

12-15-2009

Working Paper No. 62, Uses of Abduction in Economic Science

Daniel Urban
Portland State University

Follow this and additional works at: https://pdxscholar.library.pdx.edu/econ_workingpapers



Part of the [Economic History Commons](#), and the [Economic Theory Commons](#)

Let us know how access to this document benefits you.

Citation Details

Urban, Daniel. "Uses of Abduction in Economic Science, Working Paper No. 62", Portland State University Economics Working Papers. 62. (15 December 2009) i + 22 pages.

This Working Paper is brought to you for free and open access. It has been accepted for inclusion in Working Papers in Economics by an authorized administrator of PDXScholar. Please contact us if we can make this document more accessible: pdxscholar@pdx.edu.

Uses of Abduction in Economic Science

Working Paper No. 62

Authored by: Daniel Urban

A Contribution to the *Working Papers* of the
Department of Economics, Portland State University

Submitted for: EC446 “Institutional Economics”

15 December 2009, i +22 pages

Prepared for Professor John Hall

Abstract: This inquiry considers the meaning of abduction and its uses in Economic Science. Abductive logic is discussed at some length, in order to clarify how it is used in this inquiry. In addition, abduction is traced from its appearances in the writings of pragmatist philosopher Charles Sanders Peirce and how its meaning is later carried on in Thorstein Veblen’s *Institutional Economics*. Peirce’s influence proves foundational for Veblen’s contributions, as well as for the writings of John Roger Commons. My research suggests that after Commons, Peirce’s influence in economics wanes. Additionally, the use of *retroduction* in critical realism provides a contemporary example of abduction. This inquiry concludes by discussing implications of abductive logic, suggesting that abduction proves essential for the advancement of Economic Science.

JEL Classification Codes: B15, B25, B31, B41

Keywords: abduction, Charles Sanders Peirce, *Institutional Economics*

retroduction, Thorstein Veblen,

With his infamous article that got published in the *American Economic Review* back in 1898, in “Why is Economics not an Evolutionary Science?” Thorstein Veblen addresses what he views as the deplorable state of Economics in his day. Specifically, Veblen ([1898] 1968, pp. 223-227) confronts the ubiquitous use of deductive logic, arguing it unfit for a superior “evolutionary” science. An orthodox economic method—rooted in deduction—appears based upon theories of natural law that depend upon establishing the “normal case,” and then assuming a “meliorative trend” always towards the normal case. Veblen [1898] 1968, 227) suggests that so long as economics depends upon the use of deductive logic it will remain at best “a system of economic taxonomy.” What’s more, in the same passages Veblen treats induction almost as an accomplice for authenticating the results and thereby perpetuating the inadequacy of neoclassical economics. Veblen proposes that economics ought to move past this “pre-Darwinian” conception of science.

However deep his insight and cutting his critique, Veblen shies away from explicitly offering a way forward. After his deprecating comments toward the traditionally recognized methods of logical inference, Veblen leaves the reader with nowhere to go and nothing to do but wait for the evolutionary emergence of a better method. However, this is not actually entirely the case. While Veblen is never clear or explicit about this, his work, and the contributions of many

institutionalists following him, and the very evolutionary method he prescribes, relies upon another form of logic, namely: *abduction*.

This inquiry explores the use of abduction in economic science. Specifically, I shall trace the lineage of abduction backwards through American institutionalism to its pragmatist origins. Additionally, we shall examine the demise of the use of abduction. This paper also comments on the contemporary uses of *retroduction* in critical realism, arguing that it needs to be understood as a form of abduction. This inquiry concludes with a discussion of the implications of abductive logic, and also suggests a direction for moving forward.

Abduction: Another Form of Logic

The obvious place to begin this paper is to explain what abduction means and signifies. Deductive and inductive logic are commonly used even in colloquial language (albeit often incorrectly) and are certainly staples of academic discussion regarding philosophy or method. Abduction (alternatively known as *retroduction*) registers as seldom used term. (Footnote 1).

Abductive reasoning should be traced back to Charles Sanders Peirce, whose student, Thorstein Veblen—I shall show—brought the idea of *abduction* into economic thinking. Unfortunately, Peirce's definition of abduction was never

crystal clear, nor expressed consistently over time. Nevertheless, I shall attempt to piece together a workable concept of abduction.

Peirce (1955, pp. 150-154) teaches us that abduction is the adoption of *explanatory hypotheses* potentially rendering complexity understandable.

