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# Pragmatism, Adaptive Management, and Sustainability

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**ABSTRACT:** The pragmatic conception of truth, anticipated by Henry David Thoreau and developed by C.S. Peirce and subsequent pragmatists, is proposed as a useful analogy for characterising ‘sustainability’. Peirce’s definition of ‘truth’ provides an attractive approach to sustainability because (a) it re-focuses discussions of truth and objectivity from a search for ‘correspondence’ to an ‘external world’ (the ‘conform’ approach) to a more forward-looking (‘transform’) approach; and (b) it emphasises the crucial role of an evolving, questioning community in the conduct of inquiry. Any successful definition of sustainability must share these characteristics with Peircean truth. While Peirce and John Dewey never reconciled their disagreements regarding the nature and task of ‘inquiry’, a pragmatist resolution of their differences is offered, arguing that we need both a logic of management sciences (*logica utens*) and a logic of pure science (*logica docens*), which (perhaps among other differences) respond very differently to uncertainty. It is shown that adaptive management – an important approach to environmental management – can be understood as a first approximation of a *logica utens* for social learning in pursuit of solutions to environmental problems, and it is suggested that a pragmatist, transform approach to inquiry such as Dewey’s may provide a way around the ‘fact-value’ gulf.

**KEYWORDS:** Defining sustainability, sustainable communities, pragmatism, adaptive management, truth

## INTRODUCTION

The important thing is to not stop questioning .  
Curiosity has its own reason for existence. (Albert Einstein)

I would like to propose for discussion a claim that may seem quite surprising: that Charles Sanders Peirce’s definition of truth provides a useful analogy, or template, for defining ‘sustainable’, and ‘sustainable living’. This claim could never be fully justified in a single paper, of course, so I can only sketch a few elements of the complex case that would have to be made to fully justify it here.

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My purpose, then, is more to explore some new directions for environmental philosophy, and to provoke discussion of a set of hitherto ignored problems that are relevant to the search for a definition of sustainable living, than to offer definitive answers to the problems posed.

Representative versions of Peirce's definition are: 'Truth is that concordance of an abstract statement with the ideal limit towards which endless investigation would tend to bring scientific belief' (*Collected Papers*, 5.565) and 'Truth is the last result to which the following out of the (experimental) method would ultimately carry us' (5.553). In general, this definition presents a pleasing analogy to searchers for a definition of sustainability because of its 'forward-looking' temporal horizon. Exploring this analogy might uncover clues as to how to give a sustainability definition the kind of forward, normative thrust it needs. Further, Peirce understood his notion of the search for truth as the defining pursuit of a community of inquirers who start with diverse viewpoints, but who are carried forward toward the truth 'by a force outside of themselves to one and the same conclusion' (5.407). Surely any acceptable definition of sustainability must embody the idea of a forward-looking community that is normatively respectful of the pursuit, and also the perpetuation, of knowledge, so the analogy is suggestive in other ways as well. Thus Peirce's idea of truth-seeking suggests fertile ground for analogies and other forms of guidance in the perplexing task of defining 'sustainability'. I find the idea particularly attractive because it may provide a way through or around the fact-value gulf by establishing a normatively scientific notion of sustainability.

In Part 1, I introduce the idea of truth as temporal with quotations from Henry David Thoreau, who anticipated two important aspects of the pragmatic approach to truth. One might still ask, however, what pragmatists can possibly do for environmental philosophy, so in Part 2, it will be necessary briefly to consider the goals of environmental philosophy and, in particular, the *practical* goals of environmental philosophy: what can philosophers contribute to activism, to the actual goal of protecting nature? Having outlined a possible contribution of philosophers to the real-world search for a sustainable future in Part 2, I will highlight the benefits of the pragmatic approach to understanding sustainable communities in Part 3.

## 1. 'CONFORM' VERSUS 'TRANSFORM' THEORIES OF TRUTH

Near the end of *Walden*, Thoreau (1854) says, 'No face which we can give to a matter will stead us so well at last as the truth. This alone wears well.' If one takes Thoreau the philosopher seriously – and I do – then this description of truth could be taken as a clear, if homespun, anticipation of Peirce's definition of truth. What Thoreau and Peirce share, in particular, is a tendency to address the philosophical problems of truth and objectivity, not in the usual terms of a time-bound

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relationship between thought and a chunk of the contemporaneous 'external' world, but rather in terms of an intertemporal relationship between present beliefs and the outcome of a complex process that occurs through time. Near the end of the explanatory chapter of *Walden*, 'Where I Lived, and What I Lived For', Thoreau says:

