An image of enduring plurality in economic theory: The root -metaphor theory of Stephen C Pepper

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An image of enduring plurality in economic theory: The root-metaphor theory of Stephen C Pepper

Abstract
This dissertation establishes an image of enduring plurality in economic theory based on four stable and adequate world hypotheses identified by philosopher of science Stephen C. Pepper. According to Pepper’s metaphilosophy—a theory of philosophy—a world hypothesis is a conceptual system founded on a root metaphor. A root metaphor serves as a cognitive focal point or image that guides in the transformation of uncriticized, commonsense, evidence into criticized evidence and thought. A description of a world hypothesis is developed using the root-metaphor method, which derives a unique set of structural categories identified with each root metaphor. In Pepper’s system, four sets of structural categories define a metatheoretical taxonomy and reflect discrete manners by which theoreticians transform uncriticized, commonsense evidence into criticized evidence in an attempt to explain the world. The four world hypotheses identified by Pepper in the philosophical literature are formism, mechanism contextualism and organicism. Formism is based on the root metaphor or perceptual experience of similarity, mechanism is based on the image of the machine; contextualism is founded on the idea of the given event; and organicism is founded on the idea of the historical process. A world hypothesis is found to be adequate if it possesses scope and precision. Each world hypothesis is autonomous and possesses a unique ontological perspective, theory of truth, interpretation of time and causality, and mode of scientific explanation.

Based on Pepper’s root-metaphor theory, this research shows how four major theoretical perspectives or 'schools of thought' in economics correspond with the four adequate world hypothesis. Formism is associated with critical realism, which, in turn, is considered by some to be consistent with post-Keynesian economics. Mechanism is associated with neoclassical economics, Contextualism is associated with 'old' institutional economics. Organicism is associated with Mandan economics. As a result, Pepper’s metaphilosophical system provides a possible philosophical and pluralist account for the origins of the four major 'schools of thought' often cited in the economic literature.

Keywords
Economics, Theory, Philosophy

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AN IMAGE OF ENDURING PLURALITY IN ECONOMIC THEORY:
THE ROOT-METAPHOR THEORY OF STEHLEN C. PEPPER

By

Michael C. Daley
BS, University of Maine, 1983
MA, University of New Hampshire, 1987

DISSERTATION

Submitted to the University of New Hampshire
in Partial Fulfillment of
the Requirements for the Degree of

Doctor of Philosophy

in

Economics

May 2000
This dissertation has been examined and approved.

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April 13, 2000

Date
DEDICATION

The Wheel

Round, round robin run round
Got to get back to where you belong
Little bit harder just a little bit more
A little bit further than you gone before

The wheel is turning and you can’t slow down
You can’t let go and you can’t hold on
You can’t go back and you can’t stand still
If the thunder don’t get you than the lightening will

Small wheel turn by the fire and rod
Big wheel turn by the grace of God
Every time that wheel turn ‘round
Bound to cover just a little more ground
Bound to cover just a little more ground

Robert Hunter
Lyricist
(Hunter 1993)
ACKNOWLEDGMENTS

Support for life's meaningful endeavors comes from a handful of vital sources, no one more important than another. Taken as a whole, these sources of support and encouragement make a sustained effort possible. The absence of any one threatens the ability to bring a project to fruition. Mindful of this, I would like to thank my triumvirate of mentors from the Whittemore School of Business and Economics: Professors James Wible and Richard England, who served as co-chairs on my dissertation committee, and Marc Herold. Over the years, they encouraged me to pursue graduate school and doctoral research according to the ideal that it should be a process of intellectual questioning, extension and development. I would also like to thank Professor Bruce Elmslie from the Economics Department and Professor Drew Christie from the Philosophy Department for being readers on my dissertation committee and valuable contributors to this project. I also extend my appreciation to all those in the Economics Department at the Whittemore School who have assisted me along the way. I sincerely thank Sinthy Kounlaska who has helped me navigate administrative and faculty matters throughout my stay in graduate school. Also, I would like to thank Professor Bill Harrell from the Department of Sociology and Anthropology at S.U.N.Y. Institute of Technology for his time and helpful clarifications. Finally, I would like to thank Susan Stewart for editing this dissertation.
I cannot begin to comprehend the impact that this research effort has had on my family. I am grateful to my wife, Kimberly, who held strong to the belief that I could accomplish this work without disappearing from the family. To Kimberly, and our children Joel and Molly, I extend my love and appreciation for helping me create a healthy space capable of accommodating the time required for this effort. I would also like to thank my parents, Charles and Marjorie Daley, for their encouragement throughout and financial support at a critical juncture in the life of this project.
# TABLE OF CONTENTS

**DEDICATION** ........................................................................................................................................ IV

**ACKNOWLEDGMENTS** .......................................................................................................................... V

**LIST OF FIGURES** ................................................................................................................................ IX

**LIST OF TABLES** .................................................................................................................................. X

**ABSTRACT** ........................................................................................................................................... XI

**CHAPTER ........................................................................................................................................ PAGE**

**INTRODUCTION** ................................................................................................................................... 1

I. **PLURALISM AND THE POST-POSITIVIST ERA** ............................................................................ 4
   
   REVIEW OF THE RECENT LITERATURE ......................................................................................... 4
   SHEILA DOW: THE BABYLONIAN MODE OF REASONING .......................................................... 33
   SEEDS OF PLURALISM: POPPER’S CRITICAL FALLIBILISM .................................................. 44
   METHODOLOGY BEYOND MONISM AND RELATIVISM .......................................................... 51

II. **PEPPER’S METAPHILOSOPHICAL APPROACH** ........................................................................... 62
   
   GENERAL STATEMENT OF THE TAXONOMIC MODEL ............................................................. 73
   WHAT IS METATHEORETICAL ANALYSIS? .................................................................................... 79
   LITERARY METAPHOR AND EXTENDED METAPHOR ............................................................. 83
   WHAT IS THE ROOT-METAPHOR METHOD? .................................................................................... 87
   WHAT IS A WORLD HYPOTHESIS TO PEPPER? ............................................................................. 90

   THE CATEGORIAL STRUCTURE OF FOUR WORLD HYPOTHESES ........................................ 93
     Formism: An Adequate World Hypothesis ....................................................................................... 96
     Mechanism: An Adequate World Hypothesis ................................................................................ 106
     Contextualism: An Adequate World Hypothesis ........................................................................ 113
     Organicism: An Adequate World Hypothesis ............................................................................. 127

   SOME RELATIONS AMONG THE WORLD HYPOTHESES ....................................................... 134
   WORLD HYPOTHESES POSSESS THEIR OWN THEORY OF TRUTH ....................................... 137
     Correspondence Theory of Formism ............................................................................................. 141
     Causal Adjustment Theory of Mechanism ................................................................................... 143
     Operational Theory of Contextualism ....................................................................................... 147
<table>
<thead>
<tr>
<th>Coherence Theory of Organicism</th>
<th>311</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AN ILLUSTRATIVE STUDY OF WORLD HYPOTHESES</strong></td>
<td>160</td>
</tr>
<tr>
<td>THE FALLACY OF COMPOSITION</td>
<td>176</td>
</tr>
<tr>
<td><strong>FORMISM AND ECONOMIC THEORY</strong></td>
<td>182</td>
</tr>
<tr>
<td>Taxonomy and Market Structure in Industrial Organization</td>
<td>184</td>
</tr>
<tr>
<td>Taxonomy and the National Income Account System</td>
<td>195</td>
</tr>
<tr>
<td>Transcendental/Critical Realism: An Appeal to the Deep Structure</td>
<td>206</td>
</tr>
<tr>
<td><strong>MECHANISM AND ECONOMIC THEORY</strong></td>
<td>224</td>
</tr>
<tr>
<td>Irving Fisher's Cistern: The Market Mechanism</td>
<td>231</td>
</tr>
<tr>
<td>Circular Flow and Macroeconomics</td>
<td>240</td>
</tr>
<tr>
<td><strong>CONTEXTUALISM AND ECONOMIC THEORY</strong></td>
<td>258</td>
</tr>
<tr>
<td>Veblen's Contextualist Approach to Theorizing Capitalism</td>
<td>263</td>
</tr>
<tr>
<td>Coevolution and the Emergence of Unsustainability</td>
<td>273</td>
</tr>
<tr>
<td>Overdeterminism as a Contextualist Meta-Perspective</td>
<td>282</td>
</tr>
<tr>
<td><strong>ORGANICISM AND ECONOMIC THEORY</strong></td>
<td>294</td>
</tr>
<tr>
<td>Marx's Interpretation of Economic History</td>
<td>297</td>
</tr>
<tr>
<td>Marshall's Idea of Industrial Organization</td>
<td>307</td>
</tr>
<tr>
<td><strong>CONCLUSION</strong></td>
<td>316</td>
</tr>
<tr>
<td><strong>APPENDIX A</strong></td>
<td>331</td>
</tr>
<tr>
<td><strong>LIST OF REFERENCES</strong></td>
<td>335</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figures</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1 Dow's Hierarchy of Conceptual Levels</td>
<td>39</td>
</tr>
<tr>
<td>Figure 2 Fisher's Utility Cistern for One Consumer and One Commodity</td>
<td>233</td>
</tr>
<tr>
<td>Figure 3 Fisher's Utility Cistern for N Consumers and One Commodity</td>
<td>236</td>
</tr>
<tr>
<td>Figure 4 Fisher's Utility Cistern System Introducing Idea of Price Ratios</td>
<td>238</td>
</tr>
<tr>
<td>Figure 5 Elevation or Side View of Utility Cistern System</td>
<td>239</td>
</tr>
<tr>
<td>Figure 6 Plan or Top View of Utility Cistern System</td>
<td>239</td>
</tr>
<tr>
<td>Figure 7 Circular Flow Diagram Reflecting the Classical View</td>
<td>242</td>
</tr>
<tr>
<td>Figure 8 Circular Flow Diagram With Embedded Class Relations</td>
<td>244</td>
</tr>
<tr>
<td>Figure 9 Circular Flow Diagram of the Monetary Economy</td>
<td>245</td>
</tr>
</tbody>
</table>

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## LIST OF TABLES

<table>
<thead>
<tr>
<th>Tables</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1 Pepper's Taxonomy of World Hypotheses</td>
<td>80</td>
</tr>
<tr>
<td>Table 2 Summary of Pepper's Pure and Eclectic World Hypotheses</td>
<td>95</td>
</tr>
<tr>
<td>Table 3 Further Breakdown of Structural Categories in the Root Metaphors</td>
<td>107</td>
</tr>
<tr>
<td>Table 4 Summary of Attributes in Pepper's Adequate World Hypotheses</td>
<td>135</td>
</tr>
<tr>
<td>Table 5 Summary of World Theories and Scientific Domains</td>
<td>159</td>
</tr>
<tr>
<td>Table 6 Fritjof Capra's Explication of Root Metaphors in Scientific Domains</td>
<td>169</td>
</tr>
<tr>
<td>Table 7 Representation of the Metatheoretical Taxonomy in Economic Theory</td>
<td>181</td>
</tr>
<tr>
<td>Table 8 Exemplifications of World Hypotheses in Economic Theory</td>
<td>185</td>
</tr>
</tbody>
</table>

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ABSTRACT

AN IMAGE OF ENDURING PLURALITY IN ECONOMIC THEORY

THE ROOT-METAPHOR THEORY OF STEPHEN C. PEPPER

by

Michael C. Daley
University of New Hampshire
May 2000

This dissertation establishes an image of enduring plurality in economic theory based on four stable and adequate world hypotheses identified by philosopher of science Stephen C. Pepper. According to Pepper's metaphilosophy — a theory of philosophy — a world hypothesis is a conceptual system founded on a root metaphor. A root metaphor serves as a cognitive focal point or image that guides in the transformation of uncriticized, commonsense evidence into criticized evidence and thought. A description of a world hypothesis is developed using the root-metaphor method, which derives a unique set of structural categories identified with each root metaphor. In Pepper's system, four sets of structural categories define a metatheoretical taxonomy and reflect discrete manners by which theoreticians transform uncriticized, commonsense evidence into criticized evidence in an attempt to explain the world. The four world hypotheses identified by Pepper in the
philosophical literature are formism, mechanism, contextualism and organicism. Formism is based on the root metaphor or perceptual experience of similarity; mechanism is based on the image of the machine; contextualism is founded on the idea of the given event; and organicism is founded on the idea of the historical process. A world hypothesis is found to be adequate if it possesses scope and precision. Each world hypothesis is autonomous and possesses a unique ontological perspective, theory of truth, interpretation of time and causality, and mode of scientific explanation.

Based on Pepper’s root-metaphor theory, this research shows how four major theoretical perspectives or ‘schools of thought’ in economics correspond with the four adequate world hypothesis. Formism is associated with critical realism, which, in turn, is considered by some to be consistent with post-Keynesian economics. Mechanism is associated with neoclassical economics. Contextualism is associated with ‘old’ institutional economics. Organicism is associated with Marxian economics. As a result, Pepper’s metaphilosophical system provides a possible philosophical and pluralist account for the origins of the four major ‘schools of thought’ often cited in the economic literature.
INTRODUCTION

Whether one focuses on sociological formations or pluralist models of theory appraisal, the "growth of knowledge" debate centered on the work of Kuhn, Popper and Lakatos effectively pierced the veil of the monist tradition. In time, it led to a new debate focused on defining the terms and extent of plurality in a "post-positivist" era. The purpose of this research is to explore an alternative interpretation of the meaning of plurality in economic theory and to demonstrate its existence using economic texts. If one takes seriously the actual practice of working economists and the texts that they produce, it is possible to see a diverse range of work with distinct analytical orientations. In this dissertation, I offer a metatheoretical taxonomy as a means to understand the source and nature of the plurality of economic theory. This taxonomy turns on the various ways that philosophers and scientists organize evidence used in economic theory. I present the taxonomy in order to address the question of how to conceptualize the sustained generation of a plurality of types of economic theory. My primary thesis is that the plurality of economic theory is a consequence of longstanding and stable cognitive systems or "root metaphors," which guide in the organization of evidence used in formulating economic theory. These cognitive systems have been identified and developed by philosopher of science Stephen C. Pepper and called "adequate world hypotheses". Pepper identifies four adequate world hypotheses: formalism, mechanism, contextualism and organicism. He articulates them using a method that reveals the "structural categories" of
an associated 'refined root metaphor,' which finds its origin in uncritcized common sense at an earlier stage of cognitive development. Each world hypothesis is viewed as possessing a distinct set of ‘structural categories’ that render them autonomous or mutually exclusive. The structural categories and subcategories provide an organizing tendency through which substantive theories in economics, as well as other subjects, are constructed and empirically observed. The relative scope and precision of a world hypothesis, that is, its adequacy, is assessed by the ability of its structural categories to organize evidence, thereby interpreting world phenomena, and to suggest a ‘special theory’ of truth.

Based on this restatement of Pepper, I present a two-dimensional taxonomy. The first dimension, which follows from Pepper’s philosophy of science, is based on four adequate world hypotheses: formism, mechanism, organism and contextualism. The second dimension, which follows from the economic literature, refers to the ‘mode of composition’ or the ‘level of analysis’ of theoretical work. These two dichotomous levels of analysis refer to micro and macro analytical orientations: that is, whether the level of analysis of social behavior is constructed using an individual/market or an aggregate conceptualization. The resulting taxonomy contains eight conceptually discrete frameworks that suggest a pluralistic and irreducible theoretical tradition within the field of economics. Relying on the work of the physicist, Fritjof Capra, I substantiate Pepper’s claim that each world hypothesis is ‘broad in scope’ in the sense that it can handle ‘all of the world’s facts’. The four adequate world hypotheses are shown to operate in the domains of physical, life, and human sciences. Finally, I view economic theory in terms of
my taxonomic approach by showing that each adequate world hypothesis underlies at least one major strand of economic theory on both the individual and aggregate levels of analysis. As well, I selectively connect contemporary theories emanating from the philosophy of science and economic methodology to the four world hypotheses. These world hypotheses are the conceptual backbone through which a plurality of economic theoretical systems can be constructed, and between which dogmatic denial in the monist and positivist tradition is, according to Pepper, "cognitively irresponsible".
CHAPTER ONE

PLURALISM AND THE POST-POSITIVIST ERA

REVIEW OF THE RECENT LITERATURE

In the past two decades, various members of the economics profession have participated in a lively methodological discussion. During these years, the field of economic methodology has gone through its formative years and grown into a recognized sub-discipline in the profession. A crucial watershed associated with this community discourse was the path-breaking publication of *The Methodology of Economics: Or how economists explain* by Mark Blaug (1992[c1980]). Subsequent to Blaug’s portrayal of economic methodology, a lengthy list of books and journal articles appeared that seem to reflect a relatively deep-rooted interest in this meta-theoretical activity. Following Blaug’s lead, many methodologists continued to draw upon the discussion in the philosophy of science. Economists who ventured into considering methodological matters seemed to naturally gravitate toward the familiar presentation of the received view (Nagel 1961 and Suppe 1974) and its opposition to the work of Imre Lakatos and Thomas Kuhn (the growth of knowledge view). As framed by this presentation, of ‘methodological falsificationism’ was construed as the received view, which was part of a continuing

---

positivist attempt to define the appropriate 'structure' of theory. The work of Kuhn and Lakatos represented a new heterodoxy, which attempted to explain theory selection from the perspective of a 'growth of knowledge' process.

Despite the often-heard criticism that the economics profession is in the grips of a dominant doctrine, economics has long been, and continues to be, a discipline with a pluralist theoretical tradition. This was a perception that started to gain credence through the voice of the new heterodoxy, the 'growth of knowledge' perspective. Prior to the publication of The Structure of Scientific Revolutions (1970[c1962]) by Thomas Kuhn and the articulation of the mature Popper's sophisticated falsificationism by Imre Lakatos, the philosophy of science, and economic methodology by extension, prescribed a mono-theoretical model of theory appraisal. From the so-called commanding heights, there was widespread condemnation and denial of the legitimacy of a plurality of theories. However, in the aftermath of these publications, the plurality of economic theories has been increasingly conceived in terms of a dynamic 'growth of knowledge' theory, as opposed to the static approach pursued by the various positivist strains in philosophy and espoused by Blaug. In Kuhn's view, scientists practiced in distinct social formations, such as schools of thought, research traditions and research communities. Moreover, scientists made a psychological commitment to a shared paradigm, which served to define acceptable scientific activities in order to create a stable environment for research activity leading to growth. Paradigmatic commitments not only permitted growth promoting 'normal science', but also resisted criticism from outside. As a result, many have interpreted Kuhnian paradigms as implying a plurality of competing theories and/or
schools of thought. Also within the ‘growth of knowledge’ literature, an alternative and competing explanation of the plurality of theories emerged in the later work of Karl Popper and the subsequent interpretation and extension of Popper by Imre Lakatos. This research program identified a role for the coexistence of competing theories — or a pluralistic model of theory appraisal — based on individual commitment to evolving scientific research programs. Ideally, members of a research program commit to progressive programs, ones that predict novel facts, and dispense with degenerating programs, which involve merely adjusting theories to explain anomalies with ad hoc modifications.

After Blaug’s publication, the most common narrative in economic methodology moved from a critical assessment of Popper and Lakatos to Kuhn. Opposed to the falsificationism espoused by Popper, and the positivist reconstruction of the history of science desired by Lakatos, the work of Kuhn served as a bridge into the sociology of science, or more recently the sociology of scientific knowledge. At the heart of these investigations is a general acceptance of the importance of the community nature of scientific work, discovery, and ultimately theory appraisal. Theory appraisal and selection are partially determined by such ‘external’ factors (i.e., not reason, evidence and cogency of argument) as the desire for personal gain and prestige and other social determinants.

---

1 The distinction between the Sociology of Science and the Sociology of Scientific Knowledge turns on the level at which the demarcation between internal and external is applied to the scientific process. The Sociology of Science maintains the distinction between an internal core, which proceeds in accordance with scientific rationality and an external reality, which can affect the process or even study it such as Sociology does. On the other hand, the Sociology of Scientific Knowledge does not attempt to maintain an internal/external distinction and, therefore, sees sociological factors as operating pervasively in the ‘scientific lab’. For further explanation of this point refer to Hull (1989:1-32) and Hands (1994:75-106).
More recently, in addition to systematic sociological investigations, economic accounts of science have been developed in which the rational choice framework is deployed to explain the behavior of scientists relative to research selection (Wible 1998). Wible also discusses the possibility that, viewed from an evolutionary perspective, the rational choice framework permits a plurality of theories. Hands (1994) points out that when embedded in an epistemological context, coherent accounts of the nature of the scientific knowledge process — a kind of economics of scientific knowledge — can be written. According to Hands, such an account is provided by the Bartley/Radnitzky characterization in which 

"knowledge emerges from the competitive process of scientific criticism in the same way that economic welfare emerges from the competitive market process" (1994:89). That is, criticism operates like the invisible hand of the market and fosters scientific progress by eliminating error.

However, in a rush to defend the rationality of scientific progress from the Kuhnian account of 'disciplinary matrices', 'puzzle-solving activity', and paradigm shifts, methodologists and philosophers appear to have by-passed a systematic analysis of alternative perspectives that identify theoretical systems and modes of scientific explanation distinct from those consistent with deductivism, inductivism, falsificationism, positivism, etc. Some methodologists correctly identify institutional, post-Keynesian, evolutionary, and Marxist economics as indicative of different analytical strategies and alternative modes of reasoning. This is not new to the literature; when alluded to it is often related to the 'pattern modeling' or 'storytelling' associated with institutional economics. It is also associated with methodological holism. Two works that give
lengthy treatment to many aspects of this second mode of reasoning, are *Entropy and the Economic Process* (1971) by Nicholas Georgescu-Roegen and *The Methodology of Macroeconomic Thought: A Conceptual Analyst of Schools of Thought* (1996[c1985]) by Sheila C. Dow. In these works, both authors develop an analysis of the ‘nature of dialectical concepts’ in contrast to ‘the nature of arithmomorphic concepts’. Based on identifying two very different types of theoretical systems or approaches to constructing scientific investigation, each author concludes that prediction may not always be a desirable or possible feature of a theoretical system. In addition to these works, the overdeterminist ontological perspective discussed by Resnick and Wolff (1994) and the critical realist ontological perspective discussed by Lawson (1997 and 1994) bring to light differing notions of the inherent necessity of a plurality of economic theoretical systems.1

The publication of *Beyond Positivism* (1982) by Bruce Caldwell initiated an explicitly ‘post-positivist’ discussion within the discipline of economic methodology by persuasively arguing that Popperian falsificationism was not viable or widely practiced in economics (1982:236).2 In short, falsificationism, which claims that knowledge growth occurs through error elimination, is not viable for any science, much less a social science like economics. The ‘received view’, imported to economics from the philosophy of science, came under increasing intellectual attack. The Popperian falsificationism

---

1 See the Fall 1999 issue of the *Journal of Post Keynesian Literature* for a collection of articles covering the critical realist philosophy.

2 For a review of *Beyond Positivism* see an article entitled “Some Reflections on Beyond Positivism" by Hirsch (1983).
espoused by Blaug (1982), which was a refinement of logical positivism and the focal point of most methodological discussions in economics during the 1980s, was also placed on the defensive. The attention of economic methodology took its first tentative step towards producing a suitable replacement — or more likely replacements — for the long-held positivist belief in infallible or certain knowledge. The tide started to turn against the quest for a prescriptive methodology that advocated a set of rules for practicing science (monism), the fruits of which would reportedly be a conduit to certain (or at minimum the most certain possible) knowledge.

In *Beyond Positivism*, Caldwell introduced his idea of 'critical or methodological pluralism' (1990[c1982]:245-247). Critical pluralism was itself a prescriptive program formulated for economic methodologists. It challenged the discipline to reconstruct the methodological landscape in a way that would move away from the monist belief in a single method. According to Caldwell, a rational reconstruction of the writings of economic methodologists and various research programs would demonstrate that there exists a plurality of methods. Moreover, plurality need not involve anarchy because it does not preclude the possibility of reasonable and fruitful criticism and debate. He sets out to actually define a research agenda for methodologists that involves (1) documenting pluralism in the writings of methodologists and the actual practice of economists and (2) arguing why this in no way precludes rational criticism. The first comprises philosophical

---

1 Backhouse (1994a:3) writes: "The main reason why [*The Methodology of Economics*] was so important, however, was that it set the agenda for much of the 1980s. The dominant theme running through the book was falsification. More specifically, it can be argued that it was Blaug who was responsible for placing Popper at the center of the methodological discussion in economics."
criticisms of falsificationism, arguing that it is not cogent. According to Caldwell, falsificationism is not viable because narrowly interpreted it is too restrictive. It does not nurture a proper environment for theories to exist long enough for criticism to occur. Interpreted broadly, falsificationism loses its prescriptive force such that the methodologist has nothing normative to say to the practicing economist. Moreover, it is a real problem in the social sciences because initial conditions are not verifiable and general laws are lacking. The second is a desire to 'recover practice' — the notion that before methodologists can offer criticism, they must understand what it is that economists are actually doing. The strands are, of course, tangled up together. Arguing that one needs to recover practice is a criticism of the cogency of falsification for the simple reason that Popper's falsificationism is a prescriptive idea and does not occur in actual practice. Caldwell suggests methodologists abandon trying to find a set of rules that can be generalized across theory appraisal (1990[c1982]:245-47). He believes this would not lead to anarchy. Instead, methodologists should embrace an agenda of methodological pluralism and embark on three tasks. First, methodological analysis need focus on the "rational reconstruction" of the methodological content of both the writings of economic methodologists and the various research programs in the discipline. Secondly, critical evaluation of the methodological content revealed in the reconstruction should occur. Finally, the role of the methodologist is to show there is no 'given method' and then demonstrate that reasonable criticism and debate is still possible. The latter task is achieved by the critical discussions of the strengths (if any) and limitations of the rationally
reconstructed methodological positions. As Backhouse points out, this is not an agenda for economists; this is an agenda for methodologists (1994:10).

Over a decade later, Roger Backhouse edited a survey of essays in *New Directions in Economic Methodology* (1994). The survey reflected an attempt to cast the critical net more widely onto the fledgling post-positivist landscape. According to Backhouse, the decade of the 1980s saw many new themes emerge as economic methodologists explored alternatives to falsificationism. However, most of the work positions itself against the Popperian orthodoxy established by Blaug. Within this context, Backhouse maintains that it is possible to pick out two main strands. Backhouse writes (1994a:4):

> One comprises philosophical criticisms of falsifications, arguing (as Caldwell did) that it is not cogent. The other is the desire to "recover practice" — the notion that before methodologists can offer criticism, they must understand what it is that economists are actually doing.

In his summary of the series of volumes edited by de Marchi, Backhouse identifies five categories of contribution to the literature that include (1) 'post-modernist' arguments against the project of methodology in general; (2) philosophically based criticisms of Popperian methodology; (3) attempts to apply falsificationist methodology to the analysis of economics; (4) attempts to "salvage" something from the Popperian tradition; and (5) defenses of falsificationism (1994:7). By the nature of the first and second categories, which comprise orientations most hostile to Popperian falsificationism, it is evident that

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*De Marchi's volumes included: The Popperian Legacy in Economics (1988); Appraising Economic Theories: Studies in the Methodology of Research Programs (jointly edited with Blaug 1991); and Post-Popperian Methodology of Economics (1993).*
criticism of the orthodoxy continued to be a higher priority than an explicit agenda to construct something qualitatively different.

Even though the majority of Backhouse's survey is not indicative of a progressive attempt to move beyond falsificationism, it does reveal ever-sharpening battle lines regarding the cognitive status of the methodological project and its future course in economic methodology. The scope of topics entertained by Backhouse demonstrates that the critical debate within economic methodology had broadened considerably since Caldwell's identification and inauguration of a post-positivist era. While a discussion of pluralism remained implicit, an explicit categorization and inclusion of essays falling under the general heading of "recovering practice" reveals a movement toward a re-centering of the discussion. Essays introducing economists to the sociology (and economics) of scientific knowledge⁷ (Hands 1994), metaphor analysis (Henderson 1994), and rhetoric and discourse analysis (McCloskey 1994a and Brown 1994) are included in the survey. Likewise, McCloskey's The Rhetoric of Economics (1997[c1985]) urges economists to look carefully at how they attempt to be persuasive in their written publications. Metaphor analysis, rhetoric analysis and discourse analysis are all examples of "recovering practice" because they treat the publications (texts) of economists as a type of empirical

⁷ Caldwell writes (1994:11): "Scientific knowledge is produced by communities of scientists. It is, therefore, possible to analyze the processes whereby scientific knowledge is created from a sociological point of view, exploring the ways in which networks of scientists operate and how they interact; how scientific ideas are communicated and negotiated; how reputations are created and sustained; how entry into science is regulated; how funding decisions are made, and so on. This is the sociology of science. Many sociologists, however, take the argument a stage further, developing the notion that the social processes involved have implications for the content of scientific knowledge itself — that is, what counts as scientific knowledge is the product of the social system that produces it. This is often termed the
evidence from which we can glean lessons. Caldwell also mentions Klamer's (1984) book, *Conversations With Economists*, which documents how economists see their work when talking about it in a more informal way (i.e., during conversation). In addition, Backhouse introduces to the discipline the philosophical ideas of ‘transcendental and critical realism’, through which Lawson (1994) presents an ontological argument in favor of why the natural and social sciences require different methodologies; this is in itself a move toward a limited pluralism. Less controversial, both traditional (defensive) interpretations (Blaug 1994) and more liberal (reconsidered) interpretations of Popperian falsificationism (Caldwell 1994, Boland 1994, and Backhouse 1994b) appear in the survey. Most notably, the tensions created by post-modernism and constructivism were evident throughout. In reading this survey, one can begin to appreciate a comment by Boylan and O’Gorman that “The central question on the economic methodologist’s agenda is [now]: What lies beyond positivism, more particularly, where are current developments of the post-positivist era taking us?” (1995:29).

Whereas Roger Backhouse’s survey of the literature included a collection of essays that could be identified in relation to falsificationism, a more recent survey entitled *Pluralism in Economics: New Perspectives in History and Methodology* reflects a focus that goes beyond falsificationism (Salanti and Screpanti 1997). It could well signal a new stage in the development of the ‘post-positivist’ debate within the methodological sociology of scientific knowledge.” I assume Caldwell classifies this as ‘recovering practice’ since it is a study that attempts to see what economists are actually doing.
community, one with an identity that may not require the distinction of the adjective ‘post’. The positions of the authors surveyed by Salanti and Screpanti capture their identity in the context of a pluralist environment — whatever its merits, falsificationism becomes one of many.\(^6\) In the essays, much effort is made to define, clarify, and in many instances limit what one means in claiming to endorse or defend a plurality of theories. It is safe to say that despite the re-centering of the discussion away from falsificationism, there still exists considerable uneasiness with the constructivist ‘bogey man’ stalking the pluralist landscape. Some contributors take particular pains to sharpen their attack on ‘anti-realists’ or constructivist approaches (i.e., those denying an independent reality that can be known), while at the same time specifying more clearly and self-consciously exactly what they mean by pluralism. According to Samuels, this is characteristic of scientific realism, which attempts to find the correct theory relative to an objective reality. Samuels writes (1997:308):

The realist argument requiring one and only one true theory is not acceptable even when methodological pluralism accepts the existence of more or less objective reality. For one thing, that objectivity is only more or less. Secondly, the reality is arguably in the process of social construction. And third, there is no conclusive a priori reason to assume that the reality, such as it is, is homogeneous.

\(^6\) I will maintain a hyphen throughout, choosing to refer to ‘post-modernism’ as opposed to ‘postmodernism’. My understanding is that post-modernism implies a body of knowledge defined in opposition to modernism. Postmodernism implies a body of knowledge defined by its own terms.

\(^9\) As noted in the Acknowledgments (1997:viii), the essays and comments collected in this volume were originally presented at the conference ‘Pluralism in Economics: Theory, History and Methodology’, held in Bergamo, Italy, in May 1994 and jointly organized by European Association for Evolutionary Political Economy (EAEPE) and the Department of Economics of the University of Bergamo. Also, papers prepared for a roundtable ‘Pluralism in Editing Economic Journals’ at this same conference are now published in *History of Economic Ideas* (1994) Vol. 2(3):61-128. Finally, it is worth noting that the following five authors were included in Backhouse’s (1994a) survey and in this one: Bruce Caldwell, D. Wade Hands, Tony Lawson, Uskall Mäki, and Philip Mirowski. Mark Blaug did not appear in the survey on Pluralism and Economics.
and universally so. The object of study may be heterogeneous, subject to many theories, such that no one true theory can be correct.

In some ways, it is not surprising that the general development of the post-positivist debate in economic methodology would gravitate toward a full-fledged discussion of pluralism. After all, in terms of the big picture, pluralism takes a pragmatic middle course between the dogmatism associated with the monist position and the skepticism associated with the relativist position. It is a newfound freedom of movement implied by pluralism that seems to disturb some in the orthodoxy. Caldwell expresses such a perspective when he writes (1982:14):

Everyone agrees that we are better off without the Puritanical rigidity of positivism, but is a methodology of free love much better?

Though this statement is perhaps rhetorical in nature, characterizing the extreme of those troubled by the “inevitability of relativism”. Caldwell is not someone whose beliefs are normally dictated by the extremes. Nonetheless, to fall somewhere in between one and infinity does leave plenty of room for moving around. *Pluralism in Economics* is an attempt to lend perspective and definition to the emerging intellectual response to the vacuum created by the dissolution of widespread belief in positivism. In comments contained in the introduction and the afterword, Salami (Salami and Screpanti 1997:1-9) and Screpanti (Salami and Screpanti 1997: 398-307) tighten the focus on pluralism by couching it in terms of the Intellectual tension created between the beliefs of scientific realists and constructivists/post-modernists. Salami writes (1997:2):

In the following sections, commenting upon the essays in this collection, we will see that pluralism in history and methodology can be advocated on the basis of at least two different perspectives. One is offered by those who, conscious of the
difficulties encountered by all traditional empiricist methodologies as well as by recent attempts to reconstruct an epistemological framework in the same tradition, are nevertheless not prepared to abandon any hope of obtaining fruitful advances in that direction: this is because they are not prepared to withdraw from the belief that the world ‘out there’ must be, after all, a determining factor of our scientific knowledge. They are not prepared, in other words, to embrace the view that what comes to be scientific knowledge can be ultimately reduced to (and explained uniquely by means of) the sociological aspects of the scientific enterprise and/or the most successful rhetorical devices employed in scientific literature.

Another perspective on pluralism is supported by those who endorse, to use the title of a paper by Roger Backhouse (1992), the ‘constructivist critique of economic methodology’. Among economists this approach is mainly known through the works of Donald McCloskey (1983, 1985 and, more recently, 1994a) who publicized it under the heading of ‘the rhetoric of economics’, even if — as pointed out by Roy Weintraub (1992:53) — it would be better thought of as ‘the set theoretic union of philosophical pragmatism, post-modernist literary theory, post-modern historiography and rhetoric’.

In general, the range of views surveyed by Salani and Screpanti encompasses the following: those who have for all intents and purposes abandoned falsificationism, but who want to maintain methodology as a normative endeavor à la Popper (Lawson, Dow); those who advocate some type of constrained pluralism (Caldwell, Mäki, Dow, Delorme, Hodgson, Scizzieri); to those who embrace a thoroughgoing pluralism (Samuels) or see pluralism as a necessity and advocate a hermeneutics approach (Benedetti and Solari).

The discernable categorical contributions in this survey are as follows:

1. Espousal of a hermeneutics approach and/or a constructivist orientation.

2. Philosophically based arguments for a ‘constrained pluralism’ using ontological or epistemological perspectives, with particular emphasis on complexity and adherence to scientific realism.

3. Attempts to maintain something (the normative thread) of Popper without any mention of falsificationism.
4. Elaboration on or description of the various ways that economists participate in the actual practice of economics. This is the ‘recovering practice’ orientation and is consistent with a thoroughgoing pluralist stance.

Mäki sets the stage in an article entitled “The One World and the Many Theories”, which is a philosophically based argument for a constrained pluralism about theories (1994:37-47). Also, it is written as a primer on the meanings of pluralism in a post-positivist discussion; he distinguishes between ‘pluralities’ and ‘pluralisms’. Thus, his purpose is twofold: (1) to partially clarify the concept of pluralism and (2) to defend the idea of pluralism about theories without succumbing to the plurality of ‘many [actual] worlds and truths’ associated with constructivism. Concerning the first endeavor, Mäki makes what seems to be a meaningful and innocuous distinction between ‘a plurality’ and ‘a pluralism’. When speaking of a plurality of theories (more than one theory in macroeconomics), or a plurality of methodologies (more than one theory about how the validity of theories are to be established), or a plurality of epistemologies (more than one theory of knowledge), or a plurality of ontological perspectives (more than one theory of reality), one is simply saying that these entities exist in the plural. Thus, we see a variety of schools of thought in macroeconomics with contending theories about the macroeconomy. In addition, each school of thought may possess a distinct methodology or ontological perspective. As a descriptive matter, these theories constitute a plurality of substantive economic theories, and the metalevel theories of methodology constitute a plurality of methodologies or world views.

On the other hand, talking about these theories from the perspective of pluralism means “pluralism is a theory or principle that justifies, legitimates or prescribes the
plurality of items of some sort" (Mäki 1997:31). Thus, a statement about plurality is descriptive in character, whereas the term ‘pluralism’ has a normative connotation. A plurality of theories may or may not actually attain; whereas, a statement involving pluralism may applaud an existing plurality or it may advocate adoption of a greater plurality than currently exists. The distinction seems fair enough as far as it goes. For example consider the title of this dissertation. I face a choice between “An Image of the Enduring Nature of Pluralism in Economic Theory” and “An Image of the Enduring Plurality in Economic Theory”. Based on Mäki’s distinction, the former implies that practicing economists prescribe or advocate a plurality of theories. Ultimately, I chose the latter because I believe that the forthcoming metalevel taxonomy provides an explanation of the irreducible underlying structure of theories, which by its nature provides a universal potential for a plurality of theories. In summary, as proposed by Mäki, a “plurality of theories” and “pluralism about theories” constitute two different things. The existence of plurality of theories in economics may hold separately from a theory of pluralism, which requires or implies some kind of normative orientation advocating the development of a plurality of theories.

10 From this perspective, I assume that “monism” implies a normative stance that attempts to prescribe the acceptance of a single theory. Thus, traditional methodology — methodological monism —prescribes a single model of theory appraisal — one methodology. Methodological pluralism prescribes a plurality of theories of theory appraisal, or more simply a plurality of methodologies. It is important to note that methodology is a normative enterprise regardless of whether it advocates a singularity, a plurality or an infinite number of appraisal models. Thus, for those like Lawson who want methodology to remain a prescriptive enterprise, there is little need to worry. It is just a question of whether “the best” or “the better” are prescribed. For those who believe that methodology is a positive enterprise, then I am content to see methodology as primarily a descriptive endeavor.
As portrayed in Salanti and Screpanti (1997), the ongoing process in the field of economic methodology is an in-house exercise to demarcate between the beliefs of 'constructivists' and 'scientific realists'. This is a theme that Mäki asserts by focusing on the idea of 'one world' and 'one truth'. According to Mäki, constructivism adheres to the notion that there exists a 'plurality of worlds' and a 'plurality of truths'. Scientific realists adhere to the notion that there exist a unity to the world (i.e., one world) and a unity to truth about this world (i.e., one truth). It is through the realist’s belief in one actual world with one actual truth — which Mäki takes as a given — that an attempt is made to constrain pluralism. Thus, Mäki wants to allow for a plurality of theories in economics but he does not want to abandon the principle of 'one world' and 'one truth'. According to Mäki, epistemic pluralism and ontological pluralism are highly undesirable because, if my understanding is correct, this opens the door to constructivism. As Mäki sees it, the constructivist believes that it is possible to create multiple worlds and multiple truths in a 'real' sense in the process of theorizing. Thus, on the one hand, constructivism claims the world is actually created in the process of doing the analysis, interpretation, or the text. Mäki disagrees and states that “fixed price theories and flexible price theories do not create fixed price and flexible price world” (1997:40). Although likely correct, it seems more difficult to argue that theories based on maximizing behavior and individuality do not in some way shape “the world” — or at least one of the world’s cultures — into this very

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I am not sure whether Mäki sees metatheoretical activity as another form of theorizing. If he does, I do not see how he can suppress the notion of a plurality of metatheories involving truth and reality. Is there any theory lurking behind Mäki's claim that there is “one [actual] world” and “one truth”. As theorists
image. On the other hand, scientific realists believe there is a world out there that is basically independent of the ‘knower’ and capable of being theorized or interpreted as such. Juxtaposed to the various attempts in this survey to constrain pluralism is Warren Samuel’s essay, which advocates pluralism on all levels (1997:67-79). Caldwell writes (1997:102):

Warren Samuels, I suspect, will have none of this. For him, pluralism at all levels is the key. I do not agree with Samuels, but I think that I understand what might be motivating him. His problem is the same one facing any advocate of tolerance: What is the proper response to intolerance? Many advocates of tolerance answer: Tolerate everything except the intolerant. As a pluralist, Samuels, is tolerant of any beliefs except those that explicitly deny pluralism at some level. This might be why he has no truck with the recent claims of realists like Lawson or Ustali Mäki, who are ontological monists. There may be another reason: it may be simply that Samuels is enough of a pragmatist that he does not see what difference a commitment to realism makes. And indeed, the advocates of realism have still not demonstrated this. As the saying goes, much work remains to be done.

Finally, I would like to clarify my position at this point in juxtaposition to Mäki’s constraint. As a theorist, I assume that it is through the act of generating theories and explanation that I attempt to know the world. The assumption that there is ‘one world’

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12 I think of the argument often heard surrounding firearms or tobacco use that the national media does not create reality it only reflects it.
seems to assert something about the world. As a tentative assumption it is acceptable, even though it may be seen as yet another theory. However, if it is beyond dispute it becomes dogmatic. If it is be I believe that at this particular stage in the process of becoming cognizant of the nature of plurality in a post-positivist landscape, it is especially harmful to short-circuit the discussion by appealing to an irrational and dogmatic fear of constructivists. More importantly, scientific realists must be content to provide explanations about the world and not in claims that somehow purport to know its ultimate form and structure. After all, these principles and perspectives are expressed as metatheories. Once theoretical plurality is established, it is but a short leap to realize that theories are theories, whether metalevel theories or substantive theories with disciplinary content. Theories are theories. So, it should not be as difficult as it might seem to accept a viewpoint such as Samuels (1997) that suggests and even celebrates a “thoroughgoing plurality on all levels.” It is with this in mind that in the following chapter I will present a perspective that traces out the “structural categories” associated with four distinct and discrete “cognitive systems”. Moreover, each cognitive system can be seen to have its own theory of truth or epistemological orientation.

Having made a “grand stand” against the constructivist ontological position, which might read “The Many Worlds and The Many Theories”, Mäki returns to building his argument for limited pluralism. Mäki defines two different cases of theoretical plurality as (1997:40):

(1) A multitude of theories may be based on their being substitutes, being rival claims to nothing but the whole truth.
(2) A multitude of theories may be based on their being complements, being complement claims to a part of the whole truth.

According to Måki, if theories are complementary with one another, there are good ontological and veristic reasons for a plurality of theories (1997:41). In other words, if a set of theories do not make conflicting claims about their domain of inquiry, it is straightforward to justify the plurality because it is consistent with the “one world, one truth” principle. The individual theories can be added up in order to generate a vision that constitutes the whole truth. To the contrary, substitute theories about the same domain of inquiry possess conflicting claims about the whole truth. Måki writes (1997:42):

It is less obvious that theoretical plurality can be defended on ontological and veristic grounds if the many theories are substitutes. If there is only one way the world is, two or more theories cannot all be true at the same time.

Based on the assumption that there is “one truth” and “one world”, the substitutes position is inconsistent since if both theories are true than there must be either more than one truth or more than one world. Thus, we should observe in science a situation in which substitute theories require replacement and complementary theories lend themselves to synthesis. In either case, the endgame for Måki’s tightly circular reasoning is to generate a reduction in the number of theories, or a limit to pluralism.

Tony Lawson combines elements of categories two and three in an essay entitled “On criticizing the practices of economists: a case for interventionist methodology” (1997:13). He first argues that methodologists should not turn their backs on pursuing a normative agenda, especially in a time when the entire discipline (or at least methodology) is in a state of disarray. He finds Weintraub’s position, that “there is no position totally
apart from the doing of economics which can inform the consideration of the doing of economics, unacceptable (Weintraub [1989:86] quoted in Salanti and Screpanti [1997:15]). To the contrary, Lawson maintains that methodologists should not resort to "naive or simple minded describing of the practice of economists and possibly evade the question of their epistemic worth. Thus, like Popper he wants to maintain a normative role for methodology. Lawson poses the question and answers it (1997:16):

Is it possible to elaborate an adequate conception of science, or scientific method and then to use it to assess the scientific possibilities for, or scientificity of, actual economic practice? In pursuing this line of questioning, I am persuaded not only that the current crisis in economics warrants a reconsideration of the question of naturalism — i.e., whether social, including economic, phenomena are susceptible to explanation in essentially the same sense as are natural phenomena.

His answer deals directly with his belief in the transcendental realist perspective developed by Bhaskar. In short, the transcendental realist perspective defines "what is real" by appealing to the existence of underlying structures that scientists rely on in moving from an experimental situation to the world itself (Lawson 1997:22). By the transcendental realist account, the laws of science are not restricted to closed systems or the experimental lab, in which the purpose of intervention is to put into effect an empirical law by isolating a single and stable mechanism. Instead, the purpose of scientific intervention in the more general case of open systems is to insulate a particular mechanism of interest by holding off all other potentially counteracting mechanisms. In so doing, it becomes possible to bring about circumstances under which a non-empirical law, a power, a tendency, or mechanism can be empirically identified. Lawson's account of scientific realism will be further developed later on in this research. For now, let it suffice that Lawson argues for
realism in the sense that natural sciences, which he characterizes as closed systems, and social sciences, (or open systems) require different approaches to scientific explanation. This is a form of limited pluralism based on an ontological perspective.

In an essay entitled “Methodological pluralism and pluralism of method,” Sheila C. Dow also addresses the different levels of pluralism (ontological, epistemological, methodological pluralism, and pluralism of methods (1997:39). She begins by focusing on the nature of the subject matter of the social sciences. Like Lawson, Dow makes a distinction between a ‘closed system’ and ‘open system’ mode of thought. According to Dow (1997:90):

An open system is one whose boundaries are not predetermined. Further, the nature and range of its constituent variables and the structure of their interrelationships are not predetermined. This is not a matter of stochastic variation. In contrast, the boundaries of a closed system are predetermined, as are the full range of constituent variables and the structure of their interrelationships. While closed systems are the province of classical logic, open systems are the province of a broader system of logic — ordinary logic, or human logic, as exemplified by Keynes (1973).

Dow believes the subject matter of economics is best studied as an open system. This is a theme Dow (1996[c1985]) develops in a thorough description of differences between the Euclidean/Cartesian and the Babylonian modes of thought. However, the essay at hand is focused on delineating and explaining the different levels of pluralism. According to Dow, pluralism takes on meaning in the context of an open system reality where in one extreme regularities exist but are not predetermined (as in general equilibrium theorizing) and in the other extreme the pluralism is not based on a complete fragmentation of reality
or our understanding of it as in post-modernist thought.

Dow identifies ontological pluralism as the belief that reality constitutes a plurality of entities, which involves a rejection of the notion of a unity of nature. More strongly, if reality and our understanding of it are fragmented, then this necessarily implies epistemological pluralism. Together, ontological and epistemological pluralism denies a role for general theorizing and methodology. Dow maintains that this is the stance of the post-modernists; however, she claims it is an untenable implication that is belied by the fact that in the content of post-modernism general statements of reality are made and theories and methodological statements are put forward. Moreover, many non-mainstream economists (other than post-modernists) hold a modified pluralist position, which is based on the idea that there are process (as opposed to event) regularities in nature that science can and should identify. Dow claims that epistemological pluralism entails a plurality of understandings of reality. The rhetoric/hermeneutic approach and post-modernism take a pluralist position on understanding. For the post-modernist, the fragmented individual (an extension of a fragmented universe) may have multiple understandings. For the rhetoric/hermeneutic approach, reality is expressed by means of a plurality of narratives. According to Dow, non-mainstream economists (such as post-Keynesians) maintain a limited or constrained epistemological pluralism containing a range of understandings of reality (imperfect knowledge) for economic agents and economists.

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13 See Roseneau (1992) for a description of two main streams of post-modernists — what she calls the "affirmative" and the "skeptical" post-modernists — and the positions they take on issues such as the possibility of theorizing, methodology, epistemology, ontology, etc.
alike. However, just as open-system ontology implies regularities in nature, open-system ontology implies that there are regularities in the knowledge-generation process. As for pluralism of method, and methodological pluralism. Dow, who draws from her ‘post-Keynesian’ heritage, identifies methodological pluralism as the proper device for dealing with the complexity of objects of economic analysis.

Such an ontological consideration (i.e., reality is complex) also informs the work of Robert Delorme (1997:105-123). According to Salanti and Screpanti, he draws his conclusions from a personal research experience and identifies pluralism as a consequence of radical uncertainty as well as a byproduct of procedural rationality and complexity (1997:5). Delorme bases his endorsement of pluralism on actual research practice and personal experience in the economic discipline. In other words, he is ‘recovering practice’ (his own) through observations he made while involved in a research project of his own. According to Delorme, methodological pluralism is useful when there is a reason to free oneself from monism. Specifically, Delorme places research and the evaluation of proposed theories in the context of the problems to be solved. He relates a personal experience in which he discovered the need for pluralism (a plurality of theories) while doing research on the long-run determinants of public expenditure growth, and while extending his research to state-economy interaction. Delorme found reason to maintain multiple hypotheses, all of which had some relevance to local or particular matters. The extension to explaining the long run determinant for different countries with different types of market systems intensified the notion of a strong diversity not amenable to the one-sided character of available theory. This led Delorme to propose a research program
of characteristic modes (with similarities and differences) of interaction between state and economy. Thus, the theoretical approach to explaining state long-run determinants was rooted in a pluralist effort that took various contexts seriously. In general, Delorme concluded that the research experience or context is defined by (1) radical uncertainty confronting any given scientist as to which is the best method to use when investigating a complex situation when there is no final arbitrator; (2) procedural rationality or appropriate deliberation for simple problems, but interference gives uncertainty with no available algorithm; and (3) complexity.

Geoffrey Hodgson addresses theoretical pluralism from the point of view of metaphor (1997:131-154). Specifically, he argues that since the objects of the world are related in a complex manner (that is, the world is complex), the preferred metaphor to employ is the biological metaphor. According to Hodgson, the biological metaphor in its non-reductionist form is able to move beyond the limits of reductionist analysis associated with creating a microfoundation of economic investigation or even trying to explain the physics of subatomic particles. Thus, like many authors in the first section in this survey (Lawson, Dow, Delorme), Hodgson bases his approach to scientific explanation on an ontological perspective. Also, like most of these authors he sees “a preferable way” (biological metaphor in his case) in which to frame an understanding of economic phenomena. Yet he does not claim that reductionism is universally inappropriate (1997:136). Theoretical pluralism for Hodgson is a normative position — economics should learn from biology how to organize its empirical evidence. That is, pluralism is viewed as a theoretical position derived from the perspective that the world is complex.
therefore we should use a metaphorical structure that can deal with the requisites of complexity. Hodgson provides us with a quote by Brian Arthur. Arthur writes:

If you have a truly complex system, then the exact patterns are not repeatable. And yet there are themes that are recognizable. In history, for example, you can talk about ‘revolutions’, even though one revolution might be quite different from another. So we assign metaphors (Quoted in Waldrop, 1992, p.334).

Hodgson is also careful to advise the reader that this level of metaphor is not to be mistaken for the literary device — a sentence-level consideration. Metaphor is more of a structural consideration. This line of thought will be the basis for the ‘root metaphors’ developed in the following chapter in this research. To the contrary, Hodgson (1997: 137) directs us toward a quote by Max Black (1962: 237):

Metaphorical thought is a distinctive mode of achieving insight, not to be construed as an ornamental substitute for plain thought.”

After addressing the various uses of the mechanistic and biological metaphors in economics, Hodgson emphasizes that a normative or ethical attitude supporting plurality of theories is desirable because:

[u]ltimately, the clashes and tensions between different approaches in a subject provide the sources of creativity and novelty. A possible source of creativity in science is through the juxtaposition of two different frames of reference, so that already existing but previously separate ideas can cross-fertilize. Accordingly, Larry Laudan (1977:103) argues that the amalgamation of different research traditions may produce a sum greater than the constituent parts (Hodgson 1997:146).

Hodgson concludes by reiterating that the argument for theoretical pluralism in science can be derived from biology itself. Darwinian evolution depends on variety, and variety is the evolutionary fuel. Without the maintenance and regeneration of a variety of forms.
evolution would come to a stop. The evolution of scientific ideas requires diversity and pluralism, as does evolution in nature (1977:147). To this Hodgson adds (1997:149):

Strictly speaking, however, this pluralism concerns the policy of institutions toward the funding and nurturing of science. It is ‘pluralism of the academy’ and it does not concern the individual practices of science itself. There is much to be said for tolerance of many different and even antagonistic scientific research programmes within a department, university or nation. But we should not tolerate the existence of inconsistent ideas within our own heads. The role of diversity is not to sanctify or foster contradiction. Tolerance of the right of a scientist to practice, even when we may disagree with his or her views, does not imply tolerance of any method and proposition. The policy toward science must be pluralistic and tolerant, but science itself cannot be so. Pluralism does not mean that ‘anything goes.’

Roberto Scaglieri emphasizes that given a complex reality, the analytical act first necessitates ‘pre-analytical vision’ (Schumpeter 1954:41), which is determined by cultural considerations. An analytical formulation of an economic problem first requires that some kind of vision or mental picture is present so that it is possible to choose from the myriad of possible phenomena. The pre-analytical act helps give the analyst a focus, which in turn leads one to generate a limited, but manageable analysis of the problem. Thus, once in possession of this vision, it is ‘reasonable imagination’ (Georgescu-Roegen 1971:35) or the logical capacity of the mind to create analytical representations that constitute scientific investigations. The process of analysis demands that we make artificial interventions into a seamless complex reality characterized as a dialectically unfolding process. Thus, analytical representations become the analyst’s choice (either consciously or unconsciously) of where to draw the boundaries around the problem.

It is possible to make economic processes suitable to theoretical investigation by devising economies that are abstract representations of virtual processes. These abstract
representations are the immediate counterpart of any analytical representation. Accordingly, the inevitability of theoretical pluralism emerges as a consequence of the plurality of possible representations. Scanzieri focuses attention on the various analytical representations possible in conducting a scientific investigation and suggests that all are not equally suited for the same tasks. According to Scanzieri (1997:159):

analytical representations are descriptive devices such that the relevant features of reality are selected on the basis of a conjecture concerning the important factors that one needs to consider to solve the problem at hand.