Likewise, Peirce (1992, p.140) also phrases this as “adopting a hypothesis for the sake of its explanation of known facts.” Essentially, abduction is the process by which hypotheses are created. In its broadest sense, abduction seems to be little more than guessing. In its intended use in science, abduction is the beginning of scientific inquiry. (And guessing itself is not a far step from an honest representation of parts of the scientific process.) It serves here to elaborate upon what Peirce means by a “hypothesis” (Footnote 2).

To Peirce (1955, p.150), a hypothesis means:

“Any proposition added to observed facts, tending to make them applicable in any way to other circumstances than those under which they were observed.”

This conception of a hypothesis is essential to the understanding of abduction, because in Peirce’s mind abduction is the process of generating such hypotheses. Whereas induction moves from the general to the specific, and deduction moves

from the specific to the general, abduction moves in between antecedent and consequent. The hypothesis rendered through abduction is one of a connection between the “known facts.”

Peirce (1992, p. 170) elaborates upon abduction, explaining that it begins with the colligation of separately observed facts. Here Peirce’s use of “observation” is referring to experiential observation. Rather than strict external observation of objects as commonly conceived of with induction, this experiential observation stems from “the enforced element of the history of our lives.” This, Peirce clarifies as “that which we are constrained to be conscious of.” Or, phrased differently, abductive inference does not come from a strict set of facts, but rather the totality of consciousness as it relates to the question at hand (Footnote 3). From the premises built up in our experience we then form hypotheses regarding why the resultant known facts came to be.

Peirce (1992, p.142) clarifies abduction by noting that there is “no definite probability” of the conclusion as can be found in induction. In other words, hypotheses are not adopted because we know there is a high probability of their conclusion being correct. This is essentially implicit in the nature of a hypothesis, in any sense, and certainly in the Peircean sense. A hypothesis is adopted based upon its seeming ability to function in an explanatory capacity. As Peirce (1992,

p.180) phrases it: “nothing justifies a[n] [abductive] inference except its affording an explanation.”

A key to understanding abduction is that Peirce meant for it to be seen as part of a larger scheme of logical inference. This complete logic encompasses all three forms of logic in the greater process of scientific inquiry. Peirce (2000, pp. 131-132) separates the different forms of logic into “stages of inquiry,” which he defines thusly:

1.) First, we have abduction or the adoption of a hypothesis. Peirce (2000, p. 131) teaches us that a hypothesis is generated by furnishing an explanation. One comes about such an explanation through “pondering the phenomena in all their aspects.” He further clarifies his definition of an explanation as a “syllogism” which exhibits the phenomena in question “as necessarily consequent upon the circumstances of its occurrence.” A *syllogism* is simply an inference in which the conclusion is inferred from the premises. To be “necessarily consequent” suggests that the premises are *causally connected* to the conclusion. In other words, Peirce’s *hypotheses* are *causal explanations*. The hypothesis is then “provisionally” held to be “plausible.” Peirce is careful to note that abduction itself does not provide any “security” until the hypothesis has been tested.

2.) Next we find deduction, which has two parts, namely: “explication” and “demonstration.” Explication, Peirce (2000, p. 132) teaches us, is the processes of

rendering the hypothesis distinct. That is, to make the hypothesis clear by explicitly defining it. When the hypothesis is clear, demonstration follows explication. Demonstration, for Peirce, is determining the consequents of the hypothesis via “deductive argumentation.” In brief, Peirce’s deduction involves clarifying the hypothesis, and demonstrating the logical consequents. Peirce’s definition of deduction suggests roughly a narrative account similar to the traditional conception.

3.) The third stage is induction. Peirce (2000, p. 132) defines induction as having three parts, namely: “classification,” “probation,” and “sentential.” Classification is the process of attaching ideas to experience. In other words, classification is defining as categorizing the relevant pieces of experience. Probation is the testing phase. The relevant pieces of experience are placed up against the logical consequents of the hypothesis determined in deduction. Alternatively, the results are matched up with the deductions. The final part of induction is sentential, or, an evaluation of the hypothesis. Probationary testing is concluded by ‘sentencing.’ Elements from the probationary phase are appraised, and final judgment is provided. In summary, Peirce (2000, p. 132) describes induction as the process of “... ascertaining how far those consequents accord with experience.”