Let us settle ourselves, and work and wedge our feet downward through the mud and slush of opinion, and prejudice, and tradition and delusion, and appearance, that alluvion which covers the globe, ....., through poetry and philosophy and religion, till we come to a hard bottom and rocks in place, which we can call *reality*... (p. 70)

This passage emphasises Thoreau's commitment to the existence of truth, and not just opinion, but it also links this idea to a process that takes time, a lifetime pursuit for a person, a pursuit that, when successful, also evokes more eternal connections:

If you stand right fronting and face to face to a fact, you will see the sun glimmer on both its surfaces, as if it were a cimeter, and feel its sweet edge dividing you through the heart and marrow, and so you will happily conclude your mortal career. Be it life or death, we crave only reality. (pp. 70-71)

Thoreau starts the next chapter by once again extolling the eternal nature of achievements to truth:

With a little more deliberation in the choice of their pursuits, all men would perhaps become essentially students and observers ... In accumulating property for ourselves or our posterity, in founding a family or a state, or acquiring fame even, we are mortal; but in dealing with truth we are immortal and need fear no change nor accident.

I quote Thoreau here because he anticipated two important aspects of Peirce's approach to truth and objectivity. First, as noted, he anticipated the temporal, forward-looking notion that Peirce later developed. But Thoreau also anticipated a more general feature of Peirce's thought, the idea that inquirers can struggle toward truth and objectivity, and that the struggle takes place entirely within human experience. Both Thoreau and Peirce clearly recognised that the problem of truth and reality cannot be addressed as a matter of correspondence with a reality external to experience. Thoreau said, 'I am not interested in mere phenomena, though it were the explosion of a planet, only as it may have lain in the experience of a human being' (Thoreau 1984, Vol. VI: 206).<sup>1</sup>

It has been characteristic of Western philosophy since Aristotle, and accentuated since Descartes, to seek truth and objectivity in a correspondence between thought and reality behind or beyond experience. Thoreau struggled to reconcile his neo-idealist view that nature must provide, within experience, adequate assurance of truth with his runaway individualism. Thoreau sought to combine his above-mentioned commitment to truth below the slush of opinion with a subjectivist viewpoint. In his journal for May 6, 1854, Thoreau wrote:

There is no such thing as pure *objective* observation. Your observation, to be interesting, i.e. To be significant, must be *subjective*. The sum of what the writer of whatever class has to report is simply some human experience, whether he be poet or philosopher or man of science. The man of most science is the man most alive, whose life is the greatest event. Senses that take cognizance of outward things merely are of no avail. (Thoreau 1984, Vol. 6: 236-237)<sup>1</sup>

His bold reconciliation was to see truth as a manifestation of the completeness of a process, an intertemporal relationship: to have a truth is to 'connect' with eternity. It is to have a belief that would be shared with an idealised individual who has had all possible experience. Operationally, Thoreau's conception suggests that assertions of truth are best seen as predictions: To say that a statement, P, is true is to predict that P will eventually be accepted by inquirers who have vastly more accumulated experience than we do.

Thoreau, I believe, placed undue faith in what he calls individual 'genius', and apparently thought the process of observation could result in truth by virtue of a spontaneous, conscious act of apprehension. As far as I can see, Thoreau never explained how and why such a look inside could be credited with such epistemological weight, and I have no intention to defend this aspect of Thoreau's philosophy. I nevertheless think Thoreau had a glimmer of an alternative approach to the problem of truth, and that his approach is worthy of mention in anticipation of Peirce.

It was left to Peirce to reconstrue the temporal relation more concretely as a *community* process, a process pursued by a very special community of scientific inquirers – the lovers of truth. This community has implicit norms and explicit methods for approximating the truth, and a study of the 'logic' of their enterprise, Peirce thought, would yield a method that will eventually zero in on truth. Peirce identified the point toward which this community would tend as a predestined point, which he identified with reality. He was able, therefore, to maintain that his brand of pragmatism was 'realist' and touted a 'correspondence' theory of truth. But he continued to view the search for truth as a temporally developmental process, a task undertaken by a succession of generations in the community of truth-lovers.