Moreover, analytical representations require the assignment of meaning, which goes beyond the logical matter concerning the admissible combination of propositions. Since analytical representations are rooted within a given community of practitioners, meaning must be and is assigned by the speakers/readers of a given theoretical text. The assignment of meaning (or its negotiation) is a process through which the representations gain rationality or intelligibility to the community. That is, the meaning attached to the analytical representations is socially constructed. However, it is interesting to note that even though relativism between the different linguistic communities can be seen as an issue, Scanzieri does intimate the existence of foundations. Scanzieri writes (1997:159):

The above point of view entails the conception of analytical representation as a cognitive device by which phenomena are made intelligible within a given community. It follows that analytical representations are necessary to the formation and accumulation of knowledge, but that they should not be considered as purely subjective or idiosyncratic constructions. For any given description to be a proper analytical representation within its own domain, it has to provide the foundation (or the starting point) of a conceptual system, that is of

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For a similar hermeneutical treatment of analysis, see an article by Brown (1994) entitled "The Economy as Text." Brown focuses on the 'reader' as opposed to the 'writer'.
a system of propositions derived from one another by means of formal (though not necessarily symbolic) rules of inference. In practice, no analytical representation may be accepted as such (rather than being considered as a mere description) unless its ‘object’ is rooted in the linguistic and conceptual structure of a particular community of scholars.15

In sum, Scanzieri locates the identity of real processes in terms of virtual processes that are interpreted and assigned meaning in a social or institutional setting. However, virtual processes must be rooted in what Scanzieri calls economic structure:

The concept of ‘economic structure’ has a critical role to perform within the above framework, since it provides the benchmark of any given analytical representation. In other words, economic structure may be considered as a cognitive devise by which economic processes are given a form that makes them suitable to theoretical investigation. It may be argued that the above conception of structure is compatible with a non-conventional approach and is, at the same time, conducive to theoretical pluralism in the field of economic inquiry (Scanzieri 1997:160).

In sum. Scanzieri envisions interplay between subjective structures (the community of practitioners) and objective structures (objective conditions that mold the system of events). In the chapter to follow, I will present in great detail four ‘root metaphors’ that each perform the task of providing a great deal of ‘structure’ to economist’s attempt to theorize the economic world and philosopher’s attempt to theorize the world in general. They, too, appear to provide communities of practitioners with the necessary ‘material’ — a benchmark or foundation — upon which social constructions grow and prosper.

Indeed, the essays in this survey are focused on clarifying the ideas involved in

15 This point is noted because it offers some relief to the extreme relativism or antifoundationalist perspective associated with the work of Rorty. It is also a tension that can be observed in Brown (1994). The foundational function of an analytical representation can be seen as similar to that provided by Pepper’s use of the root metaphor with the proviso that Scanzieri’s analytical foundations are socially constructed and Pepper’s world hypotheses are better viewed as natural structures.
discussing pluralism. The contributors spend considerable effort identifying the contexts in which they do or do not accept pluralism. These contexts tend to be discussed in terms related to ontology, epistemology, methodology or theory. As previously mentioned, a key theme and defining sensitivity throughout this collection turns on the demarcation between a "scientific realist" and a "constructivist". The former maintains that the objects of knowledge are separate from the knower; therefore, they are given in such a way so as to be discovered through scientific investigation. The latter maintains that the objects of knowledge cannot be clearly separated from the knower; therefore, they are not given at all but created (socially constructed) in the process of scientific investigation. Those moving in the direction of advocating some level of pluralism or acknowledging the existence of plurality seem particularly interested in maintaining carefully delineated boundaries in order to avoid what Dow (1997:93) refers to as the "pure pluralism" espoused and celebrated by the post-modernists. Those more comfortable with a thoroughgoing pluralism (i.e., Samuels, McCloskey, Klamer, etc.) seem basically content to accept the self-imposed limits or constraints employed by the realists. As long as the discussion is about pluralism, constructivists must realize that intellectual momentum is at least moving in the "proper" direction. However, one cannot help but sense that the genie of pluralism, having escaped from the bottle, will not go back in very easily. This being said, it makes sense that the definitional turf battle over "who's who" and "what's what" in the post-positivist ideascape is a meaningful exercise with much intellectual reputation at stake.
Overall, there are few places in the economic literature where a self-contained description of an alternative to a reductionist mode of analysis is given explicit, serious, and lengthy treatment. A notable exception is a book entitled *The Methodology of Macroeconomic Thought: A Conceptual Analysis of Schools of Thought in Economics* (1996[c1985]) by Sheila C. Dow. This work was influential in bringing together the strands of thought that have inspired me to explore an explicit treatment of the pluralist nature of economic theories. Dow argues for a frameworks approach that implies understanding methodological pluralism from the point of view of the various world views that underlie schools of thought instead of the 'commanding heights' of a normative project in methodology or the philosophy of science. Her work, which was influenced by the work of Kuhn, draws upon the idea that there is a degree of 'incommensurability' between schools of thought founded on different world views or ontological perspectives. Dow writes (1996:7):

Recent developments in methodology on the hand are influenced more by alternative modes of thought which allow for greater diversity of approach in addressing particular problems. These developments provide the initial justification for considering macroeconomic thought in terms of schools of thought. While Kuhn's approach as such has met with some problems in application to economics, it nevertheless contains the elements required to serve the purpose here of giving an account of different bodies of theory with an objective basis for appraisal. It is the incommensurability of schools of thought which require that we pay attention to their methodological foundation.

As a post-Keynesian macroeconomist, Dow is motivated by the crucial question: Why do serious disagreements appear to persist (emphasis added) among economists? Following
the work of Myrdal in *The Political Element in the Development of Economic Theory* (1953), Dow writes (1985:12):

[It] is in the nature of economics that there will be disagreements; while these may have ideological elements, ideology cannot be eradicated from theory. If this is the case, denial of the existence of valid disagreements should be regarded with some suspicion.

Because of an absence of conclusive empirical grounds for theory appraisal, therefore, we will pursue the third approach, identified with Myrdal that fundamental theoretical differences can persist which cannot be isolated from ideological content. In focusing particularly on macroeconomics, we will attempt to identify broad categories of theory, or schools of thought in macroeconomics, between which there are fundamental theoretical differences.

Dow’s analysis is guided by a desire to reveal the cause of unnecessary criticisms, dismissive critiques, and misunderstanding in debates that occur between economists. She claims economists (and methodologists) base criticism on an incomplete understanding of levels within economic analysis — levels that move from policy texts to theoretical systems to schools of thought to modes of thought or world views. It is at the most inclusive level of the world view that practicing economists and methodologists stand to learn much.

According to Dow, much confusion and misunderstanding results when economists representing different schools of thought do not distinguish between levels in disagreements. As a result, policy prescription may or may not be explained by theoretical differences possessed by one school of thought or another. That is, policy prescription may converge for two schools of thought with different world view, or it may diverge for two schools of thought operating within the same world view. The use of the equilibrium concept within the Austrian School may differ from the Neoclassical, Post Keynesian, and
Marxian Schools. Economists stand to gain from tracing differences to increasing levels of abstraction, a metatheoretical consideration that deals with the underlying differences in methodological perspective or world view. In one of those rare instances in the often cryptic and highly specialized world of methodological discourse, Dow actually takes a risk by unequivocally explaining what she means. Dow writes (1985:4):

The focus here is on methodology as a basis for description, rather than prescription. The aim is to establish that there are some basic methodological differences, which divide bodies of theory, and that these differences include differences as to theory appraisal. In the absence of a value-free set of criteria for appraisal comprehensive enough to override those criteria internal to each school, there can be no assurance that these methodological differences can be resolved.

From Dow's perspective, theory appraisal must occur in the context of a classification system that has at its most inclusive level of abstraction acknowledgement of a methodological position, or world view. Dow goes on to discuss the nature of two distinct modes of thought that constitute different world views (1985:12):

Within the complex history of Western thought, we can identify in general terms two strands, or patterns, of thought which underlie the traditional and new approaches to methodology respectively, and which have echoes too throughout economic theory. These modes of thought encapsulate quite different ways of constructing arguments and of appraising theories. They are not opposites, nor are they all-encompassing; other patterns may also be identified.10 The purpose of focusing attention on only two modes of thought is to demonstrate the importance of awareness of mode of thought, as well as the other levels in the hierarchy (methodology, theory, policy prescription), if we are to understand debates in economics and use them constructively.

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10 In the second edition to Macroeconomic Thought, Dow begins to develop the idea that critiques reacted to her idea of a Babylonian mode of thought in dualist terms. Thus, the opposite of the Euclidean/Cartesian mode of thought was a strictly Non-Euclidean/Cartesian mode of thought, which she sees as the basis of the 'anti-methodology' position advocated by postmodern and rhetoric views. Dow maintains that her intent with introducing the Babylonian mode of thought was to present a third way that supported the notion of a plurality of methodologies and not the impossibility of methodology.
Dow’s work is an attempt at bridging the gap between the ‘specialist topic’ of methodology and macroeconomic thought, which itself has splintered into many separate strands, or schools of thought. It is the close proximity with which she views the two that keeps her approach to methodology in line with what the various school in macroeconomics actually do in practice. A primary thesis in her work is that once one understands how economists use different notions of concepts such as ‘equilibrium’ for example, it is easier to see how different schools of thought develop different positions on theory and policy issues. For the purposes of my research project, I am not interested in summarizing the manner in which the various schools of thought employ the ‘equilibrium’ concept or view the ‘microfoundations of macro’ debate. Instead, I am interested in briefly portraying Dow’s coherent and well-articulated characterization of the modes of thought or world views reflected in the work of economists and their associated schools of thought. Again, Dow presents a picture that is consistent with those who believe that methodology should illuminate what economists do in practice. Also, Dow views methodology as a descriptive and critical enterprise (i.e., not as ‘pure descriptivism’ as advocated by constructivists (Dow 1996:40-42), but not as a normative epistemological/methodological project interested in forming a general theory of theory appraisal. Dow makes no claim that there is one scientific method that can be rationalized by methodology.

17 In the later chapters of the book, Dow analyses how four schools of thought in macroeconomics — the Neo Austrian, Mainstream, Post Keynesian and Marxist schools — view (1) the micro-foundations of macro debate, (2) the equilibrium concept, (3) expectations, (4) money, and (5) methodology and macroeconomic policy.
Dow claims that her approach is primarily motivated by the idea that disagreement in economics should be expected because ideology cannot be eradicated from theory. In other words, even after ideology has been considered, differences will still remain between schools of thought. Furthermore, according to Dow, this notion should directly confront how economists view theory because "of an absence of conclusive empirical grounds for theory appraisal" (1985:2). Thus, she works from the premise that basic theoretical differences cannot be isolated from ideological context. This point of departure is important because it gives Dow the tolerance to accept as valid fundamental differences in theory. In her view, it is futile and misguided to pursue methodology as if it were desirable to single out one approach as better than all others. Dow writes (1985:2):

The demarcation criterion to be used here to identify fundamental differences is a methodological one. A school of thought will be defined by its common methodology. [Analytical orientation] The method of a school of thought refers to its technical procedures, i.e., its modeling technique, its choice of categories, and its preferred testing procedures. But these in turn derive from an underlying conceptualization of reality and a preferred mode of reasoning. We use the term "methodology" to encompass both the methods actually employed within a school of thought and the underlying world view which generated them.

This is likely the earliest and clearest 'methodological' statement suggesting pluralism that one can find in the methodology of economic literature. However, coming close on the heels of Blaug (1980), Dow's position does not fit in well with mainstream economic methodology. In sum, Dow argues that disagreements between schools of thought (her sociological unit) flow from various ontological assumptions that generate a preferred mode of reasoning such as Euclidean/ Cartesian or Babylonian — reductionist or organicist, respectively (1996:14-16). The choice is primarily a subjective value judgment.
often related to the perceived problem situation at hand, and cannot be rationalized on ‘testable empirical’ grounds. The choice leads to different uses of concepts, different methods and analytical procedures. Together with the underlying world view, these aspects form the methodologies of the schools of thought such as are observed in the field of macroeconomics. This in turn leads to the various policy conclusions that are associated with the schools of thoughts. The levels in Dow’s conception of methodology are presented in Figure 1 on the following page. Dow continues (1985:3):

By attempting to identify broad groupings of theory according to underlying world view, or methodology, therefore, we hope to focus debate on those areas where debate is most constructive. Where debates stem from fundamental methodological differences, it is only at this level that any resolution is feasible. Debates at other levels are of course constructive, in the sense that they promote exchange of ideas as well as impetus to improve the quality of technical procedures, including technical procedures. But ultimately, debates require some basis for theory appraisal. Since each school of thought derives criteria for appraisal from its methodology, any constructive discussion involving appraisal must include awareness of methodological differences. Within each school of thought, the criteria for appraisal are held in common, so that synthesis is much more feasible without explicit reference to methodology.

What Dow implies here is the Kuhnian notion of ‘incommensurability’. If we start from a different ‘world view’, a school of thought necessarily employs a ‘test of theory appraisal’ internally consistent with its methodology. Naturally, this concern does not bother Dow either since she is operating from a perspective that can legitimize and validate multiple ‘world views’ as being irreducibly value laden and co-occurring. The critical conjunction of ideas in Dow’s thought turns on the relationship between ‘world view’ and ‘methodology’. Thus, where fundamental difference of methodology occurs, the best economists can do and the only thing that methodologists can advise would be to
Figure 1  Dow's Hierarchy of Conceptual Levels

World View: Ontological Assumption of Reality

Schools of Thoughts

Methods. Theories Analytical Procedures

Policy Conclusions
“agree to disagree”. To complete setting the stage for her ‘methodological perspective’, Dow articulates what she means by ‘world view’ underlying schools of thought. To accomplish this she identifies the two modes of thought — reductionism and organicism.18

In abandoning the traditional epistemological project, which attempts to secure the foundation for certain knowledge and treats methodology capable of generating a metalevel theory that transcends all theory contexts, Dow entertains the question: What helps define or characterize the underlying ‘methodology’ of different schools of thought? She focuses her attention on what she calls ‘modes of thought’ — specifically, the Cartesian/Euclidean and the Babylonian modes of thought. She does not claim that the two modes of thought are exhaustive; however, they are sufficiently distinct to demonstrate her point about world views. It is on this level that we can account for the incommensurable argumentative forms associated with the various schools of thought. According to Dow, the more familiar Cartesian/Euclidean mode of thought is attributed to the combined work of Descartes and Euclid, two mathematicians who together developed the geometric method. According to Dow, the two pillars of this mode of thought are reductionism (atomism) and dualism. This method turns on developing basic axioms that are true by definition (self-evident) and independent of the observation of reality. Next, deductive logic is used to derive theorems. Finally, the self-evident axioms used to develop a closed axiomatic system are applied to observable phenomena. This is the

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18 In the following chapter, I present the work of Stephen C. Pepper. I believe that the four adequate world hypotheses, which are identified and described by Pepper, support and augment the ‘reductionist’ and ‘organicist’ delineation made by Dow.
theory structure popularized by Lionel Robbins (1935) as the method of science appropriate for economic investigation. According to Dow, it is the system of axiomatic logic that has remained the ideal in much of mainstream economic theory. Although economic investigation has primarily proceeded along the lines of self-evident axioms such as ‘consumer rationality’. Hirsch and De Marchi (1990) argue that Friedman’s ‘pragmatic man’ envisions a Deweyan process of inquiry that uses both observation of reality (induction) and deductive logic in an evolving manner to come up with the right testable hypotheses. In any event, whatever combination of induction and deduction used in model construction or theoretical systems, the application of axiomatic systems approach to generating knowledge leads to some identifiable features. In essence, this is often referred to as reductionism (or atomism) because the entire logical structure depends on the basic axioms which, therefore, must be made as universal or widely accepted as possible. In economics, for example, the axioms of consumer rationality (or optimizing behavior) allow a wide range of theorems to be derived by deductive logic. While this axiom is based on reductionism, Dow points out that in some contexts it may not be always self-evident as a universal representation of human behavior such as in Earl (1983). Dualism is the second key aspect of this mode of thought. Dualism relates to the use of arithmomorphic concepts, which are of the form A and non-A. It is a way to classify concepts, statements and events in dualistic terms, as belonging to only one of two all-encompassing categories.
Whereas the Cartesian/Euclidean mode of thought is characterized by reductionism and the use of dualist concepts (i.e., arithmomorphic), the Babylonian mode of thought is characterized by organicism. Dow writes (1996:15):

This may stem from the view that the subject matter of science is itself organic; or it may stem from the view that the subject matter is ultimately unknowable in any complete sense, so that the most appropriate knowledge system for understanding it is organic. An organic system involves interdependencies that preclude the selection of one set of axioms as universally causal; it also involves interdependencies which are complex and evolutionary, and thus not amenable to formalization with respect to separable elements within a single system of reasoning. In practice, the organic system must be segmented in some way in order for knowledge to progress; it is then legitimate to have separate disciplines, separate fields within disciplines, and separate chains of reasoning within each field. But the underlying presumption is of the openness of each, and the need for the scientist to be aware of other lines of reasoning on related issues.

The Babylonian approach or organicism is a non-axiomatic style of mathematical reasoning found typically in theological and legal argument. It often starts with contemporary problems and chooses starting points of reasoning that are best suited to these problems. Adherents to this mode of thought often believe that human minds are incapable of capturing a complex reality in a complete system of deductive logic. Instead, logic is applied within partial systems. Dow mentions Simon's (1955) use of bounded rationality. Dow writes (1985:16):

Since the ability to agree on any one set of axioms is doubted within the Babylonian approach, there is no particular incentive to make the axioms as narrow as possible. Indeed, since Babylonian arguments or theories can draw on a range of facets of a system, depending on which is singled out for particular attention (physical, economic, political, or whatever) it is more useful to focus on the nature of the system as a whole. Rather than being reductionist or atomistic, this approach is 'holistic'.

42
As a result of these and other related strategies, this mode of thought does not rise or fall on a single chain of reasoning. Chains of deductive reasoning based on the strict use of universal dualistic categories are forsaken for a collection of chains of reasoning meant to address the problem at hand. The Babylonian approach can easily be seen as an epistemological strategy closely related to the notion of ‘holism’ found in organicist and contextualist systems of thought, which will be developed in the next chapter using Pepper’s metalevel taxonomy.

In conclusion, Dow sees methodological pluralism emanating from differing metatheoretical approaches (pre-analytical and not solely ideological) as a consequence of attempts to analyze complex social reality. By developing her discussion around two distinct modes of thought, she is able to talk about the incommensurability of theoretical systems held by schools of economic thought. There are limits that surround meaningful criticism. Moreover, since ideology or value negates the possibility of objective and absolute theory appraisal, it also leads individual researchers to choose their analytical strategy in harmony with their own value system. This being said, there is no reason to jump to the conclusion that there is no structure to analysis. In fact, to discuss methodological pluralism is to maintain that well-defined tendencies in analysis do exist and can be employed in appraising theoretical systems (the traditional job of the methodologist) and in referring to choice of analytical strategies, ex ante, in a rich and
meaningful way. In Dow’s work, we see an author who does not try to defend methodological pluralism but instead takes it as a given and goes from there.¹⁹

SEEDS OF PLURALISM: POPPER’S CRITICAL FALLIBILISM

Before moving ahead, a short digression is in order concerning a notion of plurality that emerged from within the philosophy of science. It is in the later work of Karl Popper and his followers, namely Lakatos, that the seeds of theoretical pluralism were recently planted. Popper was an ardent critic of logical positivism, which was growing triumphant out of the verstehen debates. The logical positivist’s position stated that the meaning (unifying aspect) of science lay in its ability to make informative empirical statements about reality. According to Caldwell (1990[c1982]):

The logical positivist program asserted that only meaningful statements were to be permitted scientific consideration and accorded the status of knowledge claims. Meaningfulness (or cognitive significance) was strictly defined as being attributable only to those statements which are either analytic (tautologies or self-contradictions) or synthetic (factual statements which may be verified or falsified by evidence). By this criterion, metaphysical statements are neither analytic nor subject to empirical test, so must be deemed meaningless, expressing emotional stances of ‘general attitudes towards life’ [1982:13].

¹⁹ Dow is one author who has self-consciously attempted to distance herself from the ideas of postmodernists and constructivists. In Dow (1996[c1985] she changes the title of the book to The Methodology of Macroeconomic Thought: A Conceptual Analysis of Schools of Thought in Macroeconomic Thought from Macroeconomic Thought: A Methodological Approach. In addition, she further articulates and clarifies her position by distancing herself from some of the post-modern tendencies in her original portrayal. She moves away from a fledgling post-modernist pulse — present in the 1st edition and identifiable in her portrayal of plural methodologies, which are associated with schools of thought and incommensurable in the Kuhnian sense — and aligns herself with Lawson’s “methodologically superior” realist approach. Section 3.5 of the 2nd edition addresses constructivism (anti-methodology) and Section 3.6 discusses critical realism. This is an ontological approach that has been introduced into methodological circles by Tony Lawson. According to Dow, critical realism reflects a progressive synthesis that implies pluralism by going beyond the dualist reaction (i.e., either monism or relativism) to her first edition.
Logical positivism equated statements one by one with observed empirical reality. In so doing, it denied theoretical systems with metaphysical cores, or non-testable postulates. This was a very strong and restrictive program for science, and from the 1930s to the 1950s logical positivism was replaced by logical empiricism. Logical empiricism was more sophisticated than the highly dogmatic stance logical positivism took toward the primacy of physical evidence, which by allowing only empirical statements necessarily denied a role for theories. The more mature version saw meaningful scientific statements as emanating from both theoretical and empirical systems. In this, we see the emergence of the hypothetico-deductive model of science. In the refinement that followed, a more realistic characterization of the structure, nature, and function of science and scientific theories emerged. Again, Caldwell writes (1982:31):

The relationships and phenomena investigated by both the natural and social sciences can often be represented formally by axiomatic hypothetico-deductive structures known as theories. In their formal state, such structures have no empirical import, which can only be achieved when certain of the symbols in the hypothetico-deductive system are given an empirical interpretation via correspondence rules.

Implied by this hypothetico-deductive model of the structure of theories is the weak requirement that only some of the terms need have empirical counterparts. This is necessary because theoretical terms, which are used extensively in science, defy explicit interpretation into the neutral observation language [of empirical facts]. Rather than attempting to rid science of such terms, as some early positivists and operationalists suggested, the current view recognizes the essential role played by theoretical terms and thus urges retention of them.

As a result of this change in vision, positivism relaxed its requirements on cognitive significance. Individual synthetic statements within the hypothetico-deductive model need not all be tested; instead, it was the entire theoretical structure that must be supported by
evidence. Distinguishing between meaningful and meaningless statements was out. The
cognitive significance of theories (systems of statements) was what should concern the
philosophy of science. According to Caldwell (1990c[1982]), Popper’s critique was
primarily reacting to the mature positivists who espoused logical empiricism.

We now turn to Walter Weimer’s (1979) book, Notes on the Methodology of
Scientific Research, for a discussion of the Lakatos’ (1968) interpretation of Popper’s
thoughts on methodology. In his effort to develop a framework for understanding the
rationality science, Weimer relied on an explicitly metatheoretical conception, or the ‘deep
structure’ underlying the seemingly chaotic diversity of ‘received view’ positions in
philosophy, theology, art, etc. The positivists were centered in what Weimer called
‘justificationism’. At the heart of this metatheory of rational inquiry is the belief that there
is certain knowledge and that by following a procedure, such as the hypothetico-deductive
method outlined above, we can attain certain knowledge via ‘The Scientific Method’.
Using a metatheoretical organizing strategy, he claimed that the most significant crack in
the justificationist orientation of science occurred at the hands of Karl Popper. According
to Weimer, it is through an understanding of three stages in the development of Popper’s
thought, as developed by (Lakatos 1968), that we can see the emergence of a

Popper introduced the methodology of falsification as an alternative to notions of
confirmation and verification espoused by the logical empiricists. According to Popper,
the positivists were preoccupied with justifying or implementing an inductive logic to
determine the strength of hypotheses using confirmation by evidence. But Popper was
well aware of the obstacle posed by Hume’s problem of induction, which logically
challenged the notion that there exists a justification for any inductive inference used to
bolster a scientific claim to knowledge. Thus, verification, corroboration, or confirmation
of a theoretical system does not possess the power to be called certain truth. Even worse
to Popper, constructing theories with this in mind might be harmful to science.
Theoretical propositions would naturally become biased so as to be easily verified.
Scientists would not take risks; instead, theoretical propositions with little empirical
content would be generated so as to be easily verifiable and therefore defendable as
scientific claims. Caldwell writes (1982:41):

All of the arguments above concern our ability to justify or implement an
inductive logic which could determine the relative strengths of arguments (or
hypotheses) based on their confirmation by evidence. The desirability of
formulating an inductive logic is unquestioned in the above treatments. Karl
Popper takes the opposite position, believing that a preoccupation with highly
probable hypotheses is exactly the worst way to approach science. Science
advances by bold conjectures and critical refutations, not by repeated attempts at
confirmation of hypotheses; indeed, theories with the highest empirical content
are those with the lowest probability.

As a result of this critical appraisal, Popper introduces the methodology of
‘falsificationism’. The growth of knowledge proceeds by a process of error elimination.
Theories cannot be proven true; however, they can be disproved. In moving to Popper,
we need beware that he theorizes a ‘growth in knowledge’ in place of defining a ‘nature of
knowledge’. Weimer reconstructs the interpretation given by Lakatos of the three distinct
phases in the development of the Popperian tradition: a dogmatic falsificationism,
methodological or naïve falsificationism, and sophisticated methodological
falsificationism (Lakatos 1969). In short, the dogmatic falsificationism of Popper the graduate student (Popper\textsubscript{a}) maintains that while theories cannot be proven conclusively, they can be conclusively disproved and, therefore, rejected from the works of science. This is just a negative interpretation of a confirming justification. The problem is with the word “conclusively.” It is untenable because we cannot have certain falsifications based on induction any more than we can have inductively certain corroboration or confirmation.

According to Popper\textsubscript{r}, methodological falsificationism maintains that to be falsifiable, or open to criticism, a theory must forbid some states of affairs. The theory must specify an example of at least one instance capable of being falsified. The empirical content of a theory must not allow something to happen. The more that is disallowed the better, since the more the theory will be open to criticism and enhance progress in science. What distinguishes the dogmatic falsificationist and the naïve falsificationist turns on the conventional aspect of community agreement relative to what is potentially falsifiable. In other words, a sociological entity (i.e., a discourse community) is involved in the decision as to what is the falsifiable empirical content of a theoretical system. Naïve falsificationism moves beyond matters related strictly to logic. This is what Weimer refers to as a neo-justificationism. However this intermediate stage in Popper’s intellectual...
development continues to imply a monotheoretical assessment model. Weimer writes (1979:197):

Thus even though Popper, recognized the theoretical nature of observation statements, according to his model of theory testing, it must be possible to maintain a distinction between the theory level of science (which is tested) and the observation level (which provides the "facts" that do the testing). This separation entails a monotheoretical assessment model — i.e., one in which a single theory is tested in isolation — because everything "theoretical" in nature is treated as part of the theory under test. A single theory confronted by the facts is the hallmark of naive falsificationism.

In the above description of a model of scientific theory appraisal, attention is focused on the test conditions that a theorist would specify, a priori, as forcing one to abandon the theory under test. Thus, the specification that there exist test conditions that could generate conclusive refutations is, according to Weimer, every bit as justificationist in nature as dogmatic falsificationism. The "neo" comes about because Popper introduces the conventional notion that it is possible for the relevant community of scientists to agree that a theory is refuted when it is confronted with "facts" inconsistent with its predictions. Thus, implicitly Popper requires that a theory be rejected or eliminated from science if one of its hypotheses is refuted. This distinction is critical because conventional rejection is Popper's way of maintaining a monotheoretical model of theory appraisal.

Popper's sophisticated falsificationist (Lakatos 1969), finally transcends the justificationist metatheory. This has been labeled critical fallibilism. By concerning himself with the growth of science, Popper and his followers were able to overcome the monotheoretical model for a pluralistic model of theory appraisal (plurality of theories). In this view of science, Popper maintained that only a competing plurality of theories can...
be assessed, rather than a single theory in isolation, and that assessment involves the scrutiny of inconsistencies rather than in refutations. Finally, we have a fledgling notion of uncertain, contingent knowledge as a logistical norm in the advance of science. More importantly, we now must entertain the notion that multiple theories can coexist without ever being refuted. It is this aspect of Popper’s critical fallibilism that leads quite naturally to methodological pluralism.²¹

If it is true that the lack of crucial tests limits refutation of theories with substantive empirical content, and as a result a pluralistic model of theory appraisal is needed, then why should this not also be the case on the metatheoretical level. The positivist criticism has all along been that metatheory is metaphysical and therefore not capable of refutation. Even though positivism is itself a metatheory in capable of falsification. But if substantive theory is not capable of falsification, then what positivist argument remains against metatheory. Is there reason to believe that for all the reasons we observe theoretical pluralism, we should also observe a plurality of metatheories (i.e., methodologies), which attempt to appraise so-called substantive theories? The distinction

²¹ For another discussion of Weimer’s development of a nonjustificationist metatheory of scientific rationality, refer to The Economics of Science: Methodology and Epistemology as If Economics Really Matter (1998) by James Wible. Wible argues that Weimer’s synthesis of Popper, Kuhn and Lakatos is an evolutionary perspective of scientific rationality (1998:136-137). According to Wible, such a perspective is capable of supporting a plurality of theories within economics. In addition, Wible points out that Weimer’s work correctly anticipates a role for rhetoric (i.e., persuasion) in the process of theory choice. Wible’s general approach — an economic account of science and epistemology — is a different focus than the one presented here for two reasons. First, no attempt is made to employ the tools of economics to explain pluralism. Second, metatheory is treated as equivalent to so-called substantive theory in the sense that neither is falsifiable. With this in mind, my intention is to point out that metatheories in the philosophy of science are aligned with corresponding forms relative to substantive theories. I seek to establish plurality, and advocate pluralism, across these pairs. However, as does Wible, I maintain a complements, as opposed to a substitutes, viewpoint of science.
suggests the following: it is necessary to go beyond 'a pluralistic model of theory appraisal' (i.e., a model that permits multiple theories) to 'a plurality of models that appraise theories'. The rationality of the mature Popper accepts that multiple theories can coexist within an appraisal model without ever being refuted. However, once we strip methodology of a privileged theoretical position and see various methodological positions as being theoretical in nature, then a universal or single theory of methodology is also problematic, for even if one did exist we could never inductively learn of it in terms of certain knowledge. In fact, once the genie is out it must be a thoroughgoing pluralism: theoretical pluralism, methodological pluralism, and epistemological pluralism would characterize a nonjustificational world view. Theories about knowledge are pluralistic, theories about theories are pluralistic, and scientist ought to accept the presence of a plurality of competing theories. In the second chapter, we shall see in Pepper’s metalevel perspective, a plurality of metalevel theories that comprise what has been termed a pluralistic epistemological system.

**METHODOLOGY BEYOND MONISM AND RELATIVISM**

Despite the seemingly broad appeal that pluralism maintains throughout contemporary American academia, tolerance towards pluralism does not necessarily extend to the more tradition-bound disciplines of philosophy of science and economic methodology. Ask academics in these disciplines if pluralism in the arts, entertainment, political life, or consumer choice is desirable, and the answer will be on the whole in the
affirmative. Ask these same academics if pluralism in theory choice is desirable and the response is by no means certain. As Deirdre McCloskey points out in *The Rhetoric of Economics* (1997c[1985]), many in the profession have long labored in the modernist tradition, believing that there exists a single correct way to do science. Many in the profession believed in the existence of a scientific method that is capable of discovering a single truth or at least providing a guarantee of a road toward that truth. It is not surprising, therefore, that the profession is slow to embrace the matter of pluralism. There lives a fear that if the barbarians break through the gate, theoretical science will degenerate into a state of muddled, or worse, absolute relativism — paralyzed by the lack of a basis to choose between better and worse theories. The commonsense notion that intellectuals, who are members of an open and democratic nation, a pluralistic culture and a multiethnic society, can somehow maintain distinctions between correct and incorrect, better and worse, ethical and unethical falls by the wayside.

As a result of the cognitive dissonance created by a rejection of positivism, the debate over pluralism runs the risk of intellectual impasse predicated on apparently irreconcilably and polarized positions. With the tradition of monism in relative decline, practitioners in economic methodology and the philosophy of science are confronted with navigating around an abyss created by the monist/relativist dualism. Those advocating the traditional monist approach are labeled dogmatists by progressives, and those advocating movement from a monist past are labeled relativists by traditionalists. Those who have moved beyond the smoke and mirrors of this squabble quickly discover that overcoming the hegemony of monist beliefs and habits is easier than constructing an alternative. In
general, it is easier to tear something down than to construct something new. It is at times such as these that voices of pragmatism so often speak to the occasion. In *Experience and Education*, John Dewey reminds us that at times of impasse and polarization, the business of the philosophy of education:

...means the necessity of the introduction of a new order of conceptions leading to new modes of practice. It is for this reason that it is so difficult to develop a philosophy of education, the moment tradition and custom are departed from. It is for this reason that the conduct of schools, based upon a new order of conceptions, is so much more difficult than is the management of schools which walk in beaten paths. Hence, every movement in the direction of a new order of ideas and of activities directed by them calls out, sooner or later, [for] a return to what appear to be simpler and more fundamental ideas and practice of the past (Dewey 1938:5).

The primary purpose of this research is to present a vision that helps to move beyond the impasse. I seek a third way that moves beyond a tired and worn discussion in which monists and relativists are content to criticize the weaknesses of each other's extreme positions and avoid seriously considering alternatives. I seek to avoid the dogmatic attitude of the monist and the absolutely skeptical attitude of the relativist.

This dissertation offers an interpretation of the enduring nature of plurality that characterizes economic analysis and economic methodology. As a scientist, it is not enough to celebrate the variety of schools of thought in economic theory. Their existence must also be explained. Accordingly, I set out to present a philosophical basis — a metatheoretical taxonomy — for the major schools of thought in a manner that can be replicated in undergraduate and graduate education. Since I have been trained as an economist, my attention will be directed mostly toward the economic profession. However, I believe that the metatheoretical taxonomy presented in this dissertation is a
system of organization that can be applied to any of the sciences — physical, life, or human. This is a notion that I was first able to grasp by reading The Turning Point: Science, Society and the Rising Culture by Fritjof Capra (1982). While it is possible to criticize some of the conclusions and implications of the ‘systems view’ (holism) drawn by Capra, the basic first impression remains; his depiction of the extension of the mechanistic metaphor into all scientific domains is well supported and its presentation is understandable. The exclusion of alternative approaches to analysis and/or metaphors in scientific domains is likewise well supported. In addition to presenting an interpretation for the enduring nature of pluralism in theory construction, I set out to fulfill a second challenge by trying to address the following question: As someone whose pre-analytic vision and value system is pluralistic, how would I instruct a course in economic methodology to undergraduate or graduate students in a post-positivist era? In this sense, I believe this research suggests a vision of an educational purpose for economic methodology, as well as a conscious return to the same for education in economics proper. Short of accomplishing this goal, this research points toward the future importance of articulating such a vision.

In my estimation, the need to provide an interpretation of the nature of plurality is intensifying in the current cultural and technological context — where access to information and ideas is rapidly changing. If on the one hand, the economic profession commits an inordinate amount of resources to a dominant paradigm, then the challenge is to contribute to the process of effecting a redistribution of intellectual effort. In this case, an adequate philosophical interpretation, one that legitimizes and validates the major
schools of thought in economics, seems in order. If on the other hand, the economics profession commits an optimal amount of resources to research activity, then the question of redistribution may diminish. Nonetheless, the ability to efficiently train students to think and conduct inquiries along the lines of multiple paradigms or a plurality of world views may still be worthy of being elevated to an intellectual ethic. Thus, an interpretation of plurality is still relevant. With this in mind, I have embarked on a project to develop a concise metalevel taxonomy that clarifies the pluralistic theoretical tradition long established in economics research. Is it possible to present the body of economic theory in such a way so that the next generation students may take a lasting impression, or generate a working knowledge, of the various manners in which economists tend to organize the evidence? For it is here, with the classroom in mind, that the economics profession, and those committed to either change or excellence in teaching can make the biggest difference. I recall the incredible amount of additional work it took to learn Spanish in my mid-20s and compare this to the time required for a child to master a second or a third language. Likewise, under the stress of the undergraduate or graduate experience, consider how easy it is for instructors and students to follow the path most traveled. Consider how easy it is for economists-as-educators to be led by inertia and follow a path-dependent way of conceptualizing economics. It is my belief that economists can gain from a clear and concise metalevel taxonomy for organizing economic theory. It is the underlying premise of this research that economic methodology should be in the business of preparing economists to speak more than one language, to operate from more than one analytical framework.
By way of the philosophy of science, methodology has typically dealt with the manner in which scientific disciplines evaluate claims to knowledge. The branch of philosophy most directly associated with theories of knowledge has been epistemology. By developing a logic of theory appraisal, epistemologists have hoped to establish a "general theory" of theorizing. That is, they have tried to articulate a set of rules or criteria that could universally and objectively establish the scientific legitimacy of a theory or hypothesis — of a claim to knowledge. The epistemological project has been intimately connected with the "Logical Positivist" philosophical quest for certain knowledge or truth. This sought-after methodological doctrine would then serve as a foundation to the guaranteed progress of individual disciplines and science in general. The attempt at unifying various scientific disciplines through a methodological foundation has lead to the distinction between "Methodology" and "methodology". The former refers to the overarching epistemological project: Methodology is a theoretical project that aims to discover a unique set of rules and procedures which permit objective theory appraisal and help assure the progress of science. On the other hand, "methodology" refers to a more modest pursuit of considering and analyzing the actual methods and techniques economists use to fulfill a potentially more encompassing set of purposes. Recently, this focus has come to be called "recovering practice" and admits analyzing economic texts with the use of discourse analysis, as well as more traditional "scientific" focuses such as model building, testing, and the likes. To the extent that methodology is a concern in this research, it will be most closely related to the "plurality of methods" which are used in the practice of science.
The ‘Methodological project’ may well be at an impasse in the social sciences in general and economics in particular. On the one hand, progressives in the methodological discussion realize that resuscitating a constructive role for methodology will require a fairer treatment of the ‘practice of economics’ as done by economists. This is problematic because a non-normative interpretation of the various research agendas pursued by economists seems to preclude a single methodological story, which is, after all, a crucial aspect of the longstanding epistemological goal of developing a unified social science agenda. On the other hand, traditional methodology may have pursued a research path that has developed its own intellectual inertia in the past few decades. Conservative methodologists hold tightly to a conception of methodology wedded to the Popperian notion of falsificationism. This is unfortunate because a sympathetic reading of the mature Popper’s notion of ‘critical fallibilism’ appears to construct a bridge to a less reductionist epistemology by de-emphasizing falsificationism and elevating critical debate in a social context. Bridge or no bridge, the aim of this research is to present a taxonomic approach that has not received a systematic treatment in the post-positivist literature. It is an approach that I believe has been overlooked by the methodological project. This

22 In the afterword to Salanti and Scrappani (1997) entitled “Can Methodological Pluralism Be A Methodological Canon?” Scrappani claims that even literally interpreted critical fallibilism ultimately intends to limit pluralism. Scrappani writes (1997:301) “[When we see criticism contained in the realm of scientific realism] an apparently plausible foundation would emerge: the multiplication of methods and theories devised to attack the complexity of reality could at least serve to increase the probability of striking the right conjecture. Maybe rather a bold foundation but the only one that seems compatible with realism. This attitude is typical of ‘fallibilism’, an approach in which methodological pluralism is accepted as a critical tool. But in so far as fallibilism is coupled with realism it inevitably leads to methodological monism. Fallibilists like Caldwell, for example, endeavor to seek plurality and then try to reduce it through criticism.”
research highlights four "world hypotheses" or "cognitive systems" and two "levels of
analysis" or "modes of composition" orientations. The resulting metatheoretical taxonomy.
I claim, provides one way in which to see that the plurality of economic theoretical
systems cannot be philosophically denied. The four discrete world hypotheses, which are
founded on the root-metaphor method developed by Stephen C. Pepper, are called
formism, mechanism, organicism and contextualism. Each world hypothesis will be
developed in reference to its unique set of "structural categories," which in turn possess
defining characteristics such as a notion of causation, space and time, a "special theory" of
truth and a mode of scientific explanation. In the development of his metaphysics
using the root-metaphor method, Pepper is explicit that each world hypothesis possesses
its own theory of truth. Thus, he claims that there is a plurality of theories of truth, one
associated with each of the root metaphors used to define a world hypothesis. Using
Pepper's four world hypotheses and the distinction between humanist/individual and
structural/aggregate levels of analysis in economic theory, I attempt to locate
representative works in economic theory that fit into Pepper's metatheoretical
classification system. However, before moving directly into a taxonomy of substantive
economic theories based on Pepper's four root metaphors, I will focus my attention on the
manner in which the "structural categories" unique to formism, mechanism, organicism and
contextualism migrate across the physical, life and human scientific domains. That is, a
world hypothesis is viewed as a kind of metaphor (i.e., a root metaphor) that is more

23 Refer to page 167 for a discussion of the "special theories of truth" associated with each world
hypothesis.
universal in character than metaphors such as the 'biological' or the 'ecological' metaphor. Ultimately, it is in reference to Pepper's notion of 'structural categories' that economic theory will be taxonomically classified. To motivate this discussion, I rely on the work of Capra (1982). In this research, Capra takes great pains to demonstrate that physics no longer operates exclusively from its traditional classical Newtonian orientation. In my analysis, I will point out that Capra has effectively demonstrated that the physical sciences (e.g., physics, chemistry, etc.) can be viewed from the perspective of Pepper's four root metaphors. Moreover, through an extensive set of examples, Capra shows that this also occurs in the life and human sciences.

The actual taxonomy through which I view economic theory is based on unique sets of structural categories that define the world hypothesis. In a sense, these structural categories can be viewed as an enduring 'deep structure' capable of generating a plurality of theories that can be more abstractly characterized as a theoretical system, which contains four analytical frameworks as suggested by the taxonomy of world hypotheses. The basic approach parallels in some suggestive and instructive ways the approach pioneered by Noam Chomsky in linguist theory.\textsuperscript{24} Whereas Chomsky sought to reveal the underlying and universal generative structure of natural language (i.e., syntax), I seek to reveal the underlying structure (through a taxonomy of frameworks) of theoretical systems.

\textsuperscript{24} It is worth noting that Walter Weimer's approach to metatheorizing owes a lot to Noam Chomsky. Weimer works in the discipline of cognitive psychology, which is a specialty within the more general field of linguistic theory. For a recent treatment of Chomsky's theoretical approach from the perspective of an empirically based cognitive science, see Lakoff and Johnson (1999:469-513).
in economic theory. Specifically, I am interested in associating the Pepper's lower level structural categories with corresponding higher level analytical structures and forms (methods, concepts, models, methodology, modes of explanation, types of causality, etc.). Thus, the analytical frameworks generate the plurality of research artifacts, texts, knowledge products, or in general argumentative forms that are typically associated with major schools of thought in economics. I hope that by doing this research, future methodological accounts of economics will be in a better position to explain and understand the underlying and enduring 'structures' that generate irreducible 'language forms' in economic thought.

By choosing to organize evidence along the lines of the structural categories of organicism and contextualism as opposed to mechanism and formalism, an economist necessarily commits to a different mode of scientific explanation and associated set of analytical and conceptual tools. More generally, each of the four modes of analysis possesses a unique set of structural categories derived from their respective root metaphors that define the point of origin of the metaphysical system. Indeed, the distinct world hypotheses represent a distinct 'language form' or manner of organizing the evidence of the world. As previously mentioned, if these language forms have anything in common with methodology, I consider it to be related to the modest program typically associated with techniques or other lower level methods. It is these methods and techniques that reflect the underlying structure of both substantive and metaphysical theoretical structures. It should become clear, however, that just as theoretical systems can be portrayed as incommensurable sociological entities (paradigms, schools of thought,
etc.), the underlying structure of theoretical systems can be portrayed as distinct across analytical frameworks based on unique sets of structural categories. If metaphysical systems are distinct, which Pepper claims they are, they cannot be meaningfully unified as part of a universal methodological or epistemological theory; however, they can be celebrated for their uniqueness and difference. And, the research artifacts that they generate can be aptly criticized and submitted to scrutiny in what amounts to a complex process of knowledge acquisition. I submit that the primary unifying aspect of science is indeed criticism in a social context; but criticism does not appear as an undifferentiated, universal form. Criticism needs to be qualified and differentiated in order that it may be meaningful in terms of a specific metaphysical system.
CHAPTER TWO

PEPPER’S METAPHILOSOPHICAL APPROACH

Stephen C. Pepper was a philosopher who worked and wrote in the tradition of American pragmatism. He was born in Newark, New Jersey, in 1891. In his early childhood, Pepper lived in Paris before moving to Concord, Massachusetts, where he attended middle school and high school. Pepper was the son of a professional artist who made his living as a portrait painter. His family was a longstanding member of the Baptist church. The family’s liberal and religious tradition dated back to his grandfather who was a minister and served as president of Colby College in Maine in the late 1800s (Efron 1980:5-6). Reflecting on his nature and personality as a youth, Pepper stated in the preface of World Hypotheses that he had always had a “consuming personal desire to know the truth” (1942:vii). This yearning for truth led him to study the issues of theology.

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25 I would like to thank Bill J. Harrell, recently retired professor at the Department of Sociology and Anthropology at S.U.N.Y. Institute of Technology, for his time and helpful clarification relative to the work of Stephen C. Pepper. In addition, I refer the reader to Harrell’s web page at (http://www.sunyl.edu/~harrell/billyjack/Index.htm) where he has assembled articles related to Pepper’s work, links to Pepper-related work in a variety of disciplines, a Pepper list for communication between researchers using Pepper’s ideas, and more. Also, refer to the Stephen C. Pepper homepage organized and maintained by Bill Harrell at (http://www.sunyl.edu/~harrell/Pepper/index.htm).

26 Arthur Efron’s biography and critical analysis of Stephen C. Pepper was published in a two-volume edition of Paunch entitled “Root Metaphor: The Life and Thought of Stephen C. Pepper.” Both volumes 53 and 54 were dedicated to the philosophy of Pepper. Efron’s introduction to this two-volume set is entitled: “Pepper’s Continuing Value.” To obtain the text of Efron’s piece, go to http://www.sunyl.edu/~harrell/Pepper/pep_efron.htm. As well, to obtain the text from other articles included in the two-volume edition go to http://www.sunyl.edu/~harrell/Pepper/pep_fbl-contents.htm.
physics and philosophy. Working in the tradition that envisions philosophy as a means to better understand and improve the human condition, Pepper believed that the intellectual effort should be put to the service of improving humanity.\footnote{Near the end of his life Pepper wrote an autobiographical piece for a book containing personal statements of mid-twentieth century philosophers. See Pepper (1974) for an article entitled “Ideals in Retrospect”, which is Pepper’s personal autobiographical account of his life and works. For more biographical detail as to Pepper’s personal motivations, see an article entitled “The Stephen C. Pepper Papers, 1903-1972” by Hahn (1980). The Pepper Papers, which are stored at the Southern Illinois University at Carbondale’s Morris Library (Special Collection 106), comprise a 2,500-page journal compiled by Pepper beginning at age 12. The papers embrace extensive published and unpublished manuscripts, lecture notes, consultant reports, University of California at Berkeley Art Department and Philosophy Department honors and records, position papers in connection with university and civic problems, professional and personal correspondence, family papers, photographs, some drawings, a number of poems, a diary or journal in which he made entries for almost seventy years, his published books and articles, articles about him, and memorabilia.}

Pepper started his college training at Harvard in 1909 and received his B.A. and M.A. in 1913 and 1914, respectively, and his Ph.D. in philosophy in 1916. While at Harvard, Pepper studied the philosophies of materialism, idealism and pragmatism. According to Andrew Reck (1968:45):

Pepper heard Santayana lecture and studied under [George Herbert] Palmer, but of all his Harvard teachers of philosophy it was Ralph Barton Perry who exerted the major influence upon his intellectual development.

After graduating from Harvard, Pepper took a yearlong position as an instructor at Wellesley College before leaving academia to perform military service in World War I. After the war, he took a position at the University of California, Berkeley. At Berkeley, he became a full professor in 1930 and eventually became chair of the Philosophy and Art Departments. It was during the 1920s and 1930s that Pepper started to publicly work out intellectual questions relating to his desire to establish philosophical grounds for sound judgment in science, art, and ethics. According to Reck, Pepper’s intellectual
development benefited from the lively and stimulating atmosphere at Berkeley and through his association with some distinguished colleagues there (1968:46). In addition to Pepper's association with Berkeley, his beliefs and values concerning the society in which he lived were influenced by the violent changes sweeping the world in the early decades of the 1900s. Pepper writes (1942:vii-viii):

[The violent changes that were taking place in social values were having their effect. Individualistic democracy, which through the first quarter of the century [naively accepted as the unquestionable social ideal, met with severe jars, and became subject to criticism. As an ideal it obviously needed revision. It was in active competition with other political ideals. What were the grounds and evidences for any of these political creeds?]

Pepper's intellectual interests lay primarily in the philosophy of art, most likely due to the influence of his father. This is evident in the books that he published from 1937 to 1967. Published in 1942, World Hypotheses: A Study in Evidence was Pepper's major contribution to the traditional philosophy of science. However, Pepper's work in philosophy was primarily related to aesthetics and value theory. His major publications include the following: The Basis of Criticism in the Arts (1945); Principles of Art Appreciation (1949); The Work of Art (1955); The Sources of Value (1958); Ethics (1960); Concept and Quality: A World Hypothesis (1967); Aesthetic Quality: A Contextualist Theory of Beauty (1970c[1965]).

While C. I. Lewis had taught that the immediate quality of all experience is aesthetic, it was Pepper who, more than any thinker of his generation, made aesthetics and the philosophy of art the technical fields of study they are today.

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28 For a summary of these books see Reck (1968:44-80).
However, Pepper had a deep interest in the traditional philosophy of science and metaphysics. Early in his professional career, Pepper had become intellectually dissatisfied with both dogmatic materialism and dogmatic idealism. Although pragmatism offered a third way, he still came to the conclusion that pragmatism was but another metaphysical system. In the 1930s and 1940s, the intellectual temperament of the times was becoming increasingly dominated by logical positivism, in the discipline of philosophy as in other disciplines. With roots in British empiricism and an emphasis completely on data and formal logic, the positivist philosophical tradition denied the possibility of metaphysics as a meaningful cognitive enterprise. The positivists asserted a position that restricted knowledge claims to belief founded on the evidence of observable data and formal reasoning. In this light, World Hypotheses: A Study in Evidence can be seen as a direct response to logical positivism. In World Hypotheses Pepper offers a defense of metaphysics, but he does it in a manner that reflects a tolerance for a plurality of metaphysical systems. Thus, Pepper's is a pluralist metaphilosophical position. He not only identifies logical positivism as a metaphysical system, he locates it alongside three other distinct metaphysical systems. The context of Pepper's metaphilosophy is, therefore, the state of metaphysics in mid-century when it was shattered by the epistemological strictures of logical positivism. Reck writes (1968:47-48):

Thus World Hypotheses presents a theory of metaphysics, not a metaphysics: it offers a metaphilosophy — that is to say, a theory of philosophy. Now according to Pepper's metaphilosophy, metaphysics is a specific kind of belief that attempts to embrace all facts and to organize them within a coherent system. A metaphysics is, in Pepper's phrase, "a world hypothesis." A world hypothesis, moreover, is an unrestricted hypothesis, as distinct from the restricted hypothesis characteristic of the special sciences. For Pepper there is no basic difference
between an empirical scientific hypothesis and an empirical world hypothesis — only a difference in scope. *World Hypotheses* is, according to its subtitle, a study in evidence. An essay on philosophical method, it examines the source, the nature, and the grounds of metaphysics.

Based on this critique of logical positivism, Pepper proceeds to develop four world hypotheses that he maintains are equally adequate in the history of philosophy. One can see that Pepper explicates the four world hypotheses — what he refers to as formalism, mechanism, contextualism and organicism — in both a forward and a backward direction. In the forward direction, Pepper presents what he calls the root-metaphor theory. In essence, the root-metaphor theory is Pepper’s hypothesis concerning the manner in which a world hypothesis develops in the first place, that is, over the history of cognition or the history of philosophy. Thus, in pre-scientific times, a theorist attempting to grapple with the morass of commonsense evidence finds a way to explain something. From here, the cognizer utilizes the root or the foundation of what made the explanation possible and starts to extend the explanation into other domains. If the root metaphor is fruitful, it will be capable of bringing more and more of the world’s evidence into its domain. The continued development and refinement of the structural categories of a root metaphor lead to Pepper’s four world hypotheses. From the forward-moving perspective, Pepper’s penchant for pragmatism can be seen in the way he views the working out of knowledge through an experiential process involving a “knower” criticizing commonsense evidence with the help of a root metaphor. As we will see later in this chapter, pragmatism is the theory of truth that after its birth in the late 1800s quickly thickened into the contextualist world hypothesis (Pepper 1942: 268).
In order to operationalize his root-metaphor theory, which is the basis of his metaphilosophy, Pepper relies on what he calls the root-metaphor method. This is simply Pepper's way of developing the structural categories that define and give form to each of the metaphysical systems or world hypotheses. Thus, he does an exercise in which he describes what we do any time we decide that two or more things are similar. By specifying in detail this process, he identifies the source and nature of the categories of formism. Likewise, he describes the operation of a lever in order to explicate the structural categories of mechanism. In this way, he is able to develop an abstract model of the four world hypotheses or conceptual systems. However, it is also certain that Pepper's approach was highly informed by his thorough study of the writings of philosophers that occupy a place in the history of philosophical thought. In answering criticisms to his root-metaphor theory in the conclusion of *World Hypotheses*, Pepper writes (1942:337):

*Can any one of the basic theories be ascribed to a classical philosopher?* Probably not just as described in the text. Nevertheless, the classical philosophers are the men whose writings provided the empirical evidence for the descriptions given in the text. What I maintain is that these theories are what these writers were heading toward in their pursuit of structural corroborations.

Thus, what we also see in Pepper is a philosopher who is also a historian. In current methodological terminology, Pepper attempts to "recover the practice" of philosophers. And in this vein, the significance of the root-metaphor theory, while still applicable to a theory of cognition, can be viewed from a different perspective as a metatheoretical approach that attempts to identify and explicate the various structural forms underlying the work of philosophers. As we will see, this seems to represent the formist emphasis that
Pepper employs in *World Hypotheses*. Although he does not say this, Pepper is presenting his way of recovering the various schools of thought in philosophy, a task he feels compelled to undertake as a result of the dogmatic impingement of logical positivism.

In the current philosophical climate, a metaphilosophy of the work of philosophers or a philosophical theory of the various philosophies of science brings to mind the problem of reflexivity.\(^9\) In Pepper's case, the question might be framed as which world hypothesis is being used to explicate the metaphilosophical system. Based on the fact that the root-metaphor method attempts to replicate the actual experience of philosophers theorizing the world starting from uncriticized commonsense fact, it appears that Pepper works primarily in a contextualist or a pragmatic tradition. Thus, one might ask if the contextualist world hypothesis can adequately or fairly represent the formist world hypothesis.\(^10\) This philosophical problem has been drawing increasing attention in the literature of late due to the proliferation of meta-analyses that turn critical analysis inward (internal critiques) and inevitably lead to logical inconsistency. For his part, Pepper seems

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\(^9\) In economics, a well-defined example of the problem of reflexivity can be found in the research of Wible (1998). Wible deploys the analytical tools of economics (i.e., rationality) to study the extent to which there exists economic rationality in the process of economic science and theory selection. Wible suggests that the turning of the critical lens on the theoretical activity of one's discipline may be the sign of a maturing scientific research program (1998:13). He gives explicit treatment of the issue by reviewing the problem in science (empiricism), philosophy (falsification) and mathematics (Gödel's theorem) (1998:203-218). Wible concludes that "the most plausible way out of this dilemma [is] a philosophy of criticism" (1998:216). In addition, see Hands (1994:91-96) for a discussion of the problem of reflexivity as it relates to the metacritique of the "strong program" in the sociology of science. Also see Ashmore (1989) and Bloor (1991) for lengthy treatments on the issue of reflexivity in the sociology of scientific knowledge.

