The theoretical and technological transformations characterizing the Scientific Revolution, along with its supporting Judeo-Christian tradition, were seen as chief contributors to the highly anthropocentric, exploitative relationship of humankind to other-than-human nature in western culture. From Arne Naess's contrast between thing- and field-ontology (1972), to Carolyn Merchant's case against Modern science and her plea for a return to a holistic, organismic conception of nature (1980), to Charles Birch and John Cobb, Jr.'s "mechanistic" and "ecological" models of the living (1981), to J. Baird Callicott's "metaphysical implications of ecology" (1986), and, ultimately, to the elaboration of these contrasts by other writers during the 1990s, including Bryan Norton (1991), Warwick Fox (1990), Murray Bookchin (1990), and Arran Gare (1996), this model became a defining feature of much environmental philosophy. Since worldview talk is also central to the post-Kantian tradition, the Continentalists among environmentalists seamlessly extended the general antipathy to the sciences in dominant strands of Continental philosophy into environmentalism, and works like Neil Evernden's (1985) and David Abram's (1996) also traded on a series of oppositions central to the grand contrast between mechanistic and ecological worldviews. Even today there are calls for "worldview remediation" as a way of promoting the kinds of social change environmentalists hope to

achieve.[1] Although the figures and approaches listed are often thought to be antagonistic to one another (e.g., deep ecology is often not compatible with critical ecofeminism, nor is ecophenomenology compatible with social ecology), they all share a preoccupation with distinguishing a minority environmentalist "ecological worldview" from a hegemonic "mechanistic worldview." More recent environmental humanities discourses and new ontologies (such as neo-vitalisms) that intend to "re-enchant" a disenchanted world, although they often possess more nuanced views of the relations between the sciences and environmentalism, still share many features of this "worldview clash" model. In this essay, I argue that there are good reasons to think more carefully not only about this traditional polemical contrast, but about the concept of "world- view" itself, one of the most taken-for-granted concepts of our intellectual era. If we are to be even moderately reflexive and critical of our own concepts as environmentalists, then we have to reflect on this model for thinking about environmentalism in terms of clashing worldviews.[2]

I consider the clash of worldviews model to be one type of metascientific stance commonly accepted in environmentalist discourses. By "metascientific stance" I mean the mostly implicit conceptions of the role and place of the sciences in the production of knowledge (including notions of epistemic authority, social context, historical significance, and political relevance). In other words, a metascientific stance includes tacit assumptions about the nature, practices, goals, and place of the sciences and knowledge-makers in society. The terms "philosophy of science" and "social studies of the sciences," by contrast, do not cover this full range of phenomena. Although a metascientific stance is not identical with an implicit or explicit ontology, such stances also importantly entail many ontological, epistemological, and even metaethical assumptions. The global orientation such stances provide often speak to basic ontological assumptions about forms of agency, determination, and dependence, as well as metaethical assumptions about the relations between theory and action. The relation between a metascientific stance and an articulated philosophy of science is analogous to the relation between a set of metaethical assumptions and an articulated normative ethical theory. It is

[1] Some of the sources referred to include Naess 1973 and 1989, Chapter 2; Merchant 1980; Birch and Cobb, 1981; Callicott, 1986, 2011, 2012 ("worldview remediation" is Callicott's term); Fox 1990; Norton 1991; Bookchin 1990; Gare 1996; Evernden 1985 (second edition 1993); Abram 1996. For more discussion of "Continental" environmental philosophy, see Irene Klaver's introduction and notes to "Environmental Continental Philosophy" in Zimmerman et al. 2004 as well as Foltz 2006. Another more recent uncritical use of the worldview concept can be found in Crist 2018.

[2] In recent work, German philosopher Markus Gabriel carefully articulates what he calls the "no-world-view," which says that the "world," conceived as an item or totality of which we can give one true description, does not exist (Gabriel 2015, 187). Therefore, he argues that we have to give up the conception of "worldviews" because there is no world, i.e., no single such totalizing description (Ibid., 196). Instead, there are "fields of sense," or perspectives, in which many equally true descriptions are possible. My arguments against "worldview clash" in environmental philosophy were developed separately, but complement this position. What he calls "zoontological optimism" can also lead to the antirealist idea that I criticize here—that the "world" depends on us (ibid. 34).

unlikely that anyone would claim that one explicit philosophy of science belongs to environmental philosophy, but this does not mean that it does not often have very clear beliefs about the nature and goals of the sciences (i.e. a coherent metascientific stance).

Put simply, in its original form, the clash of worldviews model is a metascientific stance that often accuses capital-S "Science" of instrumentalization or domination of nonhuman nature, largely due to its mechanistic or scientistic conception of nature.[3] Not all who adopt a worldview clash model are anti-science, but they are opposed to a certain dominant image of the sciences that might be characterized as positivistic or as "scientism."[4] Several later writers, including science-friendly theorists and working scientists, have attempted to blend their critiques of instrumentalization with more recent complexity theories and the generally more pluralistic ecological approaches in the sciences in order to ally themselves with environmentalists against the growing swell of right-wing science- deniers and climate skeptics. Such alliances do not rectify the problems with the worldview clash model, however, since a metascientific stance includes not only epistemological assumptions but also metaethical ones— tacit assumptions bearing on the relation between theory and action. I will propose another more science-friendly environmentalist model below.

It might be objected at this early stage that worldview talk is just a harmless and convenient rhetorical device for organizing polemics between environmentalists and strong anthropocentrists. The literature, however, shows that an enormous philosophical burden is borne by such talk. It implies an epistemology, a moral psychology, a metaphysics, and a theory of social change. Not every use of the term is pregnant with all of these connotations, and part of the point here is to make readers more sensitive to the uses of the term and more able to recognize the varied work that the term does in our contemporary intellectual environment.

While they will not be further discussed in this paper, other metascientific stances for thinking about science-environmentalism relations also exist. The most common form of popular science-driven environmentalist thinking—embraced by practitioners, policymakers, and the public—relies on a positivistic model of science that assumes a sharp boundary between observation and theory, an absolute distinction between subjective and objective constituents of knowledge, the unity of the sciences ideal, reduc-

[3] The famous essay by Lynn White Jr. perhaps set the stage for philosophical approaches to understanding the ecological crisis. In White 1967, he claims that in order to address the ecological crisis we need to get to "fundamentals," and these are the historical western "presuppositions that underlie modern technology and science" (1204). It turns out that Christianity is the villain in the narrative, "the most anthropocentric religion the world has seen" (1205), and it is the source of the ideology of dominating nonhuman nature that pervades both technological change and mechanistic Science. He calls for a cultural conversion to a more benign form of Christianity. The model of worldview clash is definitely prefigured here: there are fundamental, implicit cultural assumptions about humans and nature, so widespread as to be invisible; they directly determine much social and individual behavior; therefore, as a society, we need to adopt different fundamental assumptions to determine better behavior.

[4] See, among scientists, for example, Ulanowicz 2009, and among radical ecologists, Gare 2017.

tionist metaphysical materialism, a gradualist model of scientific advance, and a linear "predict-and-act" policy framework. The problems with this conceptually bankrupt positivistic model have been discussed for decades in mainstream history and philosophy of science, although it still persists in popular consciousness. Crucially, it includes a unilateral conception of the relation between knowledge and practice, where science provides "nothing but the facts" and, informed by the experts, "policymakers" provide recommendations on the basis of these finished facts.[5] This conception can be part of different metascientific stances. As different as they otherwise may seem, for both the clash of worldviews and positivist environmentalist models it is what uniform Nature is (allegedly) like that forms the starting point for recommendations for uniform social or behavioral change. Whether Nature is a collection of discrete material objects (reductionist mechanism) or of vital ecologically interdependent subjects (ecological worldview), the assumption is that the right description of Nature must be the starting point for collective action guidance. This assumption regarding the linear relation between worldview and action is put into question here. Such stances obscure the chasm between theory and practice with assurances that social change will follow directly from recognition of "the way things are."[6] Generally speaking, both equally rely on the conception of an undifferentiated Humanity with an identical interest in escaping environmental degradation, and both downplay the important role that social and cultural difference, social institutions, and intersecting natural-social processes play in

[5] Philosopher of science Sandra Mitchell characterizes the standard "predictand-act" model as one that depends on the assumption that we can achieve a high degree of certainty about the facts of a case in the world, assign unambiguous values to their components and future outcomes, and choose the better option. The most common form of this is cost-benefit analysis (2009, 86–89). In a complex world, however, all the components of this model are questionable. There is ineliminable uncertainty about the facts, it is extremely difficult to assign values, and who gets to participate in choosing outcomes and making policy is characterized by gross inequalities and injustices. She introduced "robust adaptive management" as an alternative. Gare made virtually the same distinction more than a decade earlier (1995, 153–54). Similarly, ecologist and social theorist Peter Taylor argues that in science-driven environmentalism "we *know* we have global environmental problems because, in short, science documents the existing situation and ever tightens its predictions (or fills in its scenarios) of future changes. Accordingly, science supplies knowledge needed to stimulate and guide social-political action" (1997, 149). Noting that this linear model often results in vulnerability to challenges dues to complexity and uncertainty, he proposes to substitute this with an improved model. Building on social studies of the sciences work, he articulates a different interpretation of "the special relationship between environmental science and politics" that emphasizes the "heterogeneous construction" of scientific knowledge across cognitive, institutional, rhetorical, political, technological, economic, and other registers (150). For further discussion of Taylor with regard to this form of "political ecology," see Peterson 2020, Chapter 6.

