

insights

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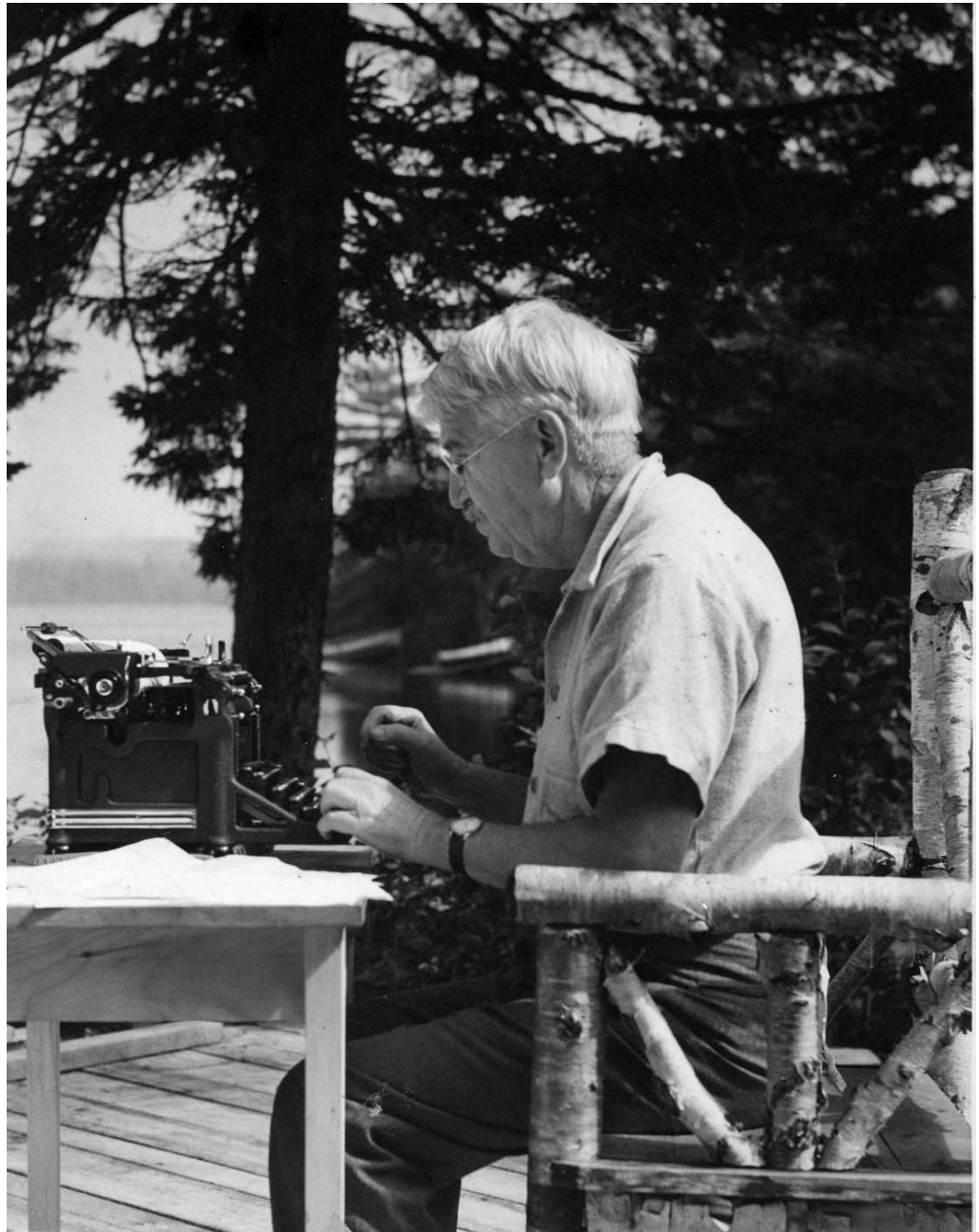
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*John Dewey at Hubbard's,
Nova Scotia (c1940)*

Editorial - Max Eastman's Heroes

Jon G. Bradley

Published in the middle of the Second World War, Eastman's personal biographical reminisces of twelve great people (ten men and two women) probably appeared at the wrong time. This is a shame! Eastman had as much to say about the remarkable people he personally knew and described as about that elusive human ability to anoint an individual with the honour of "hero".

Basing much on his adolescent reading of Thomas Carlyle's *Heroes and Hero Worship* and the "ecstatic reverence" (page ix) which he bestowed upon the volume as well as noting that he is penning his own book in the middle of a World conflagration of unimagined proportions, Eastman nonetheless demands that readers not forsake heroes. Rather, he suggests that one way for civilization to surmount the present difficulties is for "all good democrats [to] have twelve heroes" (page xiii)!

Unlike Carlyle, who knew none of his described great people, and unlike many other biographers of the famous and infamous, Eastman knew all of his personalities and counted ten as personal friends.

"I have never let any of them into the place of my self. I have never let them ascend beyond the wing-range of laughter. I do not regard them as possessed of some mystic substance called 'greatness'... I regard them, even those whose names will indubitably shine far through history, as made of bone and brain and muscle like myself, with a good seventy per cent of nothing more divine than H₂O" (page xvi-xvii).

Eastman's eclectic twelve includes luminaries whose works and ideas will indeed last for a millennium. His description of John Dewey is especially insightful and portrays a man at ease with himself and yet always in tension with notions and causes. The chapter is

aply titled "The Teacher as Hero" and is the last of the twelve. Of all of the attributes that Eastman could have highlighted, it is illuminating that he selected Dewey as "teacher"!

I am assuming that Dewey's last place finish in the book is significant. Clearly, Dewey had a special place within Eastman's environment and the accolade of 'the teacher as hero' and the need for teachers of ideas within Eastman's contemporary World view, may have influenced Dewey's placement. However, wherever the chapter would have appeared, the humility and the humanity of Dewey shines through.

The personal antidotes as well as the simple and straight-forward writing paint this American Philosopher in a light that does indeed raise his stature to that of a true hero.

"Dewey consists so essentially, so much more than most men, of unexcited thoughts, and his thoughts have still so long to live, their task of permeating the world with wise relations between adults and children is so little more than half begun Even after the wondrously vigorous heart of the man stops beating, it will seem true" (page 321).

References:

Carlyle, Thomas. (1871). *Heroes and Hero Worship*. Philadelphia: Henry Altemus Publishers.

Eastman, Max. (1942). *Heroes I Have Known: Twelve Who Lived Great Lives*. New York: Simon and Schuster.

Jon G. Bradley can be reached at
<jon.bradlery@mcgill.ca>

At Summer's End

J. J. McKenna

*When empty halls begin
to ring with laughter
And bulletin boards blossom
with messages of cheer
And the school sheds its slumber
as students gather,
The teachers - renewed by summer
& friends & hope - reappear.*

J. J. McKenna can be contacted at
jmckenna@mail.unomaha.edu.

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Peirce, Pragmatism and Science Education

Robert F. Kruckeberg

Introduction

Current reform in American science education tends toward the need to improve general scientific literacy. The main concern is not to generate more scientists, but to provide the average citizen with an appropriate understanding of science as it relates to technological change. The association between science and technology is often interpreted as if science were the theoretical foundation for technological practice. In other words, technology is viewed as the practical offspring of scientific abstraction and representation. This relationship shows up quite often in high school and university technical curricula: learn the foundational science first, then go practice what you have learned in the lab. On a broader scale, our entire educational system could be seen as a product of this model: acquire (mostly) theoretical knowledge as a matrix of mental representations, then go find a job where you can put this knowledge to some practical use.