\(^10\) The issue of reflexivity appears to be ignored or avoided in Lakoff and Johnson (1999). In this research, a metacritique of analytical philosophy is conducted from the perspective of "second generation" empirical cognitive science. I understand this empirical approach and its corollary of the "embodied mind" to also be akin to pragmatism.
to have anticipated or at least been aware of the problem of reflexivity in World Hypotheses. Pepper writes (1942:85):

Strangely enough, if this root-metaphor theory is correct, its truth could only be established by the adequacy of the theories which constitute its evidence. For this theory is itself a structural hypothesis — at least, it would be such in its ultimate corroboration — and, as we have seen, a structural hypothesis only attains full confirmation in a world theory. Hence, if this theory is true, an adequate world theory will support it. This theory would then, so to speak, become absorbed in its own evidence, that is, become an item in the very theory which it is a theory about. If this sounds like a dark saying, we reply that a world theory that cannot adequately explain it is not an adequate world theory.

But it is not a dark saying, though it does constitute a curious puzzle like that of the bottle carrying a label of the picture of that bottle, which picture of that bottle is pictured with a label which pictures the picture of that bottle and so on — if so on. A bottle with a label like that is a fact of some sort in the world....

At heart, Pepper’s approach to epistemology is pluralist in the sense that he attempts to identify the set of basic underlying structural categories that serve as the foundation of each particular form of metaphysical thought. In Pepper’s mind, there is a plurality of

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11 Recall Joan Robinson’s likening of a metaphysical statement or an ideology to an elephant. Robinson writes: “A point is defined as that which has position but no magnitude. No one has ever observed a point. It is a logical abstraction. But how to define an elephant? The man who had the right idea who said: I cannot define an elephant but I know one when I see it. An ideology is much more like an elephant than like a point. It is something which exists, that we can describe and discuss and dispute about. The hallmark of a metaphysical proposition is that it is not capable of being tested...Adopting Professor Popper’s criterion [of falsification, a metaphysical proposition] is not a scientific proposition. Yet, metaphysical statements are not without content. They express a point of view and formulate feelings which are guides to conduct. Metaphysical propositions also provide a quarry from which hypotheses can be drawn. They do not belong to the realm of [empirical] science and yet they are necessary to it. Without them we would not know what it is that we want to know” (1962:3-3). It has been pointed out to me that Robinson may have conceded far too much to Popper. While metaphysical systems are not directly “tested” by empirical observation, as a great deal of theory is not, it is certainly indirectly tested. It must be kept in mind that Robinson’s above quoted comment (and many others like it) was made in the days of logical positivism in an attempt to save interpretation and speculation as significant by separating them from the “really” important stuff such as confirmation and, or course, falsification.

12 I have come to see that Pepper is not a foundationalist in the sense that through reflection one can arrive at the irrefutable basis of human knowledge. Indeed, the taxonomy of metaphysical systems derived from Pepper’s four root metaphors represents four “foundations” and not one. One would have to move to
world hypotheses all of which have attained an adequate degree of structural
corroboratior in their attempts to explain the world. In his first pass, Pepper identified
four adequate world hypotheses. Furthermore, each world hypothesis contains an
autonomous set of structural categories that serve as the basis for its position. That is,
there are four relatively well-defined bases, and each one reflects a metaphysical system in
its own right. Moreover, there is truth, or warranted belief, in each of these world
hypotheses. This is not absolute truth, not certain truth, nor a quest for certainty, but
nonetheless from within each perspective a truth arising from their autonomous
collaboration. Stated differently, the world hypotheses are to be viewed as universal
forms, not fully refined or static, but real and somewhat foundational nonetheless.
According to Pepper, from these distinct perspectives, the philosophy of science is left
with four ways — not an infinite number and not just one, but a controlled plurality — to
understand the world. Pepper writes (1942:331):

Having done all that we can do rationally to organize the evidence on the topic in
question in terms of structural corroboratior, and finding as a rule that there are
four equally justifiable hypotheses explaining the nature of the subject, we shall
have the wisdom not to conclude that we know nothing about the topic, but on
the contrary, that we have four alternative theories about it, which supply us with
a great deal more information on the subject than any one of them alone could
have done.

One such topic is unique: the world itself. About that our knowledge is precisely
as concerning any lesser topic. We know a good deal about the world. We have
four rather highly adequate theories about it. But we have no single judgment to
give as yet.

the metaphilosophical level and argue that pluralism is a foundation in order to see Pepper as a
foundationist.
Thus, Pepper's metaphilosophical system views the world hypotheses as being complements of one another. The monist and the relativist metaphilosophical positions would have problems with Pepper's metaphilosophy. Insofar as he or she would even accept the notion of a world hypothesis, the monist would be driven to reduce the four hypotheses from four to three, then to two and finally to one. Thus, the formist would argue the superiority of realism. The mechanist would argue the superiority of naturalism. The organicist would argue the superiority of idealism. And finally, the contextualist would argue the superiority of pragmatism. But somehow, science would be able to choose the best perspective. On the other hand, metaphilosophical relativists such as Rorty and McCloskey, who inevitably find their anti-essentialist positions through pragmatism, would deny the necessity of structural foundations. For Rorty, these structural foundations are but the ghosts of dead, ineffectual metaphors, which function as obstacles to the creation of novel, live metaphors capable of effecting change in the current social world (Rorty 1989:13-35). For McCloskey, every word, every argument, every theory, every act is but a persuasion in a world of persuasions that defies absolute foundations. Yet, one has to see that in transforming the contextualist/pragmatist world hypothesis from a philosophy into a metaphilosophy, the relativist seems to jump out of his or her container and in so doing enters into his or her own self-contradiction. Finally.


34 For more on the relationship between Rorty and Pepper see an article by Reck (1982:207-216) entitled "Pepper and Recent Metaphilosophy". In addition, see an article in response to Reck (1982) entitled...
one may rightly ask if Pepper’s pluralist metaphilosophical position is subject to the issues associated with reflexivity. Pepper’s response to this contemporary inquiry appears to be contained in his review and conclusions of World Hypotheses. In addressing the concerns of his critiques, Pepper writes (1942:333):

"Isn’t this whole root-metaphor philosophy simply my philosophy, one more philosophy in the story of philosophy, and is not the balanced disposition of the four main theories simply my interpretation of the significance of these theories in terms of my philosophy? In a word, am I not just as dogmatic as the men I have been criticizing? Am I not dogmatically setting my philosophy up in preference to any other?"

To this question Pepper responds (1942:347):

As to the question, whether the root-metaphor theory was not a world theory itself, or one of the already described world theories pretending to be a neutral, it is almost a sufficient reply to record that the root-metaphor theory has been accused by various persons of being every one of these world theories except animism and mysticism.

But I have tried to show by my very exposition of these theories in terms of their root metaphors that there is a good deal of evidence for the truth of the root-metaphor theory. My contention is that as soon as the claims of dogmatism have been dissipated, this root-metaphor theory of structural corroboration appears of itself, just as the natural contours of a landscape appear as soon as the morning mists are burned away.

Thus, Pepper seems to appeal to epistemological naturalism to support the plurality of world hypotheses. And if he is true to his words and rejects dogmatism — that is, appeals to absolute authority, self-evident claims or indubitable facts — one can only assume that Pepper intends for his metaphilosophical position, as well as for the metaphysical conceptual systems that populate it, to be legitimate objects of criticism.

"What Pepperian Response to Rorty is Possible?" by Hare (1982). For the complete text of these articles on may also go to http://www.sunyit.edu/~harel/Pepper/ pep_related.htm and scroll down the page.
GENERAL STATEMENT OF THE TAXONOMIC MODEL

One philosophical interpretation of scientific explanation claims that theoretical inquiry attempts to identify the generative mechanisms, structures, laws or tendencies underlying the observed phenomena and empirical regularities of the world. Lawson (1994) refers to this as transcendental realism. He argues that it is a more adequate approach to understand and theorize "open systems" than the positivist method, which focuses exclusively on the level of observed phenomena and empirical regularities and is modeled after successes in describing "event conjunctions" in closed systems. In the transcendental realist philosophy, proper identification of the deep structures or underlying mechanisms that mediate the observed outcomes in an open world is the central purpose of scientific explanation. In the course of this chapter, the transcendental realist approach to scientific explanation will come to be viewed as an example of formalism as developed by Pepper. Conversely, Pepper's metaphilosophical system, which is comprised of the four world hypotheses, will be viewed as being explicated through a formalist perspective. The biological theory of evolution is the archetypal example of this approach to scientific explanation. Here, it was the identification of the crucial role "the gene mechanism" plays in forming the underlying and relatively stable structure through which one can discriminate a naturally selected and evolving variety of species. In economics, we see this
most clearly in the institutionalist emphasis (à la Veblen) of identifying institutions as the
“units of heredity” through which economic outcomes should be analyzed.\textsuperscript{15}

Most often, this type of scientific inquiry applies to ‘substantive theories’, which in
one way or another attempt to illuminate outcomes observed in the world. In principle, it
is also possible to analyze and describe ‘theoretical systems’ as structures that have been
assembled over the centuries by scientists and philosophers in their respective scientific
communities. In viewing matters from this ‘metatheoretical’ perspective, it is the
‘theoretical systems’ themselves that become the ‘data or observed phenomena’ in need of
explanation or classification. Thus, we might ask the question: What is the underlying
structure that both describes and conforms to a general equilibrium analysis or
argumentative form presented by Keynes in the General Theory? While the search for the
generative mechanisms, deep structures, tendencies or laws to explain natural or social

\textsuperscript{15} See Hodgson (1993) for a discussion of Veblen’s role in developing a framework for ‘evolutionary
economics’ or institutionalism. On a general and interdisciplinary level, this type of application of the
transcendental realist approach seems to have parallels in the literature. Two such examples include (1)
the analysis of the role of ‘generative grammar’ pioneered by Noam Chomsky (1972) in his study of
natural languages; and (2) the analysis developed by David Hull (1989) in his study of the conceptual
evolution of the Biological Theory of Evolution. I find these examples appealing and suggestive. The
former applies the ‘transcendental realist approach’ to natural languages. Although an extension, the
approach of identify the ‘grammatical structure underlying speech is consistent with the perspective that
the structure of theoretical systems can similarly analyzed as was done with Pepper’s world hypotheses.
In this regard, longstanding and stable world theories make up a kind of ‘natural language’. In analyzing
spoken and written language forms, Chomsky develops a linguistic theory that places importance on the
universal grammatical structures through which language forms (sentences) are generated. By viewing a
variety of cultures, Chomsky draws attention to the infinite number of meanings that can be generated
from a rather small and finite set of grammatical rules — rules making up the underlying structure. His
explicit model of the diversity of written and spoken language is based on an analysis of underlying
structure and generative forms. For a further discussion of this point refer to the discussion of
linguistics/analytical philosophy in Outhwaite & Bottomore (1994:341-43). The work of Hull is an
explicit and self-conscious attempt to distinguish between the static and the evolutionary concepts in order
to demonstrate and illuminated the manner in which the ‘Biological Theory of Evolution’ itself went
through an evolutionary process of refinement. Hull is interested in identifying the ‘units of heredity’ in a
social process such as science.

74
phenomena is a relatively common approach for contemporary science, its application to theoretical systems is less common. However, over the past few decades, participants in the discipline of economic methodology have demonstrated an increasing willingness to engage in metatheoretical analysis. Metatheoretical mode of analysis has been used in conjunction with identifying/descoring various research programs from a Lakatosian perspective. For example, consider the analyses of Hausman (1992), Hausman (1994:195) or Weintraub (1989:109), which attempt to identify the "metaphysical hard cores" of the neoclassical theoretical structure in mainstream economics.

The approach that I will utilize to develop my taxonomic model is similar to this approach since both metaphysical analysis and metatheoretical organization form its basis. However, the focus of the analysis will be shifted away from "substantive theoretical systems in economics" and toward what Stephen C. Pepper has called "world hypotheses and their associated root metaphors." According to Pepper, world hypotheses originate and become refined through a cognitive process, which is conceptualized in terms of a history of human cognition. This is to say that world hypotheses and associated root metaphors are enduring and stable metaphysical structures, which can be treated as legitimate objects of study. Moreover, the key relationship is as follows: various

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16 Although one that Lawson (1994) claims is a neglected alternative to the positivist approach, which maintains a focus only on universal generalizations about empirical regularities, based on the relationship between observable data/events and a Human notion of causation. Cartwright’s (1989) discussion of carrying capacities and tendency laws is a recent exception (Hanks 1995). According to Hanks, “Cartwright argues that those involved in the actual practice of science presuppose the existence of relatively enduring and stable nature, or capacities, in the systems they study; and since these stable capacities, not Human regularities, are responsible for the causal claims of science, our understanding of science depends on our understanding of the role of these capacities” (Hands 1995:7).
substantive theoretical systems can be seen as being generated through the cognitive organizing structures defined and provided by world hypotheses. Conversely, the world hypothesis serves as the transformational or generative structure in the production of substantive theory systems that populate the landscape of economics or other natural and/or social sciences. Thus, unlike Rescher (1989), who seeks to demonstrate the utility of an economic perspective for understanding the ways and means of our cognitive endeavor (i.e., research choice as constrained optimization), Pepper's approach will be used to focus on the notion that a cognitive historical process (i.e., identified by the root-metaphor method) offers one explanation of the sustained variety or enduring plurality of theoretical systems in observed economic texts.

According to Pepper, world hypotheses and their associated root metaphors emanate from everyday common sense, what Pepper refers to as uncriticized evidence experienced directly by humans without the intervention of critical analysis. However, humans have a tendency to lift uncriticized evidence out of the realm of common sense. They do not seek refuge in uncriticized, unscientific common sense, but instead call attention to cognitive powers and demand a critical evaluation of the evidence. In so doing, a process of inquiry causes primitive root metaphors to become refined root metaphors. It is through ‘cognitive evolution’ that the ‘refined and ever refining root metaphors’ take on cognitive value. Root metaphors can be viewed as being associated

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57 In 1982, Arthur Etson organized a conference at the University of Buffalo to consider Pepper’s idea of how conceptual systems evolve in practice from a basic or root metaphor. Proceedings of this conference are published in the Journal of Mind and Behavior (1982) Vol. 3(3 and 4).
with either adequate or inadequate world hypotheses. Pepper identifies animism and mysticism as two of the inadequate world hypotheses that have populated the history of the philosophy of science and human cognition. According to Pepper, world hypotheses do not become inadequate through criticism of other world hypotheses. Instead, they convict themselves as a result of the inadequate nature and structure of the categories through which they interpret the world. On the other hand, some world hypotheses possess structural categories that are internally consistent and accordingly do not convict themselves. In so withstanding the test of time, they emerge as what Pepper refers to as ‘adequate world hypotheses’. They possess structural categories of sufficient ‘scope and precision’. The crucial idea here is that each world hypothesis possesses a unique and well-defined set of structural categories through which it explains or illuminates the data or evidence of the world. The ability of the structural categories to move across seemingly disparate disciplines with distinct subject areas and varying bodies of evidence suggest a means to interdisciplinary discourse. Thus, the utility of Pepper’s metatheoretical taxonomy may well be most appreciated as both an approach to teaching economic ideas in a pluralist, post-postivist environment and more effectively interfacing economics with the social sciences. In an article entitled “Root Metaphor and

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38 One may be tempted to claim that this notion of ‘world hypotheses’ is naturalistic or static. Indeed, Pepper does see these theoretical structures as basically universal forms. Nonetheless, Pepper maintains that root metaphors are susceptible to refinement; he considers them fallible structures that evolve over the history of cognition. New world hypotheses may emerge (e.g., selectivism) and existing ones may be further developed or even discarded. Interestingly, even so-called evolutionary theories in which novelty and chance take center stage, the theory structure itself possesses an enduring quality which is conceptualized as being relatively static or stable in nature (i.e., genes, grammar, institutions).

Quine writes (1982:345-356):

In World Hypotheses (1942) and The Basis of Criticism in the Arts (1945), Pepper lays the foundation for the development of interdisciplinary curricula. The four world hypotheses — formism, mechanism, contextualism, and organicism — are applied to such disparate subjects as astronomy, art, poetry, music, sculpture, and drama. The categories of each world hypothesis are precise, yet one does not have to distort them to make them useful in interpreting the facts of any particular discipline. Pepper’s categories are neither too broad nor too narrow; they are both rigorous and universal. As Pepper puts it, they meet the criteria of scope and precision. The development of interdisciplinary curricula requires the use of categories and processes based on a metadiscipline such as Pepper’s philosophy. Extension of categories and processes drawn from popular movements and from particular fields has proven ineffective, producing curricula that are imbalanced in scope or precision. Root metaphors not only provide a balance of precision and scope; they also function as routing patterns, connecting experience with cognition, the subjective with the representative, and science with art. A broad range of disciplines can be taught from the perspectives of formism, mechanism, contextualism, and organicism. When the root metaphors of these world hypotheses are presented to students through physical analogies, puzzles and games, encounters, and in particular, centering processes, the intuitive and the rational can be coordinated.

The question as to whether this approach can be fruitful for conveying economic ideas will not be definitely answered in this research. Though I am optimistic, the purpose is to locate and detail what I see as a promising possibility — the idea that economic theories have a correspondence to distinct philosophical systems. The structural categories comprising the four world hypotheses and the root metaphors upon which they are founded will be discussed in detail later in this chapter after the general model is presented.

Before delving into Pepper’s notion of world hypotheses, let me state my taxonomy in its general form. Pepper identified four adequate world hypotheses via his
metaphysical analysis or using his root-metaphor method: As mentioned previously, they are (1) formism, (2) mechanism, (3) contextualism, and (4) organism. The taxonomic model of economic texts presented in this research is motivated by these four metaphysical perspectives. However, since this research is intended to inform the economic community of a possible interpretation of the enduring nature of plurality in economic theory, a second dimension is also considered. Specifically, consistent with the discussion associated with the “fallacy of composition,” two discrete levels of analysis are explicitly incorporated into the taxonomy. Consideration is given to the individual/market level of analysis and the aggregate level of analysis, which is characteristic of traditional microeconomics and macroeconomics as well as new and old institutional economics. Table 1 presents a taxonomic model that reflects only the four metaphysical perspectives outlined by Pepper.

WHAT IS METATHEORETICAL ANALYSIS?

Metatheoretical analysis has traditionally been an approach to “theorizing about theories” used in the philosophy of science. In simple terms, it is an approach that attempts to organize a grouping of theories on one level from the perspective of second level. The second level — the metalevel — in someway transcends the first. Weimer writes (1979:1):

A metatheory is a generative conceptual scheme that enables one to deal with any conceivable instance of phenomena falling within its domain. It is a “productive” or “creative” schema that provides an explanation for a perspective from which
<table>
<thead>
<tr>
<th>Formism</th>
<th>Mechanism</th>
<th>Contextualism</th>
<th>Organicism</th>
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Pepper's Adequate World Hypotheses
to view the occurrence of anything within its domain. It is a framework to which anything that can be conceived or discovered in phenomena can be assimilated.

It is thus the ultimate framework that renders intelligible past and present knowledge and provides a rationale for future inquiry. It is the ultimate point of view from which inquiry originates and to which conceptualization returns. Metatheories are background conceptual frameworks from which particular substantive theories originate and develop (emphasis added), but they do not lead to the “deduction” of substantive theories. Particular substantive theories are consonant with the metatheoretical framework in which they are embedded rather than being (deductive) consequences of it. Thus metatheories may provide a rationale for conflicting substantive theories – they rationalize many disparate surface-structure phenomena by being the common deep structure underlying them.

According to Weimer, a metatheoretical approach makes it possible to assess the ‘logical-isms’ (logical positivism, logical empiricism, etc.) in traditional philosophy of science, as well as existentialism and hermeneutic approaches. Each of these philosophies can be explained as instances of a justificationist metatheory of science, which is an approach to knowledge that defines truth in terms of ‘certain knowledge’ (1982:1-7). Philosophers and scientists practicing in the 20th century and writing in the tradition of logical positivism were by and large skeptical of meta-theoretical analysis. According to the positivist, metatheory is a type of metaphysics neither grounded in empirical observation or logical formulation. According to Pepper, metatheory is philosophical inquiry based on ‘structural corroboration’. However, this skepticism does not mean that
this type of analysis did not occur prior to and during the relatively short reign of logical positivism. Positivism is to be viewed as one specific instance of what Weimer (1979) calls a ‘justificationist’ metatheory.

Weimer was focused on differentiating between justificationist and nonjustificationist orientations of science, a project strictly related to categorizing the substantive theories in the philosophy of science. Other examples of metatheoretical analysis can be identified that directly pertain to work done in the discipline of economics. In a recent book entitled Schumpeter and the Idea of Social Science (1997), Shionoya employs a consciously metatheoretical approach in order to illuminate the apparent surface contradictions in the various interpretations of Schumpeter. Shionoya writes (1997: 2):

In presenting a metatheoretical framework, which covers the view of science as comprising normative, social, and historical activities, I have kept in mind recent developments in the philosophy of science since the decline of logical positivism.

In order to illuminate the static, dynamic, and evolutionary aspects of Schumpeter’s substantive economic theories and ideas, Shionoya attempts to view the substantive content of Schumpeter’s work from the perspective of three parallel metatheories: the methodology of science, the sociology of knowledge, and the history of science. Shionoya writes (1997: 6):

This [metatheoretical] framework includes not only the methodology of science concerning the precepts of science, but also the sociology of science concerning the practice of science in society and the history of science concerning the evolution of science in history. I call this system the “metatheoretical framework”. Since the fall of logical positivism, the philosophy of science has moved toward the sociology of science and the history of science, so that the three disciplines are integrated in a comprehensive study of science. Schumpeter’s idea of social science was defined by the overlapping interest of philosophers, sociologists, and historians, and his substantive work in social
science was constructed in a correspondingly cosmic fashion. All three
disciplines can be called metatheories in that they deal with a theory or science
from different angles, that is, from the perspective of philosophy, sociology, or
history. Metatheory is contrasted with substantive theory, to which it is
addressed.

Positivist theorizing claims to take perceived or observed “objects of the world” as its
primary data; metatheoretical analysis attempts to develop accounts of science by
analyzing the nature of the “theoretical systems” that purport to explain phenomena in the
world. This is an avenue of inquiry with which Stephen C. Pepper was quite comfortable,
nearly a half century ago at a time when a newly dominant positivist program was
asserting a blatantly anti-metatheoretical stance. Thus, by way of introduction in World
Hypotheses, Pepper writes (1942:2):

I wish to study world hypotheses as objects existing in the world, to examine
them empirically as a zoologist studies species of animals, a psychologist varieties
of perceptions, a mathematician geometrical systems. They are rarely treated as
objects in their own right.

LITERARY METAPHOR AND EXTENDED METAPHOR

Before moving forward, it is important to distinguish between ordinary metaphor
and extended metaphor and/or root metaphor. In general, an understanding of ordinary
metaphor may be developed in terms of “distinguishing the non-literal from the literal and
that of exploring the various forms that the non-literal use of language can take”
(Henderson 1994:344). Perhaps the most common understanding of metaphor comes
down from Aristotle who saw metaphor as the use of words in which the literal meaning
to one word is ‘carried over’ to another word. The phrase ‘Achilles is a lion’ could be
interpreted literally. But given the proper context, the phrase figuratively implies that Achilles has the attributes of a lion. The meaning of the phrase is established through a non-literal transference referred to as an analogy. The use of this level of metaphor, the transference of meaning between words, has been injected into the economics discipline most prominently through the work of McCloskey (1997[1985]), who maintains the focus on rhetorical devices used to persuade. Henderson (1994:345) provides a good example:

The notion of transference can be illustrated using a modern economic example. Investment in education is investment in the creation of human capital is a sentence in which transference of associations across two categories takes place: ‘human’ and ‘capital’, which might be taken as exclusive categories in an elementary natural classification system. Human capital, if taken literally, might refer to slavery. Capital might be taken literally as machines. The transference across the (alleged) natural categories makes it possible to rework the notion of education. Education is, in this metaphor, not consumption but investment and if the metaphor proves useful, the application of the senses in which it is ‘investment’, through the application of capital theory and its associated language and techniques will spell out the comparison implicit in the view that education is investment.

Thus, in this example the meaning of capital is metaphorically extended. In his exploration of metaphor, Henderson goes on to explain a host of other tropes, also known as literary devices, in which words used do not mean what they are ordinarily taken to mean. These include simile, analogy, metonymy, synecdoche, irony, paradox, personification, idiom, and allegory. In practice, they occur in a rhetorical or literary analysis of the texts of economists.

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9 For a more recent extension to the concept of natural capital see England (1998).
However, the application of metaphor has been observed on many levels in addition to the meaning of words on the level of the sentence and the context in which argument or persuasion occurs. Henderson points out that Mirowski (1989) has explored the use of metaphor in terms of the writing of 19th century economics. Mirowski focuses on many different levels of the text (as does McCloskey), while at the same time adding emphasis to the idea that contemporary economics gains much of its impulse by drawing an analogy to 19th century physics. This is a deeper, more structural use of the concept of metaphor. According to Henderson, Loewenberg distinguishes between two general types of metaphors: “single phrase metaphors” and what he labels “extended metaphors” (1994:355). Extended metaphor functions as a combination of extending analogies, model and theories. In the entry on “metaphor” in the Handbook of Economic Methodology, Henderson quotes Loewenberg (Henderson 1998:291):

For an understanding of the development of economic ideas, the notion of extended metaphor, either as a series of related metaphors, or as models and analogies, with implications to help sustain longer stretches of argument, is likely to be much more significant (Loewenberg (1973:32)).

Often times, this “deeper structure” — the extended metaphor — is thoroughly assumed and not necessarily argued for like the transference of meaning associated with single phrase metaphor. Henderson (1994:354) points out that for Nietzsche, literal language is nothing other than metaphors that we have long forgotten, root metaphors that structure experience and which are not recognized as metaphor. Henderson writes (1994:358):

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80 For a recent study of the philosophy of science based on the blending of primary metaphors to form complex metaphors see Lakoff and Johnson (1999).
It is part of the generative aspect of metaphor to assist in the development of a routine vocabulary for handling economic ideas. This was recognized by nineteenth-century writers on economics, particularly Marx (who made an analysis of the language of property), Marshall (who stressed the pedagogic value of metaphor as well as its usefulness in the direct exploration of ideas about economic analysis) and Edgeworth (who used metaphors drawn from thermodynamics and other aspects of contemporary physics to extend his own understanding of economics processes).

[In this sense, metaphor] increases what we can significantly say ... with the vocabulary we have (Loewenberg 1973:44).

Finally, an illustrative example of the power of extended or deep metaphor is provided by Willie Henderson in the *Handbook of Economic Methodology* (Henderson 1998:292):

Root metaphors may be buried ‘deep’. We may think, for example, of the ‘magnificent dynamics’ of classical economics in terms of economic growth. We could also think in terms of movement, bodies in motion or at rest. This move can lead towards a wider question, ‘Who informed Smith’s view of motion: Aristotle or Newton?’ and so from there to the intellectual origins of ‘the stationary state’. It is clear that, in attempting such an analysis, any ‘digging’ must be carried out on appropriate texts. Paradoxically, the ‘roots’ are on the ‘surface’ of discourse. Textual analysis has to be informed by issues raised by those interested in the rhetoric of economics, including issues of tropical recognition (mentioned earlier), narrative, point-of-view and cohesion (McCloskey 1997 and 1994; Brown 1994). Once the ‘roots’ have been exposed, some sort of reconsideration may become appropriate. Such reflection is called for at moments of intellectual crisis. Thus the switch made by Keynes can be stylized as changing the question from ‘Why is the automatic adjustment mechanism not working?’ which suggests that the questioner is still being used by (in context) an inappropriate metaphor, to ‘Is there such a mechanism?’ In reframing, Keynes pointed to the cumulative rather than corrective aspect of market disturbance. The spiral structure of *The General Theory* is testimony to the difficulties involved in escaping from the influence of a pervasive metaphor and replacing its world view with a new one (Marzola and Silva, 1994).
WHAT IS THE ROOT-METAPHOR METHOD?

In order to explicate his notion of world hypotheses Pepper presents the 'root-metaphor theory'. The root-metaphor theory is a hypothesis intended to highlight the connection of each world hypotheses with common sense experience. It is a metaphilosophy or a theory of philosophy about the works of philosophers. It is an affirmation of the idea that the origin of each world hypothesis initially resides in the facts of unrefined or uncriticized common sense. In this way, the root-metaphor theory can be seen to simulate the actual experience of attempting to explain the world using chaotic, commonsense evidence as a starting point. Thus, the root-metaphor theory is primarily interpreted as a contextualist or pragmatist approach. In addition, it purports to illuminate the nature of each world hypothesis so as to render them distinct from one another. Finally, the root-metaphor theory serves as an instrument of criticism for determining the relative adequacy of each world hypothesis (Pepper 1942:84). It is important to note that Pepper is careful to qualify his root-metaphor theory as not being reflective of more traditional hypotheses in the manner by which it is tested. In essence, this is because the 'evidence' in support of the root-metaphor theory is the world hypotheses themselves. More importantly though, in the context of his epistemological system (i.e., each world hypothesis carries with it a unique special-theory of truth), Pepper writes (1942:85):

Our interest is not so much in the truth of a certain theory about world theories as in the cognitive value of the world theories themselves.

This is perhaps the most salient and important attitude to bear in mind with Pepper. Although Pepper shows no indication of being anything but a scientific realist (i.e., each
world hypotheses attempts to organize evidence that exists in an objective world. He believes that there exists an enduring set (a plurality) of world hypotheses and that each possess cognitive value irreducible to one another.

As part of the root-metaphor theory, Pepper presents the 'root-metaphor method', which is the tool or procedure he uses to uncover and describe the 'structural categories' of each world hypothesis. Pepper poses the question: "How can world theories be generated?" He answers (1942:87):

Barring the refined account from world theories themselves, and sticking to the levels of common sense and data, two suggestions emerge. One of these is typical of common sense, the other of data. The first suggestion is analogy: the second, permutations of logical postulates. The root-metaphor theory is an elaboration of the first suggestion.31

Concerning the 'traditional' analogical method of generating world hypotheses, Pepper writes (1942:91):

The method in principle seems to be this: A man desiring to understand the world looks about for a clue to its comprehension. He pitches upon some area of common sense fact and tries [to see] if he cannot understand other areas on terms of this one. This original area becomes then his basic analogy or root metaphor. He describes as best he can the characteristics of this area, or if you will, discriminates its structure. A list of its structural characteristics becomes his basic concepts of explanation and description. We call them a set of categories. In terms of these categories he proceeds to study all other areas of fact whether uncriticized or previously criticized. He undertakes to interpret all facts in terms of these categories. Since the basic analogy or root metaphor normally arises out

31 I encourage you to read Pepper's discussion of the desire to construct world hypotheses in a positivist tradition, which would require using logical postulates and multiplicative corroboration. Pepper writes (1942:88): "The idea is to conceive a world theory in the form a deductive system with theorems derived from postulates. Once [such a system is obtained], new world theories might then be generated like new geometries by simply adding or dropping or changing a postulate and noting the result in the self-consistency of the system and in the application of the theorems to all the observed facts of the world." Sufice it to say that Pepper claimed this approach is only a possibility (it has never been successful) and even if it were its reliance on multiplicative corroboration (i.e., repetition) suggests it presupposes the structural categories of the formist world hypothesis.
of common sense, a great deal of development and refinement of a set of categories is required if they are to prove adequate for a hypothesis of unlimited scope. Some root metaphors prove more fertile than others, having greater powers of explanation and of adjustment. These survive in comparison with the others and generate the relatively adequate world hypotheses.\(^2\)

In conclusion, the root-metaphor method involves choosing a focal point (such as an object or an idea) and developing the structural categories that emerge in the act of describing the focal point. It is the method proposed by Pepper for describing the underlying cognitive structure present in a world philosophical system. It is important to note that the actual refinement of the structural categories for each world hypothesis considered by Pepper began hundreds, if not thousands, of years ago as seen in the thought of early philosophers. Moreover, Pepper sees them as fallible systems that continue to be refined throughout the course of history. Pepper sets these historical processes (the critical refinement of the world hypotheses) on a theoretical footing by critically simulating (via a reconstruction of organizational tendencies using the root-metaphor method) such a process. In so doing, he developed the structural categories of the four relative adequate world hypotheses, all of which have withstood the test of time. It is the resulting taxonomy and not the ‘theory of cognitive development’ that primarily interests me in this research.

\(^2\) Pepper presents a synopsis of the development of the Milesian world theory (1942:92-97), which he claims was the first self-conscious world theory and was originated by Thales, who stated that: All things are water? This was generalized into the “generating substance” root metaphor, which according to Pepper is not a very adequate world theory even if it is “periodically revived in practically pure form (1942:93).
WHAT IS A WORLD HYPOTHESIS TO PEPPER?

According to Pepper, world hypotheses are first and foremost real or empirical objects to be studied. They are to be studied because they have the ability to provide the analyst with ‘cognitive value’. Pepper refers to a world hypothesis as a cognitive system or metaphysical system that is capable of dealing with ‘all the evidence or facts’ given in the world. This is not to say that an interpretation offered by a world hypothesis will not involve anomalies. Anomalies may frustrate a world hypothesis, allowing it to have what Pepper refers to as relative adequacy; nonetheless, a world hypothesis is wide in scope. In addition, a world hypothesis possesses a suitable degree of precision in that it does not generate multiple interpretations of the same data. Thus, world hypotheses are systems of organizing evidence and empirical data that possess scope and precision. The idea of a world hypothesis can be further developed by contrasting it with a theory that restricts the scope of its analysis. Any theory in macroeconomics, be it monetarist, Keynesian, New Classical, etc., naturally restricts the scope of what it considers to be part of the theory. This is also the case with the biological theory of evolution, the atomic theory, Einstein’s

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43 The "world view" theory, as we might call it, is an old concept in civilization. As far as I (Bill Harrell) know, the first scientist (as opposed to philosopher, writer, politician, etc.) to try and lay out the core notions of the world view theory was William Stern, pioneer of both applied and developmental psychology. (Stern, W. (1915) Vorgedanken zur Weltanschauung. Leipzig: Barth.) Stern’s contributions were vast, ranging from notions of “telemechanics” to methods of assessing individual differences that came to be widely used by industrial psychologists. He developed numerous studies of the psychology of eyewitness testimony. The list goes on and on. His collected works have not been published in English, but a brief statement about his world view theory appears in A History of Psychology in Autobiography by Murchison (1961) Vol. 1:335-388. This footnote was posted on the Pepper List by Kaiser Carrara, professor at Universidade Estadual Paulista — (UNESP) in the Educational Psychology Department, City of Marilia, São Paulo, Brazil.
theory of relativity, or any other theory set forth from with a specified discipline. According to Pepper, a world hypothesis on the other hand cannot take refuge in limiting itself to a select set of evidence, thereby restricting its scope. To do so is to convict the theory of being inadequate.

According to Pepper, the hallmark of a world hypothesis is its ability to have unlimited, or nearly unlimited scope. In addition, a world hypothesis is a specific version of a metatheory. Recall that a metatheory is an analytical tool that attempts to identify the common or underlying theme of a particular set of physical or metaphysical objects. In the case of Pepper, the derived world hypothesis can be viewed as possessing a unique structural form capable of accounting for a host of observed analyses across scientific disciplines. Thus, each world hypothesis becomes a metatheoretical perspective for the types of theories that organize evidence in accordance with its particular set of structural categories. Henderson writes (1994:354):

In philosophy, Pepper identified four that stood the test of time: formalism (the root metaphor being "similarity"), mechanism ("machine"), organicism ("the historical process") and contextualism ("the historical event"). The latter three are to be found in most of the major schools of economics and may constitute a basis for their classification.44

By way of introduction, Pepper also identifies a set of maxims concerning the properties possessed by adequate world hypotheses (1942:96-114). These will be listed only with

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44 It is this quote by Willie Henderson that motivated me to take a look at World Hypotheses. I contacted Henderson and in an email exchange he indicated to me that even though Pepper’s work is dated, there is work to be done on the extent to which [root metaphors] can characterize different schools of economic and social thought. Henderson’s publications include Economics and Language (1993), Economics as Literature (1995) and John Ruskin’s Political Economy (2000).
the purpose of highlighting the inherent pluralist tendency characteristic of the Pepperian approach. The maxims include the following (1942: 96-114):

1. A world hypothesis is determined by [the development of] its root metaphor.

2. Each world hypothesis is autonomous in that it each one can handle evidence adequately. Therefore, there is no definitive appeal beyond or between adequate world hypotheses.

3. Corollaries to (2) include the ideas that (a) it is illegitimate to disparage the factual interpretation of one world hypothesis in terms of the categories of another — if both hypotheses are equally adequate; (b) it is illegitimate to assume that the claims of a given world hypothesis are established by the exhibition of the shortcomings of other world hypotheses; (c) it is illegitimate to subject the results of structural refinement (world hypotheses) to the cognitive standards (or limitations) of multiplicative refinement (i.e., positivism); (d) it is illegitimate to subject the results of structural refinement to the assumptions of common sense; (e) it is convenient to employ commonsense concepts as bases for comparison for parallel fields of evidence among world hypotheses.

4. Eclecticism is confusing — since world hypotheses are mutually exclusive the intermixing of their structural categories is admonished.

5. Concepts which have lost contact with their root metaphors are empty abstractions.

The remaining portions of this chapter consist of a statement of the categorial structure unique to each of the four adequate world hypotheses and a brief description of the special theories of truth associated with each one.
THE CATEGORICAL STRUCTURE OF FOUR WORLD HYPOTHESES

The following four sections are a statement of the adequate world hypotheses and their associated root metaphors as developed by Pepper. Using the root-metaphor method, Pepper (1942) identifies the four relatively adequate world hypotheses, which include formism, mechanism, contextualism, and organicism. In addition to spelling out in considerable detail the structural categories that form the basis for each world hypothesis, Pepper focuses attention on how the four world hypotheses relate to and interact with one another. From the point of view of the structural categories, the descriptive feature that defines a world hypothesis, he conceptualizes the world hypotheses as a dynamic cognitive system in which the world hypotheses have an affinity for or are repulsive to one another. For example, he speaks of the manner in which one species of mechanism (discrete mechanism) may devolve into a formist account in the hands of some philosophers. A second species of mechanism (consolidated mechanism) tends to migrate toward contextualism. For the most part, he couches this discussion in terms of how the relative deficiency possessed by each world hypothesis (either its scope or its precision) seeks to be compensated (or is overrun) by the relative strength in another. Thus, as another example, it is often the case the organicist, author of an account that is very precise yet

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45 My detailed restatement of Pepper adheres closely to the work of Pepper and Pepper alone. I have presented it in detailed fashion since it is new to the economics discipline. I have contained the exposition to Pepper's work alone and not cross-referenced other works in the philosophy of science so as to be able to finish my project. I leave it for future research efforts to update or otherwise modify Pepper's (1942) work or construct cross-reference within the philosophy of science literature. However, I believe Pepper's explication of the four adequate world hypotheses was sufficiently complete to approximate a stand-alone piece. Finally, a fifth world hypothesis — selectivism — was formulated by Pepper in Concept and Quality: A World Hypothesis (1967). Selectivism deals with purposeful action.
narrow in scope, will be tempted to disparage a formist, author of an account that is very wide in scope but imprecise in defining its terms. In essence, this is an inquiry into how the relational dynamics of the structural categories of each world hypothesis generate ‘eclectic forms’. It is an interesting and enlightening study, which adds to the understanding of Pepper’s epistemological framework.\(^6\) Although Pepper’s impure or eclectic forms are touched upon from time to time in this work, it is beyond the scope of this research project.\(^7\) The purpose of this chapter is to establish the nature of Pepper’s taxonomic contribution by describing the four distinct root metaphors as efficiently as possible. A complete explanation of the interactions between the structural categories, which inevitably leads to the multitude of eclectic philosophical (economic) frameworks (impure species) will not be attempted in this work. For the sake of clarity and future research, the pure and eclectic forms are summarized and briefly described in terms of their dynamic interaction in Table 2.

\(^6\) Pepper’s world hypotheses are primarily an epistemological system since, as carefully detailed by Pepper, each hypothesis implies a particular theory of truth. Multiple theories of truth are what I refer to in my first chapter as a ‘plurality of theories about truth’.

\(^7\) The notion of dynamic or relational aspects of the structural categories seems to point toward a ‘theory of cognition’. In this research, I am content to introduce the pure species and the “taxonomic function” of Pepper’s cognitive and epistemological landscape. Thus, the root-metaphor method is envisaged as a procedure that develops a metalevel taxonomy of world hypotheses, of which formism (the basis of taxonomy) is but one. In turn, the variety of texts in the discipline of economics will be viewed through the formist lens (metatheory). At the same time, some substantive economic texts will be identified by their formist type.
<table>
<thead>
<tr>
<th></th>
<th>Formism</th>
<th>Mechanism</th>
<th>Contextualism</th>
<th>Organicism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formism</td>
<td>(F)ormism</td>
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<tr>
<td>Mechanism</td>
<td>Formism/Mechanism^(a)</td>
<td>(M)echanism</td>
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<tr>
<td>Contextualism</td>
<td>Formism/Contextualism^(a)</td>
<td>Mechanism/Contextualism^(a)</td>
<td>(C)ontextualism</td>
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<tr>
<td>Organicism</td>
<td>Formism/Organism^(a)</td>
<td>Mechanism/Organism^(a)</td>
<td>Organism/Contextualism^(a)</td>
<td>(O)rganicism</td>
</tr>
</tbody>
</table>

**Strong Attractions or Scarcas Formations - pp. 149-150**

1. F32A are analytical types and complements because what one lacks in precision (F) the other provides, and what one lacks in scope (A) the other provides.
2. O&C are complete opposite, yet mutual complements because they offer each other support for their own areas.
3. Mechanism gives a basis and substance to contextual analysis, and contextualism gives life and a reality to mechanism synthesis.
4. O&C are synthetic types and mutual complements because O offers an integrative plan and C offers a dispersive plan.

**Mixed Attractions - pp. 149-143**

(a) F32 are neutral. As dispersive theories they "create multiple of facts loosely scattered about." Cosmic chance is acceptable
(b) O&C are neutral. As integrative theories nothing is left to chance. Facts occur in a deterministic order, driven by a law of probability.

**Hostile - pp. 147**

(a) F32 are complete opposite yet hostile. Organism try to destroy the 'linear' or 'static' logic of humanity, and humanity try to tear apart the 'mechanical' and 'predictive' logic of organism. That is, their strengths compete instead of complement one another.
Formism: An Adequate World Hypothesis

According to Pepper, root metaphors serve as the cognitive foundation of a system of thought or a world view. The systems of thought of particular interest are those that have evolved from uncritcized common sense experience into refined root metaphors, thereby withstanding the test of time. This section will briefly explain the structural categories of the formist world hypothesis. Since Pepper's description of the various systems of thought involves identifying a "literal set of categories", which serve to define and differentiate the system, it has been suggested that Pepper's "root metaphor" is better viewed as being more akin to notion of subcategorization developed by Lakoff and Johnson (1980). This is because in the root metaphor analysis, the structural categories are meant to be taken in a literal fashion. The potential source of confusion can be seen especially well with formism, whose root metaphor Pepper identified with the notion of "similarity". It is worth pointing out that similarity (or simile) is itself a metaphorical device used in literature. However, this is not Pepper's intent in his explication of the formist cognitive system of thought. The root metaphor and the structural categories derived from the root metaphor, which form the basis of the world hypotheses, are not to be taken figuratively. The significance of the root-metaphor method is as organizing device around which the structural categories are derived and defined for the world hypothesis. Therefore, we should take Pepper's description of the categories, which are
unique to the world hypothesis, in a literal manner. The structural categories may transfer between different empirical areas; however, their general description is 'the same' (not similar) no matter the subject area to which they are applied. The structural categories are intended to be taken as literal. It is through an understanding of these categories that it is possible to be specific about the ways in which a philosopher or scientist may organize and interpret evidence as part of a problem-solving inquiry.

According to Pepper, the root metaphor of formism can be derived from the cognitive experience of similarity (1942:151-185). There are two discrete instances of similarity that are described by formism: (1) immanent formism and (2) transcendent formism. A third instance of formism referred to as amalgamated formism results by fusing the categories of immanent and transcendent formism. Immanent formism arises out of the commonsense perception that two or more objects can be similar. For example, we might consider blades of green grass, sheets of yellow paper, silver spoons or American-built automobiles. Immanent formism is 'simultaneous in nature'. It is something that already exists; in this case it is a form that exists within a concrete object. As we will see, this cognitive activity (or system of thought) has a practical scientific

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48 Searle (1979) supports this view by focusing on the idea that the distinction between literal and figurative statements is dependent on context. He points out that "we must be of aware of the context of an utterance if we are to know whether it is to be taken literally or figuratively. If a speaker says, 'It's getting hot in here,' he can mean literally the ambient temperature of the room is becoming uncomfortable; or figuratively, that the discussion is becoming intense and people are losing their temper. What the sentence means is not contained entirely in the sentence but requires a knowledge of the intentions of the speaker, which can only be discerned by reference to the context."

49 See Lakoff and Johnson (1999:337-390) for their metaphorical account of the historical (cognitive) progression from the Mileian philosophical system to "the forms" in the metaphysical systems of Plato and Aristotle.
application in the development of systems of classification or taxonomies. On the other hand, transcendent formism can be viewed as being 'transitive in nature'; its categories are capable of describing the form (or generative process) through which perceived objects emerge. For example, in the hands of an artisan, a pair of shoes is made to fit the 'pattern of a pair of shoes'; and in the hands of nature, an acorn interacting with the environment brings forth an oak tree that fits the 'pattern of an oak'. Transcendent formism suggests that particular objects are created or exemplified through a 'norm', such as contained in a mental vision or the product of a genetic replication. Finally, it is possible to amalgamate (superimpose) the structural categories possessed by these two instances of formism and at the same time introduce the ontological leveling notion of existence/subsistence. This leads to the formist idea that actualized events are outcomes that are generated through 'forms' such as 'laws' or 'norms'.

According to Pepper's metaphysical analysis, "immanent formism consists in simply describing [the] experience of two exactly similar objects minutely and accepting literally the result of the description" (1942:152). The structural categories that emerge from describing this experience are central to Pepper's explication of a world hypothesis. This general procedure will be used to reveal the unique structure of categories associated with each root metaphor and help serve to provide an interpretation of the respective world hypothesis and how it operates. To illustrate the root metaphor similarity, Pepper considers two identical pieces of yellow paper: these objects of perception can be understood to have quality and particularity. The quality in this case is the color yellow. The particularity of objects relates to the form that the object necessarily implies.
According to Pepper, we never see quality and particularity separately; nonetheless, they are distinct aspects of our experience. It is confusing to say the two identical sheets are but qualities (i.e., yellow) because in so doing we deny the experience of our perception that there are two particulars (i.e., sheets). In addition to possessing different qualities (i.e., color, taste, smell, shape, size, etc.), more than one particular may also be characterized as having relations with, or being in relation to, one another. Thus, one pair of yellow sheets may exist side-by-side (or above, below, contained in, etc.) to another pair of yellow sheets. Thus, in Pepper’s description of the immanent formism, particulars can be characterized as having qualities or relations. The combination of qualities and relations is defined as the category of characters.

According to Pepper, the active categorial relationship between particulars and characters is one of participation. Particulars participate in characters, and simultaneously characters participate in particulars. Pepper (1942:152) writes: “It is the particularization of a character and the characterization of a particular.” Particulars and the characters are “categorically related” because they participate in one another or are tied to one another. Note that in Pepper’s scheme, a ‘categorial relation’ is deeper or more fundamental than the relations between particulars (side-by-sideness), which is contained within a category (a subcategory) as opposed to across categories. Thus participation is a tie, a concept that is required if particulars are to be joined to characters. In conclusion, the salient operational statement of these formal categories in Pepper’s description of immanent formism is as follows: (1) characters (relations plus qualities) and (2) particulars (3) participate in one another to form the objects of our perception (1942:154). As
previously discussed, immanent formism is about sameness (as provided by the similar character possessed by different particulars), but it is also about difference (as provided by the relations of ‘other’ particulars). In this sense, one needs to be careful about seeing the ‘root metaphor’ as a metaphor; the categories that Pepper defines in the perceptual act of identifying similarity are to be taken literally. The ‘root metaphor’ of formism may have been better stated as ‘sameness’ and ‘difference’.

The next step in the development of immanent formism is to describe to what use analysts put the objects of our perceptions. The participation of characters in particulars creates the concept of class. According to Pepper, “a class is a collection (more than one) of particulars which participate in one or more character” (1942:159). In general, the greater the number of specified characters, the fewer particulars there will be observed in the class. Beyond this, a class can be further organized into a system of classes, where characters are carefully selected to produce a classification scheme. This is commonly referred to as “taxonomy”, which is the full (or immanent) appearance of characters/particulars. Concerning the definition of a class within the context of the formist categories, Pepper writes (1942:162):

A class is itself neither a character, nor a particular, nor a participation, nor a separate category. It is simply the actual working of the three categories in the world. We simply observe that a character or a group of characters normally participate in a number of different particulars. We give a name to that observed fact and call it ‘class’. Class is simply a name for a specific operation of the three immanent categories, an operation completely analyzable into the functioning of those categories. A class is, accordingly, a thoroughly real thing, but what is real is the functioning of the categories.
As will be discussed later in this research, taxonomy is an analytical activity common to most if not all sciences including economics.

According to Pepper, *transcendent formism* is the second instance of commonsense experience rooted in the perception of similarity that gives rise to a species formism (1942:162). As already mentioned, the common sense experience refers to a plan or a mental vision through which an object emerges or is created. In natural processes, it is the *norm* of an emerged object that is conceptualized; in human processes (i.e., handicrafts, building construction, systems organization) it is the *norm* (or ideal) that one seeks to attain in creating the object. Thus, an object may be the creation of nature (the norm of the oak tree) or it may be of human design (the norm of the pair of shoes). In actuality, neither oak trees nor pairs of shoes realize their full appearance relative to the norm, which is an ideal; however, the perceived objects do represent the appearance of something similar. Although, similarity continues to be Pepper’s chosen root metaphor, the cognition of similarity is not for one object with respect to another, as is the case of two particulars participating in the same set of characters. Instead, similarity is the relation of an actualized object to its normative (ideal) conception. Due to limitation of skill, knowledge, or material on the one hand, or slight variations in the genetic code or selection process on the other, the norm is rarely realized. it transcends the object in its actuality.

The formal categories assigned to transcendent formism are completely parallel to those of immanent formism. Pepper describes them as (1) norms which contain characters (qualities plus relations), (2) matter for the exemplification of norms, and (3)
a principle of exemplification which materialized the norms (1942:163). The parallel can be stated as follows: a norm contains qualities and relations that participate (through some principle) in ‘matter’, a process that generates an exemplified particular. I give emphasis to matter with quotations because ‘conceptual systems’ may also be seen to serve as such a particular. Thus, for example, each world hypothesis in the taxonomy presented by Pepper is derived from an analysis of structural categories using the root-metaphor method. They are actualized in scientific texts that only reflect the norm. Specific exemplification of the world hypotheses need not be exact replicas, any more than oak trees are not exact replicas but only similar in form. This is the case when one attempts to view a specific world hypothesis across disciplines with different subject matter.

Pepper concludes his structural analysis by explaining how the categories of immanent and transcendent formism can be brought together or amalgamated. The amalgamation of the categories of immanent and transcendent formism creates a fused species of formism. It is the most interesting of the formist species since it offers a vision of formism that moves beyond taxonomy and suggests a particular mode of scientific explanation. Amalgamated formism points us toward a specific mode of scientific explanation resulting from the belief that there are “laws of nature”. Moreover, the aim of science is to discover these laws, which implies that laws are “norms which regulate the occurrences of nature” (1942:166). This more complex understanding of formism enhances the power of the formist approach to science by adding to taxonomy a mode of
scientific explanation proper. Later on, I will develop the idea that it corresponds closely to Roy Bhaskar’s philosophy called ‘critical/transcendental realism’ — a mode of scientific explanation articulated by Tony Lawson that has been injected into recent methodological discussions in economics.

It is relatively easy to see the parallel between the categories of immanent and transcendent formism. The basic difference resides in the articulation of the first category. In the case of immanent formism, it is characters (qualities or relations) that participate in the particulars, which are primarily perceived as material objects. In the case of transcendent formism, it is a norm (an ideal vision of characters) that participates in particulars, which are conceived and perceived as material (or even conceptual) objects. That is to say, the actualized shoe possesses texture, size, shape, color, smell, left/right status (all characters, which reflect the norm and participate in the manner used to create the material object). The basic solution has already been noted: Norms and characters are simply connected by the fact that characters (qualities, relations) participate in norms.

Thus, in immanent formism characters participate in particulars (concrete objects) and in transcendent formism norms participate in particulars that exemplify the norm. In amalgamated formism, characters participate in norms creating what Pepper calls “a particular of the second degree” (1942:167). To further develop this notion, Pepper

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90 See Georgescu-Roegen (1971:22-28) for a discussion on the genesis of science in terms of the evolution of taxonomy into logical filing systems in positivist theorizing. Bear in mind that Georgescu-Roegen offers this discussion of the development of “theoretical science” (i.e., taxonomy to logical filing system) as a contrast to “theoretical science” using dialectical reasoning. Amalgamated formism appears to be the basis for “transcendental realism” as well as metatheorizing in general.
introduces the concepts of *substance* and *existence*. The field of existence refers to all of the concrete objects of immanent formism. Pepper calls this the field of concrete existence. Furthermore, the field of subsistence is the "field of characters and norms." Care must be taken not to consider 'characters in norms' as participating or being exemplified as basic particulars. By this, Pepper means that we do not observe them as concrete objects in the sense of the particulars of immanent formism. Thus, to explain amalgamated formism Pepper layers reality in the following manner:

- **Subsistence (laws)** — Norms participating in characters, second degree particulars.
- **Existence (concrete)** — Second degree particulars participate in concrete objects/events.\(^\text{51}\)

Based on this fundamental distinction between subsistence and existence, Pepper considers the various ties between characters and norms in the field of subsistence or non-actualized events. Pepper writes (1942:168-169):

> Norms as we pointed out are complex in character and are definitely subsistent forms. A norm, therefore, such as a shoe (the norm of a shoe) or an oak must participate in characters — in shape, color, and so on. A norm, therefore, is a sort of particular. But it is not a basic particular because it may not be fully particularized. [Its] participation is, of course, about a second-degree participation, and does not constitute concrete existence.

Finally, this leads us to the definitive statement of formism as it relates to scientific activity and investigation. The idea is that norms can be viewed as subsistent forms that operate in a law-like fashion to regulate concrete or actualized events. Concerning the

\(^\text{51}\) According to Pepper, Aristotelians and Platonists do not dispute the reality of the subsistent forms. However, they do differ over whether or not the subsistent forms possess an independent status.
behavior/function of the structural categories, the crucial feature is that existence and
subsistence cannot be consolidated into a single field such as space and time in mechanism.
Reality is layered and not amenable to complete integration. Thus, even though the
identifiable ‘laws of nature’ (or society) exist and are constrained by the requisites of
space and time, they cannot be unified into a single field such that a law becomes an
internal part of the object or event. I conclude this section by presenting Pepper’s
summary description of the mode of scientific explanation implied in the set of structural
categories associated with amalgamated formalism. Pepper writes (1942:166):

The obvious interpretation of all such facts is that there are norms in nature, just
as Aristotle observed. There seems to be plenty of apparently direct evidence for
norms exemplified in nature.

In fact, every law of science may be so interpreted. Persons who accept the
theory that there are laws of nature, and that the aim of science is to discover
these laws, which nature “follows”, seem (if their words do not belie them) to
imply that these laws are norms which regulate (literally render regular) the
occurrences of nature. On this view, the inductive method is a method of
collecting observations for the discovery of the regularities or laws which “hold”
in nature. Any actual induction may be in error, but its aim is to approximate to
the law exemplified in natural phenomena.