[6] Latour's term for this kind of reasoning is "short-circuiting." He explains how references to capital 'N' Nature or capital 'S' Science are often used to silence debate about political issues in the first chapter of his *Politics of Nature*, brilliantly using Plato's allegory of the cave as the original model. See Latour 2004, 9–52. Among worldview clash theorists, Gare's work constitutes an important exception to this move of short-circuiting, and acknowledges the need for and the cultivation of more democratic processes on the way toward building an ecological civilization (2017).

the construction of knowledge and policy. These metascientific stances have practical consequences. Both worldview and science-driven conceptions take substantial agency away from those in communities of struggle, the first by making environmentalism a matter of worldview conversion usually without reference to social institutions or material factors, and the second by making environmental social change the business of an elite policymaking class, rather than the concern of everyone.

A third metascientific stance, involving a differentiated "political ecology," aims to understand scientific work, as well as the historical, social, and philosophical interpretation of that work, in its social context, and does not take the question about how ecology is used or may be used to support environmentalism or environmental philosophy for granted. It also embraces the central insight that human exploitation of nature is directly linked to human social domination. It importantly makes visible the multiple opportunities for intervening in ongoing social processes at local scales that are rendered invisible by the popular worldview clash or positivist science-driven environmentalist models. Ecologists Richard Levins and Yrjo Haila acknowledge the denunciation of mechanistic science by radical environmentalists, but also claim that "environmentalists are usually not sensitive enough to the possibilities of modifying scientific practices better to correspond to the demands of an egalitarian society and better to cope with ecological issues" (Levins and Haila 1992, 9). We can learn much from such politically aware practitioners of ecology in order to articulate a critical metascientific stance on the relation between the sciences and environmentalism. Such a view contrasts with both worldview clash and science-driven environmentalism in rejecting the universalist thesis—that "humanity" or the "human species" as a whole is the cause of environmental degradation—and it adopts a multifactoral approach to considering science-politics relations, complicating the theory-action assumption. It allows us to satisfy the need for local explanatory efficacy as well as for a global structural account that may orient individuals and communities endeavoring to thrive in a more-than-human world, a world not made for us. I further explain and develop this third stance elsewhere (Peterson 2020) and will limit myself to discussing the pitfalls of the worldview clash model in this article.[7]

In what remains, I identify some problematic conceptual tensions in the worldview clash model and engage in some speculation as to the historical sources of one of the central assumptions of the worldview model.

[7] For those familiar with radical ecologies, all of this might seem to be simply revisiting the "green consciousness/green politics" opposition invoked by writers like Dryzek (2013, 185), and that I am just extending the critique of positions that prioritize consciousness change (at the expense of institutional/ structural change) in the movement for social change. While there might be some truth to this, I question the simple theme of this dichotomy, introducing the concept of metascientific stances as an analytical tool meant to reveal the historical contingency of adopting specific understandings of science- environmentalism relations, as well as the assumptions at work in the ways these relations are conceived. Clarifying these assumptions, whether epistemological, ontological, or metaethical, should contribute positively to the movement for environmentalist social change.

2. Variations on a Theme

Before continuing the discussion, let me note that an early objection to the model of worldview clash casts doubt on the way that it uncritically identifies contemporary science with an eighteenth-century Modernist conception of "mechanism." This left the science of ecology in a rather peculiar position: sometimes it was treated as one more extension of mechanism—and as thus useless or even harmful for environmentalism— and at other times it was regarded as somehow fundamentally different from every other science—and so as ally and even justification for environmentalism (Shrader-Frechette and McCoy 1993). However, unless one is willing to sacrifice the cognitive authority of the ecologist's claims about biodiversity loss, for example, a perspective on the sciences that does not consider scientific knowledge (merely) another "worldview" is absolutely essential for environmentalists. A similar point was made by philosopher of science Kristin Schrader-Frechette and taken up by later authors who called out environmentalists for not adequately recognizing the difference between "hard" or "scientific ecology," and "soft" or "Romantic-politicalmetaphysical ecology" (Shrader-Frechette and McCoy 1993, see also Keller and Golley 2000). An important advantage of this distinction is that contemporary scientific ecology and metaphysical ecology (or "ecological worldview") may be treated separately, and it puts into question the ready identification of scientific ecology with metaphysical mechanism or scientism. This simple shift toward considering different varieties of ecology already deflates the often-exaggerated dualistic framing of the clash of worldviews, and creates an opening into which more nuanced understandings of ecology and environmentalism may be inserted. For these more nuanced approaches, there is a struggle within the sciences (as well as without) for a more politically sensitive, socially engaged science, in contrast to positivistic, "value neutral" science that has often easily ended up as legitimizing authority for the status quo, namely, exploitation of nonhuman nature. From this standpoint, the problem is not so much "mechanism"—although the ontological and epistemological principles involved in it should receive a thorough categorial analysis—but a positivistic, "scientistic" epistemology that prevents the recognition of the value-saturated interests driving the production of knowledge and obscures the many other social factors conditioning knowledge-making.[8] A political-ecological metascientific stance that aims to see practicing scientists as socially engaged knowledge-producing agents embedded in

[8] I follow the late Marxist mathematical ecologist Richard Levins in his recommendation to recognize the dual nature of the scientific enterprise: "Science has a dual nature. On the one hand, it really does enlighten us about our interactions with the rest of the world, producing understanding and guiding our actions. . . . On the other hand, as a product of human activity, science reflects the conditions of its production and the viewpoints of its producers or owners" (Levins 1996, 103). Likewise, I endorse Haila's resistance to simplifying, homogenizing historical accounts, such as those of White, Jr., Merchant, or Leiss, which create the impression that "Science" is to blame for the environmental crisis, and his recommendation to avoid the dualistic clash of worldviews model and instead embrace "contextual socio-ecological analysis" (2000). Peter Taylor's work expertly elaborates this insight in the theoretical register (2005).

their social contexts, and which brings the tools of the history, philosophy, and social studies of science to bear in their analyses, would be an improvement for environmentalism. It should also help us to avoid falling into the trap of the naïve "science wars" opposition between classical scientific realism versus postmodern relativism, which is so clearly one of the most decadent expressions of traditional dualisms.

For many environmentalists the model of worldview clash has persisted despite its ambivalent stance on the sciences. It would be a mistake, of course, to regard as homogenous all of the approaches that incorporate a contrast between worldviews. On closer examination, we find many variations on the theme, but there are two broad types that we may (unimaginatively) call idealist and materialist. These terms refer to the kinds of conditioning factors of social change privileged by the authors in question, not to the classical philosophical positions of "idealism" and "materialism." Callicott's "Metaphysical Implications of Ecology" (1986) and Merchant's *Death of Nature* (1980) may serve as classic examples of these two variations, respectively. I include these sources because, although they may be well-known to environmental philosophers, they are likely little known by others outside of philosophy. Readers interested in "new materialism" and alternative ontological approaches might discover that environmental philosophers have been working with concepts only more recently considered academically fashionable for at least five decades.

In a recent essay, Callicott speaks of an "evolutionary-ecological world- view," cultivation of which is a necessary prerequisite for social change, he claims. "The dissemination of evolutionary-ecological literacy and the ethical implications of the evolutionary-ecological worldview is the principal task of the present generation of ecological ethicists" (2012, 16). He wrote about this model for theoretical and social change much earlier in his own version of the distinction between "mechanistic" and "ecological worldviews" (1986).[9] According to Callicott, "atomism" in the Modern period was deliberately opposed to the Aristotelian doctrine of substantial forms and entailed a number of categorial shifts that ushered in a distinctive view of the world. Composite bodies are composed of atoms in various combinations, generating different levels of organization in the material world. A central tenet of this atomistic physical theory is that the structure and behavior of composites are reducible to the structure and behavior of their constituents, which characterizes physical reductionism. Since the behavior of these components is fairly limited, "motion or translation from point to point," Callicott believed this implies mechanism (1986, 302). These physical concepts were also extended to other domains of investigation. "This material, reductive, particulate, aggregative, mechanical, geometric, and quantitative paradigm in physics governed thought in other areas of philosophical interest, for example in moral psychology and biology" (303). In psychology, the majority of Modern writers subscribed to a dualism in which minds were ontologically separated from and superior to bodies. He claimed

[9] Karen Warren and Jim Cheney critically assess this essay of Callicott's in Warren and Cheney 1993.

that physical atomism is supplemented by spiritualist exceptionalism that reaffirms the dualistic metaphysics of human and nature, or mind and body. This ontological separation enabled a noninteractionist, disembodied, "atomist" conception of mind, and an instrumental conception of rationality (304).