After presenting these processes related to abduction, Peirce again differentiates abduction from deduction and induction. In clarity and brevity rarely found, Peirce (2000, p. 133) notes: "... deduction explicates; induction evaluates: that is all." To Peirce, abduction serves as the sole contributor to new concepts. In other words, the creative aspects of abduction register as what is significant to Peirce.

Peirce's process of inquiry provides a complete conception from start to finish, although it must be noted that 'finish' is only a temporary state of being, as the process of inquiry is never truly over (Footnote 4). It should be noted that the entirety of Peirce's logic is occasionally subsumed under the rubric of 'abduction' alone, as a convenient synecdoche. This means that sometimes abduction ought to be interpreted as the whole process of inquiry, though the more common use registers as the but the first stage.

From Peirce to Veblen

How then do we get from early pragmatist philosophy to economic method? As was alluded above, Veblen serves as the conduit between Peirce's philosophy and Economic Science. Alan Dyer (1986, p. 31) traces connections between Peirce and Veblen. However, Dyer notes that much of the connection is not explicitly documented, but rather has been inferred through common points in their work.

This is an unfortunate consequence of the combination of both scholars' styles: Peirce published little in his lifetime, and Veblen was not oriented towards extensive citation. Despite these points, it has been confirmed that Veblen was at one time a student of Peirce's, and Dyer suggests that this interaction, though brief, proved significantly influential upon Veblen's career (Footnote 5). This inquiry seeks to establish this scholarly connection, but at the same time the thesis relies upon this speculation as a crucial point of origin for our discussion.

One contention that is that Veblen never used the word abduction. However, as Dyer (1986, p.31) notes that (on some occasions) when Veblen is using induction he is really using it more in the sense of Peirce's abduction. This interpretation of Veblen is not unfounded. As Dyer establishes (and this author thoroughly supports) Veblen's philosophy of science follows Peirce in emphasizing the shift from uncreative methods of inference (meaning deductive and inductive) towards creative inference, provided exclusively by abduction. Dyer (1986, pp. 31-35) examines Veblen's work. This shows up in his article *Kant's Critique of Judgment*, showing that Veblen demonstrated an understanding of abduction. Notably, Veblen's "principle of adaptation" (alternatively "principle of search") serves to guide 'induction' to provide for creative hypotheses. Sound familiar? Dyer asserts that while writing 'induction' Veblen actually means 'abduction' in the Peircian sense. This is not merely a charitable interpretation as

Veblen first obtained a doctorate in philosophy from Yale University in 1884, and his understanding of Peirce can be seen in his writings.

Building upon Dyer's work, Hall and Whybrow (2008, p. 350) note that the connection between Peirce's philosophical contributions and Veblen's economics actually extends well beyond his theory of scientific knowledge, and into his enduring contributions to economic science. Hall and Whybrow observe the fact that Veblen attempted to steer economics away from its traditional foundation in Newtonian mechanics: with the goal of transforming economics into an evolutionary science. Most importantly, Hall and Whybrow (pp. 350-351) trace Veblen's use of "cumulative causation" to Peirce's concept of *synechism*. They consider Peirce's inquiry towards an understanding of "continuity" and "continuousness," as being embodied in his concept of "synechism." The term *Synechism* is rooted originally in Greek thinking, suggesting continuity and a sense of things being held together. Hall and Whybrow (p.350) expand upon synechism by teaching us that it "insists on the necessity of hypotheses involving true continuity." Such an approach is clearly in opposition to the atomistic mechanics-based economics of which Veblen was so critical. And so it comes as no surprise that Veblen's work promotes an approach which looks for continuity. Hall and Whybrow attribute Veblen's understanding and use of *cumulative causation* to Peirce.

Furthermore, Hall and Whybrow (2008, p. 350) suggest that Veblen “appears fully indebted” to Peirce’s contributions in these areas. This author agrees with their sentiment, while also suggesting both Dyer’s and Hall and Whybrow’s research misses a key connection. Essentially, these authors fail to take their conclusions far enough. “Fully indebted” is an accurate depiction of Peirce’s influence on Veblen’s thinking. Dyer connects Veblen’s notion of scientific creativity to Peirce through abduction. Hall and Whybrow, on the other hand, connect Veblen’s cumulative causation to Peirce’s synechism. But, both dimensions are just pieces in the larger puzzle of Veblen’s contribution to Economic Science. Namely, Veblen’s evolutionary economics depends upon both of these aspects, as it demands the creation of explanatory hypotheses depending upon continuity. More specifically, Veblen’s evolutionary science depends upon Peirce’s logic of scientific inquiry.