Finally, Pepper writes (1942:177):

A law, in other words, is a bridge from one set of basic particulars to another set,
determining the characters of one set by those of the other.

These laws are, of course, real natural structures. Events are genuinely similar to
one another because they genuinely participate in the same law. But the law must
not be identified with any one of its particular exemplifications, nor with any
collection of particular exemplifications. A law is not a basic particular, nor a
concrete existent particular (i.e., a single exemplification of the law), nor a
collection of concrete particulars (i.e., a class). A law is a form, and its status is
that of an entity of the first category.
A summary of the structural categories of each species in the formal world hypothesis is presented in Table 3. In addition, the structural categories of the three remaining world hypotheses to be discussed are presented in the table.

**Mechanism: An Adequate World Hypothesis**

The second adequate world hypothesis identified by Pepper is mechanism, perhaps the mode of analysis most familiar to (and assumed by) economists trained in the second half of the 20th century (1942:186-231). It has been pointed out that similarity is not, technically speaking, a root metaphor, but instead more akin to a root cognition fundamental to metaphor.\(^2\) However, there is little disagreement that the *machine* is the unequivocal root metaphor associated with the mechanistic world hypothesis. According to Pepper, there are two species of mechanism, which he refers to as *discrete mechanism* and *consolidated mechanism*. Discrete mechanism is based on a machine such as a *lever*, a watch, or an engine. The development of its structural categories follows the concepts of classical Newtonian mechanics. Consolidated mechanism is based on a machine such as a *dynamo* (electrical generator). The development of its structural categories follow the

\(^2\) For a discussion of this point go to Bill Harrell's homepage which is located at [http://www.sunyit.edu/~harrell/billyjack/pnp_notes3.htm](http://www.sunyit.edu/~harrell/billyjack/pnp_notes3.htm) or Lakoff and Johnson's (1980) book, *Metaphors We Live By*. Lakoff and Johnson's work distinguishes between the notion of sub-categorization and metaphor. Harrell for his part writes: "The basic term of Stephen Pepper's philosophy is "root metaphor," which is the cognitive foundation of the various relatively adequate systems of thought, the world hypotheses. Yet the root metaphors associated with some of the world hypotheses do not appear to be actual metaphors, but basic cognitions. I believe this is not a mere terminological quibble but important to the interpretation of Pepper's philosophy."
<table>
<thead>
<tr>
<th>World Hyp.</th>
<th>Formalism</th>
<th>Mechanism</th>
<th>Contextualism</th>
<th>Organicism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root Metaphor</td>
<td>Similarity (pp. 152-154, 162-164, 167-170)</td>
<td>Machine (pp. 191-195)</td>
<td>Historical Event (pp. 223-237)</td>
<td>Historical Process (pp. 281-283)</td>
</tr>
<tr>
<td>Immanent</td>
<td>Discrete Mechanism (lever)</td>
<td>MACHINE - MATTER</td>
<td>(1) Events spread (space-time present)</td>
<td>Progressive Categories (Steps)</td>
</tr>
<tr>
<td>Form</td>
<td>&quot;The Inerted Lever&quot;</td>
<td>&quot;The rest that is rest in a field (space)&quot;</td>
<td>(2) Event's change (continuous)</td>
<td>APPEARANCE</td>
</tr>
<tr>
<td>(1) Characteristics</td>
<td>(1) Location in a field (space)</td>
<td>(2) Primary quality (e.g., mass)</td>
<td>(3) Event's degree of fusion respected</td>
<td>(1) Fragments in experience</td>
</tr>
<tr>
<td>a. Qualities (color, size, etc.)</td>
<td>(3) Laws of internal to parts</td>
<td>(4) Merger of details of texture</td>
<td>(2) Appear as a nexus with</td>
<td>(2) As a nexus with</td>
</tr>
<tr>
<td>b. Relations (side-by-side)</td>
<td>(5) Laws, if any, of regularities of 4</td>
<td>(6) Laws, if any, of regularities of 4</td>
<td>(3) Spontaneous contradictions</td>
<td>(3) Spontaneous contradictions</td>
</tr>
<tr>
<td>(2) Particles (perceived objects)</td>
<td>Consolidated Mechanism (dynamic)</td>
<td>(4) Relic of an Event</td>
<td>(4) Resolve to an organic whole</td>
<td>(4) Resolve to an organic whole</td>
</tr>
<tr>
<td>(3) Participation (to each other)</td>
<td>&quot;Electromagnetic Fluids&quot;</td>
<td>Directly define texture</td>
<td>(5) Realities of an Event</td>
<td>(5) Realities of an Event</td>
</tr>
<tr>
<td>Class (outcome of 1, 2 &amp; 3)</td>
<td>&quot;The Consolidated Machine&quot;</td>
<td>Indirectly define texture</td>
<td>(6) Ultimate goals of an Event</td>
<td>(6) Ultimate goals of an Event</td>
</tr>
<tr>
<td>Classification: Organized Classes</td>
<td>(1) Location as spacetime field</td>
<td>Ultimate goals of an Event reached</td>
<td>(7) Determined movement toward an</td>
<td>(7) Determined movement toward an</td>
</tr>
<tr>
<td>Transcendent</td>
<td>(2) Primary differentiating quality</td>
<td>ultimate finality</td>
<td>Ultimate goal of an Event</td>
<td>Ultimate finality</td>
</tr>
<tr>
<td>Form</td>
<td>(3) Laws - both gravitational and electromagnetic integrated into the structure of the field</td>
<td></td>
<td>finished and perfect organic whole</td>
<td>finished and perfect organic whole</td>
</tr>
<tr>
<td>(1) Norms (ideal type or plan)</td>
<td>Attempted consolidation of 1, 2, 3</td>
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concepts associated with the electromagnetic field, which is a development closely associated with Einstein’s development of the special/general theories of relativity. The fundamental differences between the two species of mechanism are twofold. The first involves the introduction of time as a fourth loci (consolidation of time and space) for describing the position of an object in the "field of location". The second involves the substitution of electrical charge for mass as the primary quality that exists in the field of location. In discrete mechanism, the three spatial coordinates (x, y, and z) serve to locate an object in the field of location (Euclidean absolute space). Pepper’s notion of ‘consolidation’ deals with the trend by mechanists to consolidate the three discrete structural categories into one highly fused category. Recall the discussion of subsistence/existence developed in formism. The movement toward consolidation is an evolutionary refinement of the mechanistic root metaphor. It implies that ‘subsistent forms’ are not amenable to mechanism; in fact it seeks to eliminate subsistent forms and instead interpret reality as a unified and consolidated field involving space/time, gravity and electromagnetism. Thus, in mechanism, the ‘laws of the machine’ are ultimately as much a part of the machine as the masses or individual parts that make up the machine. In

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1 For further discussion of the idea that time is a field of location, refer to Georgescu-Roegen’s (1971:131-135) discussion in a section entitled “Time: The Great Mystery”. As well, refer to his many rich discussions relative to his exposition of ‘time as locomotion’ or the reversible nature of time in mechanistic analysis. In addition, Fritjof Capra has a similar interpretation of the fundamental nature of space and time in identifying location in mechanism (1982:53-74). Also, see Lakoff and Johnson (1999:137-170) for an analysis of the primary and complex metaphors that construct our understanding of the concept of time.

2 This notion of two interpretations of the mechanistic metaphor — discrete and consolidated — is a point discussed using different terminology by Philip Mirowski in More Heat Than Light (1989). Here he argues that if economics wants to emulate physics it should update its metaphor in accordance with the lessons of quantum mechanics.

108
its most evolved form, mechanistic laws are collapsed and become an integral part of the
‘field of location’. Another difference between the two species of mechanism is the type
of action (causation) implied by the choice of machine — the lever or the dynamo. A
machine such as a lever functions on the basis of direct ‘push and pull’ contact. The
operational principles of the dynamo (the electromagnetic field) work on the basis of
‘action at a distance’. Despite the differences between discrete and consolidated versions
of mechanism. Pepper maintains that the basic structural categories describing the
mechanistic world hypothesis are fundamentally unaltered when moving between the two.
He writes (1942:186):

Many details are altered by the shift but since the basic categories are the same,
the general theoretical attitude is not changed.

For this reason and for the sake of simplicity, I will confine my discussion to the notion of
discrete mechanism and only note the analogous terminology employed in the
development of consolidated mechanism.

As in my explanation of formism, I present a statement of the structural categories
descriptive of mechanism. Primary attention is given to discrete mechanism, which is the
older and well-known root metaphor. Recall that the root cognition of formism was
derived and refined from the commonsense perceptual experience of observing similarity.
The resulting structural categories were developed based on explaining this experience.
Likewise, according to Pepper, a careful description of the operation of a simple lever
(e.g., a teeter-totter) reveals the basic structural categories of mechanism. These are
literal categories that are ‘carried over’ and serve as a model for organizing evidence in
domains other than physics. The teeter-totter represents the simplest lever-like machine; it is no more than a bar resting on a fulcrum. Nonetheless, it is sufficient to reveal the categories of discrete (and consolidated) mechanism. The teeter-totter illustrates the notion of push/pull action, or what is also called efficient causation (local cause and effect). It exemplifies a system in which molar bodies (masses) affect one another through contact. If a human applies a force to one end of the bar, then a tree stump resting on the other end of the bar is lifted up. Pepper refers to this setup as one that possesses ‘efficient causal structure’.

Next, it is necessary to generate a quantitative description of the bar and fulcrum machine. The fact of the ‘tree stump’ is unimportant to the description of the machine. Nor is the texture (e.g., roughness, size, color, etc.) of the object located on the bar necessary for a description of the machine. The weight of the tree stump in kilograms (mass units) is sufficient. Likewise, the ‘pressure of the arm’ may be replaced by the specification of a weight, thus increasing the precision of the description of the machine. Finally, the description boils down to the specification of two 30-kilogram objects that are located on opposite sides of a uniform bar and at equal distance from its fulcrum. The arrangement keeps the lever in balance.

Through this simple introduction to Physics 101, Pepper develops the structural categories fundamental to mechanism, or more generally the image of the ‘cosmic machine’. The activity of describing the ‘machine as lever’, which is what Pepper means when he says he is using the root-metaphor method, reveals the fundamental categories of the discrete mechanism. Six categories — three primary categories and three secondary
categories — emerge from this description of the operation of the machine as lever (Pepper 1942: 191-194). The primary categories are as follows:

- **Field of Location** — The lever is a configuration of externally related parts (independent particulars with mass) having specified positions in a ‘field of location’. More strongly, to exist (or be real) the parts of the lever must be specified in terms of spatial coordinates. They must have location. The length of the bar, the position of the fulcrum, and the location of the masses are the distances required to fully specify the operation of the machine. In discrete mechanism, the parts of the machine are identified in terms of spatial coordinates.  

- **Primary Qualities** — These are the ultimate differentiating characters in the field. It is sufficient to specify the objects (particulars) involved in the push/pull machine in terms of mass. The only differentiating quality that is needed to describe the particulars is mass units (such as kilograms) associated with externally related objects. Mass is the primary ‘differentiating quality’ that exists in the field of location.  

- **Primary Laws** — The parts of the machine are related to each other in the field of location through what is called a law, such as the ‘law of gravity’. 

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53 In consolidated mechanism, an object or particular (the mass) is located in terms of its space and its time coordinate. The existential particulars become a space-time particular.

56 In consolidated mechanism, the electrical charge replaces mass as the primary differentiating quality. Differentiating quality is placed in scare quotes because in mechanism the nature of the differentiating quality (which is a particular) is expressed in terms of a quantity. This distinguishes mechanism from formalism, which maintains that the qualities present in particulars are qualitative in nature. In addition, the particulars of mechanism are contained in an integrated field, whereas the particulars of formalism are exemplification of a subsistent form.

57 See Georgescu-Roegen (1979:39-52) for a discussion dealing with anthropomorphic versus dialectical concepts. The requisite of quantification guarantees that the variables considered in discrete mechanism will be anthropomorphic in nature.

58 Pepper explains that the trend toward consolidation (1942:213) occurred first with the integration of time into the spatial field (the special theory of relativity), and next with the introduction of the law of gravity into the spatiotemporal field (the general theory of relativity), and finally the with the substitution of the electrical charge for mass and magnetic attraction and their incorporation into the electromagnetic field. The result is the conceptualization of one highly structured particular: the electromagnetic, gravitational, spatiotemporal field. This is where all the action is located. There are no subsistent forms to this field; instead, laws are part of the structure of the field.
Newton mechanics, the law of gravity is exemplified by Newton's laws of motion. In the case of the lever, the description of this functional or law-like relationship is the equation \( F_1 \cdot d_1 = F_2 \cdot d_2 \). This equation describes an efficient law of action inherent in the structure of the machine.

According to Pepper, the machine in its natural setting cannot be completely disassociated from a set of secondary categories. To be complete and precise, the description of the machine requires acknowledgment of the arm of the human or the fact of the texture of the tree stump. The set of secondary categories concern the attachments to the machine, which, in any event, do not affect the operation of the lever. Pepper writes (1942:193):

> The color and texture and smells of the old tree stump, as well as the pleasantness and unpleasantness of these, still remain, as also my vivid feeling of exertion in my arms at my end of the lever and the pleasantness there. These feelings and qualities in these parts of the lever have not disappeared. They are as vivid as ever and, even though not essential or even relevant to the effective action of the machine, are not to be forgotten, for they are still in some way attached to the machine.

Thus, according to Pepper, the secondary categories consist of (1) secondary qualities, (2) the principles by which secondary qualities are attached to the machine, and (3) any laws or regularities among the secondary qualities relevant to the description of the machine. In Pepper's development of the 'cosmic machine', it is necessary to consider both the primary and the secondary categories. Pepper explains that even though the connection between the two sets of categories are loose, they still need each other in order to maintain the scope of this world hypothesis. Pepper claims that philosophers such as Hobbes, who try to do away with the secondary categories, are called materialists; and philosophers such as Berkeley, who try to do away with the primary qualities and create a mechanism without a machine, are subjective idealists. Ultimately, the opposition of the
primary and secondary categories refers to the philosophical discussion of the mind/body split and plays into the explication of an adequate special theory of truth for mechanism. This discussion goes beyond my immediate purpose, which is only to describe the structural categories of mechanism. It is also worthwhile to note that the image of mechanism most common to the modeling efforts of economists concerns the primary categories (the machine) as outlined by Pepper.

Contextualism: An Adequate World Hypothesis

According to Pepper, the best commonsense term that identifies the point of origin of the contextualist cognitive system is the ‘historical event’ (1942:232-279). However, one must take care not to view the historical event as something that only exists in the past simply because it actually happened in the past. On the one hand, the historical event may (and probably did) happen in the past. Still, the key to understanding the root metaphor is to see the inquiry into the ‘historical event’ as an effort to bring the event to life now. Inquiry is an attempt to “re-present” the historical event as alive in the present (1942:232). Thus, a possible meaning of a historical event is portrayed in association with an interpretation of its context. On the other hand, one cannot exclude the possibility that the ‘historical event’ is a current event, which is actually transpiring at this particular moment. Whether past or present, it may not be, and probably will not be agreed upon as to what constitutes the context. The context is a contested zone, which leads to a variety of interpretations for understanding the potential meanings of the ‘historic event’. Arguably,
a more accurate description of the contextualist root metaphor could be the 'located or situated event' or even the given 'problem situation', since more often than not the process of understanding the event occurs by means of 'acting' through it. According to Pepper, the contextualist event is attached to a complex set of "life's incidences" or actions that are happening. This web of incidences defines the context of the "total given event" and brings meaning and understanding to the "changing present event". Pepper derives the categories of the contextualist world hypothesis by focusing on the total given event. The contextualist cognitive system is considered a synthesis, as opposed to an analysis, because the meaning of the event is intuited as a whole into which the various incidents (or parts) describing the context are drawn. However, since the total event is a "rich concrete thing" (Pepper 1942:233), which possesses varying and interpenetrating features, the derived structural categories are subject to some degree of arbitrariness. So the question becomes: If events have varying structural categories, how do we derive a single set of categories? The contextualist would claim that it really is not necessary to derive such a unique and static set of categories. Pepper writes (1942:237):

...there is no definite number of concepts that must be named. The relations involved in a historic event are inexhaustible, and a set of contextualist categories does not so much determine the nature of our world as lead one to appreciate fair samples of the world's events.

However, the category of change is fundamental to the contextualist world hypothesis.

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On the other hand, an analysis operates in reverse. In formalism and mechanism, the whole does not take on meaning independent of its parts. Analysis starts with reference to the parts and their interrelations. Any notion of a whole revolves around an integration of these separate parts (i.e., a classification system of a machine).
Pepper writes (1942:234):

Disorder is a categorical feature of contextualism, and so radically so that it must not even exclude order. That is, the categories must be so framed as not to exclude from the world any degree of order it may be found to have, nor to deny that this order may have come out of disorder in any way you please, so long as it does not deny the possibility of disorder or another order in nature also. This italicized restriction is the forcible one in contextualism, and amounts to the assertion that change is categorical and not derivative in any degree at all.

Thus, the more we go into detail about the total given event, the more the structural categories are experienced as ‘change and novelty’. subcategories that Pepper sees as defining the nature of the ongoing epoch of human history. In developing the categories of contextualism, Pepper states that in contextualism nothing shall be construed as denying that anything can happen in the world. It is in this radical sense that change and novelty are regarded as the “fundamental presuppositions of this theory” (1942:236).

Although novelty and change are fundamental to contextualism, the categories of change and novelty are exhibited as details within other categories for matters of convenience. By Pepper’s account, the operational structural categories of contextualism are quality and texture. Quality refers to the total intuited meaning of the event; it is what we ‘see’ as the meaning of the Great Depression, the Cold War, poverty in Appalachia, or the firing of the high school principal. Texture is the means by which the analysis and control of an event occurs. Though analytically distinct, in actuality the two categories are interrelated (inextricably bound) to one another, one being incapable of operating without the other. Thus, the total intuited meaning of an event (its quality) depends on the act of analyzing or controlling it. The act of controlling or analyzing an event cannot occur independent of an event’s meaning. Pepper proposes a particular set of subheadings for
both quality and texture to help distinguish between them. The subheadings of quality include (1) the spread of an event, (2) the change of an event, and (3) the degree of fusion of an event. The subheadings of texture include (1) the strands of texture, (2) the context of texture, and (3) and the references of texture. The references of texture consist of the following sorts: (1) (a) linear, (b) convergent, (c) blocked, and (d) instrumental. I will turn my attention to explaining this set of structural categories and subcategories descriptive of contextualism.

I will first consider the structural category quality, which signifies the intuited meaning of an event. Using the root-metaphor method, the demonstration of the structural category for meaning consists of describing a historical event. Pepper points out that there is no need to focus exclusively on grand historical events (e.g., the first trip to the moon, dropping of the atom bomb, or the Great Depression, the corporate phase of capitalism); a very simple event is sufficient to create an exposition of the basic categories. For the purpose of his demonstration he focuses on a “given present event”, one that he actually creates for the purpose. He writes (1942:237):

We need for this illustration, some present given event. Let us take one out of what we are doing, I am writing sentences. Let my writing of the next sentence be our illustration. A period will be placed at the end of this sentence.

According to Pepper, action (an ongoing act) is a good basis for interpreting an event contextually. Based on this example — the act of writing this sentence — the primary categories can be explained as follows: (1) quality is roughly the sentence’s (the exemplified event) intuited total meaning and (2) texture is roughly the words/grammatical relations making up the sentence. Clearly, there is no meaning without the letters, words
and phrases that constitute the sentence. The sentence would not exist and therefore has no quality. Likewise, there is little sense of having the letters, words and phrases if the sentence does not take on some meaning. With respect to an event (the sentence), quality and texture presuppose one another. As already mentioned, the quality of a given event is its intuited whole meaning or its total character; the texture refers to the analyzable details and relations (the parts of the sentence) that make up the quality. One need only think of the act of observing someone’s face or listening to a song. The quality of the face or the song resides in its wholeness. The act of analyzing the face or the song will offer understanding in its own right; however, one does not need to isolate the parts of either to know the whole. It is one thing to appreciate the meaning and significance of the world’s rain forests, or intuit its complex and interdependent nature. It is yet another to analyze this complex and interdependent ecological web, which is constituted by all of its interrelated species and fauna.

Let us first consider spread, a subcategory of quality. In contrast to formism and mechanism, contextualism takes the notion of time seriously. The importance of time to contextualism becomes apparent through the concept of spread. In the contextual world hypothesis, time is related to the meaning of an event as it develops through ‘an ongoing action’. The quality of an event spreads forward in time and backward in time. Thus, the

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60 Time is not a categorical consideration in formism. Pepper writes (1942:174): “There is nothing gained for formism by converting the structures of time and space into the category of particularity, and much is endangered. All the formist needs to observe (if he does observe it) is that as an empirical fact all concrete existences do participate in the physical laws of time and space, so that every concrete existent object or event is to be located at a date and at a place.” In mechanism, time is a categorical feature. Also, the idea of time refers to “schematic or linear time”. It refers to a structured sequence. Mechanistic time is related to the location of a particular (and not a quality or meaning) in a field.

117
meaning of an event can be traced to its past and to a pending or imminent future. Returning to Pepper's exemplified sentence, *(A period will be placed at the end of this sentence.)* notice that just prior to writing the word “end”, the sentence’s meaning is both reaching for the remaining portion *(end of this sentence)* and reflecting the words that have already proceeded *(A period will be placed)*. Thus, even though we might have just written the word ‘*the*’, the meaning of the ongoing event — its quality — is realized through what comes before and what comes after the event. This is the “specious present” of contextualism. It is a contained lens (a long moment) that defines the quality and situates or locates the event in a particular historical moment. Pepper writes (1942:240):

> What is present in an event is whatever contributes directly to its quality. Since “period” and “end” so contribute, they are present in the event, even though one comes quite a little after the other and neither happens to be the word I am writing.

To clarify this seemingly paradoxical notion of the *spread* or the *specious present* of an event. Pepper contrasts the contextualist notion of time from that of the mechanists. From both the mechanist and contextualist perspective, there does exist a temporal scheme that defines the order of the words in the sentence. There is a dimensionality that sees one word as coming after the other. However, a distinction arises when the mechanist argues that the only word existing in the present is the word that I am actually writing. To the contextualist, what is real in the present involves the fact that the *spread* *(the past, present, and imminent future)* of the event is responsible for defining the meaning of the
event. As a result, contextualism is careful to distinguish between qualitative time (also called duration) and the schematic time, which is descriptive of time in mechanism.\(^6\)

*Change* is the next structural subcategory that contributes to the quality — or the intuited whole meaning — of an event. For analytical purposes, consider a bounded interval of "qualitative or historical time". This is the specious present. As we pass its sequence (in schematic time), the event unfolds in a manner that defines the meaning of the event. *Change* relates to the idea that as we traverse this interval of historical time, the meaning or quality of the event continuously varies. Moreover, the meaning that does emerge always has the potential of being novel. In terms of the exemplified sentence (*A period will be placed at the end of this sentence*), Pepper writes (1942:242):

> As I write "the", the focus of the quality balances between the schematically past "period" and the coming "end". As soon as I have written "end", this word occupies the focus of the quality, and "period" takes on a modifying role, and the immanence of the last phrase is acquiring prominence. With the writing of each word, the tensions of the previous words are redistributed, the configuration of the total meaning is altered, and the quality is accordingly changed.

For contextualism, reality resides in the meaning of the event, and the nature of the event is such that change is continuous and the possibility of novelty is always present. As previously mentioned, change and novelty cannot be eradicated from the categorial structure of contextualism.

*Fusion* is the final subcategory that contributes to the quality or intuited meaning of an event. *Fusion* involves the idea that the quality or intuited meaning of an event is

\(^6\) For a similar treatment of time, see Georgescu-Roegen (1971:69-72). Here, he elaborates on the difference between instants of time and duration based on the philosophical structure detailed by Alfred North Whitehead.
not determined by the sum of its parts or in this instance the separate details (e.g., constituents of a face) that make it up. Instead, these details are the constituents of the texture, and as we will see in a moment, they only come into play during analysis or control of the event. Thus, the exemplified sentence is made up of a set of details that define the texture of the sentence. The grammatical phrases and words do possess meaning of their own. However, their meaning as details has no logical connection to that which is intuited in the whole. The blue eyes, the aquiline nose, the rounded rosy cheeks, the facial hair, and whatever else can be detailed about the face of the stranger in the crowd, are not the same as the intuited whole meaning received when one sees the face.

As further explanation, Pepper offers the example of the decomposition of a triad in a musical chord, which to the sharp or trained ear may actually appear as either a unified sound of distinct quality or three separate notes. Still yet, there are degrees of fusion. For while these individual details do bleed into the meaning of the whole event, the integrity of the whole event requires that their separate meanings do not dominate. If they were to dominate, then the event splinters and becomes more than one event. As yet another example of fusion, Pepper considers a lemonade drink. Here, the individual details (lemon, sugar, and water) that make up the entire taste are highly fused and cannot be separated by the taste buds. The discussion now turns to quality’s counterpart, texture.

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For a discussion of fusion from a slightly different perspective, refer to a discussion of ‘overdetermination’ in Resnick and Wolff (1993). An overdetermined event, which to Resnick and Wolff is characteristic of most if not all events in the social domain, is an event which is highly fused in terms of the multiple details which determine it. This is discussed further in chapter 3.
According to Pepper, it is easy to forget about the categories of quality because, as a rule, “the analysis and practical control of events goes on in terms of the categories of texture” (1942:245). The quality — the whole meaning or the total character — of a historical event is intuited as a synthesis in the form a fused whole with duration and an ability to change. Together the synthetic elements that constitute the quality of the event — the spread, change and fusion — interact to determine a meaning for the event. However, according to Pepper, the control and analysis of events occur in terms of the structural category texture and its subcategories, which are context, strands, and references. Thus, in the case of the exemplified sentence, the texture comes from an analysis of the event in terms of the words and the grammar. To understand the analysis of texture, it is important to note the relative nature of parts and wholes. Let us consider a set of levels, which start with the quality of individual letters and move up to the quality of a book. The levels are thus written as follows: (1) letters, (2) words, (3) phrases, (4) sentences, (5) paragraphs, (6) chapters, (7) book. If we focus on the level of a single paragraph, then we may say that this paragraph is a whole relative to the sentences (the parts) that make it up. But from a different perspective, a sentence is a whole relative to the phrases that make it up. To make a contextualist analysis work, it is first necessary to have a ‘point of entry’ that is predicated on the quality or meaning of the event. Pepper writes (1942:248) that “the relativity of context, texture, and strand (the locus of our analysis) is itself relative to the actual qualitative structure of a given event.” Pepper chooses to initiate the demonstration using ‘the whole sentence’ as the unit of meaning. Accordingly, we can say the texture, which makes up the meaning of the event, emanates from the fused sentence.

121
This being the case, we now proceed to perform an analysis of the texture of the event: *(A period will be placed at the end of this sentence.)* The analysis takes place on the level of the parts, which will in this case consist of the phrases and the words of the sentence. The phrases are *(1) A period, (2) will be placed, (3) at the end, and (4) of this sentence.* The words are eleven in number and constitute the individual parts of the phrases. According to Pepper, "a texture is made up of strands and it lies in a context" (1942:246). Let us begin by examining the phrase "at the end". which is one of the details that constitutes the texture and therefore contributes to the whole meaning of the event. The phrase "at the end" possesses a fused quality (a meaning) of its own that is reflected in its texture. The phrase "at the end" is made up of the details *at + the + end.* These details are the *strands* of the phrase under consideration. Also, the phrase "at the end" is situated among three other phrases *(A period + will be placed + of this sentence).* These phrases (and their respective strands) account for the context of the phrase under analysis. Pepper writes (1942:246):

By way of definition we may say that whatever directly contributes to the quality of a texture may be regarded as a strand, whereas whatever indirectly contributes to it will be regarded as context.

Thus, we observe a situation in which the meaning of the individual strands of the phrase *(at + the + end)* feed into the meaning of the whole phrase. In addition, there exists connections between the phrases and associated connections between the words in one phrase with the words in another phrase that account for the context of the phrase "at the end". On one level, "at the end" lies in the context of the other phrases "A period" and "will be placed" and "of this sentence". On a second level, it is possible that a single word
in one phrase may take on meaning relative to a single word in another phrase. Pepper writes (1943:247):

The particular meaning of "end," for instance, in this phrase is determined by connections partly grammatical and partly of other sorts, with the already written "period" on the one side and the about-to-be-written "sentence" on the other. These contextual connections are gathered up onto the word "end," which contributes them as a group to the meaning of the whole phrase.

Thus, in our structural analysis, the meaning of the "unit of texture" is determined by direct contributions (its strands) and indirect contributions (its context). By way of contrast with methods of analytical or elemental analysis (reductionism), Pepper writes (1942:247-248):

(A strand) is a contributing detail in a texture, but it also reaches out into a context and brings some of the quality of the context into the texture. It shows that too sharp a line cannot be drawn between texture, strand, and context. It constitutes a running demonstrative criticism of the method of element analysis, and of the analytical theories generally. For contextualism, element analysis is intrinsically distortive.

The implications here are revolutionary from the standpoint of the analytical theories, formalism and mechanism. In these theories it is assumed that any object or event can be analyzed completely and finally into its constituents. [T]hat there is an ultimate and final and complete analytical constitution of water [for example] is assumed. This assumption is categorically denied by contextualism: for according to its categories there is no final or complete analysis of anything.

With the analysis of any event, as we analyze a texture, we move down into structure of strands and at the same time sheer out into its context. A bottom is thus never reached. For the support of every texture lies in its context.

A contextualist analysis can obviously proceed along many paths since the details (strands) that help to describe an event are numerous. And the details, which are themselves events in their own right, have associated strands of their own, all of which form connections to other events that help to define a context. This leads to a common theme in contextualism; any number of different analyses are capable of describing an event. How
does one choose which set of strands and contextual connections to pursue? In general, the contextualist approach is involved with an action geared to solving a problem. Analysis of a historical event, which very well may been characterized in terms of the action that solved the problem situation, requires a purpose. Otherwise, based on the inherent relativity of the categories of contextualism, there would be no way to approach the analysis. To the contextualist, the analysis of an event requires a practical purpose. In the absence of a purpose or a problem to solve, we are left with only analysis for the sake of analysis.

To finish our analysis of texture, I will briefly discuss the subcategory references. References are related to strands. Specifically, references deal with the nature of the connections that link various strands throughout the context. In terms of our exemplified sentence, a reference would refer to the manner in which a word in one phrase (at the end) relates to another phrase or word in another phrase (of this sentence). Thus the connection between end/sentence is described in terms of a reference. Pepper identifies four types of references: (1) linear, (2) convergent, (3) blocking, and (4) instrumental (1942:252). A linear reference moves forward and backward between two strands. It has an origin, a direction, and a satisfaction. Between the initiated strand “end”, the reference reaches forward and is satisfied when the question “End of what?” is answered. A tension is relieved. With a linear reference there is one initiation, one reference, and one satisfaction. A convergent reference involves more than one initiation leading to one satisfaction, or one initiation leading to more than one satisfaction. Once again, consider the event (A period will be placed at the end of this sentence.). The letter “e” is contained
within the texture (as strands extended to another level of detail) of this event on seven occasions. According to Pepper, these seven letters may stand out in one of two ways.

Pepper writes (1942:255):

If we look at [the seven e's] we have an initiated reference from which we derive seven satisfactions. But if they spontaneously impress us with their identity, then we have seven initiations converging upon one satisfaction.

It is the activity of a convergent reference that makes these seven letters attain their similarity. The third reference involves the blocking of an initiation from its satisfaction. It is a failed reference, in which a strand for one reason or another cannot reach its satisfaction. Pepper writes (1942:255):

Smooth-running strands constitute the contextualist interpretation of what we generally mean by order. Blocking is accordingly a fact of disorder, and it inevitably involves some degree of novelty. For, concerning a strand blocked, the blocking is not expected or included in the reference of the strand.

Blocking means that an action (such as crossing a stream that is blocking the trail) is unexpectedly confounded by a conflicting action. The novelty created may be one of two different types: intrusive or emergent. Intrusive novelties are explained in terms of the prior histories of the blocked strands and the way in which their references created conflict. Emergent novelties occur when a strand is initiated or blocked without explanation or a new event simply appears and its novelty is observed.

The fourth and final reference considered by Pepper is the instrumental reference, which can be understood as a type of integration of the previous three references. An instrumental reference involves volition. Specifically, it involves an action that is intended
to overcome the presence of a blocking reference, which prevents a satisfaction from occurring. Pepper writes (1942:261):

An instrumental action is one undertaken as a means to a desired end and as a result of some obstacle that intervenes between the beginning of the action and its end or satisfaction. Instrumental action accordingly implies a linear reference that has been blocked, and a secondary action which removes or circumvents the blocking. The instrument proper is the secondary action...

Moreover, the instrumental reference possesses a texture of its own. That is, it is the initiation of another event within the context of the blocked satisfaction. Pepper continues (1942:261):

An instrumental reference, therefore, involves three factors: (1) First, it is a linear reference in its own right, with its own initiation and satisfaction. But (2) this satisfaction is dependent upon the satisfaction of the original reference which it serves, this dependency or service being the instrumental factor proper, the reference which connects the instrumental strand with the terminal strand. And (3) it is a reference to the blocking strand.

Thus, the instrumental action intervenes into the ongoing event to mitigate a tension that involves the blocking strand preventing a terminal strand from being realized. It is the additional action required to cross a stream that interferes with the path to my home. Upon satisfaction, which is by no means preordained, the instrumental action becomes totally incorporated into a newly defined texture. So close is the connection between the blocked strand, the instrumental strand and the terminal strand that:

When an instrumental action is thoroughly integrated with its end and its obstacle, all three work together as one total texture. The obstacle no longer appears as an obstacle, nor the instrument as an interpolated action, but all as simply articulations of a total complex action (1942:262).

According to Pepper, the perception that the instrumental reference becomes integrated or fused into the whole event has caused many contextualists to caution about seeing the
means/ends distinction as absolute. Instead, the quality of instrumental action is seen as something the can propel us out of the given moment. It reaches beyond the quality of the given moment and sets the stage for yet another means/ends event. In other words, to the contextualist, there really are no ends. This is consistent with the contextualist belief in a continuously changing world characterized by the appearance of novelty. As Pepper writes, in moving beyond the immediacy of the given event we see the "evidence for a widely extended universe in which a myriad of given events are interlocked and march forward arm in arm into the future with great strides" (1942:264).

Organicism: An Adequate World Hypothesis

The fourth adequate world theory identified by Pepper is organicism. The root metaphor that Pepper associates with organicism is the organism or integration, neither of which Pepper sees as being especially suitable. Organicism may also be closely linked with the root metaphor of contextualism, which is the historic event and, therefore, the two world theories can be explained in contrast to one another. The difference between the two world theories can be seen through the dispersive nature of contextualism and the integrative nature of organicism. That is, while both theories are synthetic in their theoretical approach (operating in reference to wholes), contextualism works toward the whole meaning of the given event in terms of a defined duration. Contextualism reaches

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out into the parts as it brings forth evidence into the description of the historical event, but the essence of contextualism is to let the whole event remain an isolated or self-contained entity. It has a horizontal cosmology in which a wide array of evidence (dispersive) is utilized to explain or develop the meaning of a moment (or a duration) of time. On the other hand, organicism also works from the parts toward the whole; however, in so doing it attempts to integrate fragments so as to fit them into a coherent, process-oriented picture of the underlying whole. That which does not appropriately find its place in the organic whole is left behind and assumed to be the material for a future integration. Because of this tendency to integrate, the organicist can be described as one who is focused on the historical process, which, given the choice of the ‘historical event’ for contextualism, may well be the best way to describe the root metaphor forming the basis of this cognitive system. Contextualism is concerned with change and novelty that flow out of the specious present of a historical event. It lacks any notion of direction in terms of time, yet it takes ‘qualitative time’ very seriously in its use of the concept of duration, or the lens through which a historical event is contained and gains its meaning.

As a process-oriented cognitive system, organicism contains a clear and pronounced attitude toward direction, often construed as time; and the direction is always toward revealing the appearances that block our knowledge of reality or the organic whole. In addition, organicism adds to contextualism the notion of an ‘absolute ideal’, which is the final outcome (understanding of the organic whole) toward which a series of integrations will inevitably move. It is from the perspective of the realized organic whole (a reality that existed prior to its discovery) that time ceases to be taken seriously by
organicists. This is somewhat of a paradox since one usually associates ‘historical process’ with time. The key to resolving the paradox is simply to understand time as being defined in terms of successive integrations in the process of knowledge or understanding. One could perhaps see organicism as having a vertical cosmology (with respect to time) in which knowledge (verifying pieces of evidence) moves toward the ultimate organic whole and contrary evidence (anomalies) are shelved or allocated to different domains. Whereas the contextualist sees meaning and focuses analysis on the strands/context feeding into a single event with a specified duration, the organicist sees the meaning of an event as being a fragment that is asking to be integrated into a historical process reveals the true meaning of the organic whole. In any case, it is successive integration, and not time per se, that is the central feature of the historical process. Pepper writes (1942:280):

Organicism has to deal mainly with historical process even while it consistently explains time away, whereas contextualism has to admit integrative structure surrounding and extending through given events even though these structures endanger its categories...The root metaphor of organicism always does appear as a process, but it is the integration appearing in the process that the organicist works from, and not the duration of the process. When the root metaphor reaches its ultimate refinement the organicist believes that the temporal factor disappears.

According to Pepper, this constitutes a major difference in the structural categories between organicism and contextualism and leads him to develop a separate set of structural categories. Contextualism is sometime referred to as absolute idealism without an absolute.
As with the previous three world theories, Pepper develops the structural categories of organicism by focusing on a description of its root metaphor — the organic process. The structural categories of organicism divide into a progressive and an ideal set. Between these progressive and the ideal, there is a definite movement (direction) through the progressive categories to the ideal categories. This is a natural part of the cognitive experience of uncovering the organic process underlying the world’s events and evidences. Pepper points out that the opposition of these categories is often called the antinomy of "appearances and reality" (1942: 282).\(^4\)\(^5\)

**Progressive Categories**

\[\text{Appearance} \rightarrow \text{Progressive Categories} \rightarrow \text{Ideal Categories} \rightarrow \text{Ultimate Reality} \]

In short, the organic process is one in which appearances are progressively eliminated in a movement toward an 'ultimate reality' or an 'absolute ideal'. One need not stretch too far to see how dogmatic organicists, who place complete emphasis on the absolute ideal, run into trouble due to intellectual associations with social phenomena such as ethnic cleansing utopias or other totalitarian and perfectionist tendencies. According to Pepper, the structural categories that are present in any organic or integrative process can be expressed as follows (1942:283):

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\(^4\) Bill Harrell points out that O.W.F. Hegel is the most influential developer of the organicist world hypothesis.

\(^5\) Pepper also points out that an undogmatic organicist need not force the categories of the ideal to monopolize those of the progressive type — this allows appearances to be as real as the "absolute ideal" or the ultimate reality defined in a organicist’s theory and thus gives more weight to the actual process by which knowledge is uncovered (1942:282). Pepper also writes: "the early organicists, notably Hegel, thought that there was one and only one course of progress from maximum fragmentariness to ultimate integration. His books narrate the tragicomic drama of this fixed and inevitable progress" (1942:292).
(1) fragments of experience which appear with (2) nexuses or connections or implications, which spontaneously lead as a result of the aggravation of (3) contradictions, gaps, opposition, or counteraction to resolution into an (4) organic whole.

These four progressive categories constitute the goal and the outcome, or final resolution, in describing a historical progress. In Hegelian terms, one complete integration is made up of a thesis, an associated antithesis, and a synthesis attained in a newly developed organic whole, which itself becomes a thesis for the next generation. The second set of categories that completes the description of the organic process is the ideal set. These categories are expressed from the point of view of a 'revealed organic whole' and include the organic whole, which is the pivotal category. That is, having demystified a particular set of appearances with the discovery of a newly developed organic whole, the knowledge of the organic whole is found to be

(5) implicit in the fragments and (6) transcend the previous contradiction by means of a coherent totality which (7) economizes, saves or preserves all the organic fragments of experience without any loss (1942:283).

Pepper provides an illustration from the history of astronomy to give content to these seven categories (1942:285-289). It is an organicist's account of the historical process by which we obtained the modern interpretation of planetary motion, perhaps an account that has witnessed its final integration. Starting with the planetary system organized by Anaximenes, the story is one of 'fragments' (various observations) making connections that generate contradictions or incoherence. These contradictions, which demand resolution, provide the motivation for scientists to create a refined interpretation of how the fragments fit into a new coherent whole. Thus, in its most unrefined form.
Anaximenes' makes crude claims that the sun, moon, and planets are fiery disks floating in the air like leaves. Pepper writes (1942:284):

Anaximenes said the earth is a table-like disk floating upon air. The sun, moon and planets are fiery disks floating in the air like leaves. The stars are fixed like nails in the crystalline vault of the heavens. All revolve laterally like a cap or millstone over the earth. The mountains on the northern rim of the earth hide the sun at night and produce darkness.

He made this claim in order to bring coherence to scattered and fragmented observations concerning the solar system, all of which contradicted an expectation. Why a new sun every day? Why such a confusion of stars coming and going? Why did the movement of the stars contradict the movement of the planets? Pepper writes (1942:285):

Anticipations of permanence and regularity were contradicted by change and irregularity and vice versa, expectation of impermanence and irregularity were contradicted by relative permanence and regularity. By an organization of these observations and other observations these contradictions vanished. The northern mountains and a single lateral movement brought the many appearances of the sun into one predictable system, and day no longer contradicted night, but each was consistent with the other, and so was every hour of the day and night. The planets, moon, and sun were disks floating in the air, the stars were attached to a crystalline vault, whence the steadiness of the stars and the wandering paths of the planets. An organization of heavenly appearances, anticipated some not formerly noticed (that is, predicted verifiable observations), and removed contradictions by including all in a coherent astronomical system.

However, the fragments present in Anaximenes' system of observations (the bright appearances and the segments of their motion) possessed an internal drive (their nexuses or connections) which reached out and encountered contradictions. The internal drive is the inherent and inexorable pull possessed by fragments, which operates through the interconnections that make them an organic whole in the first place. As the organicist story goes, these internal contradictions confront yet new fragments, yet to be integrated,
and inevitably caused the previous set of fragments to become resolved or integrated into Aristotle's astronomical system. The conflicting fragments attain a new level of integration. According to Pepper, the progress of each successive integration possesses increasing degrees of inclusiveness, determinateness, and more refined integration, or organicity. By organicity, Pepper explains that "an organic whole is a system that every element within it implies every other. [Or], it is a such a system that an alteration or removal of any element would alter every other element or even destroy the whole system." (1942:301). Thus in Aristotle's system, the crystalline vault holding the stars in fixed position was extended to the sun, moon and planet, all of which possessed a particular path which rotated in relation to the earth. The contradictions of Aristotle's— the intricacy or peculiarity of each planet's path contradicted the image of a system of solid spheres - under the strain of yet more observations gave way to the system of Ptolemy. The astronomical system of Ptolemy abandoned the crystalline spheres and retained only the circular motion. Ptolemy's system of circular motions, which required increasingly complex explanations for each planet, gave way to Copernicus, who placed the sun as the center of reference for all these circular motions. From Copernicus, to Kepler, to Newton (who combined the astronomical system with the mechanical system including the laws of motion and the law of gravitation), and finally to Einstein, the history of the development of our understanding of celestial motion can be fit into an organism account of the evidence. The historical progression continues until no more contradictions appear. The final truth or ultimate reality, the focus of the ideal categories, has always
SOME RELATIONS AMONG THE WORLD HYPOTHESES

Since Pepper’s work in *World Hypotheses: A Study in Evidence* has been largely overlooked by the mainstream in the philosophy of science, and even more so by the practitioners in economic methodology, I thought it worthwhile to summarize various attributes of the four adequate world hypotheses he identified. Table 4 presents a brief summary of key attributes of each world hypothesis identified in my reading of Pepper. A trained philosopher may well be able to identify additional considerations. However, given that Pepper is unknown to most economists and methodologists, the purpose of this summary is primarily to assist in any future research that might draw upon the metalevel analysis developed by Pepper. Furthermore, it serves as a reminder that on one level, Pepper’s work is taxonomic in nature. Pepper uses his formalist skills to identify four ‘discrete forms’ — out of the morass of philosophical systems a metalevel taxonomy — that may be instructive to methodologists and highly valuable in the ongoing discussion of pluralism. In addition, it serves as a reference table for keeping in mind a rather complex set of attributes that define the unique and distinct nature of each world hypothesis.

According to Pepper, the adequate world hypotheses possess a particular symmetry (1942:141-149) that can be characterized along two dimensions: (1) the mode of reason or direction of inquiry and (2) the manner in which evidence or facts are
<table>
<thead>
<tr>
<th>World Theory</th>
<th>Formalism</th>
<th>Mechanism</th>
<th>Contextualism</th>
<th>Organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root Metaphor</td>
<td>Similarity</td>
<td>Machine</td>
<td>Given Event</td>
<td>Historical Process</td>
</tr>
<tr>
<td>Type of Theory 'made of reasoning'</td>
<td>Analytical</td>
<td>Analytical</td>
<td>Synthetic</td>
<td>Synthetic</td>
</tr>
<tr>
<td>Type of Theory 'organizational plan'</td>
<td>Dispersive</td>
<td>Integrative</td>
<td>Dispersive</td>
<td>Integrative</td>
</tr>
<tr>
<td>Relative Weakness</td>
<td>Precision of Meaning</td>
<td>Scope of Inquiry</td>
<td>Precision of Meaning</td>
<td>Scope of Inquiry</td>
</tr>
<tr>
<td>Relative Strength</td>
<td>Scope of Inquiry</td>
<td>Precision of Meaning</td>
<td>Scope of Inquiry</td>
<td>Precision of Inquiry</td>
</tr>
<tr>
<td>Autonomous Categories</td>
<td>Characters Particular Participation</td>
<td>Primary (matter) and Secondary (mind)</td>
<td>Quality/Texture (Novelty/Change)</td>
<td>Progressive (Steps) Ideal (Goal)</td>
</tr>
<tr>
<td>Categorial Operations</td>
<td>Elements</td>
<td>Factors</td>
<td>Contexts</td>
<td>Complexes</td>
</tr>
<tr>
<td>Primary 'most adequate' Theory of Truth</td>
<td>Correspondence (identity of forms)</td>
<td>Casual-adjustment (mature nominalism)</td>
<td>Operational (qualitative confirmation)</td>
<td>Coherence (whole freed of contradiction)</td>
</tr>
<tr>
<td>Ontological Orientation 'what counts as real'</td>
<td>Forms (subsistent laws) exist distinct from particulars</td>
<td>Only particulars that can be placed in a field of location</td>
<td>Experience in Action Fused Whole</td>
<td>The Unrealized, Ultimate Idea (The Unity of Fragments)</td>
</tr>
<tr>
<td>Nature of Time</td>
<td>Irrelevant or Universal (Taxonomic)</td>
<td>Time as Location (dimensional, linear) (schematic time) Pendulum</td>
<td>Qualitative Time (Duration relative to meaning of the whole event) (Spacious present)</td>
<td>Time as Direction (successive integration) (Focused 'arrow of time)</td>
</tr>
<tr>
<td>Nature of Causality</td>
<td>Participation of subsistent form in particulars (events) constrained by time space</td>
<td>Event Conjunctions (Human) 'efficient causation'</td>
<td>Overdetermined (multiple causation) Experiential</td>
<td>Dialectical (internal contradiction)</td>
</tr>
<tr>
<td>Sample Philosophers</td>
<td>Plato/Aristotle Scholastics</td>
<td>Descartes, Hesse Locke, Hume Berkeley, Galileo</td>
<td>Peirce, Dewey James, McD, Bergson</td>
<td>Hegel, Schelling Royce</td>
</tr>
<tr>
<td>Associated Philosophies of Science</td>
<td>Realism Platonie Idealism</td>
<td>Naturalism Materialism/Subject Idealism (Realism)</td>
<td>Pragmatism Pragmatism</td>
<td>Absolute Idealism Objective Idealism</td>
</tr>
</tbody>
</table>

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organized. The world hypotheses operate with a mode of reason that is either *analytical* or *synthetic*. The meaning of these terms is consistent with their commonly understood definitions. An analytical theory tends to break a system down in order to conduct inquiry in terms of its constituent parts. A synthetic theory tends to bring the parts together (or assume they are already together) in order to conduct inquiry in terms of its wholes. Formism and mechanism are analytical world hypotheses whose basis facts are elements and factors, respectively. Contextualism and organicism are synthetic theories whose basic facts are contexts and complexes, respectively. On a second level, each pair of world hypotheses can be categorized by the manner in which the theories handle the evidence or facts once they are gathered. The world hypotheses operate with either a *dispersive* or an *integrative* plan. A dispersive plan, which characterizes formism and contextualism, interprets facts one by one from whatever source they come. After being interpreted, the facts remain as they arrived, which tends to allow these theories to be broad in scope. On the other hand, an integrative plan tends to gather only those facts that fit properly into the theory, casting aside as ‘unreal’ those facts that cannot be integrated into the body of the theory. Thus, mechanism and organicism tend to be more precise at the expense of being broad in scope. The summary table also includes information pertaining to the ontological orientation of each world hypotheses (what counts as real) as well as the world hypotheses’ notion of time. In addition, notable philosophers of science and philosophies of science associated with the world hypotheses are mentioned in the table. One of the crucial aspects of Pepper’s taxonomy of metatheories is the idea that each theory possesses its own *special theory of truth*. This
has led some to refer to Pepper's work as an epistemological system. Viewed in a Pepperian manner, this suggests that a related collection of substantive theories have a direct relationship to an epistemological as well as an ontological theory. This is why care must be taken not to conflate Mäki's (1997) notion of 'one world many [substantive] theories' with 'one world many [meta] theories.' That is to say, there are a plurality of theories about reality and a plurality of theories about truth, and each one is associated with a refined world hypotheses that informs the similar types of substantive theories. As long as Mäki considers metalevel considerations of epistemology and ontology as theoretical his argument seems to hold. The following section offers a brief restatement of Pepper's plurality of special-truth theories that comprise Pepper's pluralistic epistemological system.

WORLD HYPOTHESES POSSESS THEIR OWN THEORY OF TRUTH

Using the root-metaphor method, Pepper derives a set of structural categories characteristic of four cognitive systems identified as formism, mechanism, contextualism, and organicism. As a crucial test of the adequacy of each cognitive system, Pepper claims that the structural categories should imply or be amenable to a 'theory of truth' that is unique to and flows out of the structural categories. That is, each world hypothesis

66 See Bill Harrell's homepage with links to a summary of the content of World Hypotheses: A Study in Evidence as well as related links to articles critiquing or applying the work of Pepper.

67 Refer to chapter one for a discussion of Mäki's attempt to 'limit pluralism' to only 'theoretical pluralism'.

137
should reveal how it should be judged on its own terms or in terms of its unique set of structural categories. Pepper writes (1942:149):

To bring out the divergences and incompatibilities of the different interpretations in sharp detail in at least one example, I shall take pains to exhibit the theory of truth which each theory generates. This seems particularly appropriate just here, as our interest is focused on cognitive value. The logic of each theory (that is, each theory's own theory of cognitive criticism) follows from its theory of truth. We shall thus incidentally have detailed material for the comparison of truth with adequacy.62

Accordingly, at the end of each chapter dealing with a world hypothesis, Pepper focuses on what he terms the 'special theories of truth' associated with the refined root metaphor or cognitive system. For the purpose of this research, there is a potential weakness associated with Pepper's presentation of special theories of truth. The theories of truth are developed in the language of the structural categories outlined by Pepper for each world hypothesis. Unfortunately, the book World Hypotheses: A Study in Evidence does not appear to be a work that made it into the mainstream of the philosophy of science. Accordingly, a basic understanding of the theories of truth (as well as the world hypotheses proper) is in some sense locked in the work and language developed by Pepper. Therefore, if Pepper's epistemological system is to develop significance in either the philosophy of science or economic methodology, I believe links will have to be constructed between Pepper's work and contemporary discussions. However, it is difficult to see how either point detracts from Pepper's basic appeal that having generated a relatively adequate theory of truth, it is "cognitively irresponsible" to claim that any one...
of the world hypotheses is \textit{a priori} superior to another. It may well be the case that a \textit{post-rational eclecticism} may choose a most adequate perspective to deal with any body of evidence.\textsuperscript{69} However, this still does not deny or suppress the idea that the cognitive appeal of each of these world hypotheses can be viewed as a vital force in generating a plurality of economic theories. This, of course, is important in opening up economic methodology to the idea that the plurality of economic theories finds support not only in the bare fact that a plurality of substantive theories exists in economics. But it also finds support from a metalevel perspective, be it methodological, ontological, or epistemological in nature — a point already alluded to in the discussion of Weimer's interpretation of Popper. To the degree that the post-positivist discussion in economic methodology opens up to a pluralist ideascapе, I believe Pepper's highly detailed taxonomy of extant cognitive systems will prove to be a great source of understanding for both the pure and eclectic texts in the history of economic thought.

In this concluding section regarding a restatement of Pepper, I will briefly sketch the \textit{theories of truth} that Pepper describes for each world hypothesis. It is Pepper's claim that the theories of truth naturally grow out of the structural categories of each hypothesis. My review of this topic will be brief. To fully develop the various theories of truth are beyond the scope of this work. I would be satisfied if this exercise focused methodologist's attention on concrete descriptions of a handful of theories of truth. In the

\textsuperscript{69} Note that Lakoff and Johnson (1999) spend considerable research effort distinguishing what an empirically based cognitive science (as opposed to analytical philosophy) implies about the concepts of time, causation, truth, ontology, etc.
pluralist discussions in Salant and Screpanti (1997), focus is often placed on the existence of 'epistemological pluralism' (or a plurality of epistemological theories) without a corresponding effort to describe the nature of some specific theories of truth. Thus, it is meant only as a starting point and primarily concerned with solidifying the intent of Pepper in espousing a plurality of epistemological theories. However, since Pepper's exposition is consistent with the notion of plurality of theories of truth, which seems to oppose Mäki's claims in the 'One World [One Truth] Principle'. I believe it is important for economic methodologists to consider what Pepper is saying. It flies in the face of the idea expressed earlier by Mäki (1997:1747), who desires to limit pluralism to just substantive theory (i.e., theories with economic content), while constraining it in terms of ontological and/or epistemological matters. This approach is not only misguided in that it mistakes theory for the actual world (as if 'One World' is not a theory); but it also runs the risk of being unnecessarily restrictive in that it encourages economic methodologists to maintain a monist view relative to epistemology and ontology. A pluralist should expect that this in turn would naturally favor economic analysis relying on reductionist modes of thoughts. Ironically, it can be seen through Pepper's account of post-rational eclecticism that scientific realism is consistently maintained in the view of Pepper. This is true not only relative to the working of each cognitive system, but it may also transcend individual cognitive systems in the subjective choice of a most appropriate handling of the evidence.

49 By post-rational eclecticism, Pepper means that in a given situation one or another theory of truth may turn out to be the best. However, as a rule, this will not be known a priori.
of any given problem situation. However, Pepper conducts this activity without prematurely restricting plurality on the substantive level or the metalevel. This would be consistent with a generalized extension of the views expressed by Weimer about Popper, Kuhn, Lakatos, where a multi-theoretical appraisal model is viewed to include metalevel texts as a form of theory.