Peirce was a systematic thinker and I have been warned of the dangers of taking Peircean ideas out of their systemic context. Indeed, there are a number of aspects of Peirce's system that are clearly inhospitable to the practical task of defining sustainability criteria. I refer specifically to Peirce's sharp separation of science from practice and to the extreme abstraction of Peirce's logic, both of which result from his emphasis on deriving the rules of logic from thought itself. Peirce's virtual obsession to avoid 'psychologism' apparently explains his unyielding positions on these points. Given these specific problems and especially Peirce's penchant for metaphysics, environmentalists should perhaps focus more on later pragmatists, especially Dewey.<sup>2</sup> So my goal is not to link

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Peirce and his philosophy directly to modern environmentalism, but rather to focus attention on a set of productive philosophical problems that were raised by Peirce and then explored by pragmatists and their critics over the subsequent century.

For example, consider the distinction between ‘conform’ and ‘transform’ theories of truth, introduced in the 1940s as an attempt to clarify issues regarding truth (Ushenko, 1946: 2f).<sup>3</sup> According to this definition, there is a key philosophical distinction between those who believe that truth is a relation between a statement and an antecedent reality, and those who believe that truth emerges from a situation of uncertainty through the transformation of an unsettled into a settled situation. While some might identify transform theories as a characteristic of pragmatism in general, it is important to realise that the matter was debated heatedly, with Peirce steadfastly defending a conform theory throughout his career (Smith 1978: 52-53). Peirce identified the search for truth with a ‘pre-destined’ outcome, and asserted a correspondence between today’s truths and that pre-destined outcome, which allowed him to retain the rhetoric, and perhaps the heuristic value, of a temporally emerging truth, even as he denounced his transformist critics as defenders of ‘psychologism’ and as ‘nominalists’. Dewey, on the other hand, provides an excellent example of a ‘transform’ theory, and – not surprisingly – Peirce was critical of Dewey on exactly these points. What I want to emphasise here is that Peirce’s definition of truth, and arguments regarding objectivity as an intertemporal relation, led to a lively debate about alternative approaches to truth and objectivity (Smith 1978). Attention to the debates provoked by Peirce’s forward-looking, normative, community-based drive toward the truth might therefore provide interesting parallels and suggestions for sustainability theorists. These parallels will be the subject of Part 3. But first it is necessary to examine the role of philosophy in the larger, activist environmental movement.

## 2. OBJECTIVITY, ENVIRONMENTAL ETHICS AND ENVIRONMENTAL POLICY

What can environmental philosophers do for environmental activists? One way to answer this question, which I think allows us to state an important area of consensus, is to say that environmental philosophers can provide an essential ingredient in objectively supportable environmental policies.<sup>4</sup> But it is very important to be clear about what is meant by an ‘objectively supportable’ policy goal. If one thinks of truth and objectivity in terms of a ‘conform’ theory, then environmentalists are guided toward metaphysical solutions to the problem of justifying their goals. Indeed, many environmental ethicists, such as Holmes Rolston III, believe that, if environmental goals are to be justified, it must be through a representation, a correspondence to moral values that exist independ-

ent of humans and human cognition.<sup>5</sup> Down this road lie many insoluble metaphysical and epistemological problems, as I have argued elsewhere (Norton 1992); and it remains to be seen whether intrinsic value theory can be supported on less difficult-to-defend foundations (Norton, 1996). One advantage of seeking for truth and objectivity within the transform tradition is that justifications can be sought within human cognition, and claims to truth can be understood as predictions of what beliefs will emerge from the rough-and-tumble of scientific and social debate. The pragmatists thus put their faith in countless new observations coupled with improvements in our ability to learn, counting on a self-reflective method to be capable of approximating truth from within experience.

Critics of pragmatism will be quick to say that this viewpoint is fraught with ambiguity, and it cannot be denied that very diverse positions are called 'pragmatist', today, ranging from Richard Rorty's almost-relativist version to present-day throwbacks to Peirce's bolder realism. While deep theoretical differences separate pragmatists – even as they did in the days of Peirce and Dewey – they retain the tradition's problems, and its way of formulating and addressing those problems – a shared emphasis on praxis – as well as a set of tendencies of thought that are often disputed or ignored by contemporary philosophers who do not share the pragmatic bent. My goal here is neither to police the boundaries of the use of the label, nor to resolve all ambiguities, but only to show how pragmatists' problems remain relevant if discussed and disputed with a particular emphasis on the praxis of sustainable living in technologically advanced and socially fragile societies of today.<sup>6</sup>

The pragmatists' struggle toward a normative and intertemporal 'logic' of inquiry provides an alternative to the metaphysical approaches popular in contemporary environmental ethics, and to the interminable debates about who and what has 'intrinsic value'. Down the pragmatists' road toward truth there may be an alternative way to ground environmentalists' goals. If we can envision the search for sustainable living as a community-based struggle to learn, and to perpetuate a process of learning, then objective truth is a question of justifying goals and policies within a community of inquirers – of understanding and projecting a kind of transformation of subjective consciousness – not a matter of correspondence with an external reality.