From an educational perspective, Dewey saw the divide between theory and practice as a result of exaggerating the Cartesian project. While describing how successful this project has been for the advancement of science and technology, Dewey warned that by taking the Cartesian reduction too far, we risk slipping into an “intellectualism” that “draws an arbitrary line between nature and experience,” where “all experience is a mode of knowing,” while nature is reduced to “an indifferent, dead mechanism” (EPM, p. 265). According to Dewey, this kind of distinction, though a useful model for science and other contexts of inquiry, will inevitably fall short of accounting for much of what we find to be meaningful as participants in the

world. This includes the experience of classroom learning. Dewey worried that traditional teaching practices were driven by an “intellectualism” that took the experience of learning as primarily a process of cognition, where learners were essentially Cartesian “thinking things” into which knowledge had to be transferred in the spirit of Freire’s “banking” model.

Dewey’s concern was that this kind of dualistic intellectualism failed to provide children with meaningful learning experiences. For Dewey, a child’s sense of meaning is derived from what he considered to be “primary” experience, where the child is engaged as a participant in the world, rather than as a spectator over and against it. Here, there is no separation of self and other, simply the having of an experience. This concept of experience is prior to any mind vs. matter distinction, and involves a certain inarticulate feeling, a sense of quality, or more importantly for Dewey, a sort of playfulness (DE, p. 265). Unfortunately, educators have often misinterpreted Dewey as promoting “playfulness” at the expense of acquiring knowledge. Dewey has come to be the “learning by doing” educator, as if he had never written about how crucial theoretical knowing can be in enhancing our primary experiences in the world.

Dewey’s response to intellectualism was his pragmatism, where Cartesianism is limited as a construct useful for solving certain types of problems, mostly related to science and technology. But since science and technology have seemed to work so well, there is a general tendency to take the Cartesian, reductive methods of science into areas where they don’t belong. Despite Dewey’s efforts, science education remains dominated by Cartesian scientism. Richard Rorty has attempted to carry on Dewey’s project in the spirit of the later Wittgenstein with what he considers to be a neo-Deweyan pragmatism. Rorty’s main concern is that modern philosophy has attempted to subsume all disciplines of inquiry under the Cartesian umbrella, fostering a metaphor for the mind as a mirror of the extended, external world. The success of

the reductive methods of science has allowed us to accept science as the mirroring process *par excellence*. Thus, scientific knowledge becomes a matter of coming up with ultimate mental representations of reality, or the way things really are in the world. Rorty worries about the development of some privileged vocabulary that serves to devalue or exclude alternative vocabularies and ways of knowing, particularly in areas considered to non-scientific.

Rorty’s response to “representationalism” has been a pragmatism that rejects the Cartesian ontological dualism, recasting experience in terms of the language we use – a sort of deep textualism.ⁱ Rorty’s linguistic turn is appealing to science educators who take Thomas Kuhn’s view of science seriously. From a Kuhnian perspective, the development of scientific knowledge has a lot to do with how we learn to talk about our experiences in the world; this talk helps to determine how and what we see and observe, and influences what we end up calling scientific knowledge. For a science educator, Rorty’s interpretation of Kuhn can provide a great deal of insight into the dependence of scientific knowledge on linguistic practices within a community of inquirers. The concept of science as social practices reminds us that students of science have interesting ways of describing their world that must be integrated the acquisition of scientific knowledge in order for meaningful learning to take place.

As a science educator, I think reformers have yet to fully appreciate many important aspects of Dewey’s pragmatism. Rorty’s version of pragmatism has helped me to better understanding those aspects of Dewey’s work that are sympathetic to Kuhnian post-positivism. However, Rorty’s wholesale retreat to textualism fails to adequately address an aspect of science and science education that I believe Dewey would want to retain: a strong appreciation for scientific realism. We can find more of a pragmatic realism in the writings of C.S. Peirce. Like Rorty and Dewey, Peirce was deeply critical of the Cartesian project while sharing the fears of closing off inquiry and losing our focus on the

development of community. But unlike Rorty, and more like Dewey, Peirce's pragmatism is embedded in a metaphysics that never begins to question our fundamental connection to the world. Peirce's pragmatism helps to clarify Dewey's work by replacing the Cartesian dichotomy of truth vs. falsity with a smooth continuum marked by spontaneity and habit. It is precisely this continuum that, according to Peirce, describes our existence as participants in the world. In this paper, I will argue that Peirce's non-foundationalist pragmatism provides a practical and realistic worldview that serves as an alternative to Cartesianism while remaining appropriate for an education in the sciences. Peirce's pragmatism, based on his principle of continuity, entails a connectedness that leads to our dependence upon community in the broadest sense, and thus makes us necessarily responsible to each other and the world. This community orientation will help reinforce the open, democratic solidarity that neo-pragmatists like Rorty argued for. Beyond Rorty, however, Peirce's metaphysical holism manages to retain a healthy respect for scientific realism, while serving as a lens through which to help clarify much of what Dewey wanted to say about the metaphysics of experience.

I intend to draw upon quotes from a number of Peirce's essays relating to ideas set forth in the *Monist* metaphysical series, including his writings on pragmatism during and after the Harvard lectures, where he started to take the idea of pragmatism as a theme for unifying much of his earlier writings.ⁱⁱ Of course, I can only refer to a small portion of what I find to be interesting and provocative in Peirce's essays. Nevertheless, the passages that follow are rich with subtleties that help to present his pragmatism as a non-foundationalist, non-Cartesian, yet rigorously scientific way of knowing that helps to clarify Dewey's emphasis on breaking down artificial dualisms and highlighting the significance of "primary" experience.

As I discuss sections of Peirce's essays, I will make brief comparisons with some

of Rorty's writings. My aim is not to provide any detailed comparison between Rorty and Peirce; rather, by using Rorty's "textualism" as a reference, I hope to underline the progressive elements of Peirce's writing that manage to stay clear of the kind of skepticism and relativism associated with many postmodern thinkers.

I will begin by analyzing some quotes from Peirce's critique of Cartesian foundationalism and individualism. This will lead to the way Peirce begins to blur the distinction between the individual and the community. Later, I will address Peirce's pragmatic maxim, and show how his themes of anti-foundationalism, community, and metaphysical realism ultimately depend upon a fundamental metaphysics of cosmological continuity. Finally, I will make a first draft attempt to describe how Peirce's system of thought might influence the teaching and learning of science in a way that helps educators balance the dominant influence of Cartesian thinking in science education, while remaining faithful to the ideas that Dewey sought to implement on the way to modern reform in education.

Peirce's response to Cartesian foundationalism and individualism

Peirce rejects the possibility of a Cartesian faculty of intuition, where we can have immediate, foundational knowledge of an object by first stripping our minds of all doubt. In Peircean terms, there is no such thing as having a cognition that is not dependent upon previous cognitions; we are incapable of thinking without some already given prejudices and beliefs (QCCF, p. 11). Instead of speaking of foundational, first cognitions, Peirce recommends that if we are to begin somewhere, we begin where we already are, in medias res, or in the process of cognition:

...there is but one state of mind from which you can "set out", - a state in which you are laden with an immense mass of cognition already formed, of which you cannot divest yourself if you would...But do not make believe; if pedantry has not eaten all the reality

out of you, recognize, as you must, that there is much that you do not doubt, in the least. Now, that which you do not at all doubt, you must and do regard as infallible, absolute truth (WPI, p. 336).