Correspondence Theory of Formism

The theory of truth associated with the structural categories of formism is the "correspondence theory" (1942:180-184). According to Pepper, "truth consists in the similarity or correspondence between two or more things, one of which is said to be true of the others." Typically, any number of charcoal sketches of a person may contain truth by virtue of the fact that they are sufficiently similar to represent the person. The portraits are called the "descriptive objects" and the actual person is called the "object of reference". In the world of everyday experience, an apple pulled from a bunch of apples may correspond to the whole lot. In scientific inquiry, descriptive objects can be pictures, maps, diagrams, sentences, formulas, theories, models and mental images. Each of these descriptive objects could be constructed to have a true likeness to an object of reference such as a particular geography, a physical system, an economy, etc. Moreover, there is no call for the descriptive objects to correspond in all respects to an object of reference.

It is not exactly clear to me if Miki distinguishes between "the actual world" and substantive theoretical systems that propose to explain the world". Moreover, I am unable to draw a conclusion as to whether Miki sees a difference between metalevel and substantive theories.

141
There is little to be gained from constructing a map of the earth in the exact same proportion as the earth: a globe will suffice as a partial correspondence. Indeed, the most preferred descriptive objects are a combination of verbal or of mathematical symbols even though they may be a less genuine description of an object than a diagram, sketch or mental image. Pepper summarizes the correspondence theory as follows (1942:181):

With these preliminaries in mind, we may very simply define truth as the degree of similarity which a description has to its object of reference. It follows that a true description actually possesses the form of its object — within the limitations prescribed by the conventions of the description. Within the limitations of size and black and white, a charcoal portrait actually participates in the form of the sitter; within those limitations that form is there as much as in the sitter.

Pepper identifies two kinds of truth in formism that depend on the status of the referent: historical truth and scientific truth (1942:182). Historical truth deals with existence and involves descriptions of historical events. It is the domain of the historian who wishes only to note events as they actually occurred. There is no necessity or law-like behavior associated with historical truth. On the other hand, scientific truth is primarily concerned with identifying the laws of nature. For the scientist, actual historical events are used only to exemplify the identified laws. Pepper further qualifies scientific truth by distinguishing between two types of induction: (1) descriptions of empirical uniformity (e.g., observe that the moon passes through monthly phases from crescent to full) and (2) descriptions yielding the identification of natural laws. Pepper writes (1942:182):

[Empirical uniformities] are simply statements of observed correlations in concrete existence and contain no reasons why these regularities should occur. [Descriptions of natural law] are statements of genuine laws of nature, which are
regarded as necessary and therefore explanatory of the reasons why certain regularities occur. 71

Thus, the formist believes that statements of empirical uniformities are only half-truths; they are ‘rungs in the ladder’ from contingent fact to necessary law. To be scientific truth, it is necessary to identify the laws or combinations of laws that make the regularities necessarily hold. Short of law-like behavior, scientists should identify the regularities as historical coincidences in order to prevent them from being generalized and mistakenly used for scientific prediction or explanation.

Causal Adjustment Theory of Mechanism

The theory of truth associated with the structural categories of mechanism is the ‘casual adjustment theory’ (1942:221-231). The problem with developing an adequate special theory of truth in mechanism concerns the fact that most, if not all, of the action lies in the category of the ‘secondary qualities’. It is not in the operation of the lever proper or the material objects in the structural field that define truth in mechanism. To the contrary, the theory of truth is defined by the ideas contained in the minds of ‘ineffactual attachments’, which inevitably accompany the lever or the ‘cosmic machine’. In general, the cosmic machine (the image of the machine) is in most instances far removed from the range of immediate perceptions. Consider the electrons, protons and neutrons that comprise

71 It appears as if there is genuine similarity between Pepper’s notion of ‘subsistent formism’ and Lawson’s (1994 and 1997) (Bhaskar’s) notion of ‘transcendental realism’. Both philosophies focus on the identification of subsistent forms as laws or norms.
atoms or the aggregate variables that define a macro model of the economy. Thus, explanation of the ‘primary qualities’ (the effectual aspects of the machine) arises from the organism (human) that is attached to and experiences the observed correlations produced by the machine. It is organisms that must be immediately aware of the evidence. Pepper writes (1942:221):

All immediate evidence is, therefore, private to each individual organism. It follows that knowledge of the external world must by symbolic and inferential. How is the truth of that knowledge established?

Pepper explains how older mechanistic theories of truth mistakenly rely on a correspondence theory, which presupposes the formal analysis of similarity and the presence of an identity of form in different particulars. In such theories, mechanistic truth is concerned with establishing a correspondence between visual images (the idea) and external facts (the material object). It assumes that the secondary qualities (the idea or visual image) are contained within the body of the organism and are therefore private. Conversely, the material objects of knowledge exist in the external world. Pepper identifies this as the egocentric predicament, for if the object of knowledge is outside the organism, it would seem that its truth could never be known since it cannot be reached for direct comparison with an internal idea (1942:223). According to Pepper, Berkeley attempted to deal with this problem by denying the existence of the material world, which results in ‘subjective idealism’. This implies the primacy of data as mental contents or ideas. However, Berkeley’s philosophy is founded on the assumption that minds are matter and therefore can be encapsulated within the organism. In place of a correspondence theory of idea and object, more critical mechanists attempted to employ a
symbolic theory of correspondence (1942:225). This is an attempt to “externalize” the idea in a formalized system of symbols and equations. Pepper writes (1942:225):

Let the idea be a group of symbols in a sentence or scientific formula. Then if these symbols correspond with features of the object, and the symbolized relations among the symbols correspond with the relations among the objects, the sentence or formula is true.

Unfortunately, this modification (symbolic correspondence) does not get around the problem of comparing the symbols, which are secondary qualities, with the object. From here, some mechanists developed the idea that correspondence is not the crucial aspect of truth in mechanism, but the predictive power of the formula or sentence to produce expected results. According to Pepper, this revision, which focuses on the workability of a formula, is operationalism, and the operational theory of truth naturally grows from the structural categories of contextualism and is ultimately inconsistent with the structural categories of mechanism.

According to Pepper, subjective idealism, correspondence, symbolic correspondence and operationalism are not suited to the structural categories of mechanism. The most appropriate special theory of truth growing from the structural categories is nominalism. Naïve nominalism turns on the idea that words are conventionally learned and used in reference to a number of physical objects. Thus, blue jays do not possess a form but only a name. According to Pepper, mechanists have furthered the theory of nominalism by seriously confronting the question: “What is a name?” How do certain names get applied to certain configurations of matter? Along these lines, Pepper writes (1942:226):
A name is a specific response made by an organism on the stimulus of specific environmental configurations. In principle it is exactly the sort of thing that happens when an organism reacts positively to food stimuli and negatively to prick stimuli.

In general, the idea is to connect a stimulus to a response through a physiological process. It is a process of attaching significance to things through conditioned responses. The physiological process serves as a means to connect the primary and secondary qualities. Thus, we first learn to react negatively to the sight of a sharp nail rather than actually stepping on it. Next, we learn to react negatively to the word nail, which is associated with a visual stimulus, which is associated with the original prick. According to Pepper, a scientific formula physiologically interpreted, which is a string of reactions or conditioned reflex, can be causally interpreted. Upon seeing a nail, Pepper writes (1942:227):

> Suppose my organism on the stimulus of light rays impinging on the retina of my eye responds with the articulate words, “That is a sharp nail”. Suppose I wanted to find out whether that was a true response. What would I do? …I would tentatively step on the nail, and if I reacted negatively I would say that the sentence was true; if not, I would say that it was false and look about for the causes which had produced the illusion.

In mature nominalism, a system of causal connections holds between environmental stimuli and the response of an organism. Truth concerns a name for physiological attitudes, which are in adjustment with the environment of the organism. If we do not adjust we are in error. Given this structure, which links our private secondary qualities through physiological configurations to the realm of primary qualities (the material world), we have the capacity to test ideas in the form of sentences, formulas or theories.
Operational Theory of Contextualism

The theory of truth associated with the structural categories of contextualism is the "operational theory" (1942:268-279). In its most general form, the contextualist special theory of truth involves human action and the experience of solving a specific problem. There is no constraint on the significance or scope of the unsolved problem at hand: it could be as simple as figuring out how to cross a stream or defeating an opponent on the soccer field or the battlefield. The problem situation is analyzed in its context. A hypothesis is constructed and operationalized with specific details about an appropriate action. The operation is true if it solves the problem and it is false if it fails to solve the problem. In the terminology of the structural categories developed by Pepper, actual events with references are confronted by human action, which leads to satisfactions in other actual events. Pepper writes (1942:269):

The question of truth arises when a strand is blocked. If the problem is of any complexity, this analysis leads us into various relational schemes. The relations (i.e., the strands) of these schemes are studied in their relation to the blocked strand. A tentative hypothesis is constructed, this hypothesis being in the nature of an instrumental texture with definite references for action. These references are followed out, and this activity is the act of verifying the hypothesis. If the hypothesis is blocked, and accordingly the original blocked strand (the problem) is not satisfied, then the operation is said to be false and the whole process of analysis, construction of hypothesis, and verification starts over again. If, however, the following of the hypothesis leads to the satisfaction of the blocked strand and to the solution of the problem, then the operation is said to be true. Truth is thus the result on an instrumental texture which removes a blocking and integrates a terminal texture.

According to Pepper, the theories of truth that have emerged in defense of contextualism are related to the development of pragmatism. Pepper writes (1942:268):
It was with a theory of truth that contextualism came to birth. The early contextualists like Peirce and James insisted that no world theory was involved in this conception of truth. Pragmatism (or pragmatism, or whatever they chose to call it) was, they said, simply a method. It presupposed and implied nothing. It was purely empirical, purely a noting of what men actually did when they came to conclusions which they call true. The contemporary name for this method is called operationalism.

The history of the theory, even so brief as the history is, has not supported this idea. The method has thickened into a doctrine and thence into a world theory.

According to Pepper, three distinct specifications of the operational theory of truth can be identified. These specifications trace out the approximate development of pragmatism (or pragmatism). They are the (1) successful working theory; (2) the verified hypothesis theory; and (3) qualitative confirmation theory.

The ‘successful working’ theory states that truth simply resides in the success of the activity. Truth is utility or successful functioning of the operation (action) to solve the problem. Pepper points out that the enemies of pragmatism have historically ridiculed this version. It has been associated with expediency and criticized on two fronts. First, it does not define truth but only points out successful fact, something worked or it did not work. Moreover, the successful fact is most often a result of social approval. As a result, a theory or body of knowledge that works during one century may well be discarded for something more expedient and reflecting a new and improved understanding of the context. Secondly, critics have pointed out that if truth resides in the action, then what happens to the hypothesis after the problem is solved. The hypothesis is neither true nor false when it was formed. The hypothesis must be verified through action. And after the successful test the hypothesis is past and gone, implying that the successful action can
never be hypothetical. The development of pragmatism required that hypotheses be included in the operational theory. Pepper writes (1942:273):

[T]he ‘successful working’ theory is only a halfhearted contextualist theory. It leaves out not only the function of hypotheses, but also the still more important function of references without which the operations could not ensue from the hypothesis. When hypotheses and references are incorporated into the operational theory, then we have the ‘verified hypothesis theory’.

In the ‘verified hypothesis’ theory, truth shifts from the successful act to the verified hypothesis responsible for producing the solution. However, the overall scope of what generates truth is expanded to include not only the satisfaction or blocking of references (the actual verification), but also the formulation of a symbolic texture (hypothesis) and following through the symbolic references (the operations). While a successful action is required as the final factor establishing truth, truth is identified with the hypothesis, which is connected to the successful action through its references to the context. Pepper writes (1942:273):

Truth is not the quality of an act as successful or unsuccessful, but a relation between a hypothesis and its eventuality. It entails a wager of success on the part of the hypothesis. It involves a texture of symbols with references toward a definite total satisfaction. If the satisfaction is achieved, the symbolic texture is true.

According to Pepper, the verified hypothesis theory exhibits one pragmatic paradox. The theory maintains that a symbolic statement is only a tool for controlling nature. The true hypothesis gives no insight into the qualities of nature because its purpose is not to mirror nature (correspondence) or to integrate nature (organicism) into the analysis (1942:274-275). Pepper does not see this as a major shortcoming of the verified hypothesis theory, but a severe judgment on the part of formists and organicists. He maintains it is a radical
severance of the qualities of a true hypothesis from the qualities of the event that verifies the hypothesis.

A clarification of this matter leads Pepper to the ‘qualitative confirmation’ theory. Pepper sums up this modification in the development of pragmatism as follows (1942:275):

[The qualitative confirmation] theory simply stresses the basic contextualist principles that the meaning of a symbol is found in the quality it leads to and that the quality of a strand takes up the quality of its context.

In other words, when working up a hypothesis, the agent or analyst solving the problem imports the qualities of nature in which the problem situation is embedded. In turn, these perceptions about nature become incorporated into the hypothesis and come to be realized in the act of verifying the hypothesis. In other words, there is no sharp break between the qualities of the true hypothesis and the quality of the event. The agent is initially informed by the textures and quality of nature and these qualities are carried back into the act of verifying the hypothesis. Building on his example of the hunter who has been blocked by a stream, Pepper writes (1942:276):

Suppose the hunter, on looking over the situation, should make the explicit statement: “If I take up that pole, and step on that log, and push myself off from this bank, I can push myself up to the other bank. As a meaningful sentence this is already an articulated texture of references. These references are the beginnings of the operations themselves already qualitatively appearing in what we call images. These incipient references or images fill out and actualize themselves in the operations of picking up the pole and stepping on the log, balancing there, and placing the pole firmly against the bank, and so on. But these acts now are the very acts of perceptual verification of the hypothesis. The qualities the hunter is now experiencing are the very qualities of the event referred to as verifying the verbal statement. But these qualities are also the very qualities of the texture of the verbal references thickened out by the environmental contributions of the river, air, roughness of the pole, rollingness of
the log and so on. The structure of the verifying event is an integration of contributions coming partly from the operations of the hunter and partly from continuous physical textures among which these operations are carried on.

The true hypothesis is connected with the event that verifies it and this connection runs in both directions, implying that the qualities of nature can and do enter into the hypothesis. Pepper concludes that the qualitative confirmation theory of truth implies that the body of hypotheses possessed by science and philosophy gives insight into the structure of nature.

**Coherence Theory of Organicism**

The theory of truth associated with the structural categories of organicism is the "coherence theory" (1942:308-314). The key to understanding organicism’s special theory of truth resides in the process by which fragments cohere with their nexus and move along a path of successive integration toward an absolute ideal. Along the path of understanding, which grows out of the progressive categories in this world hypothesis, each integration involves placing a set of observed fragments into a new and higher level nexus. According to Pepper, the combination of fragments and nexus constitutes a judgment. Strictly speaking, a judgment resides in the nature of the fragments (facts without coherence) and the nexus to which they belong. Nonetheless, the formal expression of a judgment happens in terms of verbal or mathematical symbols. For example, Pepper writes (1942:309):

> A concrete fragment and its nexus may be expressed in a sentence with subject and predicate. For instance, the partly systematized fragment of Anaximenes’ observations on the sun may be summarized in the sentence, “The sun is a single continuous body.” The subject of the sentence refers primarily to the actual facts
of the case (the absolute) and secondarily to the best substitute Anaximenes has for these facts, namely his collection of observations on the sun. His predicate refers to the relations in which he believes these facts stand. He attributes the relations of the predicate to the matter of the subject. But it is not essentially the sentence that is true, but what the sentence means, that is, the judgment. If the judgment were not true, neither would the sentence be.

Successive integrations of fragments and their nexus bring about an improvement in judgment. Moreover, the truth of a judgment consists of fragments reaching out through a nexus and finding a place in a whole that is (temporarily) free from contradiction. Anaximenes' judgment about the sun was verified upon finding a theory that explained his observations about its movement relative to the earth. However, so long as the process has not attained the absolute ideal, the truth is relative in nature. Most organoleptists see that there are degrees of truth because the absolute ideal is never reached. Thus, truth is concerned with the amount of fact attained, and as the amount grows the degree of truth approximates the absolute ideal. In the limit, the totality of fact serves as the ultimate standard of truth. Any particular judgment soon gives way to a new set of contradictions (fragments) based on the more highly developed understanding. Pepper exemplifies this progression by describing the development of the scientific understanding of the solar system. He writes (1942:310):

"Each level brings about an improvement of judgment. Each level exhibits more truth through the higher integration of the facts. There is more truth in Ptolemy than in Anaximenes. There is more truth in Kepler than in Ptolemy, more in Newton than in Kepler. It appears that the criteria of truth are precisely the categorial feature of the organic whole - inclusiveness, determinateness, and organicity and that the ideal of truth is the absolute itself."

Finally, Pepper is careful to distinguish between coherence and consistency. He points out that in mechanism and formism, coherence may be used as a gauge of truth but not as its
essential nature. To this end, consistency, which is mere formal non-contradiction, is often mistaken for coherence. To the contrary, coherence is the positive organic relatedness of material facts. In organismism, truth is a material coherence.
An overriding purpose of this research project is to provide economists and economic methodologists with a conceptual perspective of a post-positivist landscape. At every step, I have implicitly challenged and constrained myself by asking the question: “How would I instruct economic methodology in a setting that has moved beyond the idea of traditional normative methodology, whose purpose is to find a static structure or logic that can confidently claim to be The Scientific Method?” In some ways, the ongoing transition from the ‘monist paradigm’ to the contemporary ‘pluralist paradigm’ may provide an example of a ‘Kuhnian revolution’ in the philosophy of science and economic methodology. It is difficult to see how a transition from an epistemological belief in certain knowledge to a belief in fallible knowledge could occur without at least some turbulence and resistance. The two paradigms are arguably irreducible in terms of one another, which makes a logical bridge between them difficult, if not impossible, to build. Yet, the current discourse contains the knowledge accumulated from Kuhn’s depiction of a similar transition in the discipline of physics and subsequent applications to other disciplines. So even if it is not possible to build a bridge, one might still imagine that the path to the river is at least lined with signs. Moreover, world hypotheses may provide the structure that psychological commitment to paradigms could not provide.
My thesis focuses on identifying and developing an alternative explanation of the source of the enduring plurality of economic theory. Unlike the 'psychological' and/or 'paradigmatic' interpretations associated with Kuhn’s transitional gestalt, my orientation is not directed toward the sociology of science or descriptive sociological studies of the various activities of economists working within schools of thought. Instead, I have chosen to elaborate on a pluralist perspective using a vehicle that is primarily concerned with ‘distinct theoretical structure’ — albeit more than one — which is, after all, a primary focus of traditional methodology. It is imperative to begin to see these theoretical structures in the work of practicing economists. Stephen C. Pepper considered himself a philosopher of science. I believe that Pepper’s epistemological system of world hypotheses is a pluralistic account of theoretical structures, which might well be considered traditional philosophy of science had it not been for the domineering and dogmatic attitudes (or successful rhetoric) of logical positivists against metaphysics or metatheorizing. The world hypotheses presented by Pepper can be viewed as ‘discrete structures or forms’ whose basic categories reflect the various ways scientists attempt to organize evidence or facts. They represent the structural component, as opposed to the psychological component, of what economists refer to as schools of thought. This seems compatible with methodology, but without the normative disposition to find the correct method or structure. Pepper’s world hypotheses are ‘structural forms’ or ‘cognitive systems’ that scientists use to organize evidence. They are derived from a common approach, what Pepper calls the root-metaphor method. These cognitive systems — formalism, mechanism, contextualism, and organicism — are themselves irreducible in form.
and function. As developed by Pepper, the four world hypotheses offer a relatively efficient and clear taxonomic perspective of the plurality in economic theory.72

To the best of my knowledge, the work of Pepper in general and the development of world hypotheses in particular are unknown in the discipline of economics.73 Moreover, it is relatively unexplored in the philosophy of science. There are no entries in the recently published *Routledge Encyclopedia of Philosophy* (Craig 1998) for either ‘Stephen C. Pepper’ or ‘world hypothesis’. Thus, it is imperative to connect Pepper’s world hypotheses with body of substantive economic theorizing in order to present Pepper’s work as a potential contribution to the discipline. This chapter attempts to accomplish this connection on two levels. First, the substantive theoretical work of economists proper is presented in light of Pepper’s taxonomy. Two examples of the formist, the mechanist, the contextualist, and the organist tendencies will be presented. However, any potential bridge from Pepper to the ‘working economist’ will inevitably be mediated by discussions in the methodology of economics. Thus, I also draw upon contemporary metatheoretical discussions within economics (i.e., methodology or meta-methodology). I present an example of philosophical perspectives consistent with the formist and contextualist world hypotheses.

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72 Pepper’s work has been used by those in education and psychology to highlight the fact that individual minds have natural affinities for organizing evidence around different root (or extended) metaphors. Pepper would claim that the manifest products (theoretical structures) of these individualistic organizing tendencies can be observed in a metaphysical analysis such as he has performed using world hypotheses.

73 With the possible exception of Henderson (1994).
As a student of economics not formally trained in the philosophy of science, my first impression of Pepper's account of a world hypothesis was somewhat skeptical. The root-metaphor method was completely foreign to me. Likewise, the idea that a world hypothesis gains adequacy in relation to its scope, or its ability to organize 'all of the world's facts' seemed far-fetched. 74 Recall Pepper's claim that world hypotheses differ from hypotheses constructed from within disciplines in the scope of their vision. A world hypothesis cannot seek refuge by claiming that certain facts are outside the domain of its intended inquiry. I thought for some time about how I might bolster this claim, one which is not part of the training of contemporary economists; and additionally, a claim that most likely did not enjoy much empirical or paradigmatic support at the time of Pepper's writing in 1942. 75 The answer to my query soon presented itself in the research of Fritjof

74 Pepper acknowledges that this is to some extent an exaggeration. Speaking on the development of a world hypothesis, Pepper writes: "[The adequacy of a world hypothesis] depends on its potentialities of description and explanation rather than upon the accumulation of actual description, though its power of description is never fully known short of actual performance. This fact brings out that the unlimited scope essential to a world hypothesis is more a matter of intent and accepted responsibility than a matter of actual test. Obviously, all the facts in the world can never be described literally by any hypothesis. The testing of a world hypothesis consists in presenting to it for description types of fact or specimens from diverse fields of facts, and if it can adequately describe these we assume that it can describe the rest. Experience in philosophy has made philosophers pretty well aware of what are likely to be the hardest facts for a world theory to handle, and these are at once respectfully presented for solution to any young hypothesis that ventures to claim world-wide scope" (1942:97).

75 Writing in the late 1970s, Weimer (1979:194) reminds us at the outset of a chapter entitled "Historical Trends: Development of the Nonjustificational Framework" that: "Concern with metatheoretical foundations of philosophy and science is recent. Two decades ago one would have had difficulty finding an audience prepared to listen to the idea that science had such disreputable aspects lurking in the background. The first systematic study of metatheoretical concerns did not receive institutionally recognized and sanctioned form until the 1960. Indeed, metatheoretical inquiry is so new that we are as yet only dimly aware of areas and issues that may evolve sufficiently that we can construct normal science 'puzzles' out of them. Systematic inquiry into metatheoretical questions is quite recent, yet metatheoretical concerns have occupied philosophers since the dawn of reflective thought. The fascinating, probably unanswerable, question remains: Why has systematic study appeared only so recently?" Weimer cites Radetzky, G (1970) for this anecdote. Pepper (1942:80-82) states that the positivist's dogmatic insistence that evidence is to be considered empirical/logical data and not structural
Capra, author of a book entitled *The Turning Point – Science Society and the Rising Culture* (1982). After rereading Capra’s metatheoretical critique of mechanism in Western science in light of what Pepper was claiming regarding the scope of world hypotheses, I was able to see an entire catalogue of examples supporting the claim that world hypotheses are capable of being identified through their ‘unlimited scope’ in handling the world’s evidence. Table 5 presents an overview of the discussion to follow.

It highlights the idea that each adequate world hypothesis is capable of handling evidence emanating from three primary domains of scientific inquiry each with numerous specialty fields of study. That is, a world hypothesis has scope. Thus, before I delve into “filling in the boxes of Pepper’s root metaphor taxonomy” in terms of economic theory, I will briefly recount Capra’s explication of two paradigms, which is a critique of mechanism and endorsement of the systems view, with an eye toward Pepper’s notion of unlimited scope.76

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76 Please note that although Capra is highly critical of the “over” deployment of the mechanistic metaphor in science and his rhetorical stance is at times excessive, he is on many occasions clear in his belief that the mechanistic metaphor is indispensable as an organizing locus for conducting scientific investigation. In the context of developing the notion of pluralism, this is a belief I maintain and I have chosen not to distract from it with either rhetoric or normative methodology.
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<thead>
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<th>Scientific Domain</th>
<th>Formism in the Physical Sciences</th>
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<th>Contextualism in the Physical Sciences</th>
<th>Organicism in the Physical Sciences</th>
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<td>Mechanism in the Human Sciences</td>
<td>Contextualism in the Human Sciences</td>
<td>Organicism in the Human Sciences</td>
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<td>Mechanism in the Human Sciences</td>
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<td>Organicism in the Human Sciences</td>
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AN ILLUSTRATIVE STUDY OF WORLD HYPOTHESES

The Turning Point: Science, Society, and the Rising Culture (1982) by Fritjof Capra is the first work I read that helped alleviate the intellectual stress and disappointment I experienced as a graduate student in economics.77 During this time, I realized that standard economic theory — whether micro or macro — was on some level a repackaging of the models I had previously studied in physics and chemistry in an engineering program. In a tale of two paradigms (chapters 2 and 3), Capra — a physicist — details the nature and conceptual development of Classical Mechanics and thermodynamics within the discipline of physics. Moreover, he meticulously details how the fields of biology and medicine (chapter 5), psychology (chapter 6), and economics (chapter 7) traditionally have followed the mechanistic approach, which proved so successful for Newton in decoding and rendering intelligible the underlying determinant (gravity) governing the movement of celestial bodies and other objects in the macro-physical domain. Capra’s central argument, which parallels Kuhn’s, is that physics has gone through a ‘conceptual revolution’ in the way it studies and theorizes the physical domain, what he terms the movement from classical mechanics to ‘the new physics’ or quantum mechanics.

77 The work of Capra is very readable and in my opinion is a must read for students of methodology. The research presents a comprehensive and detailed account of the limits and triumphs of ‘naturalistic’ or ‘reductionist’ approaches in physical, life and social/human inquiries (i.e., mechanism). In addition, his work explains how ‘a systems approach’ can operate in each of these three scientific domains. However, few authors in the methodology of economics cite the work of Capra. Two exceptions are Phety (1988:127-131) and Dow (1996:14 and 17).
At its core, this intellectual evolution stresses the necessity of analyzing the physical world using holistic concepts. Similarly, Capra attempts to persuade that life and human/value sciences should let the transition in world views in physics serve as an example. He argues that the life sciences should welcome the alternative ‘systems view’ of phenomena in their domains, where fundamental to the systems view is the existence of ‘structural categories’ that conform to holistic principles. Recall, Pepper’s account identifies holistic categories in organicism and contextualism. Capra’s research traces out the development of a variety of subject areas within each domain (e.g., physiology, biology, medicine and biochemistry in the life sciences). Special attention is placed on the ‘logical limits’ confronted in each subject area in the application of mechanistic worldview. Whether one accepts Capra’s central argument that conceptual development in subject areas in the life and human/value sciences should emulate the holistic turn reflected by the ‘new physics’ (the systems view), the examples assembled by Capra unequivocally demonstrate the scope of a worldview. In the language of Pepper, the structural categories of a world hypothesis are capable of handling ‘all of the world’s evidence’. In the following paragraphs, I will briefly summarize Capra’s work in order to highlight the point that the four adequate world hypotheses are active and represented in each of the scientific domains.

Classical Newtonian mechanics grew out of a centuries-long attempt to explain the nature of matter and the movement of celestial bodies. In general, it is a culmination of the ideas expressed in the mathematical theory of Isaac Newton, the philosophy of Rene Descartes, and the scientific methodology advocated by Francis Bacon. According to
Capra, these ideas and the general conception of reality they reflect have been developed and refined in constructing the conceptual framework of classical physics. Capra writes (1982:47):

Matter was thought to be the basis of all existence, and the material world was seen as a multitude of separate objects assembled into a huge machine. Like human-made machines, the cosmic machine was thought to consist of elementary parts. Consequently, it was believed that complex phenomena could always be understood by reducing them to their basic building blocks and by looking for the mechanisms through which they interacted.

The crowning achievement of this way of analyzing and gaining an understanding of the world was the scientific explanation of the motion of celestial bodies in a gravitational field. Capra writes (1982:66):

The 18th and 19th centuries used Newtonian mechanics with tremendous success. The Newtonian theory was able to explain the motion of planets, moons, and comets down to the smallest detail, as well as the flow of tides and various other phenomena related to gravity.

However, the triumph of Newtonian physics did not stop with the motion of material objects in space. To the contrary, the dominance of the mechanistic approach grew cumulatively because it was successfully applied to other physical domains. The confidence with which scientists adopted the mechanistic approach grew with its successful application in other physical sciences — including the continuous motion of fluids and the vibration of elastic bodies (1982:67). Mechanics was successfully applied to the theory of heat when it was realized that heat results from the motion of atoms and molecules (1982:67). Soon the empirical study of gases led to John Dalton's celebrated atomic hypothesis based on a general mechanical representation of atoms. According to Capra (1982:67):

162
His main assumptions were that all chemical elements are made up of atoms and that the atoms of a given element are all alike but differ from those of every other element in mass, size and properties. Using Dalton’s hypothesis, chemists of the 19th century developed a precise atomic theory of chemistry that paved the way for the conceptual unification of physics and chemistry in the 20th century. Thus, Newtonian Mechanics was extended far beyond the description of macroscopic bodies.

According to Pepper, the success of a world hypothesis is to be judged in large part on its unlimited scope. Time-tested (or refined) world hypotheses such as formism, mechanism, contextualism and organismism are able to accommodate all of the world’s phenomena. The ability of the mechanical model — mechanism — to handle evidence of all types is well documented by Capra. As pointed out by Capra, mechanism goes beyond the physical sciences. Capra writes that the basic reductionist tendency that forms the core of mechanism (1982:47):

has become so deeply ingrained in our culture that it has often been identified with the scientific method. The other sciences accepted the mechanistic and reductionistic views of classical physics as the correct description of reality and modeled their own theories accordingly. Whenever psychologists, sociologists, or economists wanted to be scientific, they naturally turned toward the basic concepts of Newtonian physics.

Early attempts at modeling studies in life and human sciences were made by Descartes, who sketched an outline of mechanistic approaches to physics, astronomy, biology, physiology and medicine. Capra writes (1982:60):

To Descartes the material universe was a machine and nothing but a machine. There was no purpose, life or spirituality in matter. Nature worked according to mechanical laws, and everything in the material universe could be explained in terms of the arrangement and movement of its parts.

In the chapter “The Mechanistic View of Life,” Capra details the crucial role that mechanism played subsequent to Descartes in the development of disciplines within life
science. These include subjects such as physiology, biology, biochemistry and microbiology. For example, in physiology the trend in the 17th and 18th centuries was to move from a simple mechanical model of blood circulation as developed by William Harvey to a more complex chemical interpretation. Thus, Antoine Lavoisier, who discovered oxygen and is considered the “father of modern chemistry,” explained that respiration by living organisms is a specific instance of oxidation. Capra writes (1982:107):

Thus biology ceased to be Cartesian in the sense of Descartes’ strictly mechanical image of living organisms, but it remained Cartesian in the wider sense of attempting to reduce all aspects of living organisms to the physical and chemical interactions of their smallest constituents.

What was evident in physiology was also evident in biology, microbiology, medicine and finally biochemistry in the 19th and 20th centuries. In the chapter entitled “The Biomedical Model,” Capra traces the history of the search for mechanisms in the gradual development of “cell theory.” The scientific development of this theory is the further refinement of understanding of the living organism. It started with the recognition by Robert Hooke that all living organisms were composed of “cells”, which were viewed as the minute

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78 Capra writes (1982:106): “Harvey applied the mechanistic model to the phenomena of blood circulation and solved what had been the most fundamental and difficult problem in physiology since ancient times. His treatise, On the Movement of the Heart, gives a lucid description of all that could be known of the blood system in terms of anatomy and hydraulics without the aid of a microscope. It represents the crowning achievement of mechanistic physiology and was praised as such with great enthusiasm by Descartes himself.”

79 See Gregory Zilboorg’s (1967[c1941]) A History of Medical Psychology for an analysis of why the history of medical psychiatry and the development of psychiatry require a different approach than the history of medicine and surgery. Also, for a supplement and extension of Capra’s research, see Sir William Cecil Dampier’s (1971) book entitled A History of Science and its Relations with Philosophy and Religion.
structures that constituted living organisms. The organism proper was henceforth studied in biology based on the idea that “biological functions were the results of the interactions between the cellular building blocks” (1982:109). After the invention and refinement of the microscope, scientists were able to view yet smaller components of these basic cellular building blocks. Louis Pasteur used this invention to demonstrate that microorganisms come from other microorganisms (‘spontaneous generation’), as well as the role of bacteria in certain chemical process such as fermentation. This was the precursor to the birth of biochemistry. Pasteur next studied diseases in animals, through which he demonstrated a correlation between germs and disease. The development of medicine along mechanistic lines is covered in the chapter “The Biomedical Model.”

According to Capra, the reductionist interpretation of this development led biomedical researchers of the time to regard bacteria as the only cause of disease. This led to an obsession with the “identification of microbes and the illusory goal of designing magic bullets, drugs that would destroy specific bacteria without damaging the rest of the organism.” Finally, Capra points out that in the 20th century biological research became focused in the area of genetics. Capra writes (1982:113):

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90 Capra points out that the development of biology and medicine progress hand in hand. Accordingly, Capra writes (1982:140): “Following the Cartesian approach, medical science has limitted itself to the attempt of understanding the biological mechanisms involved in an injury to various parts of the body. These mechanisms are studied from the point of view of cellular and molecular biology, leaving out all influences of non-biological circumstances on biological processes. Like physicists in their study of matter, medical scientists have tried to understand the human body by reducing it to basic “building blocks” and fundamental functions. As Donald Fredrickson, director of the National Institutes of Health said, “The reduction of life in all its complicated forms to certain fundamentals that can then be reassembled for a better understanding of man and his ills is the basic concern of biomedical research.” In this reductionist spirit, medical problems are analyzed by proceeding to smaller and smaller fragments — from organs and tissues to cells, then to cellular fragments, and finally to single molecules.
[this] provided a strong reinforcement of the Cartesian approach to living organisms. It became clear quite early that the material of heredity lay in the chromosomes, those threadlike bodies that are present in the nucleus of every cell. Soon thereafter it was recognized that the genes occupied specific positions within the chromosomes in linear order. With these discoveries geneticists believed that they had now pinned down the “atom of heredity” and proceeded to explain biological characteristics of living organisms in terms of their elementary units, the genes, with each gene corresponding to a definite hereditary trait.

This line of research ultimately led to the elucidation of the physical structure of DNA, which is the molecular basis of chromosomes, and the breaking of the genetic code.

A recounting of the history of the development of psychology and psychiatry, what I have called a ‘human’ or a ‘value’ science, demonstrates an analogous trajectory. Capra presents this in a chapter entitled “Newtonian Psychology,” where he traces the development of the discipline in reference to behaviorism and Freudian psychoanalysis. In a move that resonates with Pepper’s approach of developing refined root metaphors in terms of their “structural categories,” Capra highlights the close relationship between psychoanalysis and classical physics. He first considers four concepts basic to Newtonian Mechanics (1982:180): (1) separate material objects moving in absolute time and space and interacting mechanically; (2) fundamental forces different from matter; (3) fundamental laws describing the motion and mutual interactions of the objects in quantitative terms; and (4) a rigorous determinism or the notion of an objective description of nature based on the Cartesian division between mind and matter.

Concerning Freudian psychoanalysis, Capra writes (1982:180):

As Newton established absolute Euclidean space as the frame of reference in which material objects are extended and located, so Freud established psychological space as a frame of reference for the structures of the mental “apparatus”. The psychological structures on which Freud based his theory of
human personality — Id, Ego, and Superego — are seen as some kind of internal "objects," located and extended in psychological space. Thus, the spatial metaphors, such as "depth psychology," "deep unconscious," and "subconscious," are prominent throughout the Freudian system.

The extension of the world hypothesis mechanism across studies in physical, life and human sciences is not unique to mechanism. As implied by Pepper, this same extension should occur with any cognitive system that takes the form of a world hypothesis. Capra's work indeed documents and demonstrates that the remaining adequate world hypotheses identified by Pepper — formism, contextualism and organicism — each possess the ability to organize evidence across the three domains of scientific inquiry. However, it is important to note that Capra does not explicitly refer to Pepper's contextualism and organicist world hypotheses. Instead, Capra presents his metatheoretical critique in terms of two paradigms: a mechanist world view and a systems world view. Thus, the account presented by Capra tends to lump the structural categories of the two similar world hypotheses into what he call the 'systems view'. In a similar fashion, the formist tendency appears to be lumped in with the discussion of mechanism, both being characterized as an analytical orientation. Capra's research does not explicitly single out the products of formism's structural categories, although mention

81 As indicated by Pepper (1942:280): contextualism and organicism have much in common as can be seen in their structural categories. Both world hypotheses conduct their analyses with reference to a whole. Organicism assumes a whole underlies appearances and believes that this reality (this knowledge) will be arrived at as the inherent wholeness presents itself to scientists, thus bringing together the fragments. A contextual analysis proceeds in reference to the intuited meaning of a synthetic whole. Thus, both hypotheses are synthetic in nature. Both incorporate change: for contextualism this occurs within the context of the 'specious present'; whereas for organicism change is part of an overarching "historical process". Organicism implies a definite direction in time. Contextualism implies the possibility of novelty on a spatial landscape. Pepper comments that some philosophers refer to contextualism as "absolute idealism" without an absolute.
of the taxonomic tendency is included in his history of the disciplinary development in each scientific domain. In constructing Table 6 of the following page, I endeavored to disentangle conceptual or theoretical developments outlined as the mechanist world view and the systems world view. The result is a brief summary that highlights salient examples from Capra's research of theories or authors that are in the tradition of Pepper's four world hypothesis in the three domains of science. This table is not meant to be exhaustive, but only indicative of the point that each of the world hypotheses are broad enough in scope to find a voice across physical, life and human/value sciences.

Recall that formalism, which is characterized as having an analytical tendency with regards to mode of reasoning (like mechanism), forms the cognitive basis of classification rooted in the experience of identifying similarity. Taxonomies are an identifiable product of formalism. Indeed, taxonomies can be observed throughout the physical sciences. They serve to classify particles on both the macro, atomic, and subatomic levels of matter. In addition, categorizing geological formations and fossils of all types has long been the focus of attention of geologists and archeologists alike. These physical taxonomies in turn have played a crucial role in substantiating the biological theory of evolution. The discipline of chemistry possesses the atomic table, which is a taxonomy of the elements in the physical universe. Taxonomies are not solely the province of physical sciences such as astronomy, archeology, physics and chemistry. Life sciences such as physiology, biology, medicine and biochemistry possess numerous examples of classification systems and

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42 Specifically, Pepper claims that taxonomy is the product of immanent formism.
<table>
<thead>
<tr>
<th>Conceptual Domain</th>
<th>Analytical 'Reductionist' Approaches</th>
<th>Synthetic 'Systems' Approaches</th>
<th>Organicism &quot;historical process&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Sciences (Astronomy, Physics &amp; Chemistry)</td>
<td>Classification Systems, Planetary Taxonomy, Chemical Taxonomy, Particle Taxonomy, Nuclear Taxonomy, Geological Taxonomy, Species Taxonomy</td>
<td></td>
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</tr>
</tbody>
</table>
- Descartes: machine as a machine (59-60)
- Newtonian Classical Mechanics (63-67)
- Extended to liquids, gases, heat, sound, etc. (67) | 
- Non-Physics (70-73)
- "The context of measurement"
- "Naturphilosophie: Uncertainty Principles" (73)
- Bootstrap approach to understanding physical reality (62-67) | 
- Physical systems (72-73)
- Entropy - degree of evolution of a physical system (72)
- Geostatistical frameworks (74)
- Solar System - Kant, Laplace (78) |
| Life Sciences (Biology, Medicine & Biochemistry) | Linnaean: the classifier of living things (71, 105) 
- Botany & zoology (105) 
- Microbes & viruses (126) 
- Genes, chromosomes, DNA, epigenetics (111, 115) 
- Pathogens (133) | 
- Descartes: extends machine to all natural sciences (69, 69, 103, 105) 
- The Mechanic View of Life: A History (111-113) 
- Also as A Machine: A Modern (167) 
- The Mechanistic Mind (123-133) a history of the search for cellular, molecular, nervous & genetic mechanisms in biology, medicine, microbiology & biochemistry (111-115). | 
- Complexity of living organisms (119-111) 
- Pasteur/Bourdieu "masu shizen" 
- Ecology - natural webs (129) 
- Medicine - infectious diseases 
- Pasteur's view complemented by Ross Quayle: Co-evolution agenda & environment (392) | 
- Biological "Theory of Evolution" (71-72, 109, 111) 
- World not pre-constructed machines 
- Entrepreneurship & Specialization of Organisms/Cells - "combination of complex entities from simple forms" (103, 109, 129) 
- Integrative activities in cells & genes (109, 114) |
| Human Sciences (Psychology) (Philosophy) | Psychiatry mental illness (130) 
- Theory of mental illness: levels (109-57) 
- for use in "bootstrap approach" to mental illness (Pepper's biological Taxonomy) | 
- Descartes: extends psychology (63) 
- Freud's Psychoanalysis Psychology psychanalysts (179-184) 
- John Locke: atomic view of society (69-69) 
- A "social physics" | 
- Various theories of mind: causal mind (176) 
- Public Health (137-139) 
- Genetics: perception in terms of genomes (176) 
- Jürgen Psych. (259-84) 
- Artic: feminist critique of Freud (105) | 
- Functionism - mental processes are structures (179-181) 
- Political & social change (74) 
- Thomas Kuhn, Structure of Scientific Revolutions (39-32) |
taxonomies. One notable taxonomist in the life sciences was Linnaeus. Although the early naturalists may have lacked a correct notion of evolution, they were nonetheless very much interested in classifying the fixed stock of species on the planet. Capra writes (1982:71):

Ever since antiquity natural philosophers had entertained the idea of a "great chain of being". This chain, however, was conceived as a static hierarchy, starting with God at the top and descending through angels, human beings, and animals, to ever lower forms of life. The number of species was fixed; it had not changed since the day of creation. As Linnaeus, the great classifier, put it: "We reckon as many species as issued in pairs from the hands of the Creator".

More to the point, the penchant to classify includes the discipline of biology and medicine. Capra continues (1982:105):

The close association between biology and medicine continued through the Renaissance and into the modern era, where decisive advances in the life sciences were achieved again and again by scientists with medical backgrounds. Thus Linnaeus, the great classifier of the 18th century, was not only a botanist and zoologist, but also a physician, and in fact botany itself developed from the study of plants with healing powers.

The formist approach to theory is also present in the development of 19th century approaches to diseases and mental disorders. Capra points out that early on scientific inquiry proceeded along the line of precise definition and identifying the location of pathologies as well as mental disorders. "Pathologies were located, diagnosed, and labeled according to a definite system of classification, and were studied in hospitals transformed from medieval "houses of mercy" into centers of diagnosis, therapy, and teaching" (1982:106). Likewise, in early psychiatry, mental disorders were classified in hopes of being able to associate specific "organic causes" (i.e., infections, nutritional deficiencies, brain damage) with the immanent perception of the various mental disorders.
I might add that in philosophy. Pepper's metatheoretical development of root metaphors is a 'concrete' example of a taxonomy, more probably transcendent formism.

In all disciplines in each of the scientific domains, the limits of mechanism are confronted at one point or another. In Capra's opinion, these limitations are not an indication that mechanism is inadequate. Instead, this reflects a situation in which scientists are coming to realize that "all scientific theories are approximations to the true nature of reality; and that each theory is valid for a certain range of phenomena" (1982:101). In spite of the obvious enthusiasm and endorsement of the systems view, Capra is careful throughout his presentation to note the major scientific advances that have occurred in all disciplines as a result of approaching a problem in a mechanist fashion. However, it is by highlighting the eventual limits encountered by the reductionist approach that Capra points to the 'systems world view'. According to Capra, the limits to the mechanist approach are experienced in the physical domain when the analysis into the nature of matter moves into the realm of sub-atomic particles as well as in the realm of very large particles such as are studied in astrology. The prototypical exemplification of the limits of mechanism to explain the fundamental nature of matter is its inability to explain the dualistic (wave and particle) nature of electrons. It is through the philosophical implications associated with the "new physics" that Capra draws an analogy with the natural (i.e., other than physics) and social sciences. Capra writes (1982: 97):

81 See Neidhart (1996) for a discussion of the 'formal language and tools' of general systems theory (i.e., diagramming of circular causality) and its application in interpreting the economic theories of Adam Smith, Alfred Marshall, Gunnar Myrdal, and Nicholas Kaldor and the Increasing Returns Debate of the 1920's.
My presentation of modern physics in this chapter has been influenced by my personal beliefs and allegiances. I have emphasized certain concepts and theories that are not yet accepted by the majority of physicists, but that I consider significant philosophically, of great importance for the other sciences and for our culture as a whole. Every contemporary physicist, however, will accept the main theme of the presentation — that modern physics has transcended the mechanistic Cartesian view of the world and is leading us to a holistic and intrinsically dynamic conception of the universe.

The world view of modern physics is a systems view, and it is consistent with the systems approaches that are now emerging in other fields, although the phenomena studied by these disciplines are generally of a different nature and require different concepts. In transcending the metaphor of the world as a machine, we also have to abandon the idea of (classical) physics as the basis of all science.  

Similarly, the limits of the mechanist approach in biology are experienced by researchers as a host of questions or problems to which no adequate answers can be found. Capra writes (1982:103):

> It is not easy to determine the precise limitation of the Cartesian approach to the study of living organisms....The problems that biologists cannot solve today, apparently because of their narrow, fragmented approach, all seem to be related to the function of living systems as wholes and to their interactions with their environment.

Thus, on the level of the cell, it is the coordinating activities of the cells in the larger context of the body that remain difficult to understand and call for a different conceptual approach. The limitations of the mechanistic approach appeared early in the 19th century in the development of cell theory and have remained resilient even in the context of advances. Concerning biology’s approach to the living organism in general, Capra writes (1982:109):

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84 I do not necessarily believe that we are being led anywhere in terms of a superior “holistic” conception of the world. I maintain that the two views are complementary. Pepper maintains that his world hypotheses are all adequate and stable cognitive forms.
Understanding the structure and functioning of cells involves a problem that has become characteristic of all modern biology. The organization of a cell has often been compared to that of a factory, where different parts are manufactured at different sites, stored in intermediate facilities, and transported to assembly plants to be combined into final products that are either used up by the cell itself or exported to other cells. Cell biology has made enormous progress in understanding the structures and functions of many of the cells sub-units, but it has remained largely ignorant about the coordinating activities that integrate these operations into the function of a cell as a whole.

As another example, Capra points to the conceptual obstacles in the way of gaining a clear understanding of how a host of nervous circuits integrate themselves into the functioning of the whole living organism. According to Capra, another area of scientific curiosity that lacks understanding involves embryogenesis. Capra writes (1982:103-104):

An extreme case of integrative activity that has fascinated scientists throughout the ages but has, so far, eluded all explanation is the phenomenon of embryogenesis — the formation and development of the embryo — which involves an orderly series of processes through which cells specialize to form the different tissues and organs of the adult body. The interaction of each cell with its environment is crucial to these processes, and the whole phenomenon is the result of the integral coordinating activity of the entire organism — a process far too complex to lend itself to reductionist analysis. Thus embryogenesis is considered a highly interesting but quite unrewarding topic for biological research.

In the study and theory of the human mind and in the practice and theory of mental health, the same observations can be made. Whether at the hands of Freudian psychanalysis or Skinner’s behaviorism, both thoroughly entrenched in the mechanistic metaphor, the development of inquiry along mechanistic lines confronted serious limits: in psychology and psychiatry the limits presented themselves even more starkly. Without exception, the story is the same in all disciplines and on all levels or domains of scientific inquiry.
The point is that there are limits to the mechanistic approach to inquiry. Confronted with these limits, contemporary scientists and philosophers are beginning to understand that an understanding of ‘integrated wholes’ becomes crucial to the development of any particular subject matter. These integrated wholes are typically involved in a process. Also, contained within the notion of the ‘integrated whole’ is the notion of the ‘wider environment’ or the context within which the various parts operate. Capra’s detailed exploration into the limits of mechanism and resulting development of the ‘systems view’ points toward the ‘structural categories’ identified by Pepper in the world hypotheses of contextualism and organicism. Capra does not make an effort to distinguish between variants of the ‘synthetic approaches’ to knowledge. He is content to present his argument in terms of two ‘paradigms’ — mechanism and holism, where holist approaches are not explicitly classified in terms of organicist and contextualist categories. Listed below are some quotes used by Capra to explain and identify the conceptual orientation of the ‘systems view.’ Concerning the systems world view, Capra writes:

[the systems world view] is based on awareness of the essential interrelatedness and interdependence of all phenomena — physical, biological, psychological, social and cultural” (1982:265).

The systems view looks at the world in terms of relationships and integration. Systems are integrated wholes whose properties cannot be reduced to those of smaller basic units. Instead of concentrating on basic building blocks or basic substances, the systems approach emphasizes basic principles of organization (1982:266).

“What is perceived in a wilderness area is not individual trees or organisms but the complex web of relationships between them...All these natural systems are wholes whose specific structures arise from the interactions and interdependence of their parts. The activity of systems involves a process known a transaction —
the simultaneous and mutually interdependent interaction between multiple components (1982:267).

Fritjof Capra seems to be responsible for producing the first eminently readable and popular account of why scientists should reconsider both their world view and the implications that a world view has on the way science is accomplished. Capra’s account of the triumph (the transcending) of ‘The New Physics of Quantum Mechanics’ over ‘The Old Physics of Classical Mechanics’ sounds a lot like the experience Kuhn was drawing from in constructing The Structure of Scientific Revolutions (1970[c1962]). The idea that physics itself, the prototype of the social sciences, possesses two distinct modes of reasoning, one involving a mechanistic world view (reductionism) and the other what Capra refers to as a systems world view (holism) is not news to physicists. In fact, if economists and economic methodologists do indeed want to emulate physics, the work of Fritjof Capra is an accessible treatment of the issues that point toward a systems view distinct from the methodological features and structures (i.e., mechanism, logical positivism) deemed worthy by traditional methodological or epistemological thought.\textsuperscript{85} The striking aspect of Capra’s work that relates to this research is the notion that to be completely understood, physical reality — the domain wherein lie the properties of matter — requires two dichotomous analytical frameworks or modes of reasoning.\textsuperscript{86} One analytical framework — operating on reductionist principles — generates the

\textsuperscript{85} For other treatments related to the issue of how to theorize complexity see Waldrop (1992) and Wible (2000a, 2000b).

\textsuperscript{86} This is a point picked up on by Dow (1996:14 and 17). It leads to a discussion of what Capra refers to as the ‘bootstrap approach’ to understanding phenomena — a complements point of view requiring a plurality of theories for a coherent understanding. For a discussion of substitutes and complements views of the firm and science from the point of view of an economist, see Wible (1998:158-187).
understanding that is associated with Classical Mechanics, and because of the reasonable
assumption that the interaction between isolated particles is negligible, determination of
position (planets, for example) can be predicted. However, for another set of phenomena
— namely the emission of radioactive frequencies from within the atomic domain —
another analytical framework — operating on holistic, as opposed to reductionist principles
— generates the understanding and explanations associated with what Capra calls the
‘New Physics’ or quantum mechanics. That is, for this set of observable phenomena, sub-
atomic matter must be viewed as a wave. The salient point here is that regardless of the
analytical framework physicists deploy, the nature of ‘the Atomic Reality’ — the ontology
of matter — is the same. Instead of accepting one analysis as methodologically correct, one
is confronted with a situation in which a framework must be chosen on the basis of the
question “For what purpose?”

THE FALLACY OF COMPOSITION

In the economic literature, the ‘fallacy of composition’ is a logical conundrum that
is associated with the theoretical/methodological discussion dealing with the distinction
between micro and macroeconomics. More generally, it is an ontological delineation that
stakes out the domains of humanist and structural accounts in the social sciences. Indeed.
it is a discourse that is not confined to methodological discussions between economists. In its most simple and generic form, the fallacy is the idea that what is true for the parts is also true for the whole. In economics, it is a ‘level of analysis’ consideration dealing with whether one wants to (should) explain market behavior from the point of view of the atomized, isolated individual or the point of view of structural variables/aggregated concepts. In the context of the debate over the micro foundations of macro analysis, the parts/whole distinction is a reminder of the heatedly contested effort to construct macroeconomic analysis on a micro foundation characterized by homogeneous agents and optimizing (rational) individual behavior. On one level, ‘the fallacy’ can be read as an ontological consideration that attempts to maintain a seemingly self-evident proposition. Life experience insists time and time again that in some contexts, the whole is qualitatively different than the sum of its parts. However, it is also closely connected with the epistemological project that demands secure foundations predicated upon the least common denominator. However, from an analytic perspective it is merely limiting and closed-minded.

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87 See a recently published book dealing with the complexity of International Relations entitled System Effects by Jervis (1997) in which he identities the fallacy of composition as a debate in economics. In chapter one, Jervis reasserts the claim that the whole is not strictly additive.

88 Refer to Machlup (1963:97-145) for lengthy treatment of the micro/macro dichotomy in a chapter entitled “Micro- and Macro- Economics: Contested Boundaries and Claims of Superiority.” In this chapter he distinguishes between the micro and macro perspectives underpinning ‘General Equilibrium Theory’ and what he calls ‘Aggregate Economics’. In addition, refer to Neldhart (1996:55-74) for a treatment that analyses the extent of the market as developed by Alfred Marshall in terms of three conceptually distinct levels of complementary circularities. Neldhart’s work documents an evolutionary approach of explaining ‘increasing returns’ by viewing causation in terms of a nested hierarchy of levels (systems) moving from the individual firm to the industry level to the level of the city or region. For a more theoretical treatment of parts and wholes in a systems approach, refer to Neidhart (1996:194) on Parts, Wholes, and Hierarchies.
Obviously, the highly trained economists to whom I refer are those involved in one way or another with the 'Neoclassical synthesis', a longstanding research effort which basically claims that macro behavior should be formulated as a logical extension of the postulated rational behavior of individual economic agents. It is the years of time-consuming work and the serious commitment of resources given by economists to this synthesis that informs my decision to argue for, rather than assume as self-evident, a logical distinction between micro and macroeconomics. In the language of Pepper, it now appears to me as if the Neoclassical Synthesis is disciplinary example of what Pepper sees as the trend toward developing a 'consolidated mechanism' in Physics. As a result, I explicitly incorporate it as a dimension in my analytical frameworks approach. Not all economists and methodologists hold the same view about the fallacy of composition, and there are shades of meaning. David Colander is an example of an economist who is very careful to make the distinction. Colander writes (1995:184):

There are many small effects of individuals' actions on others that can influence the aggregate result but that the individual doesn't consider. When you are analyzing one individual's actions (when you are using microanalysis), these small effects can reasonably be assumed constant: the effect of one individual's actions is too small to influence the aggregate significantly, and the feedback effect of those actions' influence on the aggregate can be forgotten. One person's action is as irrelevant to the aggregate as is the size of a grain of sand to the size of a beach. If one grain of sand doubles in size, the beach is unaffected. However, when you are analyzing the whole (when you are using macro analysis), you cannot forget these small effects because, combined, they are no longer necessarily small. If all grains of sand double in size, you've got sand problems. So it isn't at all clear that if individuals are rational, the aggregate result of their combined actions will be collectively rational for society.