To this mechanistic worldview Callicott contrasted an ecological paradigm of more recent vintage. He claimed that ecology "was shaped by a complex of governing metaphors" with their roots in "Romantic intellectual countercurrents" to rationalism and mechanism (306). Because the Modern categories emphasize quantitatively characterized, discrete atoms, externally related part to part through locomotion, new views react directly to them by emphasizing instead quality, continuity, process, and "internal relations." After Darwin, and passing through variations of Darwinian ideas performed by Frederic Clements (1874–1945), Arthur Tansley (1871–1955), Charles Elton (1900–1991), and other ecologists early in the twentieth century, a "new ecology" developed on the basis of the energetic conception of ecosystems, according to Callicott. He summed up the "abstractive general concept of nature distilled from the New Ecology" this way:

> First, in the "organic" concept of nature implied by the New Ecology as in that implied by the New Physics, energy seems to be a more fundamental and primitive reality than material objects or discrete entities—elementary particles and organisms respectively. An individual organism, like an elementary particle is, as it were, a momentary configuration, a local perturbation, in an energy flux or "field." [. . . E] cological interactions, primarily and especially trophic relationships, constitute a macrocosmic network or pattern through which solar energy, fixed by photosynthesis, is transferred from organism to organism until it is dissipated. Organisms are moments in this network, knots in this web of life. (1986, 310)

By relying on this staging of a clash of worldviews in the history of ideas, Callicott's narrative shunted the development of scientific ecology into a supposed main current that leads to an ontology of flows, events, processes, and internal relations that conveniently suppresses all of the disputes over basic ecological concepts that characterize much of the history and philosophy of ecology as a science.[10] It is certainly true that one thick strand of ecological theory centers on energy and its flows through ecosystems, though it is far from being the indisputably dominant one. Foregrounding this strand of ecological theory, of course, allowed Callicott to create the greatest contrast with the mechanistic view. In place of partism, we get holism; in place of discreteness, we get relationality; in place of separation, we get unity. All of this finally has implications for how "we" think about ourselves in Nature—these being the main implications in which Callicott was and is primarily interested. The holism of the

[10] For more reliable histories of ecology, see McIntosh 1986, and Kingsland 1995 and 2008.

ecological worldview is meant to break down the boundaries between the self and environment, overcoming the "hyperseparation" (Plumwood's term, 2002) between human and nonhuman instituted by the Modern constitution. The relation between conceptual and nonconceptual factors should be clear: changing conceptual frameworks is a necessary condition of transforming social systems and institutions. Nonmental historical and social factors are barely mentioned on this idealist model. Callicott is clearly not anti-science, but this hardly matters at all with regard to the key metaethical assumption here: widespread conversion to an ecological worldview will result in positive environmentalist social change. The emphasis placed on consciousness change means that considering the role in such change of economic, political, institutional, and other material structures is not important.

Merchant's broadly materialist conception of the clash of worldviews is similar to, but far superior to Callicott's. Merchant's 1980 book *The Death of Nature* also characterized the Modern scientific worldview, but it did so more convincingly by covering the historical political, economic, and technological drivers of social change, as well as the gendered and dualistic conceptual framework involved.[11] "[F]or the past three hundred years, Western mechanistic science and capitalism have viewed the earth as dead and inert, manipulable from outside, and exploitable for profits. The death of nature legitimated its domination" (2005, 41). She began by discussing the "organic worldview" of the ancient world and Renaissance, and by remarking on the normative nature of such a cultural imaginary. Like Callicott, her aim was to provide resources for motivating cultural or behavioral change. If one worldview produces bad behavior, another might produce better behavior. Merchant helpfully made this assumption explicit:

> The image of the earth as living organism and nurturing mother served as a cultural constraint restricting the actions of human beings. One does not readily slay a mother, dig into her entrails for gold, or mutilate her body. As long as the earth was conceptualized as alive and sensitive, it could be considered a breach of human ethical behavior to carry out destructive acts against it. (2005, 43)

The imagery present in literature and plastic arts, scholarly work and philosophy, can "play a normative role within a culture. Controlling images operate as ethical restraints or as ethical sanctions—as subtle 'oughts' or 'ought nots.' Thus, as the descriptive metaphors and images of nature change, a behavioral restraint can be changed into a sanction. Such a change in the image and description of nature was occurring during the course of the scientific revolution" (*Ibid.*). In addition to these ideal or normative factors involved in the shift, importantly Merchant also invoked material

[11] Merchant adapts her 1980 discussion, often verbatim, into her more recent text *Radical Ecology* (2005). For her summary, see the section "Science and Worldviews," where the basic terms remain unchanged (41–60). I rely on this more recent text here.

factors. She described the historical changes in political economic systems occurring throughout the same historical period. Where "production for subsistence," based on organic and renewable energy sources like wood, water, wind, and muscle "began to be replaced by more specialized production for the market" and non-renewable fossil fuel energy sources, these new activities directly altered the earth (44):

> The new commercial and industrial enterprises meant that the older cultural constraints against the exploitation of the earth no longer held sway. While the organic framework was for many centuries sufficiently integrative to override commercial development and technological innovation, the acceleration of economic change throughout Western Europe began to undermine the organic unity of the cosmos and society. . . . By the sixteenth and seventeenth centuries, the tension between the technological development in the world of action and the controlling organic images in the world of mind has become too great. The old worldview was incompatible with the new activities. (2005, 44–45)

Far from claiming merely that changes in ideas changed behavior, here she implied that the activities of technological and economic development preceded and drove changes in the dominant worldview. Bacon's "experimental science" grew out of the new valorization of crafts and mechanics that came along with the new exploitative activities and the mechanical philosophy became the legitimating framework for both, "fully compatible with the directions taken by commercial capitalism" (47). Philosophical assumptions about being and knowledge were infused with machine models and images. It is the analogical and institutional connections between the structure of the world, knowledge, and machine that make unrestrained domination of nature possible. The material factors have a primacy in the account of worldview clash that seems to be entirely ignored by writers like Callicott.

Despite these differences, Merchant's characterization of the mechanist conceptual framework, and of the ecological or organismic worldview that she claimed should replace it, is in many respects quite similar to Callicott's. She wrote that according to it "the mechanical structure of reality (1) is made up of atomic parts, (2) consists of discrete information bits extracted from the world, (3) is assumed to operate according to laws and rules, (4) is based on context-free abstraction from the changing complex world of appearance, and (5) is defined so as to give us maximum capability for manipulation and control over nature" (53). Merchant summarily concludes that "[b]oth the need for a new social and intellectual order and new values of human and machine power, combined with older intellectual traditions, went into the restructuring of reality around the metaphor of the machine. The new metaphor reintegrated the disparate elements of the self, society, and the cosmos torn asunder by the Protestant reformation, the rise of commercial capitalism, and the early discoveries of the new science" (53). "Man" is seen as master and controller of the machine, able to

manage it according to rational principles uniquely accessible to him. The conceptual framework of mechanism, "emphasizing external force and passive matter divided into re-arrangable components, could provide a subtle sanction for the domination and manipulation of nature necessary to progressive economic development" (55). This history is important because "the mechanistic worldview continues today as the legitimating ideology of industrial capitalism and its inherent ethic of the domination of nature" (61). Like Callicott, Merchant also outlined the fundamentals of the contrasting worldview, widespread adoption of which would ostensibly lead to better human-nature relations.[12] They are familiar enough that I do not need to repeat them here.

While the historical and polemical contrast between mechanistic and ecological worldviews aims to motivate intellectual and social change, the details of this thematic contrast do not directly concern me here. One of the central questions of this inquiry is whether constructing such a narrative in terms of clashing worldviews in the first place enables or inhibits the social change that these writers are hoping to encourage. The contrasts they foreground certainly get something right about intellectual history, and I completely agree that a mechanistic, reductionist ontology is utterly inappropriate for environmentalist projects. What the alternative ontology ought to be and how ontology itself should be conceived are questions that I set aside in this essay in order to focus attention on the metascientific stance adopted by these writers. In its epistemological aspects, this metascientific stance is often, but not always, informed by strong currents of twentieth-century antirealist philosophy that continue to dominate the humanities.[13] A critical environmental humanities can resist these tendencies and challenge our conception of the humanities themselves. I spell out these antirealist tendencies in terms of three "tensions" in the worldview clash model that make it a bad choice of metascientific stance for critical environmental philosophy.