What Veblen adopts and carries forward from Peirce’s aids and abets in making his contribution substantial. Only through understanding Peirce’s contributions can Veblen’s larger project to rewrite economic science into an evolutionary science be understood. Veblen’s critiques of neoclassical economics are based upon his doubts of *atomism* as well as reliance upon *deduction*. As Veblen sought to advance an evolutionary economics, this suggests continuity and continuousness, to quote Hall and Whybrow. And this undermines atomism as a

scientific premise. Evolutionary science also suggests the importance of change, thereby challenging the use of deductive logic.

Veblen's writings we are left with a vague idea of opposition towards atomism and deduction. The implication is that the opposites of these concepts are the appropriate direction to move forward. Of course, we are given the specific concepts of cumulative causation, the evolution of institutions, etc..., but the methodological basis for Veblen's work is left vague. If, instead, we consider aspects of Peirce's work to be the background of Veblen's theories, the whole body of work becomes considerably clearer.

In summary, abduction relies upon synechism as a premise in the formation of inferences, thus providing for the possibility of an evolutionary science. Abduction, a keystone in Peirce's logic of inquiry, provides the foundation for Veblen's institutional economics.

Peirce's influence after Veblen:

Given that Veblen needs to be understood as the progenitor of the "Original Institutional Economics" (OIE), it follows that this Peircean influence should continue down through history. This is certainly true for John R. Commons, who continues to advance Veblen's project after his passing in 1929. Commons (1934, pp. 150-151) emphasizes that Peirce had a significant influence upon his method.

Commons uses “pragmatism” to refer specifically to “Peirce’s meaning of purely a method of scientific inquiry,” as opposed to the plethora of other uses it has since accumulated. While Commons does not specifically discuss abduction, he endorses Peirce’s method. Again, we have an example of Peirce’s influence without the luxury of Commons’ explicitly using the term ‘abduction,’ so we must infer its use as part of the method of inquiry.

Unfortunately, the trend in institutional economics remains one of implicit use, with, at best, an explicit consideration of Peirce’s concept of abduction. However, in his overarching analysis of *The Philosophical Bases of Institutional Economics*, Mirowski (1987, pp. 1007-8) suggests that Peirce’s contributions to scientific inquiry should be “... consolidated into an institutionalist school of economic theory.” In addition, Mirowski (1987, pp. 1011-13) notes that abduction stands at the core of Peirce’s scientific method and suggests that it transferred down the line to Veblen, and others following him. Mirowski’s work here clearly echoes what has been presented above (Footnote 6).

Mirowski’s expresses a special interest in institutionalist thinking after the 1930s. He traces the decline in Peirce’s influence, which interestingly coincides with a sharp decline in the overall influence of Institutional Economics. Mirowski (1987, pp. 1028-30) notes that pragmatism was in decline in this period, and John Dewey’s thinking replaced Peirce’s. In addition, a next generation of thinkers

emerged. Mirowski (1987, p. 1028) notes that Wesley Mitchell and Clarence Ayres took their thinking away from the Peircian traditions. Mitchell, so Mirowski claims, endorsed a considerably simpler conception of scientific behavior, despite having been a student of Veblen. This simpler conception led to the perception of Institutionalism endorsing little more than a naïve empiricist view.

Ayres, on the other hand, is not charged with philosophical ignorance. Instead, Ayres' efforts were largely inclusive of philosophical elements. What stands out with Ayres is that he followed Dewey's line of reasoning rather than Peirce's. In essential respects, Ayres' legacy could be viewed as a unification of traditions advanced by Veblen and Dewey. Despite many positive aspects found in Dewey's work and subsequent influence, Ayres' endorsement of Dewey and neglect of Peirce raises issues for the institutionalist method. While Dewey has undoubtedly made significant contributions to philosophy and social theory, institutionalism was originally based upon Peirce's theories, which Dewey's work could not replace without considerable loss from the original project. Mirowski (1987, pp. 1030) surmises that in the wake of Mitchell and Ayres' contributions, the once robust pragmatism based institutional method was reduced to something more closely resembling "a Popperian version of science."