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89 See Dow (1996:25-109) for a discussion and analysis of the 'Microfoundations of Macro' debate from the perspective of Neo-Austrian, Mainstream, Post Keynesian and Marxist Theory.
On the other hand, Blaug (1992[c1980]:51) sounds a more conservative note, allowing for a distinct macro analysis while asserting a clear bias toward micro rationality whenever possible. For example, in arguing for a unified approach to science (monism), Blaug is very critical of Popper's substitution of methodological individualism for methodological falsificationism in the social sciences. Blaug writes (1982:51):

Let us, by all means commend methodological individualism as a heuristic postulate: in principle it is highly desirable to define all holistic concepts, macroscopic factors, aggregate variables, or whatever they are called, in terms of individual behavior if and when it is possible. But when it is not possible, let us not lapse into silence on the grounds that we may not defy the principle of methodological individualism.

Blaug goes on further giving his qualified support of methodological individualism by offering a quotation from Brodbeck (1973:293):

The most that we can ask of the social scientist is that he keep the principle of methodological individualism firmly in mind as a devoutly to be wished-for consummation, an ideal to be approximated as closely as possible. This should at least help assure that nevermore will he daily with suspect group-minds and impersonal 'forces', economic or otherwise: nevermore will non-observable properties be attributed to equally non-observable group entities. At the same time, he will not by methodological fiat be struck dumb about matters on which there is, no matter how imprecisely, a great deal to be said.

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90 In speaking of “holistic” concepts, Blaug does not seem to distinguish between the two fallacies: the level of analysis versus the mode of reasoning. In my view, this explains why Blaug, like many others, work only in a reductionist framework that lends itself to the demands of some form of positivism (e.g., methodological falsificationism) on either the micro or macro level of analysis. However, it does leave these same commentators with very little to say about the ‘holistic’ texts that emerge from explicit consideration of an overdetermined ontological perspective. Blaug dismisses institutional accounts as mere storytelling (1982:126-127).

91 The reference to suspect group minds is reflective of the desire by most mainstream economists to force rationality into reductionist macroeconomic analysis. What is overlooked here is that a constituted individual is not necessarily required in structural accounts of economic phenomena. Often, however, what goes for structural analysis will contain incidental references to the individual or individual behavior, perhaps for narrative purposes. See Clive Lawson (1996) for a discussion of holism and collectivism in the work of J. R. Common.
Thus, we see the spectrum on the issue of the validity of macroeconomic analysis. The Neoclassical Synthesis (New Classical Macro) claims that to be meaningful, macro analysis must rest squarely on secure micro foundations — a completely reductionist approach. Colander, on the other hand, underscores the fundamental importance of the parts/whole dichotomy in terms of the fallacy of composition. Blaug and Brodbeck do not deny the existence of a distinct level of inquiry called macroeconomics; however, from a methodological perspective they translate the matter into a normative context and are obviously sympathetic and encouraging of the reductionist approach.

As a final note, let me say that the ‘fallacy of composition’ may also run in the opposite direction. This is to say that just as there is not a priori basis for claiming the need for micro foundations of macroeconomics, it is also true that there is no such basis for claiming the superiority of a ‘macrofoundations’ for microeconomics. For a theoretical consideration of macrofoundations see Colander (1993 and 1996a) and Thurow (1983). The key point here, however, is not the nature of the analysis, but the presence or absence of an associated claim that attributes a privileged epistemological status to the analytical approach. In the context of this research, the ‘fallacy of composition’ is invoked with this in mind. As a result of this consideration, I have chosen to expand Pepper’s metatheoretical taxonomy, which included four world hypotheses. Table 7 incorporates the idea that economic theory possesses discrete levels of aggregation by explicitly presenting individual/market and social/aggregate levels of analysis for each of the world hypotheses.
<table>
<thead>
<tr>
<th>Mode of Composition</th>
<th>Pepper's Adequate World Hypotheses</th>
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<tr>
<td>Aggregate/Structural</td>
<td>Formism</td>
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<td></td>
<td>Type A</td>
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<td>Type E</td>
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<td>Individual/Market</td>
<td>Mechanism</td>
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<td>Aggregate/Structural</td>
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<td>Type Q</td>
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<td>Individual/Market</td>
<td>Organicism</td>
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FORMISM AND ECONOMIC THEORY

Pepper questions the relative adequacy of the formist world hypothesis because it tends to have an unstable categorial structure. As a result, the independent and universal character of a form becomes incorporated into a unified field such as the time/space continuum at the heart of mechanism (1942:185). According to Pepper, this destroys the inherent subsistence/existence dichotomy present in the structural categories of formism and leads to a mechanist interpretation, in which laws are seen as part of a single-layered, unified field. In the hands of eclectic formists, the independence of forms is absorbed into the law-like structure of the time/space field instead of maintaining a relationship of participation in time/space. This alters the manner in which truth is asserted in the analysis, moving away from the correspondence theory and toward mechanistic notions of causation. Without stating a specific reason, Henderson also appears to downplay the importance of formism when he states that mechanism, contextualism, and organicism are the root metaphors that could likely characterize the various schools of thought observed in economic theory and are, therefore, worthy of further study (Henderson 1994:354).

In this section on formism and economic theory, I will illustrate the presence of Pepper's idea of immanent formism using examples from economic theory and methodology. First, I will focus on two familiar taxonomic approaches involving substantive economic content within the mainstream of contemporary economic theory. The first is the market structure approach used in microeconomic theory, which was
rigorously developed by Joseph Bain as the ‘structure-conduct-performance’ paradigm in the field of industrial organization. The second is the national income accounting system, which has been used as a core element in macroeconomic analysis since the 1930s. In light of Pepper’s portrayal of formism, each classification system will be seen as indicative of a theoretical approach consistent with the formist tradition. To their benefit, both taxonomies provide a necessary organizational basis and foundation that generate a variety of conceptual structures (i.e., forms) and are subsequently incorporated into mechanistic theories found in the discipline of economics. Yet, this explanation fails to appreciate the full potential of formism. Following its development and presentation by Pepper, I suggest that formism is a theoretical approach that is sufficient on its own terms as a means of organizing evidence, formulating hypotheses, generating understanding and knowledge, and framing analyses of complex questions in economics. Supported by the correspondence theory of truth, the formist analysis does not need to be narrowed in order to accommodate the habits of thought associated with mechanistic theoretical approaches.

Finally, on the level of metatheoretical analysis, I suggest that the “critical realist project” espoused by Tony Lawson, which has recently gained currency among post-Keynesian economists and economic methodologists, is closely associated with Pepper’s notion of amalgamated formism. Accordingly, critical realism may constitute an in-house philosophical account of scientific explanation that fits into the pluralistic metatheoretical framework developed by Pepper. In the remainder of this chapter, I will elaborate on each of Pepper’s world hypotheses — formism, mechanism, contextualism and organicism — using examples from economic theory and, in the case of formism and contextualism, an
example from economic methodology. As previously mentioned, the examples from economic theory illustrate analyses that focus on the individual/market and on aggregate levels, a distinction termed micro or macroeconomic theory by some and humanism and structuralism by others. Table 8 presents a synopsis of the exemplifications I chose for each world hypothesis.

**Taxonomy and Market Structure in Industrial Organization**

As developed by Pepper, the categorial structure of immanent formalism, which is based on the immediate experience of perceiving similarity, leads naturally to classification systems and taxonomic representations of evidence. In this section, I consider market structure analysis, which has served as the core to empirical studies in industrial organization and has been utilized extensively by undergraduate and graduate level microeconomic theory textbooks. While it is true that economists need not strain to identify the presence of taxonomy reflected in substantive economic theory, taxonomic-based theoretical work is not acknowledged as a point of 'elegant theory' as are axiomatic/deductive theoretical frameworks, such as individual utility maximization. The taxonomic endeavor provides the necessary categories for assessing the efficiency outcomes of various market structures in the structure/conduct/performance paradigm developed by Joe Bain (1968[c1958]). However, the intellectual endeavor of identifying market structures also provides a powerful cognitive strategy for sustaining a multitude of theoretical discussions, which generate insights into the general nature and specific
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<th>Formalist</th>
<th>Mechanist</th>
<th>Organist</th>
<th>Contextualist</th>
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<tr>
<td>Meta-level</td>
<td>Tony Lawson Roy Bhaskar (transcendental/critical realism)</td>
<td>Positivism (deductionism)</td>
<td>Hegelian Dialecticism</td>
<td>Resnick and Wolff (overdeterminism)</td>
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<td>Pragmatism</td>
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</table>
details of markets, allow students and professionals in the discipline to organize a variety of empirical evidence and concepts, and help frame public policy debates related to complex social, economic and legal issues involving anti-trust.

In spite of the role that taxonomy plays as a cognitive and theoretical activity, it is assumed or obscured for the most part and, therefore, understated in the discipline of economics. The reason for this is likely twofold in nature. On the one hand, the use of forms may be so obvious or mundane that it is simply taken for granted. This is likely the result of the manner in which the more familiar and dominant mechanistic approaches absorb forms into their analyses. The forms of the market structure analysis are considered the ‘raw material’ of the more comparative static models. Thus, formism appears to offer nothing unique to the theoretical enterprise outside its elementary role of supplying categories, which serve the more noble purpose of being quantified and casually related in mechanistic accounts of economic phenomena. On the other hand, the fundamental and unique significance of formism may be underappreciated for lack of an explicit and/or compelling philosophical perspective within the discussions of economic methodology, such as Pepper’s explication of formism as one of the four adequate world hypotheses, or more recently, by Lawson’s explication of critical realism.

The structure/conduct/performance paradigm developed by Bain (1968[c1958]) offers a vision of the taxonomic inclination in which he identifies meaningful forms or essential qualities available to human perception. In addition, Bain’s writing demonstrates the tendency to limit or contain formism for the purpose of ‘proper’ scientific investigation, which for all intents and purposes amounts to an a priori bias for seeing
good science as mechanism. The structure/conduct/performance paradigm is an analytical
approach that (1) identifies the various types of market structure in the economy using a
select set of categories and subcategories; (2) associates each market structure with a
dominant behavior tendency or a type of conduct relating to the pricing policy of firms in
an industry group; and (3) based on (1) and (2), attempts to make predictions or explain
how structure and conduct correlates with performance in a given industry group. It is
largely a mechanical setup into which forms are embedded. On the most general level, the
performance of an economy (the U.S. economy for Bain), which comprises its industries
and producing business enterprises therein, relates to its ability to provide employment,
produce goods, distribute income, etc. More specifically, Bain points out that business
firms perform in three capacities: as buyers and sellers of goods and services; as buyers
and sellers in factor markets; and as administrative units that organize productive activity.
Bain confines his analysis of performance to the activity of business enterprises as buyers
and sellers in the markets for produced goods and services. He leaves it to others to study
factor/resource markets and the administrative performance internal to the firms. Having
defined his field of inquiry, Bain writes (1968:3):

What things in general do determine the market performance of enterprises?
Casual observation, common sense, and formal theory all suggest that there are
two main sorts of determinants. First, the organization or structure of an
industry (or group of competing enterprises) exercises a strong influence on the
performance of the industry. That is, market structure constrains and canalizes
enterprise activities and their results; and variations in structure may lead to
associated variations in performance. Second, the market conduct of enterprises
— by which we mean policies, practices, and devices they employ in arriving at
adjustments to the markets in which they participate — also influences
performance. Thus we look initially to the characteristics of market structure and
of market conduct as primary determinants of market performance of enterprises, or of groups or industries of business firms.

According to Bain, the most prominent aspects or dimensions of market performance include such items as the relative technical efficiency of production in terms of plant size and scale; the height of selling price relative to long-run marginal cost; the size of sales promotion costs; the quality of products; and the rate of progressiveness of the industry in developing products and technologies (1968:11). For example, with regard to allocative efficiency, market structure analysis can be used to evaluate performance in terms of the ratio of price to long-run marginal cost. This leads to the now familiar theoretical conclusion that price/output combinations are either caused by or correlated with market structure and pricing conduct. The various price/output combinations that emerge from market structures and pricing policies allow economists to evaluate economic welfare using the concepts of consumer or producer surplus. Thus, a theoretically based assessment of the relative desirability of market structures and pricing behavior offers the hope that the regulation of markets through public policy and industry can effectuate socially desirable outcomes. What Bain terms "workable competition" may be accomplished through scientific methods (1968:12). Ideally, supernormal profits resulting from pricing well above long-run marginal costs (unworkable competition) could be identified and regulated for the social good through public policy.

As previously mentioned, Bain's structure/conduct/performance analysis of industrial organization is consistent with "science as mechanism"; nonetheless, he offers
economic literature an explicit example of formism. In summarizing his approach, Bain writes (1968:3):

There are then two tasks before us in addition to simply measuring and appraising market performance:

1. We must identify, describe, and classify the significantly different types of structure and conduct that are found in actual markets for goods and services, and determine the relative importance of each type with the American economy.

2. We must try to discover, through various analytical devices, any evident associations of market structure and conduct with market performance, in order to establish a pattern of causal relationship between structure and conduct on the one hand and performance on the other. This knowledge should enable policy makers to learn what sorts of structure and conduct are likely to lead to socially desirable market performance, and what kinds are not.

We can see that Bain is explicit about the important role that classification plays in the structure/conduct/performance paradigm. In order to generate a classification scheme, a list of criteria is established to identify the various forms of market structure in the economy. According to Bain, the criteria refer to characteristics of market organization that affect the nature of competition and pricing. Bain writes (1968:7):

The most salient aspects or dimensions of market structure are:

(a) The degree of seller concentration — described by the number and the size distribution of sellers in the market.

(b) The degree of buyer concentration — defined in a parallel fashion.

(c) The degree of product differentiation as among the outputs of the various sellers in the market — that is, the extent to which their outputs (though similar) are viewed as nonidentical by buyers.

(d) The condition of entry to the market — referring to the relative ease or difficulty with which new sellers may enter the market, as determined generally by the advantages which established sellers have over potential entrants.
Based on the criteria chosen as both the primary and quantifiable determinants of market structure, Bain makes the now familiar distinction between 'competition' and 'monopoly' based on the degree of seller concentration. Moreover, he proposes a category and subcategory scheme to identify the hypothetical combinations of the market structure.

Bain writes (1968:31):

When industries are classified and subclassified on the basis of seller concentration, product differentiation, and the condition of entry, the following very elementary classification of industries by market structure emerges:

I. Atomistic industries
   A. Without product differentiation
   B. With product differentiation

II. Oligopolistic industries
   A. Without product differentiation
      1. With easy entry
      2. With moderately difficult entry
      3. With blockaded entry
   B. With product differentiation
      1. With easy entry
      2. With moderately difficult entry
      3. With blockaded entry

III. Monopolized industries

In the development of the structure/conduct/performance analysis, Bain is clear about how 'market forms' enter into an analysis that is fundamentally mechanistic in nature. He is by his own account attempting to find the cause-and-effect relation of market structure and conduct to market performance (1968:3). Although he relies on a taxonomy to supply the raw categories in his analysis, the analysis itself illustrates a straightforward mechanistic approach as can be seen by the reference to such items as primary determinants, correlation, cause and effect, and an implicit vision of a law-like field that operates.
between structure/conduct and performance in order that ‘scientific generalizations’ can be made as conventionally understood.

Keeping with the rhetoric of economics as mechanism, Bain offers a basis for making “scientific decisions” in the public policy arena. Yet, the degree to which Bain’s original “structure as causation” framework remains inconclusive, coupled with the sustained interest in market structure classification, suggests that the interests of more than mechanism are in operation. In terms developed by Pepper, the market structure analysis is a taxonomic approach, which, when viewed through the structural categories of formism, organizes the various market structures on the basis of a set of similarities and differences. In principle, these criteria can be both quantitative and qualitative in nature. The idea of describing the various market structures (particulars) in terms of a set of criteria (norms or ideal types with qualities) does not need to be restricted to the criteria chosen by Bain, criteria chosen due to the fact that they lend themselves to measurement and therefore a more definitive and precise set of market structures. As developed by Pepper, formism highlights the human capacity to perceive similarity and is supported by a correspondence theory of truth. As such, one may appeal to argumentation strategies other than arithmomorphic identification (quantifiable measures of market concentration for example) in building a case that a given market structure takes the form of perfect competition, monopoly, monopolistic competition, or oligopoly. Moreover, performance itself need not be quantified to be meaningful. It may well be the case that in a mature economic science, the pursuit of forms in market structure analysis would proceed along more inclusive grounds and, as a result, consider and integrate additional elements into the
structure/conduct/performance sequence. Bain is careful to circumscribe the determinants that constitute the forms of market structure. He does this in order to integrate them into a more ‘appealing’ mechanistic theory, which attempts to generate hypotheses relative to market performance (i.e., efficiency) and test these hypotheses with empirical data. Indeed, Bain is quite direct about “the debt” we owe traditional economic theory in terms of framing the analysis with strictly economic determinants and furthering the analysis in a manner consistent with ‘science as mechanism’. Bain writes (1968:9):

Here we have confined our attention to four primary characteristics of market structure. Almost needless to say, other characteristics may also influence competitive behavior, and we may on occasion find it useful to extend the previous list. At times, market structure has been defined much more broadly — e.g., as “the economically significant features of a market.” So construed, market structure could embrace every objective circumstance — psychological, technological, geographical, or institutional — that might conceivably influence market behavior. According to this definition, every market has a multitude of characteristics, and every market is in some degree structurally unique. We do not espouse this concept of market structure here because a very loose and frequently ambiguous use of the idea of structure is involved, and also because meaningful intermarket comparisons and meaningful generalizations about the influence of structure on behavior are effectively forestalled if the content of “structure” is made so comprehensive that no two markets can be viewed as structurally alike.

Bain shows a desire to limit the forms or structures that he is willing to entertain. He does this in the name of economic determinants, and he does this for the purposes of quantifiable empirical study. Yet, the various market structures observed on the social and economic landscape are perceived and comprehended as conceptualized ideal types. There is no limit to what the human mind can discriminate in terms of differences and similarity. Based on Pepper’s metatheoretical taxonomy, I suggest that it is unwarranted and cognitively unwise to solely channel the formalist tendency to meet the needs of the
mechanist enterprise. In developing his explanation of the formist world hypothesis and the root metaphor of similarity, Pepper writes (1942:165):

> Of course, we were just giving the commonsense evidence in describing the root metaphor. There is the shoemaker’s norm of a good pair of shoes, the nature lover’s norm of an oak tree. But further than these is evidence that norms seem to be used or presupposed in much of the basic work of empirical scientists. The specimen of flower, or bird, or insect sought after by a biologist is not any member of the class, but the “good specimen” or norm of the species.

Like the norm of an oak tree for the biologist, market structures exist in terms of their norm for the economist. There is a similarity that can be perceived in countless varieties of real world market situations that is captured transcendently by the idea of the market structure norm. More importantly, the meaning attributable to these identifiable norms may extend substantially further than the price/output combinations that serve to characterize the unified field of market efficiency.

In conclusion, I suggest that the formist tendency, identified in the work of Bain, offers an example of formism in economics; however, it simultaneously exposes the lack of development of the application of the formist tendency in economic theory. A more mature economic science should possess greater tolerance for admitting other circumstances — psychological, technological, geographical, cultural, and institutional — that could help identify a variety of “essential natures” demonstrated by specific market structures in yet unexplored circumstances. As so often is the case when thinking proceeds along Cartesian lines, any move away from theory capable of producing generalizations produces an intellectual reaction, which immediately envisions an unmanageable and scientifically meaningless multitude of particular cases. Is it not possible that human-based
scientific activity is indeed slow and meticulous in its analysis of phenomena? And, as a result, the intellectual enterprise has the cognitive tools capable of comprehending more complex structural types based on a more refined and inclusive set of qualitative criteria describing market structure. Is this not the direction in which the taxonomist's vision should be gazing at the moment the global economy has reasserted itself along new and powerful technological dimensions, which has propelled analysis into the cultural traditions and institutional arrangements of many rather disparate market economies? It is my belief that one way to change our habits of thinking about these matters is to connect this manner of organizing evidence with Pepper's formist world hypothesis. Opposite the tyranny of the particular or a million special cases, a reassessment and extension of the structure/conduct/performance paradigm first articulated by Bain, to include a more broad set of determinants, may well offer economists a rich source of analysis that can transcend the thinness of over-generalized theoretical presentations. Finally, concerning the formist approach, Pepper points out the dispersive nature of this world hypothesis. Pepper writes (1942:143):

The categories of formism are such that, on the whole, facts are taken one by one from whatever source they come and are interpreted as they come and are so are left. The universe has for [this] theory the general effect of multitudes of facts rather loosely scattered about and not necessarily determining one another to any considerable degree. The cosmos for [this] theory is not in the end highly systematic...

With this thought, I shall conclude that the taxonomic approach utilized by Bain is limited and rather undeveloped in terms of its formist potential; but, when fortified and explained by the metaphysical analysis of Pepper, Bain's taxonomy may offer economists a primitive
glimpse at the potential for and the scientific nature of analyses that can handle social complexity through the human ability to discriminate similarity and differences.

Taxonomy and National Income Accounting in Macroeconomic Theory

Another important but often overlooked example of formalism in economic theory is the national income accounting system. In the same way that the classification of market structures is best understood relative to the structure/conduct/performance theory of industrial organization, the classification of national income aggregates is best understood relative to macroeconomic theory. In both instances, one might claim that formalism serves the needs of mechanism. As such, the categories and subcategories that comprise this taxonomic approach have been developed and incorporated into a variety of mechanistic models of the aggregate economy, most of which were inspired by the publication of the Keynes's *General Theory of Employment Interest and Money* (Ruggles 1993:241). Empirical data does not just present itself unconnected; a system of conceptual categories and subcategories are essential to knowing which data to collect. Accordingly, the provision of categories with measurable variables, in and of itself, represents an important function for the taxonomic approach. Yet, while it is true that empirical data requires a theory to be meaningful, it is equally true that meaningful theory requires empirical data for substance and support. This mutual interdependence between theory and empirical data is apparent in the development of the system of National Income Accounts in relation
to the development of Keynesian Economic Theory. Eisner expresses this idea when he writes (1988:1611):

The national income and product accounts (NIPAs) for the United States, and kindred accounts in other nations, have been among the major contributions to economic knowledge over the past half-century. Wedded to the great innovations in macroeconomic theory dating back to the 1930s, their value has perhaps been underestimated. We know the pitfalls of measurement without theory, though we may forget the strength and life that theory must draw from measurement. Several generations of economists and practitioners have now been able to tie the theoretical constructs of income, output, investment, consumption, and saving to the actual numbers of these remarkable accounts with all their fine detail and soundly meshed interrelations.

In order to better appreciate the formal tendency independent of "macroeconomic theory", it is necessary to consider that the identification and classification of categories in economic analysis possess a history that predates and postdates Keynesian theory. In other words, the taxonomic theoretical endeavor has a valid existence independent of mechanist models of the macro economy.

Whereas market structure classification remains basically unchanged since its extensive formulation by Bain in the 1930s, national income accounting has been an object of uninterrupted conceptual development, both prior to and after the period surrounding the birth of Keynesian Economics during the Great Depression in the 1930s. Moreover, the taxonomic endeavor possesses an intellectual development within the discipline that provides practical applications, typically associated with public policy decision-making, extending beyond macro modeling approaches. Over the latter portion of the 19th century and all of the 20th century, national income accounting has attracted a good deal of interest and, as a result, possesses stages of development that definitively reveal the formist...
tendency. The long-term interest in national income accounting is due to the urgent social importance placed on controlling the business cycle, providing sustained growth in the economy, and evaluating economic welfare. Considerable research effort in both academic and government bodies reveals not only an interest in providing categories capable of being empirically measured for the purpose of business cycle control, but in developing classification systems to answer public policy questions related to income distribution and social equity. This latter concern resonates more directly with a theoretical effort premised on the formist philosophical attitude since it is not driven by the requisites of mechanistic modeling. Unfortunately, these applications are rarely acknowledged due to the emphasis the profession places on 'science as mechanism'. A notable exception is Eisner (1988), who argues for the continued development of the national income accounting system through a set of extended accounts for national income and product. From Eisner's perspective, national income accounting serves the purpose of theorizing and evaluating economic welfare separate from (but in addition to) managing the level of business activity. I will consider both aspects of national income accounting, its development as a precursor to mechanistic models and its broader formist applications, in turn.

Prior to the development of the national income and product accounts (NIPA) in the 20th century, considerations of national income were conceptual in nature. The use of the concept of national income dates back some 300 years to the mercantilist school of economic thought (Ruggles 1993:235). According to Ruggles, mercantilists did not distinguish between national income and wealth since they placed importance on
possessing gold as a measure of well-being. This was due to its central role in supporting military ventures. This mercantilist doctrine and the fusion of national income with wealth ended at the hands of the Physiocratic School of economic thought in the 18th century. Physiocrats identified nature's provision of consumable crops as an income category distinct from the accumulation of wealth. In making this identification, they also introduced into economic thought the distinction between 'productive' and 'unproductive' economic activity. In this instance, the agricultural product of nature was considered productive, whereas efforts to acquire gold were considered unproductive. Adam Smith extended the scope of the productive/unproductive distinction by acknowledging the goals of manufacturers, which relate to material goods production, as a category of productive economic activity. The categories of productive and unproductive activity remained part of a variety of subsequent theoretical orientations including those of Ricardo, Malthus, Marshall, and Marx.

Alongside the development of the concept of national income, the inclination for measuring and estimating a country's national income emerged in the mid-1800s. Carson (1975) presents a chronological account of the development of the national income accounting system in the United States from the mid-1800s to the publication of the 1947 edition of *National Income*. This research highlights efforts to estimate a single national income aggregate and the gradual movement toward developing a set of income and product accounts, which ultimately resulted in the creation of an "analytical tool of the first order of importance to government and private economists" (Carson 1975:153). Carson's annotated history demonstrates the sustained effort involved in developing and
refining the conceptual categories of national income, and in addition, making operational these concepts by way of an income and products accounting system. Carson discusses in detail important events associated with the development of the national income accounting system (1975:153-160). What follows is a summary of this chronology.

- Efforts by independent individuals to develop estimates of national income from the mid-1800s up to World War I;
- Efforts by Adolph C. Miller, who served on the Board of Governors of the Federal Reserve System from 1914 to 1936, to estimate national income in order to finance World War I with the surplus over necessary consumption;
- Increasingly professional efforts by members of the newly formed National Bureau of Economic Research, including Wesley C. Mitchell, Willford I. King, Oswald W. Knauth, and Fredrick R. Macaulay, to study the size, annual variation and distribution of national income in order to generate estimates that could be used as a basis for popular consideration of social and political problems;
- An estimate of national income prepared for the first time by an agency of the federal government, the Federal Trade Commission, in 1926;
- Regular publication in 1927 of a current period national income estimate by the National Industrial Conference Board;
- In 1932, as the Great Depression deepened, a Congressionally sanctioned study administered within the Commerce Department but under the direction of Simon Kuznets at the National Bureau of Economic Research, was started for the stated purpose of developing an estimate of total national income, the portion originating from individual sectors, and the distribution of national income in the form of wages, rents, royalties, dividends, profits and other types of payments;
- Publication in 1934 of the report National Income 1929-1932 as a Senate Document. The research relied on new methods in national income accounting, devised by Kuznets, to clarify definitions used and to cite original data sources to show how the estimates were derived;
- Throughout the 1930s, prior to the existence of Keynesian Theory, efforts to estimate product accounts based on kind of expenditure: these include the work of Clark Warburton (focus on distribution of income), Simon Kuznets (focus on the relation of banking and credit control and economic stability), and Lauchlin Currie (focus on the government’s ability to shore up consumer spending);
The work performed by Kuznets' research team for the Department of Commerce was the

system of national economic accounting.

whose body of national income statistics as an intellectual and consistent
business economics. A key purpose of the consolidation was to set up a
income and product and keep commoner series was published by the Office of

In 1947, the bureau revision and consolidation of the estimates of national

Keynesian Theory:

family C+I+G+(X-M) for income is identical to expenditure approach of
national product during World War II, which reduced the influence of the
Department's product estimates and the development of the concept of Gross

under the direction of Milton Friedman, the rapid development of the Commerce

other sectors of the economy;

particular interest was the effect of wartime investment on expansions in

In 1940, the rapid switch to applying Keynesian techniques to the development

business establishment's. The latter does not.

other many of the income problems associated with classification systems were apparent,

between 1932 and 1947, which Carson documents in her article. Interestingly, from the

beginning of a period of rapid development of the national income account system

Carson writes (1973:157):

Once many of the income problems associated with classification systems were apparent,

one of the key concerns of National Accounts, and continues being developed through the years of the

the United Nations System of National Accounts, and continues being developed through the years of the

This research effort, which focuses on the

basis of the consolidation of national accounts. The original work was to

form of national income accounting principles into a more comprehensive system of national income accounting

British commercial accounting practices and a more comprehensive system of national income accounting

before the United Nations System of National Accounts, and continues being developed through the

the years of the United Nations System of National Accounts, and continues being developed through the years of the

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However, Kuznets' work and practical attitude are more telling of the direction that national income accounting was taking. For example, concern that the accounting procedure gain institutional approval and a desire to use the most reliable data possible dictated that Kuznets' project exclude certain items from estimates of national income including family-related in-house services, services of consumer-owned durable goods, earnings from odd jobs and illegal pursuits, relief and charity, and change in the value of assets. As a result of these exclusions and other considerations, Kuznets' report cautioned that to be valuable, the results of the estimates must reflect the definition assumed by the measurement. Most notably, Kuznets clarified the fact that the estimation of national income involved using market prices, which are affected by the given distribution of income. As a result of such limitations, Kuznets explicit stated in his report that welfare cannot be inferred from national income based on the method employed. Though characterized as conservatism based on institutional constraints at the outset, the exclusion of items in the classification of incomes, like the debate over the definition of different versions of national income, are examples of considerations typical to classification systems that remain the focus of theoretical discussions concerning the NIPA.

The broader issue of measuring economic well-being or welfare motivates Eisner (1988) to advocate continuing research effort into an extension of the NIPA. Specifically, Eisner endeavors to expand the effort to improve upon a host of theoretical problems and categorical deficiencies associated with the conventional national income and product accounts developed by the Bureau Economic Analysis in 1954. Eisner writes (1988:1613):
Among major motivations for the construction of extended accounts for national income and product are the development of better measures of economic activity contributing to social welfare, more inclusive and relevant measures of capital formation and other factors in economic growth, and better and/or additional data to fit concepts of consumption, investment, and production relevant to economic theory and structural econometric relations. Pursuit of these goals raises certain basic issues of national income and product accounting, which may be categorized as follows:

a) definition of the production boundary or what activities will be considered to result in economic output;
b) definition of primary incomes, which in turn related to measures of the distribution and redistribution of income;
c) definition of final and intermediate output;
d) definition of investment and consumption as the two ultimate uses of final output;
e) application of the appropriate valuation to production.

To which Eisner adds (1988:16):

All of these issues and others that follow more or less logically from the NIPA framework have been taken up by one or another of those who have endeavored to construct new, extended, or alternative accounts of national income and product.

We are looking for measures of all economic activity related to welfare, but not of welfare itself. And we seek measures that capture as fully and distinctly as possible both the flow of current consumption and the accumulation of capital contributing to future welfare.

In his article, Eisner identifies a list of ‘guiding principles’ that he views as essential to any extension of the conventional accounts. These principles involve the desirability of measuring final product; the need to extend imputed incomes that correspond with expanded production boundaries; the need to develop a comprehensive measure of investment; the need to include investment in intangible capital as such; the need to take into account revaluations of capital. In view of these guiding principles, Eisner surveys six
different research efforts that attempt to extend the conventional accounts (Eisner 1988: 1627-1669). These research efforts include the following:

- a ‘measure of economic welfare’ based on estimates of extended product (consumption) by Nordhaus and Tobin (1972, 1973);
- a measure of ‘economic aspects of welfare’ by Zolotas (1981) also focused on consumption;
- a system of accounts with vastly expanded measures of consumption and investment by Jorgenson and Fraumeni (1987);
- a set of expanded income and product accounts developed by Kendricks starting with his work on The Formation and Stocks of Total Capital (1976);
- a series of articles from 1970 to 1989 by Eisner and associates (see Eisner 1993:1649 for the listing) dealing with a ‘total income system of accounts’ designed to include the income corresponding to all consumption and capital accumulation, market and nonmarket, in all sectors of the economy.

The point to be made here is that there exists an ongoing effort to refine, reform and reconstruct national income accounting.

Moreover, in the context of the ongoing discussion of formism, the research efforts have an explicit purpose that is focused on developing measures of economic welfare. That is to say, the primary focus of the intellectual effort is not to develop accounts strictly for generating data for the more mechanistic pursuits of predicting economic growth or business activity using macroeconomic models. Thus, the importance of a research activity, which is guided by what Pepper identifies as a philosophical orientation found in formism, takes shape and gains considerable credence. The effort is not predicated on narrowing the scope of product and income accounting to integrate the chosen categories into mechanistic models of the macro economy. Instead, the cognitive
pursuit stands on its own as an endeavor that seeks to represent economic activity in its totality, which means seeking out the economic contributions to human welfare wherever they may reside. In concluding his article on the development of extended income and product accounts, Elsner writes (1988:1669)

There is more to economic activity than what is measured in conventional accounts, in the United States and elsewhere. What is covered is important and should in no way be lost or hidden from view. But perhaps the private research has shown enough in the way of possibilities for presenting a systematic set of accounts of a greater totality, along with informative rearrangements of existing data. It is time for the major resources of government to be put to the task. The payoff can be great. for the economy as a whole as well as national income accounting.

In conclusion, the publication of The General Theory of Employment, Interest, and Money (1936) by John Maynard Keynes was unquestionably a persuasive piece of analysis even if (or perhaps because) it was presented in what Dow (1996[c1985]) calls a ‘Babylonian’ style of argument. Unencumbered by the requirements of formalized deductivist chains-of-reasoning, the work effectively alerted its relevant audience that the capitalist economies were not necessarily the self-correcting mechanism implied by Say’s Law and equilibrium in the savings/investment market. Indeed, the experience of the Great Depression proved that the ‘gremlin in the mechanism’ could be disastrous for the level of output and employment in the economy. Yet, the sustained development of macroeconomic analysis and its ultimate evolution into an entire field in the discipline of economics required a formal treatment and an empirical counterpart. In short, it needed to be expressed mechanistically for consideration as theory. The creation of a terminology that could more precisely describe key macroeconomic aggregate variables became
paramount, since measurement is a necessary step toward rigor. The result was the rapid
development of the National Income Accounting System by Simon Kuznets and Richard
Stone. The aggregate concepts are by now familiar to economists for they serve as the
backbone of macroeconomic analysis. They consist of the income streams attributed to
the consumer (C), government (G), private investment (I), and foreign sector (F) of the
national economy. Once quantified and measured, these variables form the basis for
determining the level of 'gross domestic product', or GDP, and further manipulation in
any number of comparative static models of the aggregate economy. However, in
addition to their crucial role in macroeconomic theory, the National Income Accounts
are a classification system reflecting a set of human activity involving the collection and
expenditure of money by the participants in the market economy. In terms of substantive
economic content, the point is both obvious and understated: microeconomic theory and
macroeconomic theory contain within their subject matter clear examples of the formalist
manner of organizing evidence. It is still an open question as to whether or not the market
structure approach and the system of national income accounts will be developed along
more formalist philosophical lines. However, a move in that direction could well be

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92 For a discussion of the revolutionary nature of the National Income Accounts, see Patinkin (1976).
93 As a final thought, Pepper indicates that formalism is the natural domain of mathematics, which I take to
mean that numbers can be used to express underlying forms. Taken as such, it seems likely that the
formalist tendency can be interpreted as the philosophical underpinning of the Santa Fe approach involving
computer simulation of complex systems. See Wible (2000a) for an article that contains a discussion of
pattern prediction and the research of the Santa Fe workshop, which has assembled an interdisciplinary
team of researchers committed to introducing complexity into simulation models of the socioeconomic
system. According to Wible, a unifying aspect of the Santa Fe approach to complexity is to generate
computer experiments or computer simulations by incorporating into the model the dynamic properties of
as many complex adaptive systems as possible (Wible 2000a). The work of the Santa Fe approach is an
extension of the ideas of increasing returns and positive feedback in Arthur (1994[c1988]).
supported by a clearer understanding of the categorial structure and associated theory of truth associated with formism as presented in the work of Pepper. I will now turn my attention to a philosophical account of scientific explanation that is referred to as 'transcendental realism' or 'critical realism'. In my opinion, this is the clearest and most completely articulated account of scientific explanation within economic methodology that might be interpreted as being consistent with Pepper's notion of formism.

Transcendental/Critical Realism: An Appeal to the Deep Structure

The formist world hypothesis recently has been making inroads into the discourse of economic methodology in the name of 'transcendental realism and/or critical realism'.\(^{95}\) In essence, transcendental realism focuses on the nature of scientific explanation or theorizing as it relates to the natural realm. Critical realism extends the insights and conclusions of transcendental realism and argues for a particular approach to scientific explanation in the social realm. Although I have found no indication that the critical realist project has been explicitly associated with the notion of formism as developed by Pepper, the parallel is too stark to be overlooked. I believe that it is important to identify philosophical attitudes and their associated mode of scientific explanation in the context of

\(^{95}\) Refer to http://www.raggedclaws.com/criticalrealism or http://www.criticalrealism.demon.co.uk for more information concerning the critical realist project. For a listing of articles and books on critical realism go to the web page entitled "The Center for Critical Realism" at http://www.criticalrealism.demon.co.uk and click on 'people'. For a critique of the realist philosophy in science and economics see Patrick Baert (1996). Also, the entire issue of the *Journal of Post Keynesian Economics* Fall 1999, Volume 22(1) contains articles about Critical Realism.
Pepper's metatheoretical taxonomy because such placement serves as an antidote to claims such as "this is the correct mode of scientific explanation." As will become clear, the mode of scientific explanation implied by Pepper's notion of formism is consistent with that which emerges from the transcendental/critical realist philosophy.

In addition, for the purpose of future research I would like to briefly mention that the structural categories of the world hypotheses, formism, organicism, and contextualism each possesses an attitude toward 'evolution'. In one way or another, an explanation of social transformation and the process of change is a concern of each of these world hypotheses. Juxtaposed to this observation is the fact that in their ideal form, each of the world hypotheses offers a unique and distinct approach to theorizing the social and economic world. My intent in this research is only to point this out because I think that much ambiguity exists surrounding the issue of "What is evolutionary economics?" In the premiere issue of the journal Evolutionary Economics in an article entitled "Some thoughts on the promises, challenges and dangers of an 'evolutionary perspective' in economics," Dosi in effect promotes this ambiguity in order to prevent premature closure in the debate. Dosi writes: (1991:6):

First of all, is there an "evolutionary approach"? In a very loose sense, certainly there is a significant number of economists, coming from quite different traditions who try to focus the analytical attention on phenomena like institutional and technological change, disequilibrium interactions, non-linear dynamics, less-than-perfectly rational behaviors, history-dependence of economic processes, effects of extra-economic institutions on economic variables (the list is by no means exhaustive).

After presenting his own more 'strict' definition of 'evolutionary economics' (e.g., many opportunities, endogenous preferences, history deeply matters, institutional

However, to repeat, this Weltanschauung, succinctly hinted here, is a personal one — possibly shared by few others. I strongly suggest that the Journal should stick to the loose notion of "evolutionary". The danger to be avoided at all costs is to have a manifesto to be subscribed. There is no time and no use in developing yet another sect. Rather, I see an enormous potential for an editorial philosophy that "lets hundreds of flowers blossom."**

While I am in total agreement with Dosi’s perspective, I suggest that Pepper’s metatheoretical taxonomy may provide a promising landscape for sorting out the different versions of evolutionary economics.

The messenger of transcendental/critical realism in the methodology of economics is Tony Lawson. Following Bhaskar, Lawson introduced to the profession the notion of an "open-system ontology." In the entry for critical realism in the Routledge Encyclopedia of Philosophy (Craig 1998), Collier writes (1998:720-722):

Critical realism is a movement in philosophy and the human sciences starting from Roy Bhaskar’s writings. It claims that causal laws state the tendencies of things grounded in their structures, not invariable conjunctions, which are rare outside experiments. Therefore, positivist accounts of science are wrong, but so is the refusal to explain the human world causally. Critical realism holds that there is more to "what is" than "what is known", more to powers than their use, and more to society than the individuals composing it. It rejects the widespread view that explanation is always neutral — to explain can be to criticize.

In what follows, the key connection that I would like to emphasize is the idea that ‘underlying structures’ (i.e., subsistence) are the operational level of scientific explanation for both formalism and transcendental/critical realism. Lawson’s primary thesis is that

** For another discussion on the meaning of evolutionary economics see an article Boulding (1991) entitled “What is evolutionary economics?”

208
positivism and its associated mode of scientific explanation are inappropriately applied to both the natural and social sciences; specifically, based on the realist ontology he presents, positivism is argued to be untenable as a universal approach to science (Lawson 1994:257-283 and Lawson 1997:13-36). According to Lawson, realism is bound up with inquiry into the nature of being, or of what exists. He is interested in ontological questions about the nature of natural and social reality; realism refers to a specific account of this nature. According to Lawson, it is a particular ontological theory that illuminates the nature of natural and social reality, which leads him to critique positivist approaches to science and advocate 'transcendental and/or critical realism' as an appropriate vision that can facilitate a more relevant economics.

Lawson begins his critique of the goals, criteria, methods, and procedures of standard texts by highlighting a type of inductive fallacy. He uses his 'big stick and dusting mat' example to illustrate that while the 'big stick' may be good for beating the 'old dusty rug', we should not infer from this that it is also good for cleaning windows. By analogy, the positivist approach to economic science, what he call deductivism, may be good for certain analytical problems in economics (an idea that all but abandons later), but not necessarily all.³⁷ This is the exact problem Lawson sees in contemporary orthodox economics. He writes (1994:258):

Specifically, I shall argue contemporary orthodox economists have noted that certain methods of scientific analysis have, like the big stick, been found to be of

³⁷ Given that Lawson is combining deductivism with a discussion of 'empirical realism' (observable events), he is referring to both deduction and induction under the category of deductivism — a mode of scientific explanation. For a thorough discussion of deductivism and inductivism see Phelps (1988:1-21). Thus, deductivism is to be taken as some combination of induction and deduction.
worth in some important applications and they thereby infer that the methods in question must be equally appropriate to any task that appears related. In particular, it is supposed that certain methods of reasoning, aims and criteria that have proven to be efficacious in particular natural science contexts, must thereby be equally appropriate to all other scientific contexts, including the analysis of society and economy.

The claim of the inadequacy of positivism, as we have already seen, is not new. Capra used this as a major theme, arguing for a systems or holistic perspective gained from attempts at scientific explanation of sub-atomic phenomena instead of the mechanical perspective adopted from Classical Newtonian Mechanics, which focuses on particles in the macro universe (planets, balls, dust, etc.). However, it is worthwhile elaborating on Lawson’s work for two reasons. First, unlike Capra, Lawson has made substantial inroads into the discussion of contemporary economic methodologists. Second, also unlike Capra, Lawson wants to demonstrate that the philosophical system upheld by positivism (i.e., mechanism or reductionism) does not serve as an appropriate mode of scientific explanation in economics.

Lawson’s case for ‘transcendental realism’ turns on perceived ontological differences between natural reality and social reality. When Lawson considers the distinct ontological accounts of these two domains, he concludes that positivism, while appropriate for an extremely special case of event regularities observed in the natural universe (Capra would call it the macro-physical realm), is not good science for a more general interpretation of analysis of the natural universe, and, a fortiori, the social realm. Based on the philosophical approach articulated by Bhaskar, Lawson focuses on how science explains, or makes intelligible, the way in which causality emerges from the
controlled or closed ‘experimental situation’ in an open, evolving world. But before considering the more general interpretation of the ‘experimental situation’, we need to see how positivism works in Lawson’s view.

Lawson identifies ‘deductivism’ as a mode of scientific explanation, which, by virtue of its historical success predicting (explaining) events related to the movement and position of celestial bodies, has been mistakenly transformed into a universal mode of scientific explanation. Lawson highlights an underlying feature of deductivism in terms of the way in which it generates causal statements. Lawson writes of deductivism (1994:259):

[T]o be able to explain something is to deduce it, or a statement of it, from a statement of initial boundary conditions plus universal laws of the form ‘whenever event (type) x then event (type) y.’

It is the ‘universal laws’ aspect of deductivism that Lawson finds untenable in economic/social theorizing; that is, the implication that positive economics is a search for ‘event regularities’ in the field of actualized existence. As such, positive economics in particular (and positive analysis in general) is ontologically founded, or presupposes a conception of reality, which Lawson claims requires universally constant event conjunctions. Lawson portrays deductivism as a mode of explanation that possesses an image of science depending on ‘law-like’ statements of the form ‘whenever event x, then event y’. He then asks if there are systems that lend themselves to this kind of scientific explanation. His answer is unequivocally yes; they are closed systems. A constant conjunction of events occurs spontaneously in the movement of externally related objects.
in the macro-physical gravitational field. It allows a particular notion of cause and effect, which structures the actual events that occur in the field. Collier writes (1998:721):

Not only may one distinguish, as commonsense realism does, between the contents of experience ('the empirical') and the actual course of events ('the actual'); one may also distinguish 'generative mechanisms' in nature, which are real even if not actualized. Gravity is real, even when the roof is not falling in. Failure to recognize this leads to 'actualism', the attempt to locate laws at the level of the actual (spontaneously occurring constant event conjunctions). As against this, laws should be analyzed as tendencies: bodies tend to persist in a state of rest or uniform motion in a straight line; hoppy beer tends to make you sleepy; capitalist enterprises tend to get bigger and fewer.

More importantly, simulation of the constant event conjunctions can occur in a controlled laboratory experimental situation, but only with the help of human intervention. This observation is what motivates Bhaskar's (and Lawson's) development of transcendental realism.

With the help of human intervention, the controlled laboratory experimental situation attempts to replicate the static spontaneity of the natural universe. In so doing, it generates 'law-like' situations in which 'whenever event (type) x, then event (type) y', but given the controlled condition 'z'. A non-changing universal environment, such as planetary orbits, spontaneously possesses this 'law-like' structure, which is why it is appropriate for deductivism. According to Lawson, a positivist account of science is rooted in the Human notion of causality referred to as 'empirical realism'. The positivist theory of knowledge brings together actualized events and human sense experience or impression. However, a theory of knowledge requires a theory of reality, or an ontological perspective, and Lawson believes it is important that 'the nature of reality' be consistent with the mode of scientific explanation used to somehow make intelligible the
events we observe. The positivist account requires the objects of experience to be constituted as atomistic/isolated events as observed and conditioned by a field. Thus, in the positivist account of science, we have a situation based on atomistic events made intelligible through human sense experience. In order for knowledge to be generated, we need constant event patterns to be able to claim that event \( x \) causes event \( y \). This is the basis for empirical realism, which is nothing more than the Humean account of causal law for empirical regularities.\(^{98}\)

According to Lawson, the philosophical basis for a coherent explanation of realist scientific explanation turns on two observations made by Bhaskar on the nature of the controlled human experiment. Bhaskar first observed that the natural universe is not exhausted by the constant event conjunction type of empirical regularities. This is why science has relied on controlled experiments to make phenomena intelligible. Secondly, scientists have successfully ‘carried over’ law-like statements from the controlled environment and applied them in the natural universe, preventing science from becoming fenced off from the rest of the world. Lawson writes (1994:267):

"The first of these is that, outside of astronomy at least, most of the constant event conjunctions that are held as significant, that are interpreted as laws, only in fact occur under the restricted condition of experimental control — i.e., they do not occur spontaneously. The second observation is that the results or ‘laws’ supported in controlled experimental activity are nevertheless frequently successfully applied outside the experimental situation."

Thus, Lawson’s account of an alternative mode of scientific explanation starts from the

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\(^{98}\) This description of positivism seems consistent with Pepper’s development of mechanism and its associated special theory of truth.
notion of an ‘open system’ in which event regularities, except in rare circumstances, do not exist. The law-like pattern of event phenomena from which Humean causal explanation can be justified is not operable. Lawson writes (1994:262):

...Events, in other words, are multiply determined by various, perhaps countervailing, factors such that the governing causes, though necessarily “appearing” through, or in events, can rarely be read straight off.

Lawson’s account of transcendental realism goes well beyond methodological description. On the level of meta-methodology (or what methodologists should be advocating), his argument turns explicitly persuasive and normative. He claims that from ‘actual experience or observation’ (of the activities of scientists and the successes of science) we can infer that the transcendental realist approach is the most appropriate and, in effect, universal way for scientific explanation to proceed. This is directly opposed to accepting positivism and its associated mode of scientific explanation (deductivism) as universally appropriate. According to Lawson, the implication of this is that scientific explanation requires a philosophical basis other than positivism.

Transcendental/critical realism differs from empirical realism in viewing the world as being composed of, in part, objects that are ‘structured’ and ‘intransitive’. This should bring to mind Pepper’s discussion of the levels defined as subsistence and existence. Thus, the role of scientific explanation is to explain structured objects, which cannot be reduced to events. It is through these structured objects that events are generated or mediated. Also, these structured objects exist and act independently of their identification. In other words they are subsistent forms. But, they are real and operating whether or not we have discovered them. As Pepper explains in his development of the structural categories of
formism, the norms or laws participate in the basic particulars (actual events) observed in the world (1942:170). And, they are real and operating in spite of the fact that they are not directly observable by our senses, but only indirectly through events that our senses do perceive. Deep structures are not 'out there' as are actualized, existent events. Lawson's critique of positivism (deductivism) serves as a point of contrast to what he claims is a more appropriate and universal methodology for both natural and social science. Transcendental realism is an ontological perspective that starts from the assumption that the natural domain (and the social domain)

is composed not only of events and our experience of them, but also of irreducible structures and mechanisms, powers and tendencies, etc., that, although perhaps directly observable, nevertheless underlie actual events that we experience and govern or produce them” (Lawson 1994:262).

Thus, events such as the positions of planets and the distance a braking automobile skids are governed by a determinate mechanism commonly known as gravity. Gravity is never observed, just the indirect effects of gravity. Similarly, some Marxists might argue that capitalist financial crises or episodes of capital flight are events that occur in reaction to the law of the falling rate of profit. Still yet, empirical data can track the market price of currencies and interest rates confirming the experienced empirical event, however, the hypothesized underlying mechanism occurs at a different ontological level. Lawson further explains 'transcendental realism' and characterizes three domains of reality (1994:262):

Thus not only does the autumn leaf pass to the ground and not only do we experience it as falling but, according to the perspective in question, underlying such movement and governing it are real mechanisms such as gravity. Similarly, the world is composed not only of such 'surface phenomena' as skin spots.
puppies turning into dogs, and relatively slow productivity growth in the UK, but also of underlying and governing structures or mechanisms such as, respectively, viruses, genetic codes and the British system of industrial relations. In short, three domains of reality are, from this perspective distinguished, namely the empirical (experience and impression), the actual, and the non-actual or metaphorically the “deep” (structures, mechanisms, powers and tendencies).

The ‘open system’ conception of the natural domain is associated with the assumption that the three domains are in general ‘out of phase’ with each other such that, for example, the same actual event may be observed differently by scientists (empirical data is ‘overdetermined’ by the theory). In addition, actual events may be multiply determined by various underlying mechanisms. This second area of indeterminacy, however, is attenuated in Lawson’s account of transcendental realism by the qualification that many empirical events can be scientifically explained in reference to an overriding or determinate mechanism among the multitude. Thus, Lawson claims that the object of scientific explanation is to make intelligible empirical phenomena (observed events) by identifying the determinate mechanism working to govern the pattern of events.99 The system is open in the sense that natural events need not be, and most often are not, ‘spontaneous event regularities’ forever and always detectable through uncontrolled observation. Instead, in general the pattern of events can and does change in the natural domain. Therefore, the epistemological task of scientific explanation is to identify an underlying structure or

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99 As we will see in the metalevel discussion of contextualism later in this chapter, this is the ontological point at which Resnick and Wolff depart from Lawson’s ontological perspective. Resnick and Wolff assume that the ‘deep structure’ (as well as the scientific identifier of the deep structure) possesses multiple determinants, which problematizes causal interpretations because none of the determinants can be essentialized. Thus, these determinants are overdetermined such that none may be assigned a privileged or determining status.
mechanism, which is irreducible to the events of experience and at the same time independent of their identification (i.e., part of objective reality).

According to Lawson, the universal validity of the transcendental realist approach turns on the idea that in the process of knowledge accumulation (epistemology), experimental results (identified laws) must be implicitly accepted using a similar transcendental realist approach. The physical/natural laws of science are routinely "transferred" from the artificially closed experimental situation and applied to the open universe. Lawson writes (1994:267):

In order to render Bhaskar's observations intelligible, it is necessary to abandon the view that generalization of nature consists of event regularities, and to accept instead the transcendental realist account of the objects of the world, including science, as intransitive and structured. That is, experimental activity and results, and the application of experimentally determined knowledge outside experimental situations, can be accommodated only through invoking something like the transcendental realist ontology of generative structures, powers, mechanisms, and necessary relations, etc.

In other words, natural/physical scientists in general do not locate causality strictly in terms of the empirical domain. Instead, it is an underlying mechanism that determines causality and gives rise to associated laws identified in closed environments. However, these laws are not treated as positive facts but instead as operating tendencies when applied or transferred to the open world.100

Based on these arguments, Lawson extends this transcendental realist ontological perspective from the explanation of natural phenomena to that of social phenomena. He

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100 For a further discussion of transcendental realism and its relationship to epistemology and ontology see the definitions of 'theory of knowledge' and 'realism' by Bhaskar (Outhwaite and Bottomore 1994:311-314 and 1994:547-548).
elaborates on a transcendental social ontology referred to as ‘critical realism’. The leap to
a social ontology consistent with the transcendental account requires only the assumption
that “real choice occurs by individual agents.” Thus, as in the natural realm, the
transcendental ontology appeals to the observed openness of the system. However, in the
social world the openness of the system is predicated on real choice; in other words,
choice that could have been otherwise. Furthermore, in order that choice may be
intentional in some context, the individual must be able to trust in, or have some
knowledge of, a relatively enduring structure through which action may be conducted and
the outcome can be anticipated to occur. Lawson writes (1994: 270):

Choice to repeat presupposes that the world is open and actual events need not
have been. But the possibility of choice not only presupposes that events could
have been different. It also entails that agents have some conception of what
they are doing and wanting to achieve in their activity. That is, if choice is real
then human actions must be intentional under some description. Intentionality in
turn is bound up with knowledgeability. For agents must have knowledge at
least of the conditions that render their intended acts, when they are, as feasible.
In turn again, of course, knowledge presupposes sufficient endurability in the
objects in the objects of knowledge to facilitate their coming to be known. Now
if event regularities, or at least significant ones, do not, as widely reported,
generally occur in the social realm, then the enduring objects of knowledge must
lie at a different level — at that of structures which govern, but which are
irreducible to, events of experience including human activities.

From here, Lawson elaborates on the nature of scientific explanation that is consistent
with the transcendental social ontology, or critical realism. In short, he believes that social
analysis requires a “transformational conception of social reality” in which structure is
neither created by individuals nor fixed. Instead, individuals reproduce or transform social
structure, which may be fixed only at the moment the individual acts. In addition, Lawson
points out that the material of social reality is highly relational. Thus, social science
should focus on the internal relations that hold between social positions. He writes (1994:275):

If it is the case that prime ministers or presidents, say, exercise different rights, tasks, obligations, practices, duties and powers from the rest of us, or that, say, teachers exercise different practices and tasks, etc., from students, it is equally the case that the relevant rights, tasks and obligations, etc., exist independently of the particular individuals taking these roles. At issue then is a system of relationally defined position-practices, i.e., a system of positions, with associated practices, obligations and powers, etc., defined in relation to other such positions, and into which agents essentially slot. According to critical realism all social structures and systems — the economy, the state, international organizations, trade unions and households, etc., — depend upon, or presuppose, internal social relations of this form.