Turning down this road shifts the main focus of environmental philosophy *away* from moral theory and *toward* epistemological issues of justification, and toward methods of inquiry, and how to improve them, more generally. If Peircean truth is understood as a prediction that the community of truth-seekers will also embrace our beliefs and goals, and endorse our policies, then the problem is to provide an epistemologically supportable scientific justification for environmentalists' goals. Once one relaxes the correspondence demand on inquiry and, accordingly, recognises that there are avenues to truth within subjective experience, attention can be focused on the development of methods to seek the truth and to speed the process of truth-seeking. The development of

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such methods contributes to the development and perpetuation of communities of truth-seekers organised into sustainable, decentralised units. Once this process of learning and of learning how to learn is located within human experience – the collective experience of many communities of truth-lovers – pragmatists can avoid the fact-value dichotomy and the debilitating anti-naturalism usually associated with it. Within the praxis-oriented tradition of pragmatism, one never separates ‘fact’ from ‘value’. Facts gain their meaning within an action-oriented context. By positing a unity of the method of experience based on sociocultural learning normatively based in the love of truth, the pragmatists can argue for a unified experimental method that can be applied to values and purposes as much as to scientific, causal hypotheses. It is experience guided by logic and reflective methodology that encourages learning. Pursuit of proposed community goals is no less an experiment and no more subjective, than the testing of a hypothesis in a laboratory. For example, when participants in an ecosystem management process articulate tentative goals, and revisit these in subsequent discussions, the goals are open to revision in the face of what has been learned, and what has been experienced, in the meantime (Norton and Steinemann, under review).

What is interesting is that Peirce and Dewey, despite a published dialogue on the subject, never resolved their differences over transform and conform theories, despite the availability of a fairly obvious ‘pragmatist’/contextual reconciliation. As has been pointed out by Smith (1978: 117-118), Dewey and Peirce explicitly stated that they saw different purposes for ‘inquiry’. Peirce often invoked the Scholastic distinction between ‘*logica docens*’ and ‘*logica utens*’ (Hookway, 1985: 43), with the former representing the precise logical analyses of logicians, while the latter represents the unformulated logic – the unspoken standards of reasoning used by individual agents, including individual scientists. Dewey drew a somewhat different distinction: between what he called ‘common sense’ and ‘scientific inquiry’ (Dewey, 1938, Ch. IV: 114-119).<sup>7</sup>

For Peirce, who most respected *logica docens*, inquiry is ‘primarily a form of logical self-control which focuses on the manner in which beliefs are formed or, rather, should be formed’. Dewey, on the other hand, emphasised ‘the motive to control the situation which evokes it and ultimately to reshape the environing conditions of human life’ (Smith, p. 118). Because Peirce was so concerned to avoid psychologism and naturalism in his philosophical system, he often ignored and sometimes disparaged *logica utens*. But a more pluralistic approach to pragmatism might embrace the search for *both* an improved *logica docens* and an improved *logica utens*, treating these as separable tasks with separable goals, and applying different cognitive tools and different ‘standards of proof’ in different contexts in which different goals are dominant. The trick is to design an approach to environmental management that is ‘adaptive’ by playing *logica utens* off against *logica docens*. In environmental management, this would mean letting *logica utens* be dominant, in that the demands of particular situations may require actions before the scientific hypotheses on which they are based have



been adequately verified. Also, in *logica utens*, demands of action may determine which experiments should be undertaken at a given time, and could legitimately affect criteria for funding ecological and biological research, for example. Managers, however, must also submit their findings from management-driven decisions to the more stringent rules of *logica docens*; expedient, policy-driven science must eventually pass muster within the more demanding strictures of the disinterested and timeless community of truth-seekers. The resolution is contextual; it depends on the extent to which action is forced in a given context, not on the inherent superiority of the academic's goal of enforcing stringent criteria of scientific verification over the practical goal of acting, on the best available evidence at a given time, to protect social values.