It is interesting to note the parallels between Peirce's views on cognition and later hermeneutical philosophers such as Hans-Georg Gadamer, who see the first task of coming to know as the recognition of what our situation already is in the world, along with an awareness of the prejudices and biases from which we may be operating. Peirce anticipates the hermeneutical situation by claiming that what we think is always somewhat determined by our present cognitions of which we "cannot divest" ourselves. All we can really do is remain aware that these cognitions are always present, only partially knowable, and will always influence how we think. If asked the Cartesian question of where our starting point is, I think Peirce would agree with Gadamer that we can only start with the "elaboration of the hermeneutic situation", while admitting to the fundamental "endlessness of this task".³

Peirce goes on to describe this situation in terms of doubt and belief (a passage I feel necessary to quote at length):

All you have any dealings with are your doubts and beliefs, [here, Peirce notes the belief is to be taken merely as the contrary to doubt] with the course of life that forces new beliefs upon you and gives you power to doubt old beliefs. If your terms "truth" and "falsity" are taken in such senses as to be definable in terms of doubt and belief and the course of experience (as for example they would be, if you were to define "truth" as that to a belief in which belief would tend if it were to tend indefinitely toward absolute fixity), well and good: in that case, you are only talking about doubt and belief. But if by truth and falsity you mean something not definable in terms of doubt and belief in any way, then you are talking of entities of whose existence you can know nothing, and which Ockham's razor would clean shave off. Your problems would be greatly simpli-

fied, if, instead of saying that you want to know the “Truth,” you were simply to say that you want to attain a state of belief unassailable by doubt.

Belief is not a momentary mode of consciousness; it is a habit of mind essentially enduring for some time, and mostly (at least) unconscious; and like other habits, it is (until it meets with some surprise that begins its dissolution) perfectly self-satisfied. Doubt is of an altogether contrary genus. It is not a habit, but the privation of a habit. Now a privation of a habit, in order to be anything at all, must be a condition of erratic activity that in some way must get superceded by habit (WPI, pp.336-7).

A key idea for Peirce in his critique of Cartesianism is that doubt is described in terms of lack of belief. Further, belief is construed as habit. For Peirce, to doubt everything (save the fact that we are thinking) would mean that we are free of all belief, and therefore, of all habit. But freeing oneself of all habit would entail complete lack of control, or pure “erratic activity”, which certainly cannot be descriptive of our existence at any moment in time. We always retain certain habits, which means that we are constantly taking innumerable things for granted around us in order to make any sense of our experience. For Peirce, these things we take for granted are, practically speaking, things we tacitly accept as absolutely *true for the time being*. But “absolutely true” is only to be taken as the absence of doubt, that which we choose not to question. What guides our basic interactions with our environment are certain tacit beliefs, without which we could never make our next move in the world. Complete absence of any tacit belief, according to Peirce, would result in utter paralysis; we would not only stop functioning, but would no longer be able to function.

The above passage shows how Peirce wants to replace the discrete notions of “truth” and “falsity” with a spectrum delimited by doubt on one side, and belief or habit on the other. This is Peirce’s way of using terms that relate more closely to our selves as practical beings steeped in worldly activity.

Doubting and believing is something we do, whereas “truth” and “falsity” are terms that describe some abstract state, as if removed from the process of our being-in-the-world. Peirce’s claim is that what is true and false must be tied to that which we believe and doubt, since only the latter terms are useful to describe the very practices that guide our actions. In this sense, Peirce is in agreement with Rorty in taking “truth” and “falsity” seriously only in relation to beliefs and doubts regarding human conduct. Beyond this relation, the terms “truth” and “falsity” become excess baggage invented by pedantic philosophizing serving no conceivably practical purpose.

If we begin with where we are, with our current beliefs and prejudices, without any rock-solid, Cartesian foundations, then what are the conditions for obtaining “true” knowledge? Peirce is adamant that we cannot “divest” ourselves of our “immense mass of cognitions” at any point in time, thereby rejecting Descartes’ project of doubting all the way back to the cogito. However, for Peirce, doubt is still the catalyst for acquiring knowledge, and will always arise during the “course of experience”, or during our diverse interactions in the world. Such doubt destabilizes certain beliefs we maintain, which are analogous to certain habitual ways of conducting ourselves in the world. In Peircean terms, doubt is the “privation of habit”, a condition of “erratic activity that in some way must get superceded by habit” or the formation of a new belief. Rorty would follow Peirce by saying that our system of beliefs is determined by the way we interact in the world. This system gets modified based upon how our vocabulary for describing our situation tends to square with how the situation works out for us. When unexpected things happen, our system gets shaken and we are forced to “recontextualize” our web of beliefs accordingly (IR, pp.93-110).

One might respond to Rorty that such anti-foundationalism slides too easily into a subjectivist relativism. If we use Rorty’s description, what would keep me from recontextualizing my web of

beliefs based upon my unique perspective on the world, and justifying my new beliefs based on personal taste, preference, or “feel”? What if I invent beliefs that have little to do the way things really are in the world? Rorty might respond to this critic by explaining that the language of such questions implies a desire to obtain mental pictures in the mind that correspond one-for-one with what is “out” there in the world. For Rorty, we do not have such a mirroring capacity; our representations of the world are always limited by our language. The best we can do is propose a vocabulary to describe our world that coheres well with our present vocabulary. Therefore, if our new beliefs fit in well with our previous beliefs, we are doing the best we can to describe what is “true”.

But Rorty’s case for a coherentist theory of knowledge runs deeper than this. Rorty describes his pragmatism as a sort of “left-wing Kuhnianism”(SS, p. 38).

Following Kuhn, what constitutes acceptable knowledge must be considered with respect to the beliefs held by a community of inquirers. This is another way of rejecting the Cartesian idea of knowledge as individual subjective certainty and replacing it with a concept of knowledge that is always at the mercy of a community of critical inquirers; knowledge construction becomes a community project. Individual members of this community can invent according to whim and fancy, but knowledge accepted by the community of inquirers will hopefully result from a serious exchange of ideas, open argumentation, and various forms of (hopefully civil and democratic) persuasion.

Both Peirce and Rorty consider our beliefs to be highly dependent upon social interaction. Rorty enlists Kuhn in his effort to depict science as a model of human solidarity, where the general tendency toward “unforced agreement” is what makes science exemplary. However, I believe that a more Peircean interpretation of Kuhn would point out that Kuhn’s scientists achieve solidarity within a given community due in large part to a set of practices that include, following Hacking, ways of representing

and interveningiv that are binding in a way that extends beyond agreed upon social norms and linguistic behavior. I will continue this issue below when discussing Peirce's categories as they relate to his pragmatism.

Peirce's community of inquirers

The link between knowledge and community is fundamental in Peirce. Returning to an earlier quote, we can find the following statement:

Your problems would be greatly simplified, if, instead of saying that you want to know the "Truth," you were simply to say that you want to attain a state of belief unassailable by doubt.

Peirce is careful not to say something like: you want to attain a state of belief about which you can have no personal doubt. Peirce intends "unassailable by doubt" to mean unassailable by doubt in general, assuming that you will seek to check your beliefs within a community of inquirers. This intention becomes evident when, in the same essay describing his pragmatism, Peirce provides a highly nuanced definition of what he means by "you", or what we normally take to be an individual. Peirce writes:

Two things here are all important to assure oneself of and to remember. The first is that a person is not absolutely an individual. His thoughts are what he is "saying to himself", that is, is saying to that other self that is just coming into life in the flow of time. When one reasons, it is that critical self that one is trying to persuade; and all thought whatsoever is a sign, and is mostly of the nature of language. The second thing to remember is that the man's circle of society (however widely or narrowly this phrase may be understood) is a sort of loosely compacted person, in some respects of higher rank than the person of an individual organism (WPI, p. 338).