Moreover, where social analysis such as economics is concerned, the focus of scientific explanation remains on the level of the ‘deep structure’. Lawson writes (1994:276):

The first point to make, or to reiterate, of course, is that the legitimate concern of science, including economics, has been found to be not primarily recording events and their constant conjunctions (as in positivism), but identifying and elaborating the structures and mechanisms, etc., that underlie the phenomena of experience and govern them. In consequence, explanation must be recognized as precisely the (socially produced and fallible) accounting for the previously unknown mode of production of some identified event or phenomenon of interest.

Not only is event prediction typically infeasible, but if the above account is correct, it is in any case not required for a successful economics. For it can now be seen that the primary aim of science is not the illumination/prediction of events at all but the identification and comprehension of the mechanisms and tendencies, etc., that underpin and govern them. And this understanding is all that is required for policy analysis and effective action.

In addition, like scientific explanation of the natural world, scientific explanation of an open social world gravitates toward more or less determinate mechanisms that permit a causal theory. But these causal mechanisms do not appear as mechanisms that reside in structure of a universal field such as in the mechanistic world hypothesis. Instead, they are
rather localized in time and space. That is, they are subsistent forms. Lawson writes (1994:276):

Although the social world is open, certain mechanisms can come to dominate others over restricted regions of time-space, giving rise to rough-and-ready generalities or partial regularities, holding to such a degree that *prima facie* an explanation is called for. Thus, just as autumn leaves do still fall to the ground *much* of the time, so women are *concentrated* in secondary sectors of labour markets, and productivity growth in the UK over the last century has *frequently* been slower than that of otherwise comparable industrial countries.

Lawson continues with an example containing economic content (1994:277):

As an example, consider the productivity growth in the UK over the last hundred years which, as noted, has quite frequently been less than that of industrial countries that are comparable in many other respects. Now, the activities involved here include those bearing upon the rate of introducing new techniques of production, levels of staffing of machinery, the ability of an organization to respond flexibly to change, and so forth. In Britain, however, there are definite differences in the structures drawn upon in these activities compared with, say, the countries of the continent of Europe. For in Britain, unlike other countries, the legality of collective worker organization was recognized before the introduction of mass-production techniques. When work was organized upon a craft-system basis, in consequence, norms, relationships, and practices associated with this highly localized, sectional, organization of work became built into the British industrial system. Once legitimized, this craft-oriented basis has tended to be reproduced.

To pull this discussion together, I will present Pepper's aforementioned summary on the nature of transcendent/amalgamated formalism. Pepper writes (1942:166):

The obvious interpretation of all such facts is that there are norms in nature, just as Aristotle observed. There seems to be plenty of apparently direct evidence for norms exemplified in nature.

In fact, every law of science may be so interpreted. Persons who accept the theory that there are laws of nature, and that the aim of science is to discover these laws, which nature "follows", seem (if their words do not belie them) to imply that these laws are norms which regulate (literally render regular) the occurrences of nature. On this view, the inductive method is a method of collecting observations for the discovery of the regularities or laws which "hold"
in nature. Any actual induction may be in error, but its aim is to approximate to
the law exemplified in natural phenomena.

To this formist attitude, Pepper later adds (1942:177):

According to a Platonist, a law _subsists_ even though it was never exemplified in
congest existence. An Aristotelian would be less bold, would agree that a law
subsists by the definition of form [subsistence] as opposed to particular
[existent], but would declare that a law has no being outside its exemplifications.
It is, however, very important to notice that in formism a law is not to be
identified with a concrete existent structure. Whether Platonist or Aristotelian,
for a formist a law is a form. This is one of the fundamental distinctions between
formism and mechanism. These two world views contradict each other on this
issue.

In conclusion, from an ontological perspective, the social domain is an open
system; the natural universe is predominantly an open system. However, the scientific
mode of explanation generalized by positivism is based on the fact that the domain of the
natural universe (macro-physical objects) nearly approximates a closed system. Thus, as
seen in the discussion of empirical realism, or experience based on atomized events,
positivism requires a closed system so that universal laws and statements such as
“whenever type _x_ then type _y_” are able to operate (i.e., the laws are part of the field and
not a subsistent form). The critical realist position turns on the notion that positivist
knowledge cannot be universal since reality does not universally conform to such an
ontological description. To the contrary, the social domain, including economics, is part
of an open system. Based on this ontological perspective or metatheory, Lawson argues
for an alternative philosophical perspective of the appropriate mode of scientific
explanation. A theory of knowledge is required in which scientific explanation transcends
the level of experimental sense data and instead attempts to identify the underlying
structure that can make intelligible the 'tendency of an event to occur'. My claim is that this particular account of science is consistent with Pepper's development of the formist world hypothesis.

Finally, the transcendental line of philosophical argument has led Lawson to advocate maintaining a role for 'interventionist methodology' (Lawson 1994:13-30 and 1997:13-36). Thus, Lawson argues that, based on the implications of this realist theory, the mode of scientific explanation supported by positivism, namely deductivism, should be substituted for an alternative mode of scientific explanation, which occurs not through some combination of deduction and induction, but instead through abduction.\(^{101}\) In essence, Lawson uses his ontological line of argument as a philosophical basis to claim that the transcendental realist approach should substitute for the empirical realist approach. To the extent that advocates of critical realism adhere to this position, they are at odds with the fundamental pluralist attitude of the Pepperian system. My aim in this discussion has been to highlight the critical realist's approach to scientific explanation. More importantly, by locating this philosophical perspective in Pepper's metalevel taxonomy, I suggest that critical realism (amalgamated formism) can be seen as an adequate approach to science, but not necessarily as the correct one or a universal one. In general, there are two basic strategies that can be deployed in developing this type of metalevel analysis. Along the lines pointed out by Mäki (1997:37-48), an alternative vision can be introduced or substantiated as a complement, in which it is identified as

\(^{101}\) See the entry on Theory of Knowledge in Outhwaite and Bottomore (1994:313) for a discussion of abduction and how the transcendental realist ontology attempts to "solve" the problem of induction.
existing as one of a "plurality" of theories in a particular domain. On the other hand, an alternative vision can be viewed as a substitute: in which case it may or may not be previously articulated, however, in its demonstration it takes on a normative or prescriptive tone. Mäki identifies this normative strategy as one that is concerned with pluralism, where pluralism per se is a position that implicitly or explicitly argues for some kind of change. Simply put, my system is the correct one and it should replace others. Thus, the metalevel or philosophical analysis (which in Lawson's case is an ontological theory) can argue for the addition of a hitherto unknown theoretical orientation to the plurality. Or, most strongly, the metalevel analysis could argue for the substitution of a theoretical orientation for a new orientation. Tony Lawson attempts the stronger of these strategies and calls for transcendental/critical realism to substitute for positivism. This of course relates closely to traditional methodology since, as a theory of theory appraisal, methodology has validated explanatory setups that are consistent with those supported by positivism. Lawson wants his philosophy to change the conventionally accepted mode of scientific explanation that methodology advocates. Indeed, the totalizing tenor of some realists has prompted Screpanti to state that "realist theories" ultimately cannot tolerate pluralism (either methodological or ontological) but instead only tolerate a plurality of theories/methodologies in the short run (Screpanti and Salanti 1997:298-301). Following Pepper's scientific attitude, post-positivist philosophers and methodologists are not only challenged to develop compelling and intelligible visions of alternative modes of scientific explanation, but to develop a vision of a landscape that can accommodate a plurality of modes of scientific explanation.
MECHANISM AND ECONOMIC THEORY

There is little dispute in the discipline of economics that neoclassical theory is closely modeled after Classical Newtonian physics.\(^{162}\) By Pepper's account of mechanism, neoclassical theory and Newtonian physics are examples of the mechanistic world hypothesis. In the development and history of the discipline of economics, the application of the mechanistic world hypothesis to the study of choice involving the consumption and production of commodities reflects a formidable strength and an awkward weakness of the neoclassical program. It is a formidable strength because more than any other, the refinement of the mechanistic world hypothesis and the development of its structural categories has proceeded step-by-step with the overall scientific understanding and control of the material world in the past two centuries. There seems little argument that the mechanist approach to organizing evidence has been directly responsible for generating many fruitful material advances.\(^{163}\) I see no reason for denying that the mechanist

\(^{162}\) For a thorough discussion of the application of the mechanistic metaphor in economics see the work of Philip Mirowski, especially his book entitled *More Heat Than Light: Economics as Social Physics and Physics as Nature's Economics* (1989). For more information on the research of Mirowski, see his homepage at [http://www.nd.edu/~economic/faculty/Mirowski.html](http://www.nd.edu/~economic/faculty/Mirowski.html). In addition, see a survey edited by Neill de Marchi (1993) entitled *Non-Natural Social Science: Reflecting on the Enterprise of More Heat than Light*. This survey contains a variety of summaries of Mirowski's work as well as criticisms of his thesis that developments in physics have determined the evolution of the discipline of economics and economics has appropriated the wrong mechanistic metaphor in adopting Classical Newtonian Physics instead of concepts of Thermodynamics — or "photo-energetics". Note, however, Pepper's discussion (1942:186 and 212-213) of the equivalence between the structural categories of discrete and consolidated mechanism, which suggests that the importance for the neoclassical program of adopting Classical Newtonian concepts or the concepts of Thermodynamics, is likely overstated by Mirowski. In addition, see the chapter in Capra (1982:188-234) entitled "The Impasse of Economics" for a description of 'Newtonian Economics' as well as a discussion of the relationship between the neoclassical/mechanist model and undifferentiated growth.

\(^{163}\) For a lengthy treatment see Capra (1982). Through this research, he gives many examples of the successes that can be attributed to the mechanist (or reductionist) approach in physics, chemistry, biology, medicine, psychology, etc.
approach also has augmented our understanding of the functioning of markets. However, the deployment of mechanism in economic theory also coincides with an awkward weakness of neoclassical thought because the mechanistic world hypothesis, and the philosophical apparatus roughly described as positivism that sustains it, attempts to sell this as the correct method of economic science and, moreover, one that is value-free. This interrelationship between philosophy, neoclassical economics and the desire to find the correct and value-free method of science has been at the core of heterodox critiques that the neoclassical theoretical apparatus is a perfectly suited ideology for the capitalist class.

In economics, this attitude is reflected in the methodological writing of Nassau Senior, who attempted to persuade that economic science must be value free and without normative or ethical statements. Criticizing Senior's methodology contained in An Outline of the Science of Political Economy (1836), Hunt writes (1979:126-127):

"The difficulty with Senior's methodology is that the ongoing empirical reality of a capitalist social and economic system is composed of a nearly infinite number of interconnected and interrelated empirical "facts". Nothing inherent in experience per se suggests to us that any particular "few general propositions" are of central importance in understanding capitalism. The process of constructing a social theory is one in which we abstract from or ignore innumerable "facts" and simultaneously isolated and focus on a few others that we believe to have explanatory power.

If one believes his or her theory to have any importance whatsoever (and Senior as well as the later economists using his methodology always clearly believed their theories to be important), that person must believe that he or she has abstracted from, or ignored, irrelevant or unimportant facts and focused on relevant and important ones. But the question of relevance and importance have no meaning at all unless one asks, relevant or important with respect to what problem? Thus, the social or economic issue or problem to which a theory is addressed is crucial in determining what aspects of reality the theoretician ignores and what aspects he or she focuses on in a "few general propositions". But what
constitutes an important problem or an important issue is a judgment based entirely on the values of the theoretician.

Thus, values stand at the very foundation of the process of theorizing. They dictate not only what a theoretician will consider an important social issue but also what types of solutions to social problems would be acceptable. Social theories are generally addressed to problems that the theoretician considers important. Furthermore, the “few general propositions” selected are generally chosen in a manner so that the theory will produce conclusions that are acceptable within the context of the theoretician’s values. Similarly, the “few general propositions” generally preclude theoretical conclusions that are morally or ethically unacceptable. Such was definitely the case with Senior’s claim to have elevated economic theory to a higher plane, where it was supposedly uncontaminated by moral or ethical values.

There are two points to be made and their importance is not indicative of their order of presentation. First, while it is appropriate for so-called heterodox schools of thought to point out the affinity of the concepts of neoclassical economics with the interests of the capitalist class (i.e., equilibrium), it is illegitimate to disparage of the interpretation of the world that the theoretical approach generates. Pepper writes (1942:98):

*It is illegitimate to disparage the factual interpretation of one world hypothesis in terms of the categories of another — if both hypotheses are equally adequate. This disparagement is an almost universal procedure, very plausible and entirely fallacious. We believe that at the present time there are four world hypotheses of about equal adequacy. We shall call them formalism, mechanism, contextualism, and organism. Now, the very statement that these are relatively adequate hypotheses means that they are capable of presenting credible interpretations of any facts whatever in terms of their several sets of categories. Indeed, these interpretations are so convincing that a man who has not had an opportunity to compare them with the parallel interpretations of a rival hypothesis will inevitably accept them as self-evident or indubitable. The basic danda, that is, the refined evidence, of every one of these rather reliable world hypotheses has traditionally been presented and accepted as indubitable by the believers in these hypotheses, so obviously pure fact do the refined danda (evidence) of any good world hypotheses appear through the lenses of its categories.*
Conversely, in light of Pepper’s explication of four autonomous and adequate world hypotheses, the orthodox school of neoclassical economic thought stands on untenable and dogmatic grounds when it claims its mechanistic interpretation is value-free. Once one accepts the basic premise that there is a plurality of metaphysical systems for theoretically organizing evidence (i.e., world hypotheses), it is unequivocally the case that the deployment of one set of structural categories over another to achieve this theoretical task cannot be separated from the ethics and values of the theoretician. Or, if one adheres to monism, this choice must be seen as involving a value judgment on the metaphilosophical level since pluralism and relativism are two other options.

Before exhibiting two archetypal examples of the mechanistic world hypothesis in economic theory, let us see how Pepper’s representation of the structural categories transfer into the discipline of economics, specifically into the approach of consumer choice as developed by neoclassical utility theory. To do this, I will introduce the description of the structural categories of discrete mechanism offered by Pepper. Following each one, I will attempt to insert the analogous words/concepts as they are developed in economics. Six categories — three primary categories and three secondary categories — emerge from this description of the operation of the machine as a lever (1942:191-194). In describing the image of the machine, the first primary category developed by Pepper is the field of location. In physics the field of location is the field defined by space and time.
coordinates. In utility theory, the field of location is the field of exchange. According to Pepper’s account, the cosmic machine possesses the following structural categories:

- **Field of Location** – The lever is a configuration of externally related parts (independent particulars with mass) having specified positions in a ‘field of location’. More strongly, to exist (or be real) the parts of the lever must be specified in terms of spatial coordinates. They must have location. The length of the bar, the position of the fulcrum, and the location of the masses are the distances required to fully specify the operation of the machine (1942: 197).

In utility theory, this statement can be paraphrased in the following form:

- **Field of Location** – The market is a configuration of externally related parts (independent individuals seeking utility described by a given set of preferences) having specified positions in a ‘field of exchange’. More strongly, to exist (or be real) the individuals in the market must be specified in terms of their ability to obtain utility and their discrete utility functions. They exist in terms of their revealed preferences for commodities.

Next, Pepper describes the primary qualities.

- **Primary Qualities** – These are the ultimate differentiating characters in the field. It is sufficient to specify the objects (particulars) involved in the push/pull machine in terms of mass. The only differentiating quality that is needed to describe the particulars is mass units (such as kilograms) associated with externally related objects. Mass is the primary “differentiating quality” that exists in the field of location. Accordingly, the primary quality is limited to a “quantifiable quality.” Additional qualities may include size, shape, motion, solidity, etc., all of which remain quantifiable. Note, however, these additional qualities deal with location in the spatiotemporal field and are referred to as “configural” qualities (1942:205).

In utility theory, this statement takes the following form:

- **Primary Qualities** – These are the ultimate differentiating characters in the field of exchange. It is sufficient to specify the objects (individuals) involved in the push/pull market machine in terms of their desire and ability to “amass”

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104 For a discussion of the development of neoclassical utility theory (as well as its ideological implications) at the hand of its founders, Jevons and Menger, and its logical extension to general equilibrium theory by Walras, see E.K. Hunt’s chapter “The Triumph of Utilitarianism: The Economics of Jevons, Menger, and Walras” (1979:236-270).
utility. The only differentiating quality that is needed to describe the action of the individual is utility units (such as utils) associated with externally related objects. Utility is the primary "differentiating quality" that exists in the field of market exchange. It is described by a utility function, which is unique to each individual and increases with respect to commodities. Accordingly, the primary quality is limited to a "quantifiable quality" (or as it turns out one that can be ordered). There is no need for additional qualities in the field of location, the market.

Next, Pepper describes the primary laws.

- **Primary Laws** - The parts of the machine are related to each other in the field of location through what is called a law, such as the "law of gravity". In Newtonian mechanics, the law of gravity is exemplified by Newton's laws of motion. In the case of the lever, the description of this functional or law-like relationship is the equation \( F_1 \cdot d_1 = F_2 \cdot d_2 \). This equation describes an efficient law of action inherent in the structure of the machine (1942: 207-211).

In neoclassical utility theory, this statement takes the following form:

- **Primary Laws** - The parts of the market machine are related to each other in the field of exchange through what is called a law, such as "the law of rational, maximizing behavior". In Newtonian market mechanics or Neoclassical Utility Theory, the law of optimizing behavior is described as the primary law in the field of exchange. In the case of the market, the description of this functional or law-like relationship is the equation \( \frac{MU_1}{P_1} = \frac{MU_2}{P_2} \). This equation describes an efficient law of action inherent in the structure of the market machine.

As can be seen in this exercise, the structural categories of the mechanistic world hypothesis readily describe the image of economic behavior developed in the utilitarian and mathematical tradition. As a final note, Pepper also developed a set of secondary categories that are associated with the machine. As discussed in the previous chapter, the

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105 Following his research presented in *The Inexact and Complete Science of Economics* (1992), Hausman (1994:205-208) explains his notion of the "global structure of economics". His structural and metaphysical analysis seems to parallel the structural categories of mechanism as outlined by Pepper. However, Hausman appears to confine mechanism with the definition of economics. Thus, in true monist fashion, what is best seen as a description of the underlying structure (the mechanistic form) of the neoclassical research program, somehow becomes transformed into the definition of economics.
machine has connected to it what Pepper calls ineffectual attachments. The attachments are not important to the internal functioning of the machine; however, since they involve "all the characters of human perception" — and therefore our awareness and conceptualization of the machine — they remain stubbornly connected to the machine and an important set of structural categories (1942:215). Recall that the secondary categories consist of (1) secondary qualities (i.e., the historically specific and multiple determinants of the preferences that are described by utility); (2) a principle for connecting the secondary qualities with the first three primary or effective categories (i.e., they are disconnected and assumed to be given); and (3) secondary laws, if any, for regularities among secondary qualities (i.e., the formation of preferences are suited for the study of psychology, sociology, ethics, etc.). From a philosophical viewpoint, Pepper writes (1942:194):

The two sets of categories seem to be rather loosely attached, and sometimes in the development of world hypotheses they drift apart. A materialist might be defined as a mechanist who ignored or denied the last three categories. Hobbes sometimes comes near to doing this; for instance, when he says that color or sound is nothing but the motions of matter.

In sum, the structural categories of mechanism accurately describe the manner in which neoclassical theory interprets the world. Individuals, the field of exchange, and the "law" of optimizing behavior are readily characterized by Pepper’s primary structural categories. The desire to assume preferences as given and introduce them as a simplified optimizing law into the field of exchange appears to parallel the difficulty that mechanists have long experienced in the history of philosophy integrating matter and

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106 See Lakoff and Johnson (1999:513-538) for a metaphorical analysis of the rational actor model as it is used in game theory.

230
mind, which are reflected in the root-metaphor exposition as the primary and secondary categories, respectively. As we will now see, the root image of a market mechanism was identified and thoroughly explained by Irving Fisher toward the end of the nineteenth century.

Irving Fisher’s Cistern: The Market Mechanism

The portrait of the economy as a market mechanism is not solely a point of criticism in the dissenters of neoclassical economic theory; to the contrary, it is a notable achievement in the continuing refinement of the mechanistic root metaphor in economic theory — a fact not overlooked by many economists. As early as 1892, Irving Fisher proudly and illustratively pointed to the fact that economics should be and is understood in terms of a mechanism. He accomplished this in his doctoral thesis entitled “Mathematical Investigations in the Theory of Value and Prices” (Fisher 1991[c1892]:3-124). He starts his research by recapitulating the boundaries of a scientific economics (following Senior and Mills). In Pepper’s terms, he does his best to put distance between the primary and the secondary qualities of a mechanism in order to specify the proper domain of political economy. He restricts the scope of the inquiry. Fisher writes (1991:11):

To fix the idea of utility the economist should go no farther than is serviceable in explaining economic facts. It is not his province to build a theory of psychology. It is not necessary for him to take sides with those who wrangle to prove or disprove that pleasure and pain alone determine conduct.

The plane of contact between psychology and economics is desire. It is difficult to see why so many theorists endeavor to obliterate the distinction between pleasure and desire. No one ever denied that economic acts have the invariable
antecedent, desire. Whether the necessary antecedent of desire is “pleasure” or whether independently of pleasure it may sometimes be “duty” or “fear” concerns the phenomena in the second remove from the economic act of choice and is completely within the realm of psychology.

We content ourselves therefore with the following simple psychological economic postulate: Each individual acts as he desires.

After identifying all that is excluded from the domain of economic science, he offers a brief discussion on the sense in which utility is a quantity (which correctly interprets utility in an ordinal fashion). Fisher next moves on to his more pressing concern: To show explicitly how the theory of economic choice can be viewed as a mechanism. Fisher writes (1991:24):

Scarce a writer on economics omits to make some comparison between economics and mechanics. One speaks of a “rough correspondence” between the play of “economic forces” and mechanical equilibrium. Another compares uniformity of price to the level seeking of water. Another (Jevons) compares his law of exchange to that of the lever. Another (Edgeworth) figures his economic “system” as that of connected lakes of various levels. Another compares society to a plastic mass such that a “pressure” in one region is dissipated in all “directions.” In fact the economist borrows much of his vocabulary from mechanics. Instances are: Equilibrium, stability, elasticity, expansion, inflation, contraction, flow, efflux, force, pressure, resistance, reaction, distribution (price), levels, movement (and) friction.

The student of economics thinks in terms of mechanics far more than geometry, and a mechanical illustration corresponds more fully to his antecedent notions than a graphical one. Yet so far as I know, no one has undertaken a systematic representation in terms of mechanical interaction of that beautiful and intricate equilibrium which manifests itself on the “exchanges” of a great city but of which the causes and effects lie far outside.

To develop his picture of the market mechanism, Fisher relies on the image of the cistern. According to The American Heritage Dictionary (Newman 1985), a cistern is a receptacle for holding water or other fluids. Figure 2 on the following page is a replication of the
Figure 2: Fisher's Utility Cistern for One Consumer and One Commodity

Fisher (1991[c1892]:27)
cistern presented by Fisher. It is a cistern associated with an individual consumer (I) and a single commodity (N) in the market exchange economy. In the figure, the bottom of the cistern represents the volume that is filled up with an increasing quantity of a commodity that is purchased by an individual. Moving downward in the negative direction, the length of the segment OR along the ordinate OA represents the marginal utility derived from the last unit of the commodity that accumulates in the lower portion of the cistern. The total volume in the lower portion of the cistern reflects the total utility over a specified period of time: however, it is the marginal considerations that interest Fisher. Thus, as the cistern fills up with the \( n \)th commodity, the level measured by the length AR rises and the marginal utility declines. Since the individual is assumed to have no influence on the price that the commodity fetches in the marketplace, the price enters exogenously and is, moreover, equated with the marginal utility of purchasing the last unit of the commodity. Thus, the segment OR represents the equilibrium condition that \( MU = P \) for this commodity. In the limit, the amount of the commodity would fill up the cistern and the consumer would obtain zero utility from the last unit and be willing to pay a price of zero for it. Fisher writes (1991:26):

> Since the market is large enough to prevent any conscious influence on the price by the individual I, he acts with reference to a fixed price \( p \) in dollars. He will therefore consume such an amount of A that its marginal utility in dollars equals that of the price \( p \), that is, the cistern will be filled till \( OR = p \). This is evident, for if *less* should be consumed OR would be greater than \( p \), that is a little more commodity would be valued more highly than the dollars exchanged for it and so would be purchased, and if *more* should be consumed, reverse considerations hold.
Next, Fisher develops his image of a market mechanism to an economy with one commodity and many consumers. This is pictured in Figure 3 on the following page. In the figure, we see the addition of cisterns for many individual consumers (I, II, III, IV, up to N); an injection plug (S) that can increase or decrease the supply of commodities; and an aggregate cistern that represents the total supply of the commodity in the market in addition to the average level of marginal utility and average price level in the market. As can be seen in the diagram, the varying positions of the cistern represent the fact that different consumers have unique preference intensities therefore different marginal utility schedules. Fisher writes (1991:28):

Let [Figure 3] represent the utility cisterns for all individuals I, II, III, IV, ...N, in the market and let utility be measured in money as before, the marginal utility of money being considered constant (say 1 util).

The water in the connecting tubes (represented by oblique shading) does not stand for commodity.

The water will seek its own level. This is exactly what happens in the economic world and may be stated in the theorem: A given amount of commodity to be consumed by a market during a given period will be so distributed among the individuals that the marginal utilities measured in money will be equal. Furthermore, the marginal utility thus determined will be the price.

...If the stopper, *S*, be pressed, more liquid (commodity) flows into the cisterns, there is an inevitable change in the level and the price decreases. When it cheapens to 2, II begins to indulge. It is for the first time "within his reach".

Fisher proceeds in his dissertation to extend the complexity of the cistern system in the consumption (and production) of commodities and generates the standard neoclassical conclusion for the most general case of N consumers and M commodities. Fisher writes (1991:37):
Figure 1: Fisher's Utility Cisterns for Many Consumers and One Commodity

Fisher (1991[c1892]:28)
The marginal utilities of all articles consumed by a given individual are proportional to the marginal utilities of the same series of articles for each other consumer, and this uniform continuous ratio is the scale of prices of those articles.

Thus, the mechanist concludes that in equilibrium consumers will all derive equal marginal utility from each and every commodity and that marginal utility will be equal to the price or level of the water in the cistern system. Figures 4 and 5 are presented for interest only. They simply reflect the seriousness with which Fisher pictures the market as a cistern machine. The reader is encouraged to look at Fisher’s dissertation to appreciate the entire range of cistern systems that he developed for picturing consumption and production as a market mechanism. According to Fisher, Figure 4 is a more complicated cistern system that introduces the notion of a price ratio. Figure 5 represents the various cisterns of the various commodities for the individual I. Figure 6 is envisioned as a plan (a view from above) for Figure 4.

The point is that the exchange economy can be interpreted as a machine and with fruitful results. Fisher writes (1914:44):

The mechanism just described is the physical analogue of the idea economic market. The elements of which contribute to the determination of prices are represented each with its appropriate role and open to the scrutiny of the eye. We are thus enabled not only to obtain a clear and analytical picture of the interdependence of the many elements in the causation of prices, but also to employ the mechanism as an instrument of investigation and by it, study some complicated variations which could scarcely be successfully followed without its aid.
Figure 4: Fisher’s Cistern System Introducing the Idea of a Price Ratio

Fisher (199 [c1892]:38)
Figure 5: An Elevation or Side View of Figure 4 — the Cistern System

Fisher (1991[c1892]:39)

Figure 6: A Plan or Top View of Figure 4 — the Cistern System

Fisher (1991[c1892]:39)

239
Fisher goes on to combine consumption and production and produces a series of cistern pictures and levers to demonstrate his thesis that the market is a mechanism. There is no need to belabor the point and the interested reader is referred to Fisher’s dissertation.\(^\text{607}\)


The effort of the economist is to see, to picture the interplay of economic elements. The more clearly cut these elements appear in his vision, the better; the more elements he can grasp and hold in mind at once, the better. The economic world is a misty region. The first explorers used unaided vision. Mathematics [and mechanism] is [are] the lantern[s] by which what before was dimly visible now looms up in firm, bold outlines. The old phantasmagoria disappears. We see better. We also see further.\(^\text{608}\)

And so concludes a theoretician working in the tradition of mechanism, one of Pepper’s four adequate world hypotheses.

**Circular Flow and Macroeconomics**

Just as the market behavior of individual consumers and firms is modeled in a mechanistic fashion, analysis of the macro economy is also performed along mechanistic lines. Principles texts rely on a simplified pictorial device, the circular flow diagram, to represent the aggregate streams of income/expenditures in an economy. The continual

\(^{607}\) Also, the reader is referred to Fisher (1991[c1892]:35) where the author develops a list of mechanical analogues between physics and economics (e.g., particle corresponds to individual, space corresponds to commodity, force corresponds to marginal utility or marginal disutility, work corresponds to disutility, energy corresponds to utility).

\(^{608}\) Please note that throughout his exposition of the market mechanism, Fisher presents the mathematical apparatus that corresponds to the mechanical pictures.
flow of monetized economic activity is mechanical in the same way as is the cyclical motion of an internal combustion engine.\textsuperscript{109} In advanced texts, mechanistic modeling takes the form of the comparative static apparatus. As mentioned in the section on formalism, comparative static analysis is typically accomplished using the conceptual categories originally presented by Keynes and further developed in the national income accounting system. The now familiar categories and subcategories of national income/expenditure accounting are formalized as endogenous variables (e.g., the kinds of expenditure characterizing the aggregate machine) and exogenous variables (e.g., shocks or policy tools that are external to the functioning of the machine). These variables are then incorporated into a comparative static model that logically summarizes (simultaneously solves) a set of assumed linear relationships between the variables. In turn, a set of comparative static derivatives are generated that permit an evaluation of how exogenous shocks to the machine translate into movement of the endogenous variables.\textsuperscript{110} For example, based on the comparative static derivatives, the model makes predictions such as the following: given an exogenous change in consumer preferences in the consumption function or a change in federal reserve monetary policy, what is the impact on the price level and quantity exchanged in the economy. I present three mechanical representations of the macro economy. Figure 7 is a simplified version of the aggregate market machine passed on from the classical economists (Hollis and Nell 1975:15). This

\textsuperscript{109} Georgescu-Roegen (1971) covers this idea thoroughly in Entropy and the Economic Process.

\textsuperscript{110} Refer to Chiang (1984:179-186 and 213-225) for a technical presentation of comparative static analysis and a variety of examples illustrating its application to economics.
Figure 7. Circular Flow Diagram Reflecting the Classical View

Hollis and Nell (1975:15)
vision portrays a cyclical machine that is always in equilibrium, a notion codified as Say’s Law. Figure 8 is a Marxian interpretation of circular flow with class relations embedded in the model (Hollis and Nell 1975:16). Figure 9 presents a mechanical representation of the circular flow of money in a financial economy (Newlyn 1971[c1962]:151).

Building on the idea of primary and secondary categories presented by Pepper (refer to Table 3, page 107), the endogenous portion of the comparative static macro model represents the effectual market machine. In terms of the mechanistic world hypothesis, the endogenous portion constitutes its primary categories, what Pepper refers to as the particulars/parts, the field of location, and the laws causally holding the parts in relation to one another. As with the lever, the effectual mechanism is characterized as operating by efficient causation, that is, it operates by applying direct or indirect push/pull effort. In sum, the variables that describe the endogenous portion of the machine are functionally related through sets of linear equations, which describe the market machine’s operation in fundamentally the same manner as the equations that describe a lever. The exogenous variables represent the ineffectual portion of the market machine, which Pepper refers to as the secondary categories. The secondary categories are not necessary for the operation of the machine; however, they remain attached to it and are essential for its complete description. According to Pepper, these attachments are the qualities related to perception or the human mind, without which we would not be able to experience the mechanistic properties of the universe, including an analysis of the market machine. Thus, without an awareness and understanding of the market machine, we would be unable to make adjustments to the “levers” (as expressed by the comparative static relationships) for
Figure 8 Circular Flow Diagram with Embedded Class Relations

Hollis and Nell (1975:16)
Figure 9 Circular Flow Diagram of the Monetary Economy

Newlyn (1971[c1962]: 18)
relationships) for the purpose of controlling or stabilizing the economy.

Two basic features distinguish the form of the primary categories in aggregate interpretations of economic activity and analysis from those dealing with maximizing individual choice. First, the particulars or 'parts of the lever' that exist in the field of location, which remains the field of market exchange, are not individuals. Instead, the particulars of the comparative static analysis are conceptual/statistical aggregates of incomes and expenditures attributed to the activities of individuals and groups of individuals in the economy. Second, whether the equations that make up the model are purely structural (i.e., statistical and without humans) or are structural but derived based on an assumption of rational optimizing decisions of individuals, an equilibrium condition is typically imposed on the model. Thus, an equation describing expenditures (e.g., \( C+I+G+(X-M) \)), which is initially constructed as 'identically equal' to income, becomes functionally related to income by the imposition of an equilibrium condition. Those who believe in the importance of microfoundations do incorporate law-like behavior (rationality as constrained optimization) into the field of location — the field of market exchange — prior to performing a conceptual aggregation. However, there exists a level of ambivalence within the profession about developing structural equations that incorporate a law into the field.\(^{111}\) It appears as if the introduction of equilibrium is based on either a

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\(^{111}\) See Searth (1988:1-21) for a discussion of how macro theorists attempt to derive structural equations for the macro economy by reducing the aggregate functions (for the firm and the consumer) to problems of constrained maximization or individual behavior. Searth acknowledges the potential limitations of finding 'microfoundations' for macro equations. He writes (1988:20): "Another consideration has kept many macroeconomists from working toward a more elaborate, formal microeconomic base for conventional macro models. This problem is aggregation issues. The conclusion emerging from the
philosophical or normative belief in equilibrium or a perceived pedagogical benefit that comes from relying on the logical/deductive structure supporting predictions associated with the comparative static derivatives. Thus, it is acceptable to introduce law-like behavior into the model by combining an assumption of a linear relationship between the variables with an equilibrium condition. This permits the analyst to find a solution for the equations that comprise the model. Static comparative predictions generated by the model can then be tested statistically using econometric techniques. The law-like behavior captured by the structural macro model is in essence an appeal to the 'law of large numbers'.

The idea of a set of secondary categories describing a mechanism, which are the ineffectual attachments to the machine, brings up an interesting point relative to macroeconomic modeling. Recall that the secondary qualities relate to all the non-effectual attachments associated with the cosmic machine, and in the case under consideration, the machine describing the macro economy. As we have seen, the primary categories deal with effectual 'material considerations' — the properties inherent to the efficient functioning of the market machine and its representation in terms of efficient causation. The secondary categories deal with the ineffectual 'mind considerations' that are necessarily attached to the machine. According to Pepper, the importance of these ineffectual categories cannot be underestimated for it is through the secondary categories
that we gain awareness and understanding of the effectual cosmic machine. Pepper writes (1942:216):

The farther mechanism is carried out the more obvious it becomes that the effective underlying cosmic machine is quite out of sight in all its workings. The extension and duration of ordinary perceptions are not the spatiotemporal structure of the cosmic field. Those have constantly to be corrected by measurements of rule and clock and further corrected by mathematical formulas for probable error, the final result not even then being a precise description of the cosmic field structure, but only a statistical approximation. It is likewise, and even more patently, with other qualities such as weight, mass, charge, and the like. What we experience are secondary qualities only, from which as evidences we infer the mechanical efficient structure of the universe.

Applied to macroeconomic theory, mechanism’s secondary categories conjure up the idea of expectations, specifically rational expectations, in contemporary neoclassical/ne-Keynesian macro models. Intuitively, one would think that expectations belong to the realm of human perception and are not intrinsically part of the effectual cosmic machine. Just as any attempt at realistic description of individual preferences may be informed by a complex interaction of rationality, duty, and tradition, the process of expectation formation is no less impervious to the non-mechanical world, where resides the secondary qualities that permit understanding and influence the outcomes generated by the effectual machine. However, in the hand of most contemporary schools of macroeconomics, the theoretical endeavor to incorporate expectations into macro models has been carefully circumscribed and referenced only as it pertains to the primary categories. As a matter of practice, macroeconomists limit their interpretation of expectations when they build a simple expectation algorithm into the model. This avoids having to theorize a complex process of expectation formation. Philosophically speaking, Wible (1990) argues that
neoclassical economists (i.e., Milton Friedman, etc.) defend unrealistic assumptions involving expectations along instrumentalist lines. The use of simplistic mathematical analogues is methodologically justified if the model predicts well or is empirically successful.

Early attempts at introducing expectations into macro models involved ‘adaptive expectations’, which portrayed agents’ expectations of the price level as a lagged, mechanical adjustment process. Adaptive expectations maintained a healthy distance from considerations of the secondary attachments to the market machine. Although believed to realistically describe the nature of the expectation adjustment process, adaptive expectations are still a mechanical analogue introduced into the macro model. However, according to equilibrium theorists they are ‘irrational’ because agents waste information. Critiques often refer to adaptive expectations as ‘backward looking’. Even more disconcerting to equilibrium theorists, adaptive expectations implied that some markets remained out of equilibrium or did not clear. For example, if agents in the labor market are slow to adjust their price level expectations when the model predicts a price level change, they will overestimate the value of their expected real wage. This is referred to as ‘money illusion’. As a result of money illusion, the quantity of labor supplied to the labor market would be too high based on an incorrectly perceived real wage. The labor market would be in a state of disequilibrium. Output would be too high and unemployment too low (relative to some defined natural rate). Thus, adaptive expectations had the theoretical shortcoming of keeping macro models out of equilibrium for periods of time.
depending on sluggishness with which price level expectations adjusted to the actual price level.

A machine out of equilibrium is not a properly functioning cosmic machine and calls for refinement. A further refinement of the mechanist root metaphor in macroeconomic theory can be identified by the introduction of rational expectations (RE) into macro models. The RE hypothesis is basically a technical adjustment that serves to keep the macro model in equilibrium at all times, and as such, it is portrayed as an improvement over adaptive expectations. RE ensures the proper functioning of the cosmic machine, but based on Pepper's explication of the mechanist world hypothesis, RE must be viewed as a very limited kind of improvement over adaptive expectations. In terms of Pepper's distinction between primary and secondary categories, the RE hypothesis is concerned most directly with the primary categories; thus, the difference between adaptive expectations and rational expectations is one of degree not kind. It appears that attention given to the highly unrealistic nature of the assumptions underlying RE have encouraged a broader discussion of the expectation formation process that carries over into Pepper's idea of the secondary categories descriptive of the mechanist world hypothesis. This idea will be discussed shortly.

In general terms, the RE hypothesis maintains that agents in the economy use all available information in forming their forecasts of relevant aggregate variables. Common sense tells us that optimal behavior would be no different. Moreover, the RE hypothesis is not necessarily an accurate description of the actual expectation formation. Nor do its adherents make claims that it is a realistic representation. In fact, the rational expectation
hypothesis dramatically restricts the explanation of the expectation formation process by making expectations identical to the prediction generated by the model. The key is to represent agents as formulating expectations rationally, based on maximizing the use of information, and not theorizing the complex nature of expectation formation. This approach is not concerned with the idea that expectations are based on a complex process associated with the manner by which the human mind understands. John Muth, creator of the RE hypothesis, writes (1961:316):

I should like to suggest that expectations, since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory.

To which Sheffrin adds (1984:5):

Muth noted that many economists, including Simon, thought that theories based on rational behavior were inadequate to explain observed phenomena. Muth argued the exact opposite point: Existing economic models did not assume enough rational behavior. One way to ensure this rationality was to insist that expectations of economic actors be consistent with the models used to explain their behavior. Muth’s insight was that it was possible to require economic agents to form expectations of economic variables by using the very model that actually determined these variables. This ensured that the behavior of the model was consistent with individual actor’s beliefs about the behavior of the economic system.

Thus, like adaptive expectations, the nature of rational expectations is best explained as a mechanical and mathematical device that is embedded in the macro model. The mathematical sense of rational expectations has been directly articulated by rational expectation theorists from the time of its introduction into the body of thought. Quotes from William Poole, Thomas Sargent, and Robert Lucas easily illustrate the point:
The rational-expectations hypothesis is that the market’s psychological anticipation, P_{t-1}, equals the true model’s expectations, E(P_{t-1}) (Poole 1976: 468).

Rationality amounts to requiring that the public’s expectation of the exogenous variables m, Z, and pop, equal the mathematical expectation computed from the appropriate objective probability distributions (Sargent 1976: 211).

Learning, uncertainty... These things have a lot to do with information. Learning, for example is a red herring. According to the way I look at things, this is just a question of how you like to think about probabilities... (Lucas in Klamor 1984:39).

Wible (1990) offers a methodological view of this well-contained and limited view of rational expectations, couching his explanation in terms of positive economics often defended on instrumentalist grounds (e.g., Friedman 1953). Wible writes (1990:148):

Leading RE theorists confine the concept of information to explicit, objective knowledge. RE theorists typically conceive of knowledge as something quantitatively describable as a probability distribution and its measures of central tendency like a mean. A rational expectation is the equivalent to the mathematical expectation of a stochastic economic model and nothing more.

In addition to being purely mathematical, the mechanical nature of rational expectations is readily apparent in the economic literature. According to Robert Lucas, rational, self-interested agents involved in an economic transaction can be characterized for analytical purposes using primates rather than human beings. Lucas writes (1980:710-711):

To be more concrete, consider the question: How will a monkey that has not been fed for a day react to a banana tossed into its cage? I take it we have sufficient previously established knowledge about the behavior of monkeys to make this prediction with some confidence. Now alter the question to: How will five monkeys that have not been fed for a day react to one banana thrown into their cage? Now in this competitive situation, and given sufficient information as to how individual monkeys are willing to trade-off backscratching and banana eating, we can predict the outcome of this interaction (equilibrium price and quantities exchanged), at least given sufficient computation ability.
This train of thought is further pursued by Lucas and Sargent (1981) in the introduction to a collection of essays in *Rational Expectations*. They interpret rational expectations by alluding to pigeons and robots. Lucas and Sargent write (1981:viii and ix):

> Experimentally one can think ... of the classical Skinnerian animal experiments, and of much successful research in psychology and education....One would need to know a great deal about pigeons in order to construct a robot which would serve as a good imitator of an actual pigeon in Skinner’s tests. As time series econometricians, we are in the position of attempting to do exactly this, using observations only on pigeons in their natural environment.

Thus, it is relatively straightforward to see that the introduction of rational expectations into macro models is mechanical in nature, assuming a black box approach to human behavior. Moreover, in terms of Pepper’s explication of mechanism, it can be interpreted as an instance of a mechanism that is completely detached from the secondary categories. Pepper believes that such truncated mechanistic theories, which he termed materialist versions of mechanism, suffered from being very limited in scope (1942:194).

Wible (1990) offers a critique and possible solution to the problem of limited scope encountered by the RE hypothesis that resonates with Pepper’s characterization of materialist versions of mechanism. Recall that Pepper states that the development of the mechanist world hypothesis in philosophy involves attempts at resolving the mind/matter dichotomy — that is, in terms of constructing a consolidated mechanism that attempts a complete integration of the primary and secondary categories by subsuming the qualities of the mind into the law-like structure of the field or mechanical universe. Thus, the mind is viewed as being a product of the law-like structure of the universe and, therefore, capable of being conceptualized as an integral part of (as opposed to being discrete from)
the ‘effectual’ machine. According to Pepper, this trend toward consolidation within the mechanist world hypothesis goes hand-in-hand with attempts at refining the special theory of truth associated with mechanism. In his critique of the instrumentalist defense of rationality (the idea that unrealistic assumptions are fine so long as the model gives good predictions), Wible presents the positions of Polanyi (1966), Hayek (1952), and Popper and Eccles (1977) as examples of more complex explanations of rationality. According to Wible, these writers maintain that the predictive success of models relying on the model of rational economic man can be meaningfully extended beyond Friedman’s (1953) purely instrumentalist defense, in which Friedman claims that the billiard player does not require conscious awareness of mathematical physics to play pool. Instead, according to more complex interpretations, human senses are constructed so as to provide extensive though limited knowledge about the external world. That is, the human senses reflect and are structured consistent with the laws of the mechanical universe. Therefore, our knowledge may be tacit knowledge that can be understood a conditioned or rule-governed behavior and not in terms of a simple maximizing algorithm. This is suggestive of an attempt at a consolidated mechanism along the lines described by Pepper. Wible writes (1990:146):

The billiards player as such does not have to worry about the laws of physics because his body is constructed to conform with the laws of mechanics and of course biology. When playing billiards, an individual is anatomically constrained from violating the simple laws of Newtonian mechanics. Tacit knowledge arises from the very manner in which our physiological being is constituted.

Pursuing this same theme, Wible goes on to mention a similar interpretation of the role of central nervous system in allowing for tacit functioning in more complex social processes of social interaction, such as the market. Wible adds (1990:147):
Similarly for individuals functioning in complex processes of social interaction like the market requiring the cognitive or higher mental processes, the human central nervous system seems to be structured to take in much more information than is self-consciously perceived. Brain scientist Karl Pribram theorizes that patterns of information are perceived and processed as sequences of wave patterns forming miniature holograms in the brain. Patterns of activity originating in our external environment are continually being transmitted to our brains.

In spite of the fact that the theorized patterns of information are holograms, (i.e., not mechanical), presumably the structure and functioning of the central nervous system is part of the mechanical universe and, therefore, is constrained in some fashion by the laws of this universe. Again, this approach referenced by Wible appears to parallel Pepper's discussion of the integration of the primary and secondary categories of mechanism for the purpose of creating a cosmic machine with increased scope and adequacy.

The introduction of rational expectations led to the "policy ineffectiveness postulate" of the New Classical school of thought. As the argument goes, any meaningful attempt at demand management on the part of the policy must be systematic in nature. Why would the government want to surprise agents in the economy if it is their welfare that they have in mind? Thus, the strong version of the rational expectations model implies that there is no role for demand management policies on the part of an intervening agent, such as the government, in the context of an economy where there are no surprise shocks to the machine. In short, it is an antidote to years of demand management on the part of the government in the aftermath of the Great Depression. Be that as it may, surprises and unanticipated shocks — shifts in aggregate demand and aggregate supply — do occur in the macroeconomic environment. The question remains: Can the machine...
always bring itself back to equilibrium, or does it require intervention? The Keynesian model is inherently mechanistic; moreover, the application of the model via the public policy channel was also mechanistic over the decades after the Great Depression. Yet, the value of the Keynesian model does not come from its timeless nature and its determinant equilibrium, but from the way theoreticians and policymakers use it to explain disequilibrium at any given moment in the historical trajectory of macro economy. Thus, the weaker interpretation of RE has reminded economists and policymakers that even the most complex multiplier models do not lead to solutions that can be mechanically relied upon. However, given its own very mechanical theoretical nature, RE does not appear to place emphasis on developing a complete consolidation of Pepper’s secondary categories (the whole of human perception). Instead, RE is content to integrate the ‘mind dimension’ into the macro model in a reduced and limited fashion.\textsuperscript{112} In spite of its public policy implications, Pepper would likely claim that the rational expectation model is a machine that has lost touch with its mind — a variety of mechanism he calls materialism. What is needed is a more meaningful role for the secondary categories, insofar as it is through these qualities that we even have a perception of the cosmic machine. It is this perception that keeps the theoretician and the policymaker attached to the material dimension of the cosmic machine. Finally, I suggest that what is most important is not how macro theorists attempt to place expectations into the market machine (model); after all, like preferences.

\textsuperscript{112} It may also reflect the categorial fact pointed out by Pepper that the inability to resolve the mind/matter dichotomy (i.e., to develop a completely consolidated mechanism) is experienced as a pull toward contextualism (Pepper 1942:221-231).
expectations really cannot be explained without recourse to psychology, sociology, culture, history, etc. As a result, any attempt to place them within a representation of the machine will be very limited and reductionist at best. In any case, the introduction of rational expectations can be seen as the working out of the primary categories and the rightful return of equilibrium to the machine. However, the philosophical question remains: Within mechanism, is it necessary to disconnect the ineffectual secondary categories from the effectual primary categories of the machine? It seems reasonable to claim that it is worthwhile to retain the model of the market machine as an object of our perception (a secondary category) and use it to understand the nature of the economy at various points in time and in different contexts so as to be able to have a better idea of where to find the chinks in the machine. However, one may wonder if this is theoretically appealing without a more adequate incorporation of the secondary qualities into the theoretical depiction of rational expectations, perhaps along the lines pointed out by Wible (1990).
CONTEXTUALISM AND ECONOMIC THEORY

Contextualism and organicism have much in common. In terms of their structural categories, both theories employ a synthetic mode of reasoning, which is to say that both world hypotheses involve consideration of wholes. In the case of organicism, wholes are envisioned as complexes. In analytical inquiry, these wholes are attained through the progressive categories and connected to one another in an integrative plan describing a historical process. The integrative plan links one organic whole to another more inclusive organic whole. This leads to the image of a vertical temporal structure or, as Pepper says, a vertical cosmology. In the case of contextualism, wholes relate to the intuited meaning associated with (or read off of) a given event. In analytical inquiry, understanding of the ‘re-presented’ given event involves the action or experience of solving a problem, which is conditioned by the total meaning or the intuited whole of the event. However, the actual analysis of the event occurs through its texture, which is situated in a particular context replete with a web of relations referred to as strands. Recall that Pepper uses the example of the action of writing the phrases/words of the sentence to illustrate texture, context and strands. To satisfy the analytical tendency, the theoretical endeavor approximates the intuited meaning by giving detail to the various strands that form the texture and feed into the context. In contextualism, the idea is to solve or explain a given problem situation. As a result, contextualism, in spite of the fact that its structural categories continuously reflect change and novelty, does not possess a definite or important temporal structure. The ‘specious present’ simply reflects a qualitative duration conditioned by the intuited
meaning. Time is encapsulated in the specious present. Thus, the contextualist analyzes the given moment by exploring the details that comprise the immediate landscape of the given moment. Pepper describes contextualism in terms of a horizontal cosmology. In organicism, the idea is to explain the sequential steps of a process by which our knowledge approximates a series of organic wholes. In contrast, contextualism is concerned most forcefully with only one organic whole — the moment containing the given event that is being represented.

It is possible to see the active solution of a contextualist problem. Its analytical description is conditioned by a focused meaning, as but one whole that may be (or may not be) integrated in an organicist account of historical progression. For example, it is possible to see that the metatheoretical taxonomy presented in *World Hypotheses: A Study in Evidence* is a “contextualist creature”. On one level, Pepper wrote the essay at a particular historical juncture with the stated aim of preventing the philosophy of science from being overtaken by the dogma of the positivist impulse. Overcoming the dominance of positivism, which blocked pluralism, was the desired satisfaction that the essay sought to redress. Ironically, Pepper relied on a formal presentation to help his reader make sense of the blocked situation. Regarding the context of his own given moment, Pepper writes (1942:vii and vili):

> By now my old drive for the truth was directed toward the study of evidence and hypothesis — toward a reliable method rather than a reliable creed. And at this moment the logical positivists appeared on the scene with a nostrum made to order just along these lines. My immediate reaction to them was suspicious and hostile. I felt from their attitude and the tone of their statements, even before critically studying them, that they were not meeting the problem that needed to be met. I doubted if many of them had ever fully felt the problem. This was the
question of truth and of the justification of human values. To think that this question could be met in the manner of a puzzle and in terms of correlations, statistics, mathematics, and language struck me as fantastic. Here was method running away with the issues, evidence, and value itself. It was, as Loewenberg once remarked, methodolatry...

But the attack of the positivists on world theories did bring out the fact that there was more in physics which stood on its own feet with support of theory than I had been previously willing to allow.

Now all this material seems to have come to a sort of stability in the book that follows. Here I believe is the truth about these things, as near as we can get at it in our times. Or rather, here is the attitude and here are some of the instruments that can bring it to us.

At the very least, here is the solution that seems best to one man, living in the first half of the twentieth century, who has passed through most of the cognitive experiences we have been subject to: religious creed, philosophical dogma, science, art, and social revaluation.

Yet, on a more critical level, the four “forms” that Pepper brings to the table reflect the fact that Pepper primarily viewed the theoretical endeavor through a contextualist lens. As previously mentioned, the root-metaphor method views the theorist as a pragmatic actor when it comes to analyzing commonsense evidence. The root-metaphor theory reflects the pragmatic approach used by theorists when they elevate commonsense (uncriticized) evidence into the realm of criticized evidence. The history of cognition is replete with the works of philosophers who attempt to explain the world through a root metaphor that makes sense to them. Thus, it can be seen that Pepper relies on a contextualist perspective not only to generate a description of contextualism, but also a description of the remaining three world hypotheses.113

113 Refer to page 73 for a discussion of reflexivity as it relates to Pepper’s root-metaphor method and citations to the reflexivity literature.
Before proceeding to the illustrations of the contextualist approach in economic theory, it is necessary to make a distinction between the use of the structural categories unique to contextualism and two more restrictive metaphors, which are often associated with institutional and/or evolutionary economics. At the turn of the century, institutionalists were influenced by developments surrounding Darwin's Biological Theory of Evolution. As a result, those working in a Veblenian tradition were quick to latch onto Veblen's emphasis on theories of social transformation. Recall that it was Veblen who confronted the discipline of economics in an article entitled "Why is economics not an evolutionary science?" (Veblen 1965[c1931]:215). It was Veblen who pointed out that 'the institution' could be conceptualized as the 'unit of heredity' or the 'gene equivalent'. This is the necessary generative entity capable of being relatively stable, yet susceptible to change. This powerful combination of attributes is what makes it possible to separate that which is 'relatively fixed' from that which mutates. Without some kind of enduring structure it is difficult, if not impossible, to judge change. Hull (1997) points out that without such a 'genetic mechanism' the Biological Theory of Evolution remained on a tentative scientific footing. Analogously, it was Veblen's idea to identify the 'institution' (as seen through cultural traits and habits of thought) as just such a 'generative mechanism'. In so doing, he shows how economic theory could proceed as an evolutionary science. The first point to be made is that this distinct theoretical development, which has been associated with Veblen, in and of itself fits better into the formist account of subsistence and existence than it does with contextualism. The formist structural categories can handle this particular interpretation of Veblen. The institution is
given "scientific status" by virtue of the fact that it has been identified as an underlying form through which actual outcomes in various economic systems — specifically late nineteenth century capitalism for Veblen — could be identified, explained and understood. Thus, when considering the relationship between contextualism and institutionalism, one must take care to discriminate between a formist interpretation of evolution adopted by some institutionalists and the contextualist focus on change as depicted by the given moment. Moreover, it tends to limit contextualism to a notion of the biological metaphor, which as we have seen in the discussion on Capra is confusing since the biology possesses formist, mechanist, organicist and contextualist interpretations.

More recently, institutional economics has become associated with evolutionary theory by virtue of its connection to the "ecological metaphor". I believe that there is much to be learned by seeing a correspondence between social relations in an economy and the image of the ecological system in the life sciences. Indeed, the natural ecology and social institutions both have an affinity toward contextual interpretation, to the deployment of the contextualist structural categories. There is overlap between a naturalist's description of emergent qualities in an ecological system and an institutionalist account of emergent qualities in a socioeconomic system. However, care must be taken not to transfer meaning too literally from an ecological perspective; as in the case with biology, I expect ecological inquiry possesses formist, mechanist, organicist and contextualist interpretations. To understand the full scope of contextualist interpretations of the subject matter of economics one must avoid rigidly restricting "contextualist economics" to an ecological methodological presentation such as one finds in the life
sciences. Instead, it is paramount to first focus on the structural categories of contextualism, which are universal across all domains of scientific inquiry. The inherent danger is that the field of ecology, like the field of economics, will inevitably have formist, mechanist, organicist, as well as contextualist interpretations of its respective evidence and facts. The purpose is best served if ecology, institutional economics, or hybrids such as ecological economics are viewed directly in terms of the contextualist structural categories. Thus, a reliable way to see economic theory in a contextualist light is to focus on the contextualist structural categories, or the root metaphor of contextualism. I will now focus on a contextualist interpretation of institutional economics found in the work of the old institutionalism pioneered by Veblen.