On this compromise it would be possible to pursue the two types of 'logic' of science simultaneously, with each complementing the other, and each having its appropriate domain. If, following Dewey, we have faith in the ability of science and method to address real problems, then *logica utens* is adopted as the logic of environmental management and *logica docens* remains appropriate for the 'academic' study of science – for the study of science in a context, that is, where action is not forced. To illustrate how this compromise position would function in practice, it is possible to cite at least two important differences between the operations of *logica docens*, the logic of truth-seeking science, and *logica utens*, the logic of problem-solving and adaptational living.

1. Value neutrality, which remains an ideal in *logica docens*, is no longer claimed nor required, when applying *logica utens* within the policy arena. The application of *logica utens*, in fact, demands the expression of many value viewpoints in the search for policies that fulfil, to the extent possible, the many and competing interests of the community.
2. *Logica docens*, in its application, abhors positive assertions of truth that cannot be fully verified. *Logica utens*, on the other hand, must balance the concerns of too quickly asserting a nontruth against the possibility that inaction based on 'academic' uncertainty may prove calamitous (Lee, 1993: 74-75).

It may also be possible to suggest a third difference. It might be possible to reconcile Peirce and Dewey by arguing that, whereas the static, conform theory is the proper ideal of truth within *logica docens*, the more dynamic, transform concept of Dewey, with its experimental, problem-solving attitude toward truth-seeking in practical situations, is applicable in the practical disciplines such as conservation biology and adaptive ecosystem management.

Adaptive management, a movement toward more iterative and experimental management practice, was formally articulated by C.S. Holling (1978) and others, and has been further developed by numerous authors since. The philosophy of adaptive management is, I would argue, a very good first approach to

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developing a *logica utens* for environmental problems and policy. This is not surprising because, in fact, many of the ideas of adaptive management were anticipated by Aldo Leopold's multiscalar management model as illustrated in 'Thinking Like a Mountain' (1949; Norton, 1988; 1990; 1996)<sup>8</sup> and earlier by Dewey's general approach to social learning in democracies (Dewey, 1984; Lee, 1993). Adaptive managers understand the search for improved environmental policies as one of designing institutions and procedures that are capable of pursuing an experimental approach to policy and to science. And it is hoped that, in the process of building such institutions and procedures, a process of social learning will move the community toward better understanding of their environment through an iterative and ongoing task, a task that will require not just unlimited inquiry, but also the encouragement of variation in viewpoints and the continual revisiting of both scientific knowledge and articulated goals of the community.

The roots of adaptive management have been traced by Kai Lee (1993) back to Dewey's form of social and experimental activism. It would be beyond the scope of this paper to explore adaptive management and its philosophical underpinnings in detail,<sup>9</sup> but we can summarise the principles of adaptive management in a couple of sentences. Adaptive managers believe that a path to sustainability cannot be charted by choosing a fixed goal or set rules at the start. We must start where we are; but we do have the ability to engage in experiments to reduce uncertainty and to refine goals through iterative discussions among stakeholders. Environmental management must be a *process* in which managers choose actions that serve as experiments with the capacity to reduce uncertainty and to adjust future goals and choices. In this tradition, the manager tolerates a variety of viewpoints, hypotheses, and proposals for action; this variety of viewpoints, and ensuing experimentation and political discussion, are all important parts of the process of selection of more and more 'adaptive policies'.

So this variability poses no serious problem for adaptive managers, provided they are understood as seeking truth and objectivity within the transform tradition. Within that tradition, variability of beliefs does not imply relativism; variability is an inevitable precondition of cultural and scientific, as well as biological, evolution. Commitment to a process, and to the progressive refinement both of beliefs and of the truth-seeking methods we develop, deliver the adaptive manager from the spectre of relativism. The truth is that which will emerge from an indefinite and open process of observation, and from the ceaseless application and improvement of the scientific method over time.

It can be noted, in passing, that – just as Peirce and Dewey differed regarding the advantages of adding a conform theory to the transform model of truth-seeking – the decision of adaptive managers to apply the transform theory need not commit them either way regarding scientific realism or anti-realism. They can, like Peirce, adopt at least some form of scientific realism. For example, the views of adaptive managers sketched here are consistent with the position,

somewhere between Peirce and Dewey, that is referred to by A.F. Chalmers (1994: 163) as 'unrepresentative realism'. This position is realist in the sense that it assumes that the world is the way it is independently of our descriptions of it, and in the sense that it assumes physical laws apply universally, both in natural and experimental situations; but it does not embrace a correspondence theory of truth in the sense that specific sentences, taken singly, 'correspond' to any pre-linguistic aspect of nature. It is at this point that those pragmatists who hope to find a middle-ground pragmatic epistemology between Rorty's near-relativism and the dualistic correspondence approach to objectivity, emphasise *method*. If the process of truth-seeking itself is self-corrective – if, that is, we can learn *how to learn* even as we learn, specification of procedures and methods that rule out untenable hypotheses about reality may yield an adequate sense of 'objective' support for emerging truths.