[12] In the 2005 text, Merchant helpfully proposed a more nuanced way of thinking about the place of scientific and other knowledge producers in society. Merchant recommends a "reconstructive" approach to scientific knowledge that is more sensitive to contextual factors, social values, and the situatedness of researchers. It acknowledges that sciences and their methodologies are empirically underdetermined and value-laden, and that in place of the ideal of domination we should place egalitarian, democratic values. Although Merchant associates this alternative with her own contrast between mechanistic and ecological worldviews (113), I would suggest in fact that these insights constitute a completely different metascientific stance, the stance of political ecology, largely incompatible with it. We can capture the chief insights of the new interpretations of scientific practices offered by post-Kuhnian science studies, including "contextualism," "interaction," "complexity," "change and process," without reference to the homogenizing dichotomous narrative of clashing worldviews at all.

[13] For definitions of realism and antirealism in philosophy, I draw on Braver 2007, 13-58. The central ontological tenet of realism is that objects are "indifferent to thought," or "mind-independent." A central antirealist tenet is thus that "objects" are dependent on or determined by minds in some way. One potential limitation of these definitions is that they are both anthropocentric, i.e., defining the nonhuman as dependent on or independent of thought still regards it as related to humankind in some basic way. Nonhuman "indifference" to the human might be a better way of putting it.

3. Three Tensions

We can identify at least three central tensions in the discourses of worldview clash. First, worldview environmentalists seem committed to the idea that there is *one* real world on which all humans depend for their survival (universalism). On the other hand, characterizing environmentalism (or ecology) as a "worldview" implies that *multiple* views of the world are equally possible, and are relative to individuals and cultures (relativism). Is an "ecological worldview" the one true account of the world, or is it one account among others? There is a significant tension or even contradiction between claiming that worldviews are both variable and that there is one right or true one among them. Simply calling a description of nonhuman nature a "worldview" introduces this undecidability along with the model. (Some uncertainty may be characteristic of *all* descriptions, but this does not necessarily entail relativism the way that worldview clash does.) A further problem is that if large-scale conversion to an ecological worldview seems warranted, this might motivate some form of environmentalist cultural imperialism (for discussion of and response to this problem, see Gare 1995, Chapter 5).

Secondly, environmentalists want to claim that there is a *real* nonhuman world on which humans depend (realism/naturalism), but by employing the model of worldview clash they also imply that humans are responsible for generating their concepts, ideas, and meanings of nonhuman "nature" (antirealism). This is a more serious and pervasive epistemological tension. If what environmentalism claims is that humankind depends asymmetrically for its survival and flourishing on the reality of a more-than-human surrounding world (principle of dependence), and yet to hold a worldview means to give meaning and structure to this world from a strictly human standpoint, we could call this a form-content contradiction. In other words, environmentalism refers to an extra-human reality, and yet the implicit worldview epistemology emphasizes the conceptual, linguistic, or cultural "construction" of this reality or "world," thereby taking back with one hand what it gave with the other. I explore the historical roots of this pervasive notion below. The equivocation built into the term "construction," allowing both antirealist and realist uses, does not help matters.

Thirdly, a driving motivator of worldview talk, as we have seen, is the metaethical assumption that if we possess a mechanistic worldview, we are prone to dominate nature; if an ecological one, we would seek to live sustainably. "Seeing" the world from within an ecological worldview usually implies that one automatically acts in accord with it (holistic individual/cultural determination). At the same time, however, individuals are encouraged to choose an ecological worldview from some place outside of this determining culture, implying that not all of our choices are determined by worldviews (voluntarism). What I call holistic determination— where perception-conception leads directly to action—is an assumption common to worldview accounts and some understandings of the derivative concept of "paradigms." If "we" are locked into a distinct cultural formation called the "mechanistic worldview," this may be used to "explain"

a range of anti-ecological behaviors, but it also makes the problem of interrupting its dominance seem quite severe. This is a moral-behavioral tension in the model. This epistemic-practical holism is another key feature of most worldview approaches.

A corollary of this holism is that adopting an ecological worldview is not just optional for the population, but that it is absolutely necessary in order to instigate the kinds of social change environmentalists desire. The strong version of the worldview concept, as we have seen, entails the expectation that adherents of a particular (ecological) worldview automatically act in the interests of the environment, and adherents of the mechanist (anthropocentric) worldview automatically do not. Worldviews are taken to determine or motivate action directly. Haila noted that according to many authors worldviews become "a causal factor by being an integrating core in people's beliefs about their proper place in the world. . . . The assumption that structures of belief influence or even determine people's actions is quite plausible, of course, but the role allocated to views of nature in such structures," he argued, "is something that should be shown, not assumed" (2000, 160). At least in terms of one strand of worldview tradition, a worldview is an expression of one's deepest feelings, beliefs, and assumptions, and these are assumed to directly condition (or determine) action. Therefore, if you change your worldview you change your action. All the attention of theoretical environmentalists can then be devoted to coming up with the "right" ecological worldview, and behavioral change will take care of itself. The history of the environmental movement has shown that this is hardly the case. By misframing the problem of social change, it unintentionally makes social change more difficult to make, not less, and through its ineffectiveness more likely ends up supporting the status quo.

While we "choose" from among prepackaged worldview-commodities and try to "sell" ours to others, forests burn, groundwater is polluted with fracking chemicals, millions of animals are slaughtered for taste and profit, mountain tops are blown off and run downstream, and huge monocultures are cultivated with synthetic chemicals, destroying the real conditions for autonomous communal subsistence, reproduction, growth and well-being for millions of humans and nonhumans around the globe. This assumption of holistic macrodetermination prevents more subtle thinking about situated epistemology, social engagement, and dynamic moral prioritization. My claim is not that we should not attempt to change our categories, values, and institutions, but that there are many more points of intervention in ongoing interacting processes of knowledge-making and social engagement on a political ecological account than the worldview approach reveals to us (for more on this, see Peterson 2020). In the discussion that follows, the spotlight is on the second antirealist tension, though I will also return to the first and third.

4. Reflection on the Tensions

Let's briefly consider a few more examples of worldview discourse in environmental philosophy in light of the tensions laid out above. Recently, Callicott himself has reflected on the nature of worldviews as such. He claims that Aldo Leopold contrasted an "ecological worldview" with the dominant Judeo-Christian worldview in the attempt to root out the anthropocentric characteristics of the latter. He considers the worldview concept with explicit reference to Kant. Callicott claims that differences of worldview exist at the level of conceptual frameworks that are (so to speak) one level above the work performed by a Kantian "understanding," which is otherwise uniform for all human minds. While "the sensory inputs, spatial and temporal orientations, and perhaps even the Kantian categories of the understanding" are the same for very diverse observers of a single object—his example is a bear simultaneously observed by a Native American, Puritan Pilgrim, and Swedish naturalist—"their worldviews differ profoundly—shaped by their profoundly differing conceptual matrices" (Callicott 2011, 514). While this reading certainly leaves much to be desired as an interpretation of Kant, it provides Callicott with a way to account for both (natural) similarity and (cultural) divergence of worldviews. This distinction bears directly on the first tension between an aspiration to universality and the danger of relativism mentioned above. He does not dwell on this aspect of the issue, but assumes its importance lies in the third practical question: there must be some variability in worldviews, for if worldviews are changeable, then there is hope for environmentalists. Callicott states that if "our conceptual frameworks— and therefore our worldviews—may be thoroughly transformed, even revolutionized, by education," then there is a way out of the ecological crisis by transforming the worldviews of the populace from mechanistic and exploitative to ecological and benign (2011, 514). Like the shift from the Aristotelian-Ptolemaic to the Copernican cosmology, he claims, "educated people in the twentieth and twenty-first centuries may be in the midst of another unsettling worldview shift, one that exchanges one set of very common culturally generated conceptual filters for another" (2011, 515). A number of questions arise even from such a brief sketch. Is a worldview just a collection of "culturally generated conceptual filters," or does it have deeper roots? Are worldviews, if they exist, the kind of thing that *can* be transformed by education? The assumption upon which these practical implications are based is evidently that changing a worldview changes behavior. Is the relation between worldviews and action so clear cut? Relatedly, can historical changes in cosmological concepts, for example, be *explained* solely in terms of changes of worldview, or must other social factors be included (as in Merchant's account)?