Peirce's underlying theme of continuity begins to emerge in this gloss. His concept of the self is fundamentally dynamic, contingent, and with Rorty, highly contextualized. Where Rorty's metaphor for the human mind is the "self-reweaving web" of beliefs (IR, p. 93),

a web characterized solely by our language, so Peirce sees thinking as a continual exchange of linguistic signs; who we are is not clearly defined apart from the way we represent and communicate our interventions in the world and our direct or indirect communication with others. But Peirce goes further to say that who we are, as individuals, is not the first question to ask; rather, the primary identity with which we are associated is our community. Elsewhere, he writes: "now you and I- what are we? Mere cells of the social organism."^v Peirce takes the idea of community as a veritable precondition for personal identity.

Peirce's concept of the individual reveals a strong pre-modern strand in his writing, and this comes out of his appreciation for the medieval scholastics, particularly the work of Duns Scotus.^{vi} The Peircean individual brings to mind Owen Barfield's comparison between the modern and medieval self:

When we think causally, we think of consciousness as situated at some point in space...This was not the background picture before the scientific revolution. The background picture then was of man as a microcosm within a macrocosm. It is clear he did not feel himself isolated by his skin from the world outside to quite the same extent that we do. He was integrated or mortised into it, each different part of him being united to a different part of it by some invisible thread. In his relation to his environment, the man of the middle ages was rather less like an island, rather more like an embryo...^{vii}

The demarcating line between the self and non-self is unclear for Barfield's medieval man as well as Peirce's individual: one is already out there, "mortised" into the world. Describing the self in relation to an external world would not make sense here, since all we have to begin with is a self-in-the-world as unity, close to what Dewey would simply call "experience."

The pragmatism of both Rorty and Peirce could draw upon Neurath's boat as a metaphor for non-foundationalist inquiry: We begin with a boat at sea in need of repair, and are unable to find some dry dock outside of our boat, as

neutral ground from which we could replace are damaged planks. We must work with the materials at hand, within our current system of planks, replacing one plank at a time in order to keep our boat afloat. In Rorty's case, we are beings who are already "contextualized" within our linguistic habits. When problems arise that require us to repair the planks of our belief system, there is no neutral language to which we can appeal in order to check whether or not the repairs we are attempting to make are "good" or "rational". I believe Peirce would agree in the sense that we cannot "divest" ourselves of our system of cognitions and find some neutral ground outside of them, or some God's-eye view that transcends our habits and beliefs. Rorty seems primarily motivated by the fear that if we recognize some neutral ground, or independent criteria for evaluating our belief system, we will begin to privilege these criteria as fixed and final, and ultimately close off free and open inquiry. Peirce shares the same fear of closing off inquiry. But there is a difference between Peirce and Rorty in how we should avoid privileged representation.

Rorty is concerned about the extent to which science is interpreted as having developed a privileged language. This Cartesian interpretation allows members of the scientific community to appear as if they were able to come up with mental representations that mirror some objective, external world. Like many post-positivist critics, Rorty's arguments are aimed against scientism, not science. But for Rorty, the scientific way of knowing is just one way among many others; it should have no privileged status whatsoever. His project is highly critical of any attempt to claim privileged representation for what is "really there" in the world, because any such representation could become fixed and final, and might tend to dominate our way of thinking at the expense of exploring the world through other means of expression like literature and poetry.

Peirce argued against the idea of fixed representation from another perspective: as a practicing scientist, he saw fixed

representation as inimical to the very spirit of attaining any scientific knowledge. For Peirce, scientific knowledge is never certain, and is, or should always be, expressed in terms of degrees of uncertainty (AGR, pp.273-4). Further, such knowledge is always, in practice, worked out through a community of inquirers. Peirce reasoned that since our most predictable knowledge about the world is scientific, and such knowledge is always expressed as an uncertainty (DC, p.144) of which the value is reduced only through the efforts of a community of practitioners, then the claim of individual certainty would hold little credence. As an alternative to the Cartesian path to certainty (and fixed representation) through a "single thread of inference", Peirce proposes the following:

Philosophy ought to imitate the successful sciences in its methods, *so far as* to proceed from tangible premises which can be subjected to careful scrutiny, and to trust rather to the multitude and variety of its arguments than to the conclusiveness of any one. Its reasoning should not form a chain which is no stronger than its weakest link, but a cable whose fibres may be ever so slender, provided they are sufficiently numerous and intimately connected (SCFI, p.29).

Although this remark begins with what seems to be a rather scientific bent, a close look shows how carefully Peirce seems to craft his statements. He sets up methods of science as a model for inquiry, so far as such inquiry fulfills certain general requirements. First, inquiry should proceed from evidence that is open to public scrutiny. More importantly, such open scrutiny should involve a variety of arguments. Where some might balk at this gloss because it asks us to follow the methods of science, others might see this as simply likening the spirit of scientific inquiry to an ideal for any open inquiry in society, something to which I think Rorty would have little objection. Further, the cable metaphor brings us back to the theme of continuity in Peirce's work. What counts as reliable knowledge is not the product of some mind getting clear and distinct

impressions of an outer world, but rather the result of diverse, interweaving arguments put forth by a community of inquirers. Knowledge is then a product of an interconnected community of thought, where individual contributions are blurred into a whole, while the whole carries an identity that exceeds the grasp of any one individual.

However much Rorty might warm to Peirce's notion of communal knowledge, he would still have problems with Peirce's desire to model inquiry after the methods of science. It does seem that Peirce is privileging science. But I read Peirce as using science to present a model of inquiry for achieving consensus within a community. Science is a good model because it often deals with evidence that is *more* reliable and repeatable than in other areas of human inquiry. Such evidence seems to reveal the existence of entities and regularities that are more independent of individual thought and therefore more accessible to a community of inquirers. Peirce privileges science because of the greater reliability of natural experimentation, which I believe to be a reasonable distinguishing factor. As for Rorty, I remain uncomfortable with his remarks about relegating natural science to "one genre of literature" (CP, xliii), or another invented vocabulary that helps us solve our problems. This brings up the crucial difference between Rorty and Peirce: where they stand on scientific realism.

A common Rortyan thesis is that we have learned to see the world through Cartesian spectacles, and have fallen for the idea that the real, outer world of objects can be mirrored in the subjective mind, and thus known clearly and distinctly. This mirroring process works best when we use the methods of science to find some privileged vocabulary from which we can construct mental representations that correspond point for point to how the world really is. Rorty responds by arguing for what he calls a post-Deweyan pragmatism that asks us to stop worrying about truth as correspondence, and redirect our efforts to find new and better ways of talking about the world.

One problem I find with Rorty is that he seems to prefer an instrumentalist description of science, where "natural scientists are interested primarily in predicting and controlling the behavior of things" (SS, p.40). Yet, many scientists seem to be significantly motivated by the hope of finding something out about the world for the first time. Further, by emphasizing control and manipulation over finding, Rorty's picture of science seems to undermine the spirit of scientific inquiry that seeks to reach consensus about a reality that is common to us all, to which we are mutually connected, or within which we all participate. Rorty defends his emphasis on control and manipulation because he is a pragmatist who, as he puts it, views beliefs as habits of action, a position he traces directly back to Peirce (IR, p. 93). However, Peirce's pragmatism not only runs much deeper than one might gather from reading Rorty,^{viii} but would also tend not to lead one to begin favoring control and manipulation at the expense of finding in science.