Mirowski's image of the state of Institutionalism appears rather bleak. Is his diagnosis correct? Unfortunately, to some degree, yes. Blaug (1980, p. 109-10)

seeks to categorize the Institutional method and comes up with notions of “pattern modeling” and “storytelling.” At best, Blaug suggests, these are not methods excluded from the orthodoxy. At worst, they lack rigor and are scientifically questionable. Blaug’s scholarship is not to blame, but rather the fact that in the absence of an understanding an application of Peirce, our Institutional method is left vague. For example, Wilber and Harrison (1978) display the convoluted mess that interpretations of the institutional method turned into over time. However, these coauthors fail to examine Peirce’s work, and thus are left with the vague concepts of “pattern modeling” and “storytelling,” which Blaug later reiterates.

While Mirowski’s evaluation of later institutionalism is somewhat accurate for a large part of the school, it is not universally true. Certainly, this author contends that some strains of Veblenian Institutionalism have indeed survived. To some extent Peirce’s influence—including abductive inference—has always remained somewhat implicit in works considered ‘institutional’ so long as Veblen’s influence is also found. But, by and large, the connection has dissipated. In more recent years the Veblenian approach has had somewhat of a resurgence. However, this resurgence becomes handicapped when the Peircean philosophical basis—namely, the use of abduction, and the logic of scientific inquiry—is not also revived.

***Retroduction* - different term, same idea**

As Tony Lawson, critical realism has “recently gained some attention” in the economic community. To those familiar with Lawson’s “critical realist project,” abduction may seem strikingly recognizable. *Retroduction* is another term coined by Peirce, and can be understood as synonymous with abduction. Retroduction is also the prescribed form of logical inference in Lawson’s work. As noted, abduction found its way into economics beginning with Veblen’s critique of mainstream theory’s use of deduction. Likewise, Lawson (1997, p.16) first traces “failures” in neoclassical economics to “deductivism.” He then goes forward to suggest that retroduction is better suited both for economics in general, and for the application of his methodological precepts.

Lawson (1997, pp. 24, 294) traces his use of retroduction directly back to Peirce, circumventing Veblen’s implicit use, though he does mention its being used by “various institutionalist economists” (albeit only in a footnote). What is important to Lawson (1997, p. 24) is retroduction’s ability to move from “surface phenomena” to inferences regarding something “deeper.” Specifically, retroduction allows for the inferences of causation and of stratified levels of reality, both of which are essential to Lawson’s work. Also, Lawson rails against mainstream economics’ and its focus on prediction, suggesting, instead, that “explanatory power” is a more desirable goal. Thus, retroduction, as an inherently

explanatory method of inference, is a considerably better fit for Lawson in his approach to Economic Science.

It should be noted, however, that Lawson's thinking fails to fully consider Peirce's full logic of inquiry, only briefly addressing *retroduction*, and never touching upon other aspects. While Lawson is justified in his critique of the mainstreams *dependence* upon deduction, he does not acknowledge that deduction (at least implicitly) has a role to play in scientific inquiry.

Lawson (1997, p.24) contributes the notion of "as if" reasoning to our understanding of *retroduction* (abduction). In other words, for Lawson it is reasoning by analogy or metaphor. This means that given a 'colligation of facts' an inference is made based upon another set of conditions, which have in some ways a comparable structure. *Retroduction* allows us to infer that with a similar initial structure, the result will also be similar. By this, Lawson is stipulating that our inferences arise based upon experiences of comparable events. Such does not limit our inferences merely to referring to past knowledge. Rather, *retroduction* suggests the ability to come up with novel hypothesis with the assistance of a previous understanding. In the case of Lawson's work, this previous understanding has its basis in ontological presuppositions regarding the structure of the world.

While Lawson does not trace his use of *retroductive* logic through Veblen, the effects of this form of logic provide for great similarities between critical realism and Institutionalism. In fact, Lawson (2004, p. 184) argues that Veblen's work comprises features very similar to those for which Lawson himself advocates. This argument is posed after considering the legacy produced by Veblen's evolutionary essay. Essentially, the prominent features of Veblen's Evolutionary Economics (i.e. abductive logic; continuity; social structure; holism; cumulative causation) correlate undeniably with the prominent features of Lawson's critical realism (i.e. *retroduction*; holistic, continuous, and structured social reality; causal mechanisms operating through the structured social reality). In conclusion, Lawson's project can be seen as a continuation of the sort of evolutionary inquiry for which Veblen advocated, and this is made possible largely due to the reliance upon *retroductive* (abductive) logic.