With more reflexivity, pragmatist environmental philosopher Bryan Norton also embraced the worldview concept in his early work. He helpfully made explicit the by now widely-accepted post-Kantian conception that languages, concepts, and values do not limp along behind perception of the world, but actively shape it in our experience:

> Perceptions, we assume, directly affect the theoretical hypotheses and conjectures we develop to make sense of our world as we act within it. But theoretical assumptions likewise affect perception; and since perception is the only basis we have for discriminating among theories of reality, it is difficult to avoid the conclusion that to some degree at least, the constellation of conceptual, theoretical, and value precepts we operate with, and the vocabulary we use to express them, will determine the shape of the world we encounter. (1991, 75)

Norton refers directly to Wittgenstein here, but argues that this is one general outcome of both twentieth-century Anglo-American and Continental philosophy. He attempts to synthesize these trends in the concept of "worldview." "A worldview, as we are using the term here, refers to the constellation of beliefs, values, and concepts that give shape and meaning to the world a person experiences and acts within." Such worldviews may be fragmentary and unsystematized, but are nonetheless "best understood as action-oriented" conditions of engagement in the world (1991, 75). Thus, here too action is thought to follow on worldviews, but the relation is also reciprocal. Norton thinks there is an "action-theory circle" (91), but it is clear that the major implication is that actions follow from worldviews as conclusions follow from premises. Although Norton has a more nuanced understanding of "worldview" than does Callicott, he still falls prey to the common humanist conceit that it is our ideas that matter most for human experience and determine our action. Of course, this is an improvement on the positivistic separation between observation and theory, but goes too far in the direction of holistic epistemic determination. On this view, environmental conditions, habitual practices, or institutional structures, among other things, do not appear to play a significant role in determining human action. The tension between the *universalizing* environmentalist claim that our thinking must be responsive to the real world on which "we" all depend, and the *relativistic* notion that we can only ever get as far as our own worldviews, also remains. The nagging third tension returns as well: if it is really the case that Modern science is so enthralled by its own vision of human supremacy and mastery of a dead nature, seemingly locking us into a cultural prison, how do we escape the prison-house of our own conceptions and language? If worldviews, both theoretically and practically, *determine* behavior, then how is it even possible to *imagine* an ecological alternative?

Some of these problems have been addressed by Australian ecophilosopher Arran Gare, the most consistent, visionary, thorough, and radical environmental process philosopher ever to write. His work has often been unjustly neglected in environmental philosophy. He clearly explains that in order to build an ecological civilization as an alternative to the dominant anti-ecological "world-orientation" we need process philosophy as an alternative to reductionist scientism; dialectical thinking, including synopsis and synthesis as well as narrative articulations of the future, as an alternative to analysis and fragmentation; and the Radical Enlightenment as an alternative

to the economics-driven Moderate Enlightenment (2017). Gare's work is "an attempt to formulate the process world-orientation with greater coherence, and to improve its prospects as a research programme for the sciences and humanities, as a basis for action, and ultimately as the foundation for a new world order" (1996, 282).

In terms of the taxonomy of metascientific stances defined above, Gare's approach falls squarely within that of worldview clash. What I have called "science-driven environmentalism" and "political ecology" are swallowed up into the worldview clash model and become invisible, despite their significant differences. For Gare, it is possible to be both a strong realist about nonhuman nature as well as a constructivist in epistemology by recognizing the diversity of worldviews as historically developed and developing approximations to the best ecologically- informed process-based articulation of the world.[14] In *Postmodernism and the Environmental Crisis* (1995), Gare considered and argued against the charge that promoting a particular (ecological) worldview could be seen as a form of cultural imperialism (chapter 5). He revisited this question more recently in *The Philosophical Foundations of Ecological Civilization* (2017), where he calls for a form of dialogical "transculturalism" in which cultures should aim not only to understand and learn from each other but also criticize each other. Whether or not these steps (adopting process philosophy and intercultural dialogue) constitute an adequate response to the relativism question can be set aside for now. On the issue of realism, however, there is greater ambiguity. Gare explicitly embraces a form of realism that he links back to Schelling's work, but whether his constructivism avoids the disadvantages of the holistic view is open to question. As stated above, worldview theories may be said to rest on a principle of epistemological holistic determination, the stance well-expressed by Norton when he said that "the constellation of conceptual, theoretical, and value precepts we operate with, and the vocabulary we use to express them, will determine the shape of the world we encounter" (1991, 75). In a passage of *Nihilism, Inc.* articulating his overall position and worth quoting at length, Gare argued

> . . . . that environmental problems and the nihilism underlying the failure to confront them are manifestations of basic deficiencies in the world-orientation which dominates throughout the world. The roots of these deficiencies will be shown to lie in metaphysical notions that originated in Ancient Greece, were developed in medieval Europe, incorporated into mechanistic materialist science, assumed by economic theory and institutionalized in capitalist society. . . . [T]hese notions have come to inform

[14] Additionally, Gare argues that proponents of process philosophy tend to emphasise that reality is far more than we will ever be able to fully comprehend, as being far more complex than could ever be understood fully, the "unprethinkable being prior to all thought," as Schelling put it, and always presupposed in thought, including practical reasoning (Gare 2014, 308, 310–11; Gare 2017). He claims that this species of realism, or "speculative naturalism," combined with the methodological resources of dialectics and narratology, solves the problem of epistemological holism, but the ontological status of nonhuman nature and its agency is far from unambiguous on such an account.

> almost all the practices of those people who now dominate the world. They underlie the concepts in terms of which people define themselves, their relationships to each other, to society and to nature. They provide the basis on which people make their decisions about how to live and what to do. In this way they largely have come to constitute the existing social order so that people are enmeshed in a framework of defective concepts which defines their reality and limits their comprehension: they have great difficulty in perceiving or thinking about anything not intelligible in terms of these concepts. It is not only that these concepts have blinded people to the intrinsic value and fragility of their world, though this is important. By disorienting them and frustrating their potentialities, they have also engendered aggression, nihilistic violence and destructive social dynamics which exceed the comprehension of most people. Environmental problems reveal the deep-rooted nature of these deficient metaphysical notions. (1996, 3)

Although he uses the term "world-orientation" instead of worldview in an attempt to distance himself from the representationalist aspects of the latter and to acknowledge the practical and value-charged aspect of worldviews, this passage shows an explicit expression of epistemological holism. Gare is certainly right in holding that worldview or world-orientation can be used as a critical concept in order to explain the blindnesses of various people and various cultures, including modern Western culture, to the threats posed by environmental destruction. Given this diagnosis, it seems self-evident that a central component of the response to current environmental problems should be the replacement of the Modernist mechanistic materialist metaphysics or world-orientation with a consistent process philosophy as the basis for cultivating an ecological civilization. This diagnosis of the problem and prescription for a solution thus still relies on the epistemological holist (but helpfully not antirealist) assumption. This epistemological holist assumption is unfortunately conjoined with an assumption about the link between reflection and action whose outcome seems to be the program to convert the world to process-philosophy and dialectical methodology. Given the metaethical assumption that bridges the theory-action gap, the only conceivable move is to argue for widespread worldview or world-orientation conversion, which actually makes it very difficult to imagine how widespread social change will occur. Despite the brilliant synthetic work performed by Gare, it is still the case that process philosophers and positivists start from the same metaethical premise: getting the right description of nature will then lead to the right prescriptions for the social world. Gare seems to rely on a too-traditional linear model where the right description of nature by the right scientists will inform the best policymaking and action.

A way out of the dilemmas generated by the worldview clash model is to suggest that the way the problem is stated is itself faulty. The rhetorical use of worldview clash presents a simple theme that can be powerful and persuasive, mobilizing and motivating. In order to get a "clash of worldviews" out of historical processes, however,

you have to go into it with the assumption that there are coherent cultural worldviews there to be found in the first place. If interpreters do not share this homogenizing historical approach then such arguments carry no force at all. As Haila (2000) and Taylor (2005) note, simple themes homogenize otherwise multi-threaded and internally diverse processes of historical and ongoing construction. Perhaps reconsidering the historical contingency and sources of the worldview concept will allow us to steer out of this seemingly self-evident clash of worldviews model. I discuss the probable origins of the holistic epistemic assumption here, recognizing that it does not automatically explain the sources of the metaethical assumption.