This is because Peirce's pragmatism, unlike Rorty's version, is based on the hypothesis of realism. This follows from his use of scientific inquiry as an exemplar of inquiry in general, insofar as "tangible premises" are debated through a "multitude and variety" of arguments within a community of inquirers. At this point, both Rorty and Peirce are vulnerable to the critic who asks: what if the community of inquirers, as a whole, have been sufficiently deceived? I find Rorty's response to this kind of question rather vague, and I am concerned that he leads us back to "the inevitable ethnocentrism to which we are all condemned" (SO, p. 31). Peirce responds with something close to a scholastic realism:

To satisfy our doubts, it is necessary that a method should be found by which our beliefs may be caused by nothing human, but by some external permanency- by something upon which our thinking has no effect...It must be something that affects, or might affect, every man...Such is the method of science. Its fundamental hypothesis...is this: There are real things, whose char-

acters are entirely independent of our opinions about them... (FB, p.120).

When Peirce refers to “method” in this passage, he is comparing it to three other “methods” he has considered in his essay on how we should go about “fixing” our beliefs (those of authority, tenacity, and use of the a priori). The “method of science” is not intended to represent the standard textbook rendition; rather, it happens to be the only example of inquiry that appeals to something that stands independent of what the individual inquirer thinks. This is the reality common to us all. On the other hand, this reality, according to Peirce, is not independent of what the community of inquirers... thinks. Thus, there is an element of idealism in Peirce’s realism: what is real will begin to fall out from the results of a community scrutinizing “tangible premises,” using a “multitude” and “variety” of arguments as they construct the fibers that form a strong cable of reasoning.

Peirce’s pragmatic maxim

Peirce’s anti-foundationalism, sense of community, and realism are essential components of his pragmatism. More importantly, his pragmatism presupposes a fundamental principle of continuity that allows him to build a cosmological metaphysics that is thoroughly opposed to the Cartesian worldview. In order to investigate his pragmatism, I will present some core statements relating to his pragmatic maxim that will highlight two important points. First, Peirce’s pragmatism is a prescription for clarifying conceptual meaning by anticipating potential, practical effects of a concept on future human conduct within a community. Secondly, these conceived effects must be real; they must be conceived of as if they will have a real influence upon practical conduct. These real effects will form the basis for the possibility of a complex reality shared by the community, while independent of any individual members of that community. Once these points have been made, I will show how Peirce’s pragmatism, using his principle of continuity, prepares the way for a metaphysics that re-describes reality in terms of a

mind/matter continuum.

Peirce’s original pragmatic maxim may be expressed as follows:

Consider what effects that might conceivably have practical bearings we conceive the object of our conception to have: then, our conception of those effects is the whole of our conception of the object (TMP, p. 135).

This maxim was originally published in 1878 in an essay entitled *How to Make Our Ideas Clear* (p. 132), and became the basis for his introductory lecture on pragmatism at Harvard in 1903. The subsequent Harvard Lecture begins with this reference to the maxim:

The last lecture was devoted to an introductory glance at Pragmatism, considered as the maxim that the entire meaning and significance of any conception lies in its conceivably practical bearings,- not certainly altogether in consequences that would influence our conduct so far as we can foresee our future circumstances but which in *conceivable* circumstances would go to determine how we should deliberately act, and how we should act in a practical way and not merely how we should act as affirming or denying the conception to be cleared up (OP, p.145).

Finally, I would like to include a remark Peirce makes in his last of the seven Harvard Lectures from 1903:

...if pragmatism is the doctrine that every conception is a conception of conceivable practical effects, it makes conception reach far beyond the practical...(PLA, p.235).

I would like to use these three passages to begin drawing out the subtle complexity of Peirce’s pragmatism. His careful and rather systematic use of terms will allow us to see how his themes of community and continuity are intertwined with his metaphysical realism, transforming his pragmatic maxim into a normative theory of praxis. On a first pass through his maxim, we can see the more popular association between pragmatism and immediate practical action. James interpreted Peirce’s pragmatism in a way that redefined the truth of any claim as its “cash-value in experiential terms.”ix But as Josiah Lee Auspitz puts it: “James, as

Peirce saw it, took practical effects as a criterion of truth rather than as a razor for clarifying meaning...”x

The second of the three quotes above shows that Peirce’s pragmatism is primarily about meaning, which in turn must be linked to practice. This is consistent with Peirce’s original critique of Cartesianism, where we always begin thinking *in medias res*, as practicing beings imbued with habits of which we cannot divest ourselves. But unlike James’ more personalized interpretation of pragmatism, where true ideas are those that must be “verified” in “any one’s experience,”xi Peirce wants us to consider the meaning of a concept in terms of its *conceivably practical* effects which, as he remarks in the third quote above, allows conceptual meaning to go “far beyond the practical”. In addition, when Peirce writes of the conceivably practical, he means: that which we can possibly imagine as pertaining to future practices. Since we are always already dealing with a world, working things out within a community, then what we consider as *conceivably practical* must take into account our possible future interactions within a community as they might relate to our understanding of a concept. This implies that our understanding of anything must be tied to some public understanding.

If we next place emphasis on the *conceivably practical*, we are bound to think in terms of experiential interactions, not merely abstract, philosophical speculations. In other words, the meaning of any concept must always be in terms of possible concrete effects. These effects are taken to be real. Peirce’s pragmatism presupposes a reality because he is not willing to define individuals apart from their community or environment. He is not interested in the “make believe” philosophical questions of whether or not we can see through the veil that stands between our inner mental world and some outer, objective reality. Such a dichotomy is a Cartesian, philosophical invention that only serves to distort who we are as practical beings-in-the-world.

Rorty might argue here that there is no sense in invoking some concept

called “reality” to account for how our beliefs may be causally influenced. He does not deny some causal influence that is independent of human beliefs and desires. He just doesn’t want to call this influence “reality”, since this would start raising the question of just what we mean by the term “reality”. As long as we can rearrange our belief systems in a way that allows us to better solve our problems, there is no need to investigate what the objects “really are” that may cause our beliefs to change. Peirce the scientist is primarily motivated by finding out the way things really are, for this reality is the potential common ground for the community of inquirers. But the difference is subtle, because he is outright against any final form, infallible knowledge. This follows from his pragmatism, where the meaning of a concept depends upon the conceivable effects of that conception, effects which remain with respect to an indefinite future community. Since this community is bound to change in the future, there is no such thing as an absolutely fixed concept. In fact, Peirce would view any infallible knowledge as incoherent precisely because meaning is future oriented.

As some authors have pointed out, a possible reason why Rorty does not accept Peirce’s realism is because he is not sympathetic to Peirce’s phenomenological category of Secondness. xii In brief, Peirce parced experience into the categories of Firstness, Secondness, and Thirdness. Firstness is the monadic element of experience as pure presentness or quality of feeling. Secondness is a dyadic relation between acting and reacting entities, or reaction as an element of a phenomenon. Thirdness is a triadic relation acting as a medium between a Second and its First, or representation as an element of a phenomenon. xiii Secondness is that part of a person’s experience “which forces itself upon him, will-he nill-he” (SSM, p. 192). Peirce also writes: “We find secondness in occurrence, because an occurrence is something whose existence consists in our knocking up against it” (AGR, p.249). Secondness is a pre-cognitive awareness of something

other than ourselves, some element that resists us, regardless of what we do (running into a wall, being hit on the head by an apple, etc.).

Accepting this element of Secondness, in a very common-sensical way, is essential to appreciating Peirce’s pragmatism. When we investigate the meaning of something, we must conceive of possible practical effects that something might have on something else. These practical effects must include resistive effects that could alter someone’s future belief system. For example, as Peirce explains, if I am trying to understand the meaning of the term “force” (at least in classical physics), I must imagine the possible, practical effects this concept might have on some future situation. With this concept, I could imagine building a parallelogram of forces that might be used to predict the real change in the motion of an object. If I can imagine a force used as a tool for determining an object’s acceleration, than I have begun to build meaning into the concept of force (HMIC, p. 136). But in order to conceive of a “real” change in motion, I must have an idea of what this might really be like, which depends upon my experience with the changing of an object’s motion. This I have either seen, or more convincingly, felt as a part of my experience of Secondness in the world – the undeniable experience of otherness.