Interestingly, the scientists who have developed adaptive management since Leopold have not explicitly embraced one important aspect of the program of Dewey and the pragmatists: they have generally emphasised the ability of adaptive management to reduce uncertainty through scientific management experiments, but have so far said little about Dewey's dynamic approach to value change.<sup>10</sup> For Dewey and his brand of pragmatists, philosophy is most vital when it is used to clarify and formulate questions of practical import; and ethics is most alive when it is testing, in practice, goals that have been advanced in pursuit of consensus and social solidarity. If the scientific advocates of adaptive management more fully embrace the pragmatic movement and explicitly reject the artificial distinction between facts and values, then they may come to join Peirce and Dewey in declaring the unity of all inquiry and in including values in the purview of their 'experimental management'. If we feel comfortable working within the tradition of pragmatism, and if we feel that theorists in the 'transform' tradition may be able to specify in more and more detail how we might progress toward sustainability, then there is an exciting future for this thing called 'Environmental Pragmatism'. And, if pragmatists, champions of the belief in the normative nature of logic and inquiry, can bring the power of experimental reasoning to bear upon goals and values as well as facts, then environmental ethics may someday be seen as an important subfield of adaptive management science, rather than as an abstract, and sometimes abstruse, subdivision of 'the humanities'. Time will tell.

### 3. PRAGMATISM AND SUSTAINABILITY THEORY

I have suggested that American philosophers, beginning with Thoreau, and including especially the pragmatists, established an alternative approach to the problem of objective knowledge and objectively supportable goal-seeking; this tradition, which owes much to Darwin and also to the American Naturalists, is

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complementary to environmental thought in ways that the Modernist, representational model of perception and objectivity never could be. I base these comparisons on the following four points of similarity.

1. Peirce's future-orientation, in the context of an inquiring and self-consciously methodological community of inquirers, provides an excellent precedent for the type of community that must be built if humans are to live sustainably on the earth. Lee (1993), for example, speaks of the importance of the development of 'epistemological communities' to develop guidance, trust, and support for managers who patiently undertake to use the scientific method to better tune our conception of sustainable living and sustainable policies. Peirce's respect for a community devoted to the search for truth characterises the type of respect that we must develop toward the future and toward the knowledge and wisdom that will be required if we are to live sustainably. Peirce's philosophy of truth and objectivity, and the controversies it spawned, provide interesting guidance for a discussion of sustainability goals.

2. Formation and effectiveness of an epistemological community is an essential aspect of sustainability because, as advocates of adaptive management agree, sustainable outcomes are not definable in advance, but must emerge from a program of active social experimentation and learning. Both definitions are best understood as characterising evolving processes, rather than ideal outcomes. Thus the idea of adaptive management is connected – by virtue of the search for an emergent, temporally sensitive, transformative notion of truth – back, through Peirce, to Thoreau.

3. The pragmatic approach also has the advantage that it links contemporary environmental ethics historically to the Darwinian evolutionary idea so formative in Leopold's land ethic. In 1923, Leopold referred to the minor pragmatist, Arthur Twining Hadley, and embraced a definition that says, 'Truth is that which prevails in the long run'. This passage led directly into a concise but penetrating discussion of an ethic of sustainability based on broad anthropocentrism (Leopold, 1979: 141; Norton, 1988). Later, he began 'The Land Ethic' (1949) with the statement that a new ethic is 'an evolutionary possibility and an ecological necessity'. Leopold, as did the pragmatists, clearly sought both truth and right in adaptive behaviour, and clearly understood both of these in an adaptive, evolutionary sense. This interpretation establishes a connection, through Darwin and the pragmatists, to Leopold, and to the adaptive managers; this link through Leopold is especially strong if one emphasises Leopold's policy viewpoints, and de-emphasises his metaphysical and poetic speculations (Norton, 1999). Further, this interpretation favours a broadly Darwinian epistemology, an epistemology that is enhanced with a commitment to the efficacy of methodology to improve the truth-seeking process. A Darwinian environmental ethic may provide a more unified basis for judgments supporting some choices as 'adap-

tive' and 'sustainable'. If so, the pragmatist interpretation of the land ethic avoids the deep tensions that are introduced into the Land Ethic by interpreters such as Callicott (1989: 166), who attribute to Leopold a Darwinian ethic and a 'modernist' epistemology.