5. Historical Sources of the Worldview Concept

Though widely taken for granted today, the concept "worldview" is really quite recent in the history of ideas. It became a category of analysis in intellectual history at the end of the nineteenth century, and arose from a contentious debate about just what philosophy as a discipline was, and was capable of. One significant difference between historical and contemporary uses of the worldview concept should be noted right away. From the perspective of the classic late nineteenth and early twentieth-century debates in European philosophy, the phrase "scientific worldview" would be oxymoronic, since at that time "worldviews" were characteristically contrasted with or opposed to science and scientific philosophy. To have a worldview (or to think of philosophies as worldviews) was precisely to eschew the "objectifying" scientific perspective, and to acknowledge the largely subjective, historical, and cultural conditions of knowledge production. Whatever the many objections to this traditional objective-subjective dualism may be, it was crystal clear that "rigorous science" and "worldview" were utterly opposed.[15]

The question of the status of philosophy in an era of burgeoning empirical science and specialization was one impetus for the development of the worldview concept. What was at stake was whether philosophy as an "objective science" was still conceivable, or whether different historical philosophies amounted to different and irreconcilable perspectives on reality.[16] Wilhelm Dilthey (1833–1911), the best known, although not the only, purveyor of the worldview concept in the post-Kantian era, thought that philosophy was distinguished by two characteristics: by its aim to understand the world as a whole, and by its claim to universal validity (Staiti 2013). Interestingly, we could

[15] Edmund Husserl was sympathetic with the worldview approach, but in "Philosophy as Rigorous Science" sided with neo-Kantians like Heinrich Rickert. For more detail on the original concept of "worldview," see Kreiter 2007 and Staiti 2013.

[16] Opponents of worldview analysis, like Rickert, argued that there may be a place for it, but there is also a place for a theoretical and systematic conception of the world as a whole *for "scientific" philosophy.* The identification of science with empirical science alone throws the baby out with the bathwater. See Staiti 2013.

claim that of all of the philosophical fields, environmental philosophy aims to understand the whole natural- social world, and to claim some kind of universal validity for its conceptions. Appealing to these would allow agents to override more limited political economic, specialist, or exploitative perspectives. This universalist claim is in tension with the apparently widely recognized historical relativity of philosophies and worldviews, and this is the very tension that Dilthey himself tried to address.

If philosophy must give up its pretension to scientific status (universal validity), and acknowledge its historical relativity and conditionedness, still, by means of an historical and comparative method, Dilthey thought it could give us "objective" insight into the human condition generally and the "*pre-philosophical* stance towards the world as a whole," or worldview, that different philosophies differently express conceptually (Staiti 2013, 797). By hermeneutically (interpretively) *understanding* these differing implicit world-interpretations, we grasp the different existential roots of different philosophies in the constant human condition, sinking below the changeable and shifting patina of concepts and values to vital human experience. But this also reflexively raises a question about the limitations of our own philosophy—does the approach of worldview philosophy have any special universal claim to validity? Or would this threaten to relativize the worldview philosophy itself, as one among others? Without an appeal to some universal medium that underlies its various expressions, worldview philosophy would indeed fall prey to relativism.[17] Because environmental philosophers who advocate an "ecological worldview" shift have not reflected on this basic problem at the core of worldview discourse, the tension between its universal claim to validity and the juxtaposition of worldviews remains unresolved. On this model, there is no escape from the aporia of claiming that the ecological worldview is the "right" (universally valid) one, on one hand, and admitting its historical relativity, on the other. This is the "transcultural" problem that only Gare has responded to with any plausibility.

The persistence of the second tension in some worldview discourse is even more devastating. Some environmentalist Continental philosophers recapitulate this early twentieth-century conflict between science and philosophy in current debates. Neil Evernden claimed that "the source of the environmental crisis lies not without but within, not in industrial effluent but in assumptions so casually held as to be virtually invisible" (1985, xii). In his book *Natural Alien*, he too sketched an opposition between two

[17] It is saved from its own relativism only by its attempted grounding by Dilthey in a metaphysical monism of "life," which endeavors to interpret "itself" through the medium of human life. The distinction between the "theoretically oriented man" and "man as a whole" founds a distinction between a merely theoretical or scientific philosophy and a genuine worldview that expresses the whole willing, feeling, and thinking human being. This being, in turn, is an expression of an historically conditioned, fluid life process that progressively adjusts and configures itself in different periods and contexts. It could be argued, although I will not make the case here, that variations on the theme that humankind is "nature rendered conscious of itself" are simply extensions of German Idealist and vitalist models of the human, and that the initial appeal they may have for overcoming the sense of human hyperseparation in the context of environmentalism is vitiated by their questionable metaphysical assumptions and universalizing character.

worldviews: the scientific, objective, quantitative, public, mechanistic view of "resourcism," and the personal, experiential, qualitative, private, organicist one. Evernden claimed that the ecologist qua scientist is not able to help the environmentalist cause, since the ecologist sees nature through the same lenses as the most reductive mechanist (1985, 20). Descartes manufactured the dualistic "glasses" through which the average westerner and scientist sees the world, and the theoretical environmentalist's task is to fashion new ecological glasses (51–52). In Evernden's case, the Cartesian worldview is ostensibly rejected simply by adopting a phenomenological rather than scientific concept of "experience," where "[w]hat causes [experience] is not at issue; what it means is" (58).

Phenomenology allegedly bridges the classical separation between consciousness and object (a separation which is simply another expression of human-nature separation). Phenomenological description is relevant to environmentalism, for Evernden, because if "nature" is how we see, conceive, or experience it, and we see, conceive, or experience it as pieces of clockwork rather than as autonomous agents (living things with goods of their own), then a natural world full of agents effectively does not "exist" for us. If we see the world "as" a mechanism, then mechanism it "is." Likewise, if we see it "as" a world of interconnected agencies, then it "is" a world of agencies. Unfortunately, this type of argument relies on an equivocation. This is evident in the use of the term "experience." It is tautologically true that whatever I think or experience is my thought, my experience, or my value—say, my experience of climate change. But this "experience" also includes the *content* of experience or thought as well, which is less clearly my own product—did I produce the planet's carbon cycle as such, as well as the disturbance in this cycle that the phrase "climate change" refers to? *What* is thought, experienced, or valued by me is not determined in its substantive features by me, since if this were true, we would never have a mistaken thought and the world would never resist our actions—changing our ideas about climate change would change the climate. Thus, we must maintain a distinction between the image, concept, model, or interpretation of a thing and the thing itself, even if we are not always quite sure where to draw the line between them and must await the results of repeated trials in order to stabilize the line.

The reality of historically and socially situated knowledge should not be confused with holistic determination of the world by the mind or its analogues (such as discourse, being-in-the-world, language, consciousness, intersubjectivity, etc.).[18] Because he has adopted the inherently ambiguous conception of "phenomenological ontology" from Heidegger, in which there is no longer a distinction to be made between *the ways in which things are given* and *what is given*, the tension between the naturalism aspired to and the antirealism smuggled in is resolved in favor of antirealism.[19] The simple fal-

[18] Gare makes clear with his discussion of the role of "models" in his recent work that he does not fall prey to this antirealist facet of the worldview discourse (2017, 102).

[19] We should note that Heidegger himself was critical of the concept of worldview. In "The Age of the World Picture" (1977a), Heidegger rightly notes that as soon as there is one "worldview" at all then

lacy of such a position reveals the excessively idealist, anthropocentric core of much contemporary philosophy, which distributes determinative power to the pole of the subject (or its analogues) and obscures, backgrounds, or simply denies its dependence on the nonhuman. The second tension in the worldview model is exhibited in this gross contradiction between form and content. Substantively, environmentalists want to say that humans depend on nature; in terms of form, however, worldview clash only gets us as far as claiming that humans (might) instead have a worldview within which they see humans "as" dependent on nature.[20] These are not equivalent. This gesture not only assumes that mind is ontologically prior to nature, it blocks the adoption of an appropriate philosophical anthropology for environmentalism that reveals the metaethical implication that there is a real gap or hiatus between reflection (or perception) and action. The latter resists the claim that worldview determines action.

The popular idea that humans give to the world the structure and meaning that it has, that the mind is ontologically prior to nonhuman nature, has deep roots in western philosophy. In the next section I explore some of them. I claim that it is based on a fundamental inability to acknowledge that humankind is asymmetrically dependent on what was traditionally regarded as ontologically "inferior."

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we are faced with a conflict of worldviews, or competing total world pictures (134–35). He distinguishes between the terms "world-picture" and worldview, where the former is one part of the latter, and the latter includes the three elements of "lived-experience," "world-picture," and "an ideal of life." Heidegger's argument against worldviews is anchored in the argument against the representing or picturing that happens with the Modern conceptual framework—by arguing against human-centric, subject-object representationalism, he thinks he has revealed a vitiating weakness in the concept of worldview, making it worthless as a critical concept. It is because of this representationalism that exploitation of nature happens (of the sort described in "The Question Concerning Technology" [Heidegger 1977b]), and he implies that this is not because of the other aspects of worldviews (such as an impoverished ideal of life). I would argue that the entire "picturing" element of this critique is virtually beside the point, and that the critique of the metaphysics of presence, whatever its value might otherwise be, is hardly of any use for environmentalism. What is more central is the supposed link between the holistic view and action that is implied in "seeing as," a link that Heidegger himself always takes for granted in his "phenomenological ontology." This form of holistic epistemology simply cannot be reconciled with realism.