Continuity and the Cosmic Continuum

Peirce’s pragmatic maxim involves a metaphysical realism that links us up with a cosmic continuum, a connection which summons our responsibility for the maintenance of community in the broadest sense. Fundamental to Peirce’s thinking is what he calls synechism, or the principle of continuity. Elements of this principle pervade his previous remarks. We started with some passages that described Peirce’s anti-fundamentalism- the fact that we begin all of our thinking “laden with an immense mass of cognition already formed”. We start where we are, with whatever cognitions we have been forming up to a certain

point in time. We cannot break out of the flow of thinking- we can only move on from what those of the interpretive turn might call our hermeneutic situation. What we will take to be “true” or “false” in our thinking is redefined by Peirce along a continuum of doubt and belief. Who we are at any point in time is indeterminate, and is constantly being re-shaped into that “self that is just coming into life in the flow of time”. But this self sits along a continuum between the dynamic inner self and the “circle of society”. The backdrop for all of this is simply the reality of our experience in the world.

This reality is assumed to be fundamentally continuous, and runs along a spectrum between spontaneity and habit, which are correlative with doubt and belief. Spontaneity is a pure, qualitative Firstness. Because of its lack of regularity, spontaneity is indeterminate, unpredictable and, according to Peirce, functions as the essential creative force in the universe. The presence of spontaneity is another way of saying that nothing in the universe is absolutely certain, so all things are to some extent possible, and thus an element of pure Chance exists in the nature of things. Where there is less chance and more regularity, habits begin to dominate. Habits are regulatory relations between other objects and fit into Peirce’s category of Thirdness.

Given a fundamental continuum, Peirce makes a remarkable, fascinating, and sweeping metaphysical claim:

The one intelligible theory of the universe is that of objective idealism, that matter is effete mind, inveterate habits becoming physical laws (AT, p. 293).

Why is this the only intelligible option? Peirce sees physical law as something that begs for an explanation, if anything in our experience does. For Peirce, the only way we can account for the presence of regular laws in nature is to assume that they result from a process of evolution. These natural laws are rules that govern the conduct of matter. In other words, he sees natural law as a “natural habit” that has formed over time, and is still in the process of formation, albeit at an imperceptible

level. At one extreme of the cosmic continuum are what Peirce calls “bundles of habits”, or what we call matter (AGR, p.279). In other words, fully habituated existence is the matter end of the mind / matter continuum. At the other end is the lack of habit, or increasing spontaneity. Completely indeterminate spontaneity is what Peirce considers to be pure mind, or pure feeling, represented by his category of Firstness.

The Peircean universe is a continuum along which elements tend to take on habits, while the presence of chance and spontaneity counteract the habit taking tendency to increase complexity and diversity. As beings, we find ourselves in the midst of this universe, perhaps “thrown” into it in the Heideggerian sense. As Stanley Harrison writes:

For Peirce, Nature’s regularities were the signature of a larger activity in which we find ourselves and in which we participate. He was unequivocal about this. Thus he speaks of ‘that inward aspect of mind which we egotistically call ours; though in truth it is we who float upon its surface and belong to it more than it belongs to us’ (7:558). In another place...he reminds us that ‘it is well to remember that every single truth of science is due to the affinity of the human soul to the soul of the universe, imperfect as that affinity no doubt is’ (5:47).xiv

From a Peircean perspective, our fundamental connection to and participation in the world is the very basis for how we come to know anything. In terms of science, our connection allows for *il lume natural* to guide our original, hypothetical “guessing” in natural inquiry: we are capable of having a “feel” for the world, or being in sympathy with our surroundings. This is where I think Peirce would consider creative hypothesizing as a form of intuition. This individual hypothesizing is, of course, highly unreliable, and calls for continued investigation within a community of inquirers.

Peirce’s pragmatism sits in the midst of his cosmological continuum. His pragmatic maxim is a guide for clarifying meaning and acquiring knowledge

about the world, though again, it is not to be taken in the modern sense as a theory of truth. We begin all of our thinking in the middle of mind and matter, spontaneity and habit, doubt and belief. Our real experiences force us to doubt, or bring into question certain beliefs and habits. This doubt may call into question the meaning of a concept, or require us to investigate a new concept. This investigation begins by creative hypothesizing, followed by the consideration of the possible effects of this hypothesis on some series of future situations. It is important to note that, according to my understanding of Peirce, these mental projections involve a strong normative, ethical component. The meaning of a concept will always be in terms of conceivable future effects, and these effects will be within a community, acting on others and on the world. These effects cannot be calculated, only estimated in terms of probability. For Peirce, a rational application of probability involves the consideration of the largest possible pool of data from which we can make any logical inferences. Peirce is concerned with our finite ability to make such inferences:

But what, without death, would happen to every man, with death must happen to some man. At the same time, death makes the number of our risks, of our inferences, finite, and so makes their mean result uncertain. The very idea of probability and of reasoning rests on the assumption that this number is indefinitely great...It seems to me that we are driven to this, that logicity inexorably requires that our interests shall not be limited. They must not stop at our own fate, but must embrace the whole community. This community, again, must not be limited, but must extend to all races of beings with whom we can come into immediate or mediate intellectual relation. It must reach, however vaguely, beyond this geological epoch, beyond all bounds. He who would not sacrifice his own soul to save the whole world, is, as it seems to me, illogical in all his inferences, collectively. Logic is rooted in the social principle (DC, p. 149).

Peirce’s very idea of what it means to

be rational requires a community-oriented ethics. This normative orientation arises, in turn, out of our essential connectedness to the world that raises the possibility of a sort of cosmic sensibility or what Peirce calls “sentimentalism”. Ultimately for Peirce, we are driven by feeling and sympathy, already immersed in an evolving cosmos, not by abstract cognitions set apart from a mechanical universe. Returning to Dewey, we find our primary meaning in life through the having of experiences, rather than through knowledge of things that are disconnected from our experience. We can see the close relationship between Peirce and Dewey when we re-read Dewey’s remarks on intellectualism:

The assumption of “intellectualism” goes contrary to the facts of what is primarily experienced. For things are objects to be treated, used, acted upon and with, enjoyed and endured, even more than things to be known. They are things had before they are things cognized (EPM, p. 265).

Implications of Peirce’s pragmatism for science education

I have tried to show how Peirce’s pragmatism is not just another philosophical alternative to modern theories of truth, but is rather tightly woven into a cosmological metaphysics that provides an alternative to the modern, Cartesian dominated worldview. I believe that Peirce’s metaphysical orientation is consistent with many aspects of organicist post-modernism, which includes a deep sensitivity for the important issues surrounding ecological sustainability, feminism, and multiculturalism.

Peirce’s writings were extremely systematic, broad, and deep. I feel that I have merely touched the surface of his thinking. There still remains a great deal to scrutinize in his writings, including his possibly exaggerated emphasis on the practices of scientists and his accent on community at the possible expense of the individual, existential agent.xv In addition, Peirce’s pragmatism portrays meaning as the long term product of intersubjective understanding within a community, which seems to imply that any meaning experienced through

insightful, phenomenological understanding has merely a subsidiary, perhaps instrumental role in his epistemology.