Abduction, the path toward economics as an evolutionary science

So long as economics stays rooted in static forms of inference all it can do is rephrase and recalculate based upon the content it already possesses. This stagnant state is seemingly antithetical to anything calling itself a science. This proves even more problematic for dynamic subject matter such as that of economics. As we have seen this contention regarding the decrepit nature of neoclassical economics

is not new: Veblen was lamenting its shortcomings over a century ago. Nor is it outdated as Lawson's work is in the foreground of current methodology. Given that abduction somehow holds the key to a better way forward in economics, how ought we to proceed?

From Peirce and Veblen we can see the methodological path which can lead to an evolutionary and thereby relevant economic science. Logic which can encompass both change and continuity proves essential in order to be able to develop our understanding of the social world. Veblen advocated not for any specific single method, but rather for underlying methodological principles which would prove beneficial to economics. Lawson's work provides a more contemporary example of the sort of work that can be done based upon abduction, but this is certainly not the only path. What should be taken from this inquiry is the necessity for the consideration of Peirce's principles of inquiry, of which abductions hold primacy, for offering us a better insights into economic inquiry.

Any specifics related to the path forward are beyond the scope of this particular inquiry. However, the ideas addressed above are applicable not only to institutions or instincts, but to the entirety of economic phenomena. The important lesson to learn is that there is indeed a viable alternative to the neoclassical method. This alternative stems from an entirely different conception of how scientific inquiry ought to be done. Abduction is not a solution in and of

itself, but rather the means to discovering potential solutions and ways to go forward.

Footnotes:

1. Abduction is used synonymously with *retroduction*, another term of Peirce's creation. In different pieces he uses either word, sometimes with the other term in parentheses after the initial use of the selected word. For simplicity's sake I have chosen to use abduction (with the exception of the consideration of Lawson's work) with the only rationalization for this choice being that it was the term used when I was first taught about the concept.

2. I would suggest that in dealing with any philosophical writer that a careful consideration of the specific meaning intended by the use of a given term is essential. This is especially true with regard to those subsumed under pragmatism as these authors have a tendency to use colloquial terms in nontraditional senses. The term "pragmatic" is itself an unfortunate example of such a distortion of meaning.

3. Experience, and specifically participation and recognition within experience, plays a significant role in pragmatism. This idea is later embodied in James' "radical empiricism."

4. Pragmatism promotes the idea that the process of inquiry is never finished, as our experience (see above) forever continues to provide new inputs to evaluate.

5. The connection between Veblen and Peirce has been commented on, and authenticated by many authors, but for our purposes it suffices to use only Dyer, Hall and Whybrow, and Mirowski. For further consideration see their respective bibliographies for a more extensive list.

6. Mirowski's article has received criticism from Institutionalists and, in some cases perhaps, for good reason. I do not agree with the entirety of its contents, but for the details used in this paper I believe his work to be well reasoned and well referenced.

Bibliography

Blaug, Mark. 1992. *The Methodology of Economics*, London, University of Cambridge.

Dyer, Alan. 1986. "Veblen on Scientific Creativity: The Influence of Charles S. Peirce," *Journal of Economic Issues*, vol. 20, no. 1.

Hall, J. and Whybrow, O. 2008. "Continuity and Continuousness: The Chain of Ideas Linking Peirce's Synechism to Veblen's Cumulative Causation" *Journal of Economic Issues*, vol. 42, no. 2.

Lawson, Tony. 1997. *Economics and Reality*, London, Routledge.

Lawson, Tony. 2004. *Reorienting Economics*, London, Routledge.

Mirowski, Philip. 1987. *The Philosophical Bases of Institutional Economics*, *Journal of Economics Issues*, vol. 21, no. 3.

Peirce, C.S. 1955. *Philosophical Writings of Peirce*, New York, Dover.

Peirce, C.S. 1992. *Reasoning and the Logic of Things*, Cambridge, MA, Harvard University Press.

Peirce, C.S. 2000. "A Neglected Argument for the Reality of God," in Stuhr, John.

Pragmatism and Classical American Philosophy, New York, Oxford

University Press.

Veblen, Thorstein. 1968 [1898]. "Why is Economics Not and Evolutionary

Science?" in *The Portable Veblen*, New York, The Viking Press.

Wilber, C. and Harrison, R. 1978. "The Methodological Basis of Institutional

Economics: Pattern Model, Storytelling, and Holism" *Journal of Economic*

Issues, vol. 12, no. 1.