[20] In the domain of environmental humanities, even though the term "worldview" is not employed, Bennett's work also makes this typical move: in order to dispel the view that "the world appears as if it consists only of active human subjects who confront passive objects and their law-governed mechanisms," we should cultivate a "countercultural kind of perceiving," an "ecological sensibility" that recognizes the agency or proto-agency of nonhumans (2010, xiv). This is clearly a worldview clash model, and an emphasis on constructivist perceiving. This makes the status of her "materialism" entirely ambiguous. Moreover, it does not help to fight anthropocentrism with anthropomorphism: "We need to cultivate a bit of anthropomorphism—the idea that human agency has some echoes in nonhuman nature—to counter the narcissism of humans in charge of the world" (xvi). While well-intentioned, taking human agency as a model of what agency means for nonhumans remains anthropocentric as an approach to nonhumans, simply reading off favored characteristics from humankind and applying them to nonhumans in an attempt at revaluation, with the pretension to resolve ethical problems by ontological means.

6. Historical Roots of Worldview Antirealism

Although in theory some uses of the worldview concept are relatively benign and may even be critically effective—i.e., the claim that certain worldviews "blind" us to environmental degradation—it is hard practically to detach the idealist roots and stem from the potentially useful branches, leaves, and flowers. If environmental philosophy is a philosophy that asserts the essential *dependence* of human life on the other-than-human world, rather than its independence from it, this idea must be pursued consistently throughout the varied domains of human experience, including epistemology and ontology. In this section, I will examine the Cartesian heritage and identify one root of dependence denial in the occasionalist identification of knowing and being. Occasionalism here refers to the monotheistic metaphysical notion that only god can produce effects in the world, or in other words, everything that happens depends on god's causal power. I argue that Cartesian occasionalism has epistemological consequences that continue to inform contemporary thought, including worldview antirealism.

The philosophy of René Descartes (1596–1650) has been a favorite target for theoretically-oriented environmentalists, and a very quick sketch of Cartesian conceptions of substance, dependence and their historical reception will help to situate the present critique with respect to others that have already been made of Descartes' metaphysics. According to the critic of anthropocentrism, the important features of Descartes' philosophy include the dualism of mental and corporeal substances, the privileging of mental substance, and the mechanization of the corporeal. This results in human exceptionalism and the hyperseparation of the human from nature, and it facilitates the instrumentalization or domination of nature. Human hyperseparation is a result of the claims that mental and bodily substance do not ontologically communicate and that minds are never directly causally impacted by environments (Merchant 1980; Bordo 1987; Mathews 1991; Plumwood 1993). This has been a powerful and productive critique. I would like to supplement this with some attention to the category of dependence as it bears on Cartesian epistemology and ontology. Our image of the dualistic Cartesian universe begins to shift slightly when we look at it through the categories of dependence and independence. Instead of emphasizing the separation of matter and mind in terms of the Romantic longing for their ultimate unity, we can see their ontological similarity from Descartes' perspective: their common condition of dependence on a higher being. Once we do this, we discover the root of antirealism in Cartesian occasionalism.

It is well-known that Descartes asserted the existence of two different types of (finite) substance, "extended" substance (matter) and "thinking" substance (mind). This distinction was dualistically conceived, ontologically elevating mind and subordinating matter, resulting in the now-traditional conception of a rational mind controlling non-rational, valueless stuff. While Descartes' discussions of substance are varied, here I am only interested in the definitions that emphasize one central feature of substances: their independence. He stated that "by substance, we can understand nothing else than

a thing which so exists that it needs no other thing in order to exist" (2000, 244). This definition apparently implies both causal independence (i.e., that substances can be conceived as ultimate, uncaused ontological units) and subject independence (i.e., that substance requires no other substrate to exist "in"). A similar definition comes from the Fourth Replies to the *Meditations*: "the notion of a substance is just this—that it can exist by itself, that is, without the aid of any other substance" (1984, 159). The question whether or not this definition of substance is adequate even within Descartes' framework arises as soon as we recall the contrast between finite substances, such as human beings or bricks, and infinite substance, namely god. In light of that distinction, such "secondary substances," the finite substances which we are and are surrounded by, are not truly substances at all according to his own definition. While substances seem to us to be independent, when grasped purely in terms of "the Cartesian understanding of God's role in creation," they are not really ontologically independent, since "the comprehensiveness of God's creative causality can be expressed in terms of the ultimate dependence even of otherwise apparently independent or complete things, called substances, on God's causal activity" (Clarke 2003, 217). Only god is a substance in the proper sense of Descartes' definitions. Created substances depend utterly on god's continued creative power to maintain their existence. To be a substance proper is to be uncaused and uncontained—genuine substantial agency is freed from all prior determination or dependence on an Other. This view renders substance unconditioned, or independent of its conditions. By implication, to be "self-caused" or non-dependent is regarded as the highest type of existence. This move makes both other-than-human nature (extended substance) and the human (thinking substance) subordinate to a superior unitary cause. This is the ontological root of occasionalism. In this occasionalist world, no substance is truly a cause, and everything is dependent on an ontologically superior Other (god).

In just this sense, the category of "dependence" is not alien to Descartes. Descartes considers humans to be isolated atoms in a vast and frightening cosmos, one in which the fact that I existed a moment ago means nothing as to whether I continue to exist now (Bordo 1987). There is nothing that belongs to me, even as a mind, which could sustain or maintain me in being. Therefore, I must be dependent for my very existence at each moment on something else. But because "there must be at least as much in the cause of some effect, as there is in the effect," it cannot be something *inferior* to the mind in ontological status—such as bodies or nature—but only something ontologically superior to it (since even I, as a mind, cannot hold myself in being). I am dependent, finite, my existence fragile, on the edge of nonbeing—only a loving creator god maintains my existence. Therefore, while Descartes acknowledges a radical kind of dependence of the human on something other-than-human here, the "other- than-human" on which humans depend can only be an ontologically *superior* one, namely god. Both minds and bodies are in the same boat here. Consequently, humans cannot depend in any essential way on the natural world, even if their bodies need it to remain healthy, because in our essence, as thinking things, nonhuman nature is irrelevant to

what we are.[21] This argument assumes an image of nature utterly devoid of regularities or "principles" (determinative agencies) of its own—it possesses only those stamped on it by god. It is the image of a world that would fall apart without god's concurrent causal power. We can conclude that "dependence" is recognized as a form of relationship in Cartesian philosophy, but this relation can only exist asymmetrically between ontologically "higher" and "lower" substances (where lower depends on higher). What is incomprehensible in the tradition that follows is the idea of a relation of dependence between human and nonhuman nature where higher depends on lower. This is, incidentally, what "materialism" has always threatened: dependence on (or determination by) what has always been considered to be ontologically "inferior" to the human.

There are damaging epistemological consequences of the occasionalist conception of determination, and these are at the root of much contemporary antirealism, including forms of constructivism, correlationism, and worldview theories. Since, on the Cartesian model, the mind could never actually be dependent upon materiality for its existence, neither can its true knowledge of the world, so true human knowledge of nature must be garnered by rationalist in contrast to empiricist methods. Like Malebranche, Flemish philosopher Arnold Guelincx (1624–1669) was an occasionalist follower of Descartes who brought out the ontological and epistemological implications of Descartes' notion of the mind's dependence on god with exemplary clarity and consistency (Verbeek 1998). If only god is the supreme cause, and god's supreme causal power is expressed in his knowledge of how to produce effects, then analogously in the human case to have the power to produce effects is synonymous with knowing how to produce them.

According to "Guelincx's axiom," "one can truly be said to make or do something only if one knows how it is made or done" (Verbeek 1998). To be a genuine cause means to *know how* to produce the effect. Since both bodies and minds are dependent on god in the same way, as we have seen above, the axiom applies to bodies as well as minds. According to Geulincx's theocentric conception of causality, mere bodies, being nonrational by definition, cannot *know* how they produce and so *cannot* produce; it must be god who produces through them (Verbeek 1998). While he used this axiom to show that neither we ourselves nor mere things can be the causes of any effects, but only god can be their source, the axiom also clearly reciprocally entails that the mind cannot be affected by anything outside of itself since the things of the world do not "know how" to cause effects in us (say, how to impact our senses). In effect, it denies that there is an "external" world at all. "This axiom allows Geulincx to claim that one is a passive spectator of the world. . . . [T]he world cannot be the cause of one's seeing and perceiving, given the fact that, since [the world] can neither think nor know anything, it cannot be active. The only true cause is God and the only truly

[21] "[I]nsofar as I am merely a thinking thing and not an extended thing, and because on the other hand I have a distinct idea of a body, insofar as it is merely an extended thing and not a thinking thing, it is certain that I am really distinct from my body, and can exist without it" (Descartes 2000, 135). "Body," of course, is metonym for "nature" as well.

causal relation is that between God and the world" (Ibid.). This severs the connection between humans and world more definitively than even Descartes himself had done with his metaphysical dualism of mind and matter. We are utterly dependent on god, and on nothing else. We cannot even cause our own motion. We cannot do it because we do not know how it is done. We are reduced to being spectators on the world, and even of our own bodies.