I would like to be “pragmatic” about Peirce’s pragmatism: his writings should supply me with “a difference that makes a difference,” a difference that has conceivably real effects on my future conduct within the community of science education (educators and students). I feel that the most powerful aspects of Peirce’s writings involve his thoroughgoing emphasis on continuity. Thinking in terms of a continuum allows for a scientific perspective that is a refreshing alternative to traditional Cartesianism while retaining a respect for scientific realism. What are the different ways in which Peirce’s thoughts could impact my teaching in the classroom and my general orientation as an educator?

On a more obvious level, the continuity in Peirce’s pragmatism (as well as Rorty’s) can help the science educator refrain from slipping into an essentially non-scientific, albeit highly Cartesian attitude of what I like to call “right answer-ism.” All too often, students of science want the teacher to provide them with the “right answer” to a question, some pithy description of how the world “really is.” The practicing scientist (when questioned outside of the classroom and seemingly outside of the context of education) will often admit that there are no “right answers” in science, only more or less strongly supported hypotheses, which in the limit come to be considered theories for guiding practice. The Peircean approach might be: what we take to be “right” in science simply happens to be a belief that a community of inquirers has seemed to settle upon based on a variety of arguments relative to a convincing body of evidence. We should avoid speaking as if any question were ever settled; there always remains an element of uncertainty and fallibility in the way we describe any of our representations. The Cartesian might rejoin with: if everything is uncertain than nothing can be known. Peirce replies (with an echo by Dewey): nothing can be known

with the degree of certainty that most of us want, the certainty that makes us comfortable. On the other hand, if we are required to qualify everything we know in terms of uncertainty, based upon evidence, argumentation, and persuasion, then all knowing becomes more rigorous because it will involve more thorough consideration of possible alternatives to our tentative conclusions.

On a deeper level, applying Peirce’s pragmatic maxim along the lines of a probability continuum, a concept will have meaning insofar as one can conceive of its potential practical effects, in general. In other words, I take Peirce’s pragmatism as saying that deep understanding is necessarily vague, and necessarily exceeds our ability to fully articulate it in reductive terms. In Rorty’s words, there will always be a certain “fuzziness” in our understanding because the language we think with resists reductionism and non-circularity. As Rorty puts it, Peirce would remind us that “there is potentially a sign behind every sign,” as with Wittgenstein, where “there is potentially a language game behind every language game” (PCL, p. 219).

A critic might counter that education and learning should help to render ideas clear and precise, especially in the area of science. Vagueness is precisely what the science educator ought to avoid. The institution of science works well because of the high degree of precision demanded in its lexicon. But Rorty’s insistence on the irreducibility of vagueness in language (or Peirce’s insistence on the reality of vagueness as it applies to Thirdness) does not imply that we should settle for a completely indeterminate vagueness that completely obscures the possibility of effective understanding. We should rather admit that anything we seek to understand simply will never have the absolute clarity that Cartesianism seems to demand, and then begin rendering our object of understanding “more determinate,” or more resistant to various alternative interpretations.^{xvi}

This vague though comprehensive understanding should be in the direction of habit formation, which will

begin to surpass our conscious awareness as it becomes ingrained in real practices. How will an educator know when a student knows? Assessment of Peircean pragmatic understanding would indeed be far from simple, but simple assessments take place when we parse knowledge into artificial, analytical categories as “clear and distinct” Cartesian entities. Awareness of thorough, pragmatic student understanding in the classroom means being connected with students, who they are and where they have come from. It means that any assessment would be more participatory, more human, and ultimately more caring. Constructing such participatory assessments presents a serious challenge to educators, but is asking no more than what educators like Dewey have been demanding for years in our educational systems.

An important aspect of Peirce’s work is how his phenomenological categories pervade his pragmatism. His triadic thinking has led me to reflect upon a number of important elements necessary for a meaningful learning experience in science, probably similar to Dewey’s notion of meaningful learning. For Peirce, representation is Thirdness, which includes the categories of Firstness and Secondness. This makes me think that any meaningful conceptual understanding at the level of Thirdness, our cognitive-linguistic mode of representation, must include and arise out of Firstness and Secondness. In other words, we cannot expect to have cognitive representations that are meaningful unless they are rooted in experiences from which we can derive a certain emotional attachment, a sensation of quality or feeling (Firstness). In science, we might call this a sense of wonder or joy in the presence of an interesting and novel phenomenon. In addition, our understanding may lack meaningful significance unless we are able to interact and intervene with a phenomenon in a way that challenges our system of beliefs. We need to have a sense of resistance to our expectations, or perhaps a sense of surprise at how some entity responds to our actions in a way that is independent of what we

believe or want to believe (Secondness). This develops a sense of scientific realism that Peirce would say is absolutely essential for conducting empirical investigations. These elements of Firstness and Secondness form the background from which we can begin to express or modify our ideas about some physical phenomenon.

But without the phenomenological elements of Firstness and Secondness relative to learning a concept in science, student understanding may be limited to a string of words and symbols that are only meaningful, in terms of Thirdness, to the instructor who already knows a great deal about science.

Finally, I am intrigued by Peirce's metaphysics that inserts us into a cosmos along a mind / matter continuum described by spontaneity and habit. Within this continuum, we search for meaning that is always directed toward the future, toward some infinite future community. Peirce writes as if this community is as general as possible. Thus, if we are always oriented toward the most general future community, we might be more inclined to accept responsibility for the global community, which seems to encourage a certain ecological responsibility. As a science educator, this helps me to be future oriented in the most global terms. A Peircean perspective on teaching and learning about science, unlike many other critics of Cartesianism, implies a fundamental placement in the world, and a fundamental orientation toward the world. As beings immersed in this world, rather than minds detached from it, we might be less inclined to control and manipulate it, and more inclined to care for it. We might begin to see the difference between ourselves and the natural world as set along the same Peircean continuum, as a matter of degree and quality, rather than as a matter of clear distinction as an isolated quantity. This latter sense of difference is not to be discounted or dismissed. But Peirce's metaphysical pragmatism seems to provide an interesting alternative framework for resisting the excessive influence of mechanistic Cartesianism, perhaps helping us maintain a critical,

yet constructive orientation toward the continued advance of science and technology in our society.

Notes

Essays by Peirce

All references to Peirce are from *The Essential Peirce*, Volumes 1 and 2, edited by Houser and Houser, as et al. The following abbreviations apply:

AT: *The Architecture of Theories*

DC: *Design and Chance*

FB: *The Fixation of Belief*

AGR: *A Guess at the Riddle*

HMIC: *How to Make Our Ideas Clear*

OP: *On Phenomenology*

PLA: *Pragmatism as the Logic of Abduction*

QCCF: *Questions Concerning Certain Faculties Claimed for Man*

SCFI: *Some Consequences of Four Incapacities*

SSM: *The Seven Systems of Metaphysics*

TCD: *The Categories Defended*

TMP: *The Maxim of Pragmatism*

WPI: *What Pragmatism Is*

Works/ Essays by Dewey

DE: *Democracy and Education*

EPM: Experience and Philosophic Method from *The Philosophy of John Dewey*

Works by Rorty

CP: *Consequences of Pragmatism*

Essays from *Objectivity, Relativism and Truth*

IR: Inquiry as Recontextualization

SO: Solidarity or Objectivity?

SS: Science as Solidarity

Other essays

PCL: Pragmatism, Categories, and Language

- 1 See Guignon, Charles B. *Pragmatism or Hermeneutics?*
- 2 See Brent, Joseph. *Charles Sanders Peirce, A Life.*
- 3 Gadamer, *Reason in the Age of Science*, p. 108.
- 4 Hacking, *Representing and Intervening.*
- 5 Bernstein, "Action, Conduct, and Self-Control", p.90.