4. The pragmatists' conception of logic and the study of inquiry as a self-sustaining and *normative* process provides a model for normative-descriptive sciences such as medicine, conservation biology, and sustainability studies, and points the way around the fact-value dichotomy. That dichotomy, perhaps useful in academic science, is inapplicable to the practical problems of management science. Here, we need a *logica utens*, and goals as well as hypotheses must be understood and tested as hypotheses. To continue the quest, to ensure the continuation of the community and its truth-seeking ideals, the community must survive. Peirce's normative approach to logic thus points toward a more unified treatment of environmental knowledge, uncertainty, and goals for action. This aspect cries out for a more pragmatic approach to problems of value theory and applications of logic over multiple scales of time.

This fourth point of similarity and complementarity tempts me to go beyond speaking of analogies and templates, and to make a stronger statement to the effect that a pragmatist approach to knowledge and of obligations to the future may go a long way toward *justifying* some important goals of environmentalists. For example, many environmentalists, as well as a few philosophers, have argued that sources of new experience should not be summarily destroyed, providing an obligation not to destroy unique life forms and cause other irreversible simplifications of nature (Leopold, 1949: 108-112; Russow, 1981; Regan, 1986). This sentiment is often implied by advocates of biodiversity protection when they claim that every extinction of a species or every destruction of unique ecosystems is like burning libraries. Both actions irreversibly destroy unique opportunities to learn, thereby narrowing the possible occasions for us to observe and refine our current, incomplete belief systems.<sup>11</sup> We must, if we love the truth, accept a *prima facie* obligation to protect as many as possible of the particularities of the biological world for future study; we must also act so as to perpetuate the community of inquirers – so as to live sustainably, that is – or the search for truth will be prematurely interrupted. It would take egoism or 'generationism' of an extreme sort – not just anthropocentrism – to care not at all that the future will be prevented from studying and coming to know rainforests, millions of species, or natural ecosystems. Peirce also envisaged the progress toward truth as a self-driven process; the ceaseless search for truth, a commitment to contribute to a cosmic ideal of knowledge. I foresee a similar, or at least parallel, commitment to completion of a shared long-term enterprise of physical and cultural survival.<sup>12</sup> This would be the environmental application of the Einsteinian epigram at the beginning of this paper.

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If a Darwinian, pragmatist epistemology is accepted as a unifying force in a broadly anthropocentric ethic, then it may be possible to embrace a more pluralistic theory of environmental values. *Broad anthropocentrism* would argue, based in pragmatism's analysis of value, action, and science, that a Darwinian epistemology complements pluralism with regard to ethics. If our most basic commitment is to survival – of our culture as well as our genes – we might emphasise a new, non-instrumental ethic as having survival value. While I stop short of embracing a pluralism so inclusive as to comprehend value independent of human cognition and motives (Norton, 1992), the Darwinian/Deweyan/Leopoldian approach encourages a variety of value hypotheses, and enthusiastically embraces a selection process based on results in the pursuit of improved environmental policies. The tradition of pragmatism, in other words, articulates a set of questions sufficiently comprehensive to encompass *both* the epistemological *and* the value questions that are essential for charting a course toward sustainable living, and for justifying environmentalists' goals to the broader population.

## NOTES

I am indebted to my colleague, Jeffrey DiLeo, for helpful tutoring in Peirce's complex philosophy, for insightful discussions of my analogy, and for helpful comments on an earlier draft. I also thank two anonymous reviewers for this journal, whose trenchant criticisms, I hope, led to improvements in the substance and the clarity of the paper. Some of the research for this paper was supported by a grant from the National Science Foundation, (NSF # SBR-9729229).

<sup>1</sup> See Richardson (1986: 309-310) for further discussion of these passages.

<sup>2</sup> Larry Hickman (1996) has begun the task of applying the thought of Dewey to environmental philosophy.

<sup>3</sup> The following discussion owes much to Smith (1978: 52f).

<sup>4</sup> J. Baird Callicott (1989: 163) states the case clearly, when he says that his goal is to rescue environmental policy decisions 'from reduction to cost-benefit analyses in which valued natural aesthetic, religious, and epistemic experience are shadow priced and weighted against the usually overwhelming material and economic benefits of development and exploitation'. Callicott suggests that what is needed are objectively supportable moral values on which to base environmental action.