In his *Ethics*, Geulincx interestingly uses the analogy of an infant in a cradle. The infant may want the cradle to rock, but is powerless to accomplish this herself and must depend on the caregiver to do it. We stand in the same relation of complete dependence to god (Geulincx 2006). This extreme point of Cartesian philosophy—that humans are dependent only on something ontologically superior to them, and that they cannot be determined at all by an "external" world—is about as ontologically anti-environmentalist as you can get. I take this to be the root of much contemporary antirealism, and surprisingly it can be seen to inform Kantian and post-Kantian philosophy by way of Vico's work.

Geulincx expressly set out to resolve Descartes' problem of interaction between mental and corporeal substances, and he did so by rendering humans dependent upon an ontologically superior principle, which also has the result of making knowledge acquisition a mystery. The consequence is that we cannot really know the natural world at all, only god can, and he reveals it to us. Soon thereafter a positive spin is put on this recognition of human finitude. Italian philosopher Giambattista Vico (1668–1744), who also began as a Cartesian following Malebranche, admitted that if we cannot know nature because we have not made it (following Geulincx's Axiom), we can nevertheless have superior knowledge of the truths of geometry and of the human world because we have made them (Gaukroger 1986). The so-called "maker's knowledge principle" says that "making something puts one in a special cognitive relation to what one has made," and if human history and social life are regarded as human-made, then our knowledge of these phenomena should be far superior to our knowledge of the natural world (Gaukroger 1986, 29).[22]

Although many writers have since made a fundamental distinction between knowledge of nature and of history, the distinction does not necessarily follow from this initial conception of knowledge and causal production. In fact, the difference between the natural order and the human order collapses within the same century when Kant asserted that because we bring along our human categories to our interpretation of nature, nature too is as much a product of the mind as are human laws or history. In his late work, Kant himself stated that "[h]e who would know the world must first

[22] More specifically, according to Donald P. Verene, "[f]or something to be true for a knower, the knower must possess the principle of that thing's being so that he can produce it. The knower must possess its cause so that he can make it (*factum*). To be able to convert the true and the made (*verum et factum convertuntur*) is to be able to begin from the made and discover what is transcendentally true of it—the intelligibility upon which it rests. Science (*scientia*) requires the conversion of true and made" (Verene 2008, 188).

manufacture it" (Kant 1993, 240). German idealist F.W.J. Schelling reiterated it: "We *know* only the self-produced" (Schelling 2004, 197). This principle also applies to the constitutive nature of human practical activity as clearly articulated in the western Marxist tradition (Foster et al. 2010, 216, 226). Georg Lukács (1885–1971) argued that the central idea of "the whole of modern philosophy" "is the idea that the object of cognition can be known by us for the reason that, and to the degree in which, it has been created by ourselves" (Lukacs 1971, 112). In this antirealist tradition, determination flows from the mind to the world and never the reverse. Plumwood herself recognized the dangerous implications of this assumption: "[m]eanings and concepts may be cultural products, but it does not follow that what they designate are also, or we are forced to the extreme idealist conclusion that the entire universe, including distant stars we know nothing about, is a cultural construct" (Plumwood 2006, 143).

In review, the historical narrative trajectory I have roughly sketched here is this: beginning with Descartes, we get a conception of dependence that is hierarchical and unilateral; Guelincx and Vico simply extend the implications of this to knowledge of nature and history; the next stage sees forms of contemporary constructivism as the furthest expression of this perverse conception of the connection between the power to produce and knowledge of production. It claims that everything we know about nature we know because it is directly or indirectly our own construct. "Seeing [the world] as" interrelated ecological agencies instead of discrete mechanical cogs is just one more expression of this. Far from being "critical" steps beyond Modernism, such positions are firmly and unconsciously entrenched in its human-centric metaphysics. Whether knowledge of nature or knowledge of history, what this form of constructivism implies is that we can only know the "self-produced," and this is the root of antirealism's implicit denial of dependence on an other-than-human reality. The "self-produced" is precisely that upon which we can in no way originally depend because, ontologically speaking, we have supposedly created it ourselves. This inverts the order of dependence in the real world and completely blocks recognition of genuine human dependence on the nonhuman world.

While not all uses of the worldview concept carry these antirealist implications, what this sketch should at least show is that uses of the concept from this point carry the burden of proof of showing that they are not antirealist.

7. The Very Idea of an Ecological Worldview

The core tenet of environmental philosophy is that individual humans and human communities exist in an embodied and embedded position of asymmetrical dependence on nonhuman nature for their survival and flourishing. Plumwood pointed out that denial of this dependence is one of the many roots of the ecological crisis (2002). An environmental philosophy that took this principle to heart would resist the commonly accepted solution to the apparently long-since settled debate over idealism and real-

ism in progressive philosophical circles. Dependence means that the world is prior to thought, that it may even force the mind to think—about environmental problems, for instance—and that knowledge of the world is produced under conditions in a social-natural reality not of the subject's own choosing. This claim is contrary to the basic assumption of holistic worldview epistemology.

Worldview epistemology usually takes for granted a particular relationship between mind and world (human and nature) that is antirealist, and a relationship between theory and action that is plausible but unfounded. If environmentalism should aim to be nonanthropocentric, and forms of antirealism are at least *epistemic* anthropocentrism, then a consistent environmentalism has to reject them. The worldview concept perpetuates an interpretation of the relation between thinking and reality that implies that our view of the world *makes* the world. What could be more anthropocentric? In the end, we can have as ecological and non-anthropocentric a "worldview" as we like—by regarding it as a worldview we are still anchoring it in an autonomous self or culture that constructs its world, implicitly considered unperturbed by other-than-human effects upon it. Knowledge is largely taken to be an *a priori* construction in which the awareness of being face to face with something "other" is obscured. All "determination" or order in the world stems from the subject or its analogues. The "world" is immanent to consciousness, subjectivity, *Dasein*, language games, discourse, or some other human-coded medium.

In a discussion of the concept of intrinsic value, environmental philosopher Eugene Hargrove made an important observation that also bears on the relation between reflection and action, the third tension in the worldview concept. He claimed that even if there were such a thing as objective intrinsic value in living things or nature as a whole, knowledge of that fact does not amount to a motivation to act on its behalf. "[T]he fact that a particular creature has a good of its own [i.e., intrinsic value] is not enough automatically to produce moral behavior on behalf of the creature" (1992, 191). There is a gap between reflection and action, and this gap can be filled in many ways. In other words, values, concepts, and beliefs do not always determine behavior, and there is no unmediated link between perception or reflection and responsive action for a highly neurally plastic being, an "unfinished animal" such as ourselves. This hiatus between perception and action is enough to show that changing worldviews is simply not sufficient, nor even necessary, to generate behavioral changes. Since perception underdetermines both behavior and what we think about the world, change of worldview is never explanatorily sufficient. The reflection-action gap is often filled by other mechanisms, including habit, automatism, convention, force, persuasion, and institutional coercion. This claim embraces more fully the condition of human dependence, including embodiment and embeddedness in ecological and social systems, and the multiply conditioned and "distributed" nature of the social production of action and knowledge. This means, further, that referring to a worldview in an account of human behavior, even anticipatory behavior, is virtually explanatorily empty. How can we determine which actions are (or would be) the result of worldviews and which not?

Actions can be the results of any number of other modes of bridging the gap. On this account, the metascientific stance of "worldview" discourse cripples our attempts to work our way slowly, painstakingly free of the destructive patterns of social ideology, social ethos, social imaginary, and social institutional structure that form the backbone of the ecological crisis, and of our ecocidal culture. I conclude that given its history and largely antirealist assumptions, the very idea of an ecological worldview is riddled with problems, and we should not base our hopes for environmentalist social change on it.

Acknowledgements

The author would like to thank Arran Gare for his helpful comments on an earlier version of this article, as well as participants of the Mellon-funded Environmental Humanities Faculty Seminar at Colby College and the 2019 Summer Institute in Environmental Humanities (http://web .colby.edu/environmentalhumanities/the-inaugural-colby-summer- institute-in-the-environmental-humanities/) for discussion of some of the ideas presented here.

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Keith R. Peterson
The Very Idea of an Ecological Worldview
Spring 2021

Ethics and the Environment, Spring 2021, Vol. 26, No. 1 (Spring 2021), pp. 21-55.
DOI: 10.2979/ethicsenviro.26.1.02.
<https://www.jstor.org/stable/10.2979/ethicsenviro.26.1.02>
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