- 6 See Boler, John F. *Charles Peirce and Scholastic Realism: A Study of Peirce's Relationship to John Duns Scotus.*
- 7 Quoted in Bordo, p. 53.
- 8 CP, p. 161. Rorty's references to Peirce are often brief and sometimes dismissive, which seems due to his lack of patience for "system builders" in philosophy who attempt to follow the tradition of Kant. Remarking about Peirce on this page, Rorty writes: His contribution to pragmatism was merely to give it a name, and to have stimulated James. Peirce himself remained the most Kantian of thinkers – the most convinced that philosophy gave us an all-embracing historical context in which every other species of discourse could be assigned its proper place and rank.
- 9 McDermott, *The Writings of William James*, p. 311.
- 10 Auspits, "The Wasp Leaves the Bottle", p.605.
- 11 *The Writings of William James*, p. 311.
- 12 See Delaney, *Science, Knowledge, and Mind*, p. 111-18, on Peirce's critical common-sensism.
- 13 TCD, p. 160. In a subsequent essay, Peirce makes a case for the reality of all three categories, with no one category having priority over another. Firstness and Secondness are both pre-cognitive categories, or those parts of experience that are pre-linguistic. All cognition occurs on the level of Thirdness, or on the level of formal representation. Thus, conceptual knowledge must be a Third. It is not altogether clear where intuitive knowing falls within the categories, although Peirce's writings on phenomenology (*On Phenomenology* in *Collected Papers* 5.41-56) seem to leave open the possibility of pre-cognitive, intuitive knowing at the level of Firstness, our "feel" for the qualities of a phenomenon.
- 14 Harrison, "Our Glassy Essence." p. 179.
- 15 See John Smith, "Community and Reality," p. 118.
- 16 PCL, p. 220-221. See Rorty's contrast between the horizontal and vertical indefinite regress of interpretation, pp. 219-221.

References

- Auspitz, Josiah L. "The wasp leaves the bottle; Charles Sanders Peirce." *The American Scholar* 63 (1994):602-18.
- Bernstein, Richard J. "Action, Conduct, and Self Control." In *Perspectives on Peirce; critical essays on Charles Sanders Peirce*, edited by Richard Bernstein. New Haven: Yale University Press, 1965
- _____. *Beyond Objectivity and Relativism: Science, Hermeneutics, and Praxis*. Philadelphia: U. Pennsylvania Press, 1983.
- Boler, John F. Charles Peirce and Scholastic Realism: *A Study of Peirce's Relationship to John Duns Scotus*. Seattle: University of Washington Press, 1963.
- Bordo, Susan R. *The Flight to Objectivity*. Albany: The Statue University of New York Press, 1987.
- Bortoft, Henri. *The Wholeness of Nature*. New York: Lindisfarne Press, 1996.
- Brent, Joseph. Charles Sanders Peirce: A Life. Bloomington: Indiana U. Press, 1993.
- Capra, Fritjof. *The Turning Point*. New York: Simon and Schuster, 1983.
- Delaney, C.F. Science Knowledge and Mind: A Study of the Philosophy of C.S. Peirce. Notre Dame: U. of Notre Dame Press, 1993.
- Dewey, John. *Democracy and Education*. New York: The Free Press, 1916.
- Gadamer, Hans-Georg. *Reason in the Age of Science*. Cambridge: MIT Press, 1981.
- Griffith, David Ray, ed. The Reenchantment of Science. Albany: State University of New York Press, 1988.
- Guignon, Charles. "Pragmatism or Hermeneutics? Epistemology after Foundationalism." In *The Interpretive Turn*, edited by Richard Shusterman, et. al. Ithaca: Cornell U. Press, 1991.
- Haack, Susan. "We pragmatists...: Peirce and Rorty in conversation". *Partisan Review* v. 64 (1997): 91-107.
- Hacking, Ian. *Representing and Intervening*. Cambridge: Cambridge U. Press, 1983.
- Harrison, Stanley. "Our Glassy Essence: a Peircean response to Richard Rorty." *International Philosophical Quarterly* 26 (1986):169-81.
- Hausman, Carl R. Charles S. Peirce's Evolutionary Philosophy. Cambridge: Cambridge U. Press, 1993.
- Houser, Nathan, and Kloesel, Christian, ed. *The Essential Peirce, Volume 1 (1867-1893)*. Bloomington: Indiana University Press, 1992.
- Houser, et. al., ed. *The Essential Peirce, Volume 1 (1867-1893)*. Bloomington: Indiana University Press, 1998.
- Kuhn, Thomas S. The Structure of Scientific Revolutions. Chicago: U. of Chicago Press, 1970.
- McDermott, John J., ed. *The Writings of William James*. Chicago: U. of Chicago Press, 1977.
- _____. *The Philosophy of John Dewey*. Chicago: U. of Chicago Press, 1981.
- Rorty, R. *Consequences of Pragmatism*. Minneapolis: U. of Minnesota Press, 1982.
- _____. *Essays on Heidegger and Others*. New York: Cambridge U., 1993.
- _____. *Objectivity, Relativism, and Truth*. New York: Cambridge U., 1991.
- _____. "Pragmatism, Categories, and Language." *Philosophical Review*, 60 (1961): 197-223.
- Sheldrake, Rupert. "The Laws of Nature as Habits: A Postmodern Basis for Science." In Griffith, David Ray, ed. The Reenchantment of Science. Albany: State University of New York Press, 1988.
- Sheriff, John K. Charles Peirce's Guess at the Riddle. Bloomington, Indiana U. Press, 1994.
- Smith, John E. "Community and Reality." In *Perspectives on Peirce; critical essays on Charles Sanders Peirce*, edited by Richard Bernstein. New Haven: Yale University Press, 1965

Robert F. Kruckeberg, School of Education at Pace University in New York, can be contacted at: rkruckeberg@pace.edu

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Board of Directors of the John Dewey Society:

2001-2004

Eric Bredo
University of Virginia
bredo@virginia.edu

J. J. Chambliss
Rutgers University

D. C. Phillips
Stanford University

2002-2005

Richard Gibboney
University of Pennsylvania

Craig Kridel
University of South Carolina
ckridel@gwm.sc.edu

2003-2006

Steve Fishman
University of North Carolina at Charlotte
smfishman@email.uncc.edu

Leonard Waks
Temple University
ljwaks@yahoo.com

Kathleen Weiler
Tufts University
Kathleen.weiler@tufts.edu

2004-2007

Gert Biesta
University of Exeter/England
g.biesta@exeter.ac.uk

Sharon Feiman-Nemser
Brandeis University
snemser@brandeis.edu

Jim Garrison
Virginia Polytechnic Institute & State
University

Webmaster:
Craig Cunningham
National-Louis University of Chicago
<cac@cuip.net>

Become a Fellow of the John Dewey Society

The life-blood of an organization such as the John Dewey Society is a large, healthy membership base. As well as providing the financial resources necessary to maintain and active and extensive regime of publications, lectures and symposia, the members also supply those critical and essential sparks of creativity, insight and drive that allows all members to freely share notions and ideas.

The range of activities outlined by your Board of Directors for the 2003-2004 and 2004-2005 years is quite exciting. Powerful sessions are slated for both AERA and ASCD, and your two Society publications (*Education and Culture* and *Insights*) are offering colleagues and friends of the John Dewey Society professional space to discuss their ideas.

Please, approach friends, peers and graduate students who you feel might benefit from becoming a Fellow in an organization whose avowed goal is to promote the free exchange of ideas within a democratic setting.

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Jon Bradley
Faculty of Education/McGill University
3700 McTavish Street
Montreal, Quebec, Canada
H3A 1Y2