<sup>5</sup> See Rolston (1986: 96), where he says: '[W]e ... believe that through [scientific judgments] we are accurately corresponding with the natural world. When we pass to judgments of value, we do not need to consider them radically different in kind...'

<sup>6</sup> Anonymous reviewers of earlier versions of this paper were concerned that I do not state unambiguously whether the brand of pragmatism I am defending is to be 'relativistic' or 'objectivistic'. I avoid stating a specific position on this issue here because my point is that there are interesting *parallels* between the philosophical dilemmas that have troubled

pragmatists and today's problems of 'defining sustainability'. I fear that taking a dogmatic stand on the *solution* to the problems of pragmatism will detract from the parallels I want to highlight.

Having said this, I also do not wish to be viewed as side-stepping such a crucial issue as the degree or type of 'objectivity' the pragmatists can ultimately deliver. I, and I expect a number of other pragmatists, would neither defend Peirce's strong version of 'constructivist realism', nor follow Rorty's 'philosophy-as-lifestyle' approach. These pragmatists seek a middle ground in a naturalistically based, unified approach to inquiry, and have faith that attempts to improve methods of inquiry can lead to an adequate a reasonable notion of 'objectivity'. To formulate the problem of objectivity as *either* there is objective knowledge (in the sense in which Descartes sought it) *or* we must embrace relativism, seems to me to beg the question against these 'middle-ground' pragmatists. Their main programme is to question and undermine the very dichotomies and methods that have driven the rationalist-empiricist debate throughout the Modern period of philosophy, and that have led to all-or-nothing formulations of what they consider to be the mis-stated problem of 'objectivity'. For pragmatists, for whom truth is sought within experience, objectivity (or whatever non-relativism would be correctly called) emerges from a process of inquiry, and objectivity is not an all-or-nothing matter. Peirce, after all, maintained *both* that the truth emerges from a process over time (a transform understanding) *and* that this process has a unique outcome, which encourages him to assert that he has achieved, also, a 'conform' understanding of 'reality'. In this sense, Peirce *combined* a constructivist approach to specifying the truth with a more conformist understanding of the (practically, impossible) Final Result. Whatever one thinks of Peirce's heroic efforts to reconstruct a rationalistic epistemology within experience, it is better to think of pragmatists as arrayed across a continuum, with Peirce near one end and Rorty near the other. Dewey, I believe, sought, as I do, a middle ground between Rorty's near-relativism and Peirce's 'conformism'. Again, it is beyond the scope of this paper to *resolve* these problems; I only hope to raise them in a new context – the context of environmental policy debate – and to show that the problems spawned by a pragmatist examination of the problems of environmental policy and management may lead to better answers as well as better questions (Weston, 1992).

<sup>7</sup> One interesting area for further research would be to explore these differences between Peirce and Dewey, and their implications for the logic of policy inquiry.

<sup>8</sup> See Norton (1990) for an explanation of how Leopold's famous metaphor anticipates hierarchy theory, which has been endorsed as a major structural element of the conceptual system of the adaptive managers.

<sup>9</sup> See Norton (1996: 122-133) and Norton and Steinemann (under review) for more detailed discussions.

<sup>10</sup> An important exception is Lee (1993), but I do not find convincing Lee's brief discussion of value formation, expression and revision. For example, Lee introduces the ends-means distinction on the way to an explanation of social learning in Dewey (1993: 105-108), thus creating a muddle, since rejection of the ends-means distinction is a keystone of Dewey's philosophy.

<sup>11</sup> The point cannot, of course, be expressed in simple quantitative terms. The claim cannot be that, if we extinguish a species, for example, we have reduced the number of possible experiences future persons can have. Since possible experiences are limited by one's time on earth and by the limits of information processing in the experienter's brain, not by the (multiply infinite) possible objects of experience, no future person should claim we left

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them without enough possibilities of experience. It nevertheless seems intuitively true that, if the future were to be deprived of whole categories of experience – such as would occur if all naturally functioning ecological systems were converted to intense economic use – the future's ability to study and learn about natural systems and their self-organising behaviours would be impaired. In this case, I would argue, earlier generations would have harmed later ones.

<sup>12</sup> By cultural survival, I do not mean survival of the dominant, expanding, Western European culture, but as many as possible indigenous lifestyles developed by non-Western people (Quinn, 1992). Again, once one shifts from a conform to a transform conception of truth, diversity of beliefs and values represent no threat to objectivity. In a Darwinian, adaptive worldview, variety and diversity is a necessary precursor to increasing objectivity.

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