* Veblen's Contextualist Approach to Theorizing Capitalism *

Following the structural categories developed by Pepper, a contextualist analysis involves locating "various strands within a context". The strands and their context, which together constitute the texture of the contextualist analysis, derive their qualitative meaning in reference to the total meaning of a given event. Simultaneously, the act of theorizing is an attempt to convey the intuited meaning of the whole event. The idea of the contextualist analysis is to develop an interpretation or "re-presentation" of a problem associated with the given event and a solution or satisfaction to the blocked activity. Of course, there is no absolute necessity for the problem to have a solution; it may remain blocked in a given setting. In either case, the essential impetus of the contextualist
analysis is to explore in depth the given moment. In reviewing essays summarizing and
critiquing Veblen’s writing, it is common to see commentators highlight the evolutionary
aspect of his work.\textsuperscript{114} The tendency is to identify his theoretical contribution as one that
focuses on social transformation based on cumulative causation emphasizing cultural
sequence. Dugger and Sherman write (1997:992):\textsuperscript{115, 116}

Institutionalists, particularly Thorstein Veblen and his followers, work in the
tradition of cumulative causation that emphasizes cultural sequence. The works
of Thorstein Veblen and Clarence Ayres have been highly influential and have as
a common element the idea that human behavior is cultural, where cultures
evolve as behavior changes and as causes of that change.

\textsuperscript{114} For those interested in revisiting Veblen’s writing in light of Pepper’s model of contextualism, a good
place to start is the Journal of Economic Issues. The following list is a sample of articles dating back to
“American Institutionalism: Premature Death, Permanent Resurrection” Vol. XII(2); Nicholas Georgescu-
Differences between Institutional and Neoclassical Economics” Vol. XIII(4). The journal continued to
publish articles throughout the 1980s and 1990s that attempted to characterize the methodology of
institutional economics or critically evaluate the work of economists such as Veblen, Common, Ayres, etc.
In addition, the Cambridge Journal of Economics published a special issue on Veblenian evolutionary

\textsuperscript{115} In an article entitled “Veblenian Institutionalism: The Changing Concepts of Inquiry,” William
Dugger (1995:1013-1023) formalizes the seven “concepts of inquiry” identified by Ayres (1952, 1961 and
1978) in his synthesis of Veblen and John Dewey. More importantly, consistent with the notion of change
and novelty, the ineradicable structural categories that constitute contextualism (Pepper 1942:235),
Dugger examines how these concepts of inquiry have changed in Post-Ayresian applications over the half
century following the Ayresian Synthesis.

\textsuperscript{116} Dugger and Sherman’s (1997:991-1009) article, entitled “Institutionalist and Marxist Theories of
Evolution” is a good example of how eclectic formations emerge that tend to blur the structural categories
between world hypotheses. In this article, the authors focus on the interplay of interpretations drawing on the
‘evolutionary’ dimension in both world hypotheses. Dugger and Sherman write: “Institutionalism and
Marxism both provide concepts for describing and explaining how societies evolve, but branches of each
also can become reductionistic and teleological when isolated from the ideas of the other tradition
(1997:991). Institutionalism is a powerful school of thought, but a branch of it has tended to degenerate
into “progressivism” — the belief that technological change inherently leads to progress and that
resistance to such change is inherently regressive and futile. Marxism is also a powerful school of
thought, but a branch of it has tended to degenerate into “economism” — the belief that technological
change and maximum economic gain comprise the sole driving forces of social change.
As an example of this, consider the cultural sequence of predation, business, and industry that Veblen develops in *The Instinct of Workmanship*. These institutions or habits of thought describe the predatory or dynastic class, the owning or business class, and engineering or industrial class as they are expressed culturally in different socioeconomic systems across the ages. With respect to the cultural sequence of the business aptitude.

Dugger and Sherman write (1997:993):

> The members of the owning class are relatively peaceful, compared to the more ancient ruling class. Their ownership is safe only after the violence of the ruling class has been chained down by constitutions, separation of powers, and other limitations placed on its arbitrary exercise by dynastic ruling classes. The owning or business class is both a class formation and a cultural sequence whose more peaceful nature has allowed for a slightly freer play of the instinct of workmanship in the underlying population.

Developing his idea of cultural transmittance and the instinct of workmanship, Veblen writes:

> ...On the other hand, the habitual elements of human life change unremittingly and cumulatively, resulting in a continued proliferous growth of institutions. Changes in institutional structure are continually taking place in response to the altered discipline of life under changing cultural condition, but human nature remains specifically the same (1965[c1951]:306).

At the outset, therefore, as it first comes into the life-history of any one or all of the racial stocks with which modern inquiry concerns itself, this instinctive disposition will have borne directly on workmanlike efficiency in the simple and obvious sense of the word. By virtue of the stability of the racial type, such is still its character, primarily and substantially, apart from it sophistication by habit and tradition. The instinct of workmanship brought the life of mankind from the brute to the human plane, and in all the later growth of culture it has never ceased to pervade the works of man. But the extensive complication of circumstances and the altered outlook of succeeding generations, brought on by the growth of institutions and the accumulation of knowledge, have led to an extension of its scope and of its canons and logic to activities and conjectures that have little traceable bearing on the means of subsistence (1965[c1951]:323).
Indeed, Veblen theorizes that the ‘efficiency engineers’ comprising the industrial class are a recent class formation, which emerges in order to address the technological ineptitude of the owning/business class. Relative to social transformation, one could just as well point to Veblen’s focus on cultural sequence in the introduction to Theory of the Leisure Class. Here again, the focus is on emergence as part of a cultural sequence. In this instance, it is the emergence of an exploitive leisure class in the “higher barbarian societies” and the particular form it takes in the capitalist socioeconomic system in the late 1800s and early 1900s.

While it is true that the structural categories of contextualism must accommodate change and novelty (i.e., a notion of an open and emergent system), the emphasis of the contextualist analysis turns on the qualitative meaning of a given event that is contained by the specious present. Indeed, a historical sequence is the outcome of social transformation and the flow of specious present into another; however, adhering to the root metaphor identified by Pepper, it is the theoretical treatment of the given event that constitutes the unique impulse of contextualism. Thus, even with the notion of cultural evolution operating, it is Veblen’s ability to view the meaning and the richness of the particular problem confronting capitalism that distinguishes his approach as contextualist. Accordingly, in The Instinct of Workmanship, it is the professional class of efficiency engineers that greatly interests Veblen. In Veblen’s analysis, the efficiency engineers are a class formation and a cultural sequence. But, it is the fact of their emergence and their associated form at a particular stage in capitalism that captures the contextualist impulse in Veblen’s thought. According to Veblen, businessmen/owners recognized their own
inadequacies in understanding the technical aspects of technology. The development of the industrial class of engineers mitigated this problem by instituting habits of thought competent in industrial ways of knowing and therefore capable of keeping the machines running. Thus, concerning the purpose of the industrial class of efficiency engineers relative to the owning class of businessmen, Veblen writes (1965[c1951]:4:222):

... the modern businessman is necessarily out of effectual touch with the affairs of technology as such and incompetent to exercise and effectual surveillance of the processes of industry.

So, a professional class of 'efficiency engineers' is coming into action, whose duty it is to take invoice of the preventable wastes and inefficiencies due to the business management of industry and to present the case in such concrete and obvious terms of price and percentage as the businessmen in charge will be able to comprehend.

In a similar fashion, Veblen keeps the focus on the given moment in A Theory of the Leisure Class. As a result, his analysis is able to penetrate deep into the relationship between the leisure class and the working class operating in late 18th century capitalism. The habits of thought associated with the concepts of 'pecuniary emulation', 'conspicuous leisure', and 'conspicuous consumption' suggest possible reasons why the working class is not predisposed to rise up against the owning class. The working class is more inclined to emulate the habits and customs of the owning class because of the honor it brings to the individual. Veblen writes (1944[c1919]:17):

The end of acquisition and accumulation is conventionally held to be the consumption of the goods accumulated — whether it is consumption directly by the owner of the goods or by the household attached to him and for this purpose identified with him in theory. This is at least felt to be the economically legitimate end of acquisition, which alone it is incumbent on the theory to take account of. Such consumption may of course be conceived to serve the consumer's physical wants — his physical comfort — or his so-called higher
wants — spiritual, aesthetic, intellectual, or what not; the latter class of wants being served indirectly by an expenditure of goods, after the fashion familiar to all economic readers.

But it is only when taken in a sense far removed from its naive meaning that consumption of goods can be said to afford the incentive from which accumulation invariably proceeds. The motive that lies at the root of ownership is emulation; and the same motive of emulation continues active in the further development of the institution to which it has given rise and in the development of all those features of the social structure which this institution of ownership touches. The possession of wealth confers honour; it is an invidious distinction. Nothing equally cogent can be said for the consumption of goods, nor for any other conceivable incentive to acquisition, and especially not for any incentive to the accumulation of wealth.

By exploring the cultural landscape in order to explain the meaning of the emergence of capitalism, Veblen's analysis takes a different tack than Marx's approach, which tends to treat the conflictive relationship surrounding production and distribution in terms of an essentialized pair of social classes, the working class and the owning class, for yet another purpose. The contextualist tendency implicit in the analytic approach employed by Veblen allows him to be more concerned with explicating the meaning of a given moment descriptive of a stage in the capitalist socioeconomic system. Veblen treats the observable habits of people very descriptively and with much care, much like an anthropologist. In terms the contextualist world hypothesis, this is the hallmark and defining feature of Veblen's brand of theorizing economics. Thus, the irrationalities and inefficiencies of the owning/business class (the blocked strand) led him to conceive of the emergence of a "third class" — the efficiency engineers — which was a cultural development instrumental in overcoming the problems associated with the growing

117 The organicist impetus will be considered shortly.
discrepancy between the pecuniary interests of the modern owning class and an understanding of the proper use of new technology (i.e., machinery) for efficient ends. In a similar fashion, the concept of pecuniary emulation permitted Veblen to consider alternatives other than class revolution. Dugger and Sherman (1997) appear to acknowledge this distinction in their analysis of Marxism and class conflict theory. They appear to touch upon one of the key differences between the contextualist approach (which is wider in scope, less precise and possesses a horizontal cosmology) and the organicist approach (which is narrower in scope, more precise and possesses a vertical cosmology). Dugger and Sherman write (1997:999):

[To Marx], [t]he process of exploitation is defined as the process of producing and appropriating surplus labor. Workers are understood to do a certain amount of labor sufficiently to produce the goods and services their current standard of living requires. Marx calls this “necessary labor.” However, workers in all class-divided societies perform more than necessary labor. They do what Marx calls “surplus labor.” In a socialist society, the workers would retain this surplus, individually or collectively. In our society, however, the surplus will normally be appropriated directly and immediately by non-workers. The latter case is Marx’s precise definition of exploitation: when the production process involves non-workers appropriating the surplus labor of workers [see Resnick and Wolff 1987:20].

It is worth noting that institutionalists consider the definition of work or labor to be socially constructed. This means that the definition of exploitation is specific to a given time and place. Both the length of the working day and the intensity of labor are determined by specific conditions, cultural factors, and power relations. The definition of what constitutes work has evolved during the course of social evolution. On the contrary, traditionalist or fundamentalist Marxists have viewed exploitation as rigidly given by purely technological factors.

Dugger and Sherman comment that this theoretical difference remains a point of contention between institutionalists and traditional Marxists. Based on Pepper’s explication of the unique structural categories between the organicist and contextualist
world hypotheses, one should not be surprised by this. I submit that the Marxist approach tends to limit the scope and meaning of exploitation/class conflict in order to incorporate it into a theory of historical progression — the root metaphor of organismism — reflected through or driven by the falling rate of profit. Following Veblen, the institutionalist approach broadens the scope and meaning of exploitation in order to incorporate it into a theory concerned about depicting the given event — the root metaphor of contextualism. Although there may be wide areas of overlap, these schools of thought reflect two different root metaphors and, therefore, two different essential manners of organizing evidence. In his critical analysis of Veblen in History of Economic Thought: A Critical Perspective, E.K. Hunt identifies some of these differences in developing a comparison of the theories of Marx and Veblen. Hunt writes (1979:326):

There were, however, areas in which Veblen’s analysis was decidedly superior to Marx’s. Whereas they both saw, in much the same terms, capitalism’s pernicious effects on the material, spiritual, emotional, and esthetic well-being of workers, Marx erroneously believed that the time was close when the workers would revolt and overthrow capitalism. Marx’s misperception seems to have resulted from his failure to consider with sufficient care social and cultural norms and mores and their effects in the worker’s socialization. Workers embraced these socializing influences and thus promoted the interests of capitalists, even though these influences were ultimately destructive to the interests of the workers themselves. Veblen’s analysis of the power of patriotic fervor and of emulative consumption, which conditioned workers to accept these self-defeating attitudes, was extraordinarily perceptive and insightful. It remains to this day one of the most powerful and accurate explanations of why workers not only endure exploitation and alienation, but very frequently support the very institutions, laws, governments, and general social mores that create and perpetuate this exploitation and degradation.

Based on Pepper’s development of the structural categories of contextualism, a contextualist approach would naturally maintain a clear and descriptively rich (i.e.,
dispersive) focus on the classes present in a given cultural context and a given moment in history. In short, the theoretical exposition shines a light on the given moment. For Veblen, this translates into a determined effort to remain focused on a variety of aspects of culturally exhibited behavior surrounding class relations. Nothing was beyond the discerning eye of Veblen because his perspective was not driven by a theoretical imperative to develop a precisely defined theoretical system more typical of Marx; rather, Veblen strength lies in his relentless observations of the manner in which capitalist class relations were reflected in the existing culture. He was content to draw upon the cultural landscape in order to characterize and document the particular form of the leisure class or the reasons behind the emergence of the industrial class.\textsuperscript{118}

In conclusion, the first fruitful product of Veblen’s contextualist approach was the \textit{Theory of the Leisure Class}. The book was noted almost immediately for its use of satire due to it barbed phrases and corrosive view of society. It was without doubt a witty and poignant satire of the leisure class. However, alongside Veblen’s peculiar style of

\textsuperscript{118}In the \textit{Worldly Philosophers}, Heilbroner offers a portrayal of Veblen that is interesting and enjoyable to read. Concerning Veblen’s approach, Heilbroner writes (1961:218): “But what had this to do with economics? Nothing in the conventional sense of the word. Economics for Veblen had no relation to the mannerly and precise game of the Victorians in which the ways of the world were justified by the differential calculus, and it bore little kinship with the efforts of earlier economists to explain how things worked themselves out. Veblen wanted to know something else: why things were as they were in the first place. Hence his inquiry began not with the economic play, but with the players: not with the plot, but with the whole set of customs and mores which resulted in that particular kind of play called the “business system”. In a word, he delved into the nature of economic man and his economic roles and rituals, and in this almost anthropological approach it was as important for him to notice that gentlemen carried walking sticks [as an advertisement that the bearer’s hands are employed otherwise than in useful effort] and went to church as that landlords received something that society called rent. He was seeking to penetrate the true nature of society in which he lived, and in that search through a maze of deceptions and conventions he would have to take things and evidences wherever they revealed themselves: in dress, manners, speech, or polite usage.
exposition, the book contained much more. It offered a powerful glimpse into the way in which one can organize evidence contextually. Specifically, Veblen wrote a contextually based theory of the leisure class, one that penetrates into questions such as “What is the nature of economic man?” Veblen wrote a theoretical work that answers such questions not in terms of an assumption of universal rationalizing behavior, but in terms of the reality of the given moment. Similarly, Veblen’s impulse was to trace the development of the predatory and industrious institutions only as far as this cultural sequence culminated in a theoretical dissection of the current moment. As would be expected of a contextualist, his plan of attack was dispersive: he took evidence wherever he found it so long as it added to the meaning of the given moment under his discerning eye. While there is much to be found that is similar in the approaches of Marx and Veblen, what distinguishes the two is the contextualist philosophical attitude that Veblen brought to the analytical table. Marx was fully aware that the various modes of production and the social relations and ideas produced therein need to be understood in their context. And in spite of the thorough manner in which he brought an account of history into his analysis, Marx’s theoretical approach required a narrowing of scope because of the ultimate idea at which it took aim, the laws of motion of capitalism and the possibility of a more evolved mode of

\[19\] For an alternative explanation of “economic man”, see an article by Fusfeld (1999) entitled “Toward a Revision of the Economic Theory of Individual Behavior.” Fusfeld develops a theory of individual behavior that builds on the work of Veblen and John Kenneth Galbraith. Fusfeld’s focus is the assumption that in optimizing theory “choices are made on the basis of individual preferences internal to the individual. That is, preferences are not affected by the decisions or behavior of other individuals” (1999:359). In place of this assumption, Fusfeld claims “a reconstruction of the economic theory of individual behavior requires an analysis that moves the socio-cultural environment out of the category of “parameter” and into the center of the analysis. Individual rationality is not denied; it interacts with social process in a co-evolutionary manner.
production resulting from the historical procession. Veblen's theoretical approach allowed him to explore the landscape of the given moment in more detail. It permitted him to see more fully class relations from an empirical perspective, quite similar to the manner in which the traditions of biology and ecology have valued the field experience. In Veblen's view, the lower classes were not in all ways diametrically opposed to the capitalist class. Instead, the lower classes also share common attitudes with the owning class that operate simultaneous to the conflictive antagonism that surround appropriation of the products of labor. The workers do not seek to displace their managers; they seek to emulate them.

Coevolution and the Emergence of Unsustainability

At first, I was inclined to choose The General Theory (1936) by John Maynard Keynes as my exemplification of a “macro version of contextualism.” Perhaps no place else in the history of economics has society been confronted with a “historical problem situation” as that which developed over the “spacious present” of the Great Depression. The absence of a response by the Western capitalist governments was disconcerting to many in academic and public policy circles. It was in the context of this unfolding event that Keynes identified what he considered some causal weaknesses in the “self-correcting equilibrium machine” that characterized the prevailing classical view of market capitalism. As a result of the urgency, Keynes' work was written in the style of a persuasive public policy text guided by pragmatism, which is necessary whenever one wishes to address a host of audiences. The resulting analysis was argued in a "Babylonian" style of reasoning.
as opposed to a tight axiomatic and deductivist framework more akin to mechanistic reasoning associated with Cartesian/Euclidean logic (Dow [1996[c1985]). Keynes' original work addressed a historically specific problem, and as such, could be interpreted as a contextualist account of the facts and evidence. However, in the low-inflation decades following World War II, the Keynesian model increasingly became mechanistic in form and application. The use of the model as an interpretive tool to assist public policy makers address the cycles of market capitalism was forsaken in favor of a more mechanistic Keynesianism.

Upon further consideration, I decided that the recent emergence of 'ecological economics' more directly illustrates the presence and possibility of contextual analysis in a fledgling field at the interstices of economic and ecological science. In an article entitled "The Case for Methodological Pluralism." Richard Norgaard ([1989]:37-57) argues that the scientific research effort to bring economic thinking and ecological thinking together would be best served if maximum tolerance was afforded the pluralist methodological traditions of each field. His thesis is that all aspects of complex systems can only be understood though multiple methodologies. Norgaard points out that economics possesses a dominant paradigm, which is rooted in the metaphysical premises of logical positivism. However, he also points out that other schools of thought, (e.g.,

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120 Refer to Costanza (1996) for an editorial comment on the rapid growth of the journal Ecological Economics since its inception in 1992. Also, see Krishnan et al. (1995) for a survey of research articles in the field of ecological economics.

121 To conceptualize the various schools of thought in economics and ecology, Norgaard presents a methodological taxonomy based on whether the following four metaphysical assumptions of logical positivism hold: (1) methods of understanding reality are independent of culture; (2) reality is independent
Keynesian, Marxian and institutional), which dispense with one or more of the assumptions of logical positivism, have maintained a long-term presence in the discipline. This leads him to characterize economics as a pluralist intellectual tradition. Norgaard attributes this diversity to the “Methodenstreit” debates between the German historical school and the positivists. Norgaard writes (1989:41):

Economists with a much more historical leaning competed successfully with the simple use of the market model into the early part of the 20th century (Knight 1951; Pribram 1983). Historical, institutional, or Marxist economists still dominate in a few schools in Europe and the United States. In addition to this diversity in views, even those who hold to the dominant model have harboured various non-market models to explain the aggregate levels of output, employment, and inflation. Thus, though economics has a dominant paradigm, it is not monolithic. The patterns of economics thinking and the methodologies associated with those patterns have varied over time, across regions, on different problems and by schools of thought.

Likewise, the discipline of ecology, which has a much shorter formal disciplinary history than economics, uses a diversity of methodologies. According to Norgaard, “the term ‘ecology’ was coined by Haeckel in 1866 and the term ‘ecosystem’ was coined by Tansley in 1935. But the development of ecology as a body of thought and as a discipline is mostly a twentieth century phenomenon (1989:41). Norgaard attributes the plurality of method in ecology to the influence of biology and the tradition of direct observation in the field. Norgaard writes (1989:45):

The diversity of methodologies in ecology has several roots...[E]cology draws upon explanation from all fields of biology [i.e., the life sciences], accepting the methodologies implicit to those explanations. The long tradition of direct observation in the field also supports an eclectic approach in ecology. Field

of methods of understanding; (3) reality can be understood in terms of universal laws; and (4) reality can be understood through one set of universal laws (1989:43-44). According to Norgaard, the Neoclassical research program maintains the philosophy of logical positivism (that is, assumptions 1 through 4 hold), if not in practice, then as an ideal.

275
research builds a very different type of understanding of systems than does the
pursuit of the nature of system dynamics through mathematical exploration.

It is through his emphasis on the long tradition of direct observation in informing the study
of complex ecological systems that it is possible to see how Norgaard’s approach to
ecological economics and his analytical model point toward contextualism. The result of
this empirical focus has fostered a pragmatic approach to knowledge accumulation.
Norgaard believes that economics stands to learn from the different world view implicit in
the study of ecological systems. The world view underlying ecological thinking is closely
linked to the very nature of ecological systems, which have forced ecologists to see the
complex interrelationships between cultures and species in natural habitats.\textsuperscript{122} Crucial to
this understanding is the fact that these relationships must be viewed as part of a specific
context, such as a habitat. In the contextualist view, the scientific theory may draw on or
acknowledge cumulative causation; however, due to the novelty or emergence quality of
the event emphasis is placed on the meaning and the quality of the given moment. It is
through the sets of complex interaction that we observe a process that generates emergent
or novel qualities. In terms of Pepper’s structural categories, species are equivalent to
Pepper’s strands and the habitat into which the strands reach out is equivalent to Pepper’s

\textsuperscript{122} The issue of how to theorize complexity may take forms other than contextualism. Insofar as
simulation models are the means, mathematical modeling of complex systems appears to have a natural
affinity with formalism. For a discussion into the complexity literature and an entry point to the ‘computer
experiments’ of the Santa Fe approach to modeling complexity see Wible (2000a). Also a query in Silver
Platter under “Santa Fe’ will bring up numerous recent articles including a two-volume set by Casti
(1997a, 1997b) entitled Reality rules: I: Picturing the world in mathematics–The fundamentals and
is an emerging consensus that the Post Keynesian approach is consistent with much of critical realism,
with open-system theorizing applied to an economy understood as an organic, open system.” Thus, as it
turns out, the major school of thought associated with formalism may be post Keynesianism.
context. Solving a problem within the ecosystem (such as the accumulation of pesticides in eagles) requires reference to various species and their interrelationships in the context of the habitat. Although it does not preclude atomistic analysis typical of mechanism, an understanding of this basic reality can be fruitfully explored through a holistic approach that emphasizes the species interactions instituted in the habitat. Moreover, scientific explanation of any problem situation requires reference to a given moment.

Norgaard summarizes the relationship that the discipline of ecology, in general, maintains with respect to the four assumptions underlying positivism. First, unlike the positivist assumption, ecologists tend to believe that culture — the institution of modern science — affects which methodology is chosen and in turn reality depends on the application of methodology. Norgaard notes that through field research ecologists have learned to acknowledge how modern scientific culture affects method in the application of biological control strategies of agricultural pests. One response to this within the ecology discipline has been to adopt the methodologies of anthropologists. Thus, some ecologists focus on interpreting and understanding the beliefs of indigenous populations in order to discover agroecological relationships specific to a various ecological system and community. In principle, this approach is similar to that taken by Veblen in focusing intently on the signs that manifested themselves in the particular cultural setting that characterized capitalism in his historical moment. Second, ecologists, like institutionalists, tend not to believe that knowledge is universal or useless. Norgaard writes (1989:47):

Though nothing even approaching universal other than the downward slope of the demand curves has been found, [neoclassical economists] continue to believe that universal policy recommendations can be drawn from economics.
Institutionalists, on the other hand, tend to argue that knowledge is specific to the situation (Wilbur and Harrison 1978). Most ecologists would also like to be able to make generalizable statements about ecological systems and their management but have become increasingly pragmatic.

Third, ecologists and institutionalists tend to be pessimistic on the unity of knowledge — the belief that the various disciplines will eventually weld together and form a coherent understanding of the world. Norgaard writes (1989:48):

Institutional economists tend to retain [an] understanding of how economics relates to the other social sciences. History, politics, and culture are raw ingredients of their explanations rather than challenges to be explained by economics.

...[E]cology consists of diverse, incongruous theories about population dynamics, energetics, food webs, coevolution, communities, succession, etc. Ecologists are accustomed to explaining the dynamics of temperate forests in terms of succession and of tropical rainforests in terms of light patches. The idea that evolution has proceeded in different ways at different times and places precludes universal principles at the organismal level, let alone the ecosystem level.

In summary, Norgaard sees no good reason to preclude any of the methodological approaches contained within the disciplines of economics or ecology. Moreover, he stresses the idea that the development of the discipline of ecology and the scientific research practices of ecologists, which have remained closely in touch with field research due to the nature of the inquiry, offers guidance for the development of the field of ecological economics, if not the discipline of economics itself. He seems to suggest that there exists an affinity with theoretical inquiry along ecological and institutional grounds. I maintain that this affinity relates to the use of a contextualist analysis of the interaction between cultural and natural habitats.
Norgaard further develops this idea in an article entitled "The Coevolution of Economic and Environmental Systems and the Emergence of Unsustainability" (1993:213-225). In this article he argues that the emergence of unsustainable economic practices—a historical problem at the center of contemporary society—needs to be understood in the framework of a coevolutionary model, which portrays an endogenous relationship between five different subsystems or evolving processes. The five processes he identifies are (1) knowledge, (2) values, (3) organization, (4) technology, and (5) environment. Norgaard writes (1993:216):

Each of these subsystems is related to each of the others; yet each is also changing and effecting change in the others. Deliberate innovations, chance discoveries, and random changes occur in each subsystem thereby selecting on the distribution of the qualities of components in each of the subsystems. Whether new components prove fit depends on the characteristics of each of the subsystems at the time. With each subsystem putting selective pressure on each of the other, they coevolve in a manner whereby each reflects the other. Thus, everything is coupled, yet everything is changing.

To further elaborate the process, imagine that the subsystems—values, knowledge, social organization and technology—are made up of different "types" of ways of valuing, knowing, organizing, and doing things. Similarly, the environmental factors, and relationships between them. The survival and relative dominance, or frequency, of each particular type in each subsystem is explained by its historical fitness with respect to the types of things in the other subsystems. The relative importance, or frequency distribution, of different types results from selection processes.

This is a very abstract coevolutionary model that is in need of substantial empirical

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123 For other perspectives on relations see an article by Sherman (1993) entitled "The Relational Approach to Political Economy" Ecology and Marxism Vol. 6(4):104-117. Also, for a good discussion of the insignificance of the parts/whole dichotomy and the significance of conducting analysis in terms of the relationships that constitute parts or wholes see an article by Clive Lawson (1996:967-983) entitled "Holism and Collectivism in the Work of J. R. Commons."
support. Based on this model, it seems apparent that various stories (case studies) are possible in order to explain and understand the emergence of unsustainable economic practices. Norgaard highlights two: The first relates to the how economies in the past century have coevolved not with their ecosystem but instead with the requisites of fossil fuel consumption; the second relates to how the knowledge subsystem, specifically modernist notions of science, fostered the development of the global market economy.

For the contextualist, the purpose of scientific analysis is to explore these various relationships in order to highlight the qualitative meaning of this historical development — this specious present. One can focus on the role of the subsystem technology (strand) and place it simultaneously in the context of the other subsystems (strands) — which constitute the context — social organization, knowledge, environment, values. As another example, one could focus on the role of the subsystem knowledge (strand) and place it simultaneously in the context of the other subsystems (strands) — which would constitute the context — social organization, technology, environment and values. One need not stretch to see the variety of spatiotemporal situations and the possibility for pursuing strands in multiple directions. The context is laden with potential analyses that reflect the meaning of the historical moment confronted by late twentieth century — early twenty-first century global capitalism. There likely will be many interpretations and analyses of unsustainability. In fact, in his coevolutionary model, Norgaard emphasizes that change is continual and cannot be denied, a point also emphasized by Pepper in his description of the contextualist world hypothesis. For his part, Norgaard writes (1993:218):
In the coevolutionary explanation of change, on the other hand, knowledge, technologies, and social organization merely change, rather than advance, and the 'betterness' of each is only relative to how well each fits with everything else in a coevolving whole. Coevolutionary change, rather than a process of rational design and improvement, occurs through experimentation, only part conscious, and through selection. The qualities of economic and environmental systems are constantly redefining each other within the process of the coevolving whole.

This is the contextualist interpretation of what is required to understand the emergence of sustainability. Nonetheless, I can envision two ways that this coevolutionary model could be developed: One is along the lines of Veblen's descriptive and theoretical approach that focuses on the institutions or habits present in Norgaard's subsystems; the other is more along the lines of employing the complex math associated with systems theory. In the latter case, I believe the endgame is the production of 'simulation models' that can adequately replicate and anticipate possible economic and environmental outcomes. However, in my opinion, development of the idea of unsustainable economic practices finds a fruitful ally in a contextualist analysis: one which attempts to explain the various "institutions" that characterize the subsystems at this given point in time and the relationship they have to one another — that is, the context. Although dramatically different in methodological perspective, both approaches take seriously the specific historical conditions that constitute the problem situation. As Pepper would say, both are

124 For a discussion of inquiry along these lines refer to an article by Colander (1996:433-442) entitled "New Institutionalism, Old Institutionalism, and Distribution Theory." Colander concludes (1996:442): "The formal analysis of the need for institutions is grounded in the complexity of the economy. As a mathematics has developed to deal with that complexity, the relationship between institutionalist and ultra mathematicians is changing. They are becoming allies, both arguing against the simplicity of even the most complex neoclassical economic model." Although left for future analysis, I expect that the correspondence between these models and reality lend themselves well to a formist approach. The work of Nelson and Winter would be a reliable place to turn for developing this approach to evolutionary theorizing.
adequate ways to organize the evidence. Nonetheless, the power of the contextualist approach is to bring qualitative meaning to this unfolding historical moment that defines global capitalism. Of course, what is suggested is that more practicing economists/ecologists become conscious of and see the validity of the contextualist approach. One could imagine an ever-increasing army of researchers approaching the present specious present defining global capitalism in the same anthropological manner that Veblen did in his day.

**Overdeterminism as a Contextualist Meta-Perspective**

Within the economics literature, I believe the contextualist world hypothesis finds a voice in the concept of 'overdeterminism' as developed in the work of Resnick and Wolff (1987), Resnick and Wolff (1988), Amariglio, Resnick and Wolff (1990), and Resnick and Wolff (1993) and Wolff (1995). To flush out this idea, I will compare the structural categories proposed by Pepper in his explication of contextualism to the explanation of overdeterminism offered by Resnick and Wolff. Specifically, the representation of complexity discussed by Resnick and Wolff compares well to Pepper's idea of fusion. Also, in the respective discussions of overdeterminism and contextualism, change and novelty are basic to the world view. Both approaches appeal to pragmatism in order to operationalize or avoid the potential relativism that confronts the analytical act. In sum, the meta-perspective described by overdeterminism appears to be largely consistent with

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125 Resnick and Wolff (1993:39) note that “initial formulations of overdeterminism in the sense used here may be found in Freud (1950:174-205) and Althusser (1969:100-101).”
Pepper’s image of contextualism derived from his root-metaphor method. Recall from an earlier discussion that the root metaphor for contextualism is what Pepper terms the ‘historic event’ or the ‘given moment’. The event is conceived as an ongoing action, the meaning of which the contextualist attempts to re-present in analysis. The re-presentation of the given moment is conveyed in what Pepper calls the qualitative or specious present, which contains meaning carrying over from the past, the actual present moment, and an anticipated future. Thus it may be, but is not necessarily, a past event. Pepper writes (1942:232):

By historic event, however, the contextualist does not mean primarily a past event, one that is, so to speak, dead and has to be exhumed. He means the event alive in its present. What we ordinarily mean by history, he says, is an attempt to re-present events, to make them in some way alive again. We may call it an “act,” if we like, and if we take care of our use of the term. But it is not an act conceived as alone or cut off that we mean: it is an act in and with its setting, an act in its context.

Around this point of origin, Pepper develops two sets structural categories to demonstrate how a contextualist would go about organizing evidence in an effort to re-present a given or historic event. The first set of categories defines the qualitative meaning of the event, as it exists in its totality, or prior to analysis. It is the intuited meaning of the event. The second set of categories deal with what Pepper terms the texture of the event as brought

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126 In a direct e-mail correspondence with Stephen Resnick, he indicated that there are no agreed-upon meanings for the terms ‘contextualism’ and ‘pragmatism’. However he stated that “there is a use of contextualism that indeed would be close to my notion of overdetermination. And yes, there also is an understanding of pragmatism that would be close to my notion of overdetermination. For the latter, the key book for me always has been Dewey’s Quest for Certainty. There I think what he argues in regard to rationalist and empiricist epistemologies is not that different from what Wolff and I have argued. In regard to the former [contextualism], the idea that whatever one says about a society must always be limited and open to change is what I would have in mind. All theorizations are interventions and tied to a particular moment in time and space. What they produce are merely elaborated entry points, essentialist moments, that must change as the theorization develops.”

283
out in analysis of the strands on an event in their context. In describing his "sentence-event", Pepper writes (1942:238):

[The quality [of an event] is roughly its total meaning, its texture roughly the words and grammatical relations which make up that character or quality.]

We can begin to see the resemblance between Pepper’s notion of the quality of an event and the ontological portrayal of an event (or process) being overdetermined. According to Pepper, the intuited meaning of an event, its quality, is made up of (1) spread, (2) change, and (3) fusion. I will focus on the structural category fusion since this idea is readily apparent in Pepper’s demonstration of contextualism and Wolff and Resnick’s portrayal of an overdetermined reality. In short, both relate to the nature of an event embedded in a complex reality. Consider the following quotes. Resnick and Wolff write (1993:40):

Suppose the following kind of representation of complexity: any entity — for example, a human subject, a social institution, a body of knowledge, a particle in space, or a word in a sentence — is understood to be the combined result, quite literally the site, of diverse effects emanating from all other entities. The notion of an entity’s existence or causation, called overdeterminism, is radically different from that which informs much of human knowledge inside and outside the tradition of economics.

Wolff further develops the idea (1995:28):

From the perspective of overdetermination, words and images, texts and paintings, like all other social events, have no determinate, ultimate core or reality or meaning. Any meanings or “realities” assigned to them in a particular society, at a particular time depends on (1) how the contexts of these events present themselves to subjects’ gazing. In Althusser’s formulation, any meaning or any reality is always a particular subject-object interaction, overdetermined by everything happening in that interaction’s socio-natural context. This context varies ceaselessly and endlessly. It is experienced and internalized differently depending on each subject’s contextually overdetermined positioning in time and space.
Pepper writes (1942:233):

These acts or events are all intrinsically complex, composed of interconnected activities with continuously changing patterns.

Any event is a rich concrete thing, in which features interpenetrate, there is a degree of arbitrariness in selecting one feature rather than another, or so much of one feature against so little of another.

Contextualism is the only theory that takes fusion seriously. In other theories it is interpreted away as vagueness, confusion, failure to discriminate, muddleness. Here it has cosmic dignity. And it takes a certain revenge on the indignity to which it is subjected by other theories, by interpreting all cosmic simplicities as instances of fusion.

The overdetermined event/process, which is the site of diverse effects emanating from all entities, is portrayed as being highly fused. Resnick and Wolff offer a picture of an event that the analyst perceives as being inextricably lodged in a complex web of interrelations, none of which can be explained without reference to another, none of which are a priori any more important or essential than another. Any aspect of the event finds meaning by the fact that all of the other aspects help to constitute its meaning. Prior to entering an analysis of an event, this meaning is conveyed with at least some, perhaps a high, degree of fusion. Thus, Pepper explains that the perceived quality (taste) of William James's lemonade is distinct from and irreducible to its separate ingredients. The perception of the face of the familiar person is fused. Likewise, a music chord is normally appreciated in a fused state and not as individual notes. The painting by Margritte in Wolff (1995) is not only painted with overdetermination, it is perceived as a fused or overdetermined object or event. Similarly, Wolff and Resnick describe an event/process — say the human subject — as a ‘being’ or ‘being in the process of becoming’ that is the site of multiple...
determinations, none of which are more essential than the others. I conclude that an overdetermined being or process is one in which quality or meaning is perceived in a highly fused fashion. This is consistent with the contextualist notion of fusion developed by Pepper.

As a second point, it is clear in reading Pepper's explanation of contextualism and Resnick and Wolff's explanation of overdetermination that 'change and novelty' are used in a similar sense and are crucial to both perspectives. Recall that Pepper claims that change and novelty are fundamental to contextualism. They are the ineradicable categories in all times and all places. Pepper writes (1942:234):

But, so to speak, disorder is a categorial feature of contextualism, and so radically so that it must not even exclude order. That is, the categories must be so framed as not to exclude from the world any degree of order it may be found to have, nor to deny that this order may have come out of disorder and may return to disorder again — order being defined in any way you please, so long as it does not deny the possibility of disorder or another order in nature also. This italicized restriction is the forcible one in contextualism, and amounts to the assertion that change is categorial and not derivative in any degree at all.

In using his "sentence-event" as an exemplification. Pepper writes (1942:243):

With the writing of each word the tensions of the previous words are distributed, the configuration of the total meaning is altered, and the quality is accordingly changed. This change goes on continuously and never stops. It is a categorial feature of all event; and, since on this world theory all the world is events, all the world is continuously changing in this manner. Absolute permanence or immutability in any sense is, on this theory, a fiction. and its appearance is interpreted in terms of historical continuities which are not changeless.

The image of change and novelty is likewise exhibited in Resnick and Wolff's portrayal of overdetermination. For them, change flows out of the fact that each site, whether a human subject or a process engaged in by the human subject, is multiply determined by
numerous conflicting effectivities. Drawing on an interpretation of Hegelian dialectics, Wolff and Resnick write:

Human subjects and the processes in which they participate are caught in this swirl of interacting influences (1993:41).

As each of these social and natural determinations adds its unique dimension, the subject successively becomes transformed. Changes from what it was, to what it is, to what it shall be. At any moment, the subject, as the site of the determination, is propelled in different directions. For example, the momentum of the above political process may push the subject to perform the work ordered, while the impact of that cultural process may make that subject conscious of involvement in an exploitative class process, and thus not anxious to work at all. As their combined site, the individual is pushed in different directions at the same moment: to work and not to work. His or her behavior is deeply contradictory. The addition of all the other determinations from all the other processes of a sociocultural totality adds all the more to the multiple, diverse contradictions that comprise any human subject. Change in this subject, as we noted above, is the expression of the result of these contradictions. Since each subject changes (that is the mode of its being), its influences on all other entities changes: this change them and their influences back upon the subject and so on (1993:43).

Existing in contradiction or ceaseless change becomes an apt way to describe this condition, for it captures nicely how these different determinations propel any subject in contrary behavioral directions at any one moment. Evolution — the complex movement of behavior — becomes then a product of any subject’s unique set of overdetermined contradiction (that result from these diverse, constituent effects (1993:44).

Thus, we see in Pepper’s notion of contextualism and Resnick and Wolff’s notion of overdeterminism the idea of change and novelty.

The final point of comparison between contextualism and overdeterminism addresses the manner in which the theoretical endeavor must approach complexity. Let us first recall Lawson’s basic arguments for transcendental realism. Lawson argued for a mode of scientific explanation that equated real with the enduring and underlying structures or mechanisms through which events are generated and experienced. In so
doing, transcendental/critical realism amounts to a methodology that operates to identify the intransitive and independent 'deep structures' mediating events or observable phenomena. However, upon reflection it becomes clear that Lawson's 'deep structures', while an alternative to the deductivism (empirical realism) offered by positivism, requires a certain degree of reductionism. If we look more closely at Lawson's approach to theorizing, it becomes evident that even though the deep structure may generate various actualized events, the operable mechanism in the deep structure is reduced, if at all possible, to a principle or essential determinant. That is, if we conceptualize a structure that generates a particular economic event, the purpose of scientific explanation is to make intelligible the event through the identification of a predominate mechanism, tendency or law. Thus, even though Lawson points out that a multiplicity of mechanisms operate on the leaf, it is gravity that is the primary determinant of the motion of the leaf. It is gravity that offers the explanation of the enduring tendency for leaves to fall to the ground most of the time. Thus, transcendental realism informs Lawson's image of how 'law-like' statements can be generated and trusted in scientific explanation of natural phenomena. Likewise, critical realism, which is an extension of transcendental ontology applied to the social domain, envisions scientific explanation as an endeavor that attempts to identify the best possible single cause on the structural level.

Resnick and Wolff take the next logical step in introducing degrees of freedom to the ontological premise (1993:40-64). Like Lawson, they assume that the world is an open system. This in itself is innocuous. Likewise, Resnick and Wolff appear to view scientific explanation in a transcendental fashion. That is, they explain the focus of science
not on the level of actualized events but through underlying processes that mediate the events that we observe in experience. However, it is the way in which Resnick and Wolff portray the structure that differentiates their approach from the partially determinate approach maintained by Lawson. To Resnick and Wolff the structural process and the individual process are constituted by a multiplicity of determinations: for the sake of argument, they refer to them as economic, political, cultural, and natural. They identify this as overdeterminism. Thus, processes underlying events are overdetermined by the complex interaction of multiple and irreducible determinants. Like Lawson, they are cognizant of the need to explain how science can proceed in its explanatory mission (identify some kind of causality). Based on their ontological assumption about the nature of reality, they develop an analytical approach that is epistemologically consistent with it. That is, they claim to operationalize overdeterminism by developing an analytical approach epistemologically opposed to reductionist or determinist approaches.¹²⁷ Such an approach in standard microeconomics reduces the “human subject” to a single-dimension rational economic entity for the sake of manageable modeling and prediction in the construction of the theory. Likewise, in aggregate/structural accounts of economic phenomena such as inflation or unemployment, the determinant force on the structural level would be predominantly economic in character. Resnick and Wolff acknowledge that their

¹²⁷ By reductionism, Resnick and Wolff mean that their analysis refuses to reduce individual behavior to structural explanation or structural accounts to individual explanations. Likewise, by avoiding determinism, they attempt to resist explanations that identify causality in terms of a single determinant — social, economic, political, cultural, or natural.
overdeterminist (or holistic) ontology poses a challenge to traditional conceptions of what it means to generate a scientific explanation. Resnick and Wolff write (1993:44):

As an ontological perspective, overdetermination poses an immediate problem. How is analysis to proceed when every possible object for it is constitutively connected to every other? How can anything be explained? How, in short, can we operationalize the notion of overdetermination in the sense of making it a workable ontological presupposition of theoretical and empirical investigations?

However, they do present a solution and the answer lies in viewing the knowledge process itself as being overdetermined; after all, the knowledge process operates in the same social domain as the political, social, the economic determinants of any problem situation. As an alternative to the standard approach to theorizing, they write (1993:45):

The solution we have found to this problem is to extend the reach of overdetermination, to make it epistemological as well as ontological (Resnick and Wolff 1987). That is, an overdeterminist concept of thought as a process (and forms of knowledge as its products) yields a consistent and workable way to do social and economic analysis on the basis of an overdeterminist ontology. As we propose to show, it offers a way to do analyses of complexities without ignoring or reducing them to one simplicity or another.

In order to operationalize scientific explanation in an overdetermined or complex reality, Resnick and Wolff introduce the idea of ‘entry points’. Entry points are required in order to perform the analytic endeavor. They permit the analyst to proceed while being cognizant of the fact that there are many other entry points that could effectively be chosen to explain the particular event or process in question. Resnick and Wolff write (1993:46):

We may now answer the question invariably put to epistemological positions such as ours — often labeled “relativist” or “idealist” as if these were precise designations and/or sufficient grounds for dismissal. First, the question: If one accepts this overdeterminist notion of causation and complexity, then how, at least on this earth, could any theorist make sense of anything at any time? To
explain anything seems to require explaining everything; thus, the impossibility of the latter renders all particular explanatory efforts absurd in principle.

Our answer is that any analyst picks one or more of the aforementioned processes out of the totality, to construct thereby a meaning or understanding of that totality. We have called such choices conceptual “entry points” into analysis. They represent any analyst’s specifically focused theoretical intervention to bring a correspondingly specific kind of order to the infinity of complexity interacting processes comprising the totality of socioeconomic life. Entry points imply ordering by impelling any theorist initially to divide that life into two sets of processes: the entry point and all others. Once accomplished, all other processes may be theorized from the perspective, the standpoint, of those chosen as entry points. The ordering of complexity remains, however, a theoretical act performed by each analyst.

The experience of having to choose which social or natural process to focus on when explaining socioeconomic life is consistent with Pepper’s development of contextualist analysis. Pepper explains it in terms of tracing out the meaning of a strand within the context of other strands. It is what he refers to as the texture of the analysis. In Pepper’s portrayal, the analyst is confronted with the exact same problem of how to proceed in explaining an event contained within a context with interweaving strands. Pepper writes (1942:250):

And so with the analysis of any event. As we analyze a texture, we move down into a structure of strands and at the same time sheer out into its context. A bottom is thus never reached. For the support of every texture lies in its context. This support is as extensive as you wish, but you never reach the end of it.

It follows, moreover, that there are many equally revealing ways of analyzing an event, depending simply on what strands you follow from the event into its context. At each stage of your analysis (that is, in each new texture into which you have been led), this choice of what strand to follow comes up again, and every strand is more or less relevant. Hence, the contextualist rather disparages analysis for analysis’s sake. What is the good of it, except as the mere fun of paddling about in the ocean of things? Serious analysis for him is always either directly or indirectly practical (whence the term “pragmatism”).

291
Thus, to operationalize overdeterminism or to conduct a contextualist analysis, a clear purpose must exist in the mind of the analyst. Based on this discussion of the structural categories of contextualism and Resnick and Wolff’s explanation of overdetermination, there is much in common between the two. Finally, it is worth noting that in explaining their overdeterminist epistemology in terms of entry points, Resnick and Wolff seem to get uncomfortably close to disparaging the entry points of other schools of thought in economics, specifically, neoclassical economics (humanism), and Keynesian and Marxian economics (structuralism). Their claim is that these theoretical approaches essentialize either the humanist or the structural point of view. Resnick and Wolff write (1993:47):

> Once chosen, the entry points tend to become more than merely a partial beginning to theorizing about the world. Psychologically, they become for many of us valued and special friends, personal guides to untangling that web of interconnectedness, difference, and alienation constituting and haunting our lives. We know who these friends are in economics: preferences, endowments, and the production function in neoclassical theory; aggregate psychological propensities, uncertainty, and the power of trade unions to bargain for money wages in Keynesian theory; the production and appropriation of surplus labor in Marxian theory…

Yet, in contrast to overdeterminist epistemology, in conventional, determinist epistemologies, a bizarre and magical event often occurs in the use of a particular set of entry points to construct social analysis. That which was merely a personal choice and bias, a friend or guide that momentarily transformed disorder into order for the analyst (relative to the analyst), becomes instead an absolute, a God. The chosen entry point no longer only points the way to one understanding of the world, it also becomes essentialized, transformed into the ultimate, final cause and truth of that world.

Now, so far this attitude seems consistent with Pepper’s attitude of a plurality of epistemologies, which we have observed through the four adequate world hypotheses. Their attitude seems consistent with respecting the adequacy of the more important
theoretical perspectives in the discipline of economics. Yet, as we will see in the next quote offered by Resnick and Wolff, they seem to have difficulty in containing their overdeterminist and contextualist approach within the confines of an adequate world hypothesis. That is, they start down that slippery slope of essentializing the contextualist world hypothesis. Resnick and Wolff write (1993:51):

Yet those relative few among the humanist neoclassicals and structuralist "others" who did recognize the limitations of their respective determinisms, still lacked any theoretical strategy to synthesize and go beyond the two perspectives in a way that might overcome the one-sidedness of each. They did not employ the notions of dialectic inherited from Hegel and Marx to outgrow determinist reasoning as such. They either do not know or cannot utilize the fruits of the last fifty years of discussions, debates, and developments in dialectical reasoning, one of whose products is the notion of overdeterminism.

The key words here are "synthesize" and "one-sidedness" and "go beyond". In my mind, these constitute a disparaging of the relative worth of humanist and structural approaches. For, what Resnick and Wolff imply is that there is some organic whole, some absolute ideal, toward which the historical knowledge process, acting through the overdeterminist synthesis, is destined to land. Namely, this implies the ultimate correctness of the overdeterminist or contextualist mode of scientific explanation. If my understanding of Pepper is correct, this is a position he would not likely condone. That is, the assumption of a complex reality does not preclude one or another of these epistemological approaches (i.e., determinism) a priori. In keeping with Pepper's general attitude in World Hypotheses, I do not prescribe or privilege one epistemological position over the other. This conflicts with Resnick and Wolff's assertion that an overdetermined epistemology is better suited to cope with an overdetermined reality. On the other hand, it may be that
there is some overarching destiny, some ultimate synthesis, some final truth leading the knowledge process toward contextualism. But if this is so, it is best handled by an the organicist root metaphor, the historical process, which is the topic of the next section of this chapter.

ORGANICISM AND ECONOMIC THEORY

The organicist world hypothesis sits in close proximity to the biological metaphor, but a key distinction between the two needs to be made. In all likelihood, the refinement of the structural categories of the organicist world hypothesis is intermixed with and reflects an analysis of the organism in a biological context. However, when carried over into the discipline of economics in particular, and the human/value sciences in general, one must take care not to mistake the structural categories of organism with the metaphors specific to biology. There is obviously overlap as both the world hypothesis and biology lay claim to the organism. But the discussion proceeds at a more general level with regards to the organicist world hypothesis. As we saw in the earlier portrayal of Capra's metatheoretical critique, using the organicist world hypothesis it is possible see physics, biology and economics in terms of a similar set of structural categories — in this instance the organicist categories derived using the historical process as the root metaphor. Oftentimes in the economic literature, especially where it relates to 'evolutionary economics', the organicist vision or manner of organizing evidence appears to be
truncated or overly restricted. The tendency is to consider the images or metaphors within biology too literally as they relate to economics. Thus, the firm is modeled as if it were organized like a cell. Or, economic outcomes are forced into the mold of biological evolution and explained in terms of natural selection. Though both are justifiable approaches and extensions of the biological metaphor, these applications do not represent the general meaning of organismism as presented by Pepper. A direct metaphorical transfer from biology to economics restricts the meaning of Pepper's organicist structural categories.

In the discipline of biology, the organicist tendency is observed in the natural world through the study of chromosomes, genes, cells, organs, organisms, which of course culminate in their most complex, inclusive and ideal form in the human being. The organicist tendency, which reflects a historical progression toward an absolute ideal, is expressed in the biological interpretation of the evolution of organisms into the human species. However, in the interpretation that follows, I follow Pepper and maintain an entry point on a more general level, one in which the structural categories unique to the organicist world hypothesis are able to transcend texts in the physical, life and value/human sciences. By Pepper's account, it is the historical process — as seen through sequential integrations of fragments and their internal contradictions into a coherent whole — that characterizes the essential feature of organismism. Interestingly, the organicist world hypothesis finds its point of origin in the description of historical process, which is

128 For a thorough discussion of the "biological" and "evolutionary" aspects of the thought contained in the works of Marx, Marshall, Schumpeter and Veblen, refer to Hodgson (1993).
driven by forces inherent to the natural and social world and occur with or without our understanding. Nevertheless, the historical process demands analysis and is reflected in an accumulation of knowledge about these domains of inquiry. In other words, it is through the process of accumulating knowledge that we become aware of and understand the organic nature of reality. To illustrate this, Pepper relies on the stylized facts involved in the historical process by which scientists move from a primitive to a complete understanding of planetary motion. The process involves observation and the identification of evidence that appear as fragments in juxtaposition to their nexus. The scientific explanation of these fragments and their nexus contain contradictions, which are resolved upon closer examination into a higher and more integrated whole. In Pepper's account, this progressive cycle of anomalous fragments, internally related by contradiction, resolves over the centuries through several iterations, each one representing a more enlightened and coherent image of the solar system. With respect to the astronomical motion, the cycles of integration in our knowledge process attained modern prominence with Newton's explanation of motion in connection with gravity. Analogously, we see that the biological interpretation of the evolution of humans in a highly complex and integrated form is but one example of the organicist approach to organizing evidence. This being said let us now consider two examples of economic theory that organize evidence consistent with the organicist world hypothesis.
Marx’s Interpretation of Economic History

My purpose in this section is to briefly connect the work of Karl Marx to the organicist world hypothesis as presented by Pepper. I do this with some trepidation because in all likelihood the theoretical system constructed by Marx has been interpreted as any one of the four world hypotheses. Nonetheless, I will claim that the discipline of economics possesses a quintessential organicist interpretation of economics and society presented in the theoretical work of Karl Marx. Familiar to any economist who has studied the history of economic thought, Marx’s interpretation of history, which views socioeconomic transformation as driven by class antagonism, demonstrates what Pepper had in mind when defining the organicist world hypothesis. Using the idea of the historical progression as its root metaphor, recall that Pepper develops his notion of the organicist world hypothesis in terms of two sets of structural categories: one progressive and the other ideal. The ideal set of categories reflects the achievement of the organic process. This is the so-called absolute ideal, which is also referred to as the truth that intrinsically resides in a concealed organic process. The progressive set reflects the path traveled, either in reality or as part of a knowledge process, to arrive at the ideal (Pepper 1942: 283).

In an article written by Thorstein Veblen entitled the “Socialist Economics of Karl Marx,” this general theme is unequivocally identified as characteristic of Marx’s system of thought. Veblen writes (1965[c1951]:277):

There is no system of economic theory more logical than that of Marx. No member of the system, no single article of doctrine, is fairly to be understood.
criticized or defended except as an articulate member of the whole and in the light of the preconceptions and postulates which afford the point of departure and the controlling norm of the whole. As regards these preconceptions and postulates, Marx draws on two distinct lines of antecedents — the Materialistic Hegelianism and the English system of Natural Rights. By his earlier training he is adept in the Hegelian method of speculation and imbibed with the metaphysics of development underlying the Hegelian system. By his later training he is an expert in the system of Natural Rights and Natural Liberty, ingrained in his ideals of life and held inviolate throughout. He does not take a critical attitude toward the underlying principles of Natural Rights. Even his Hegelian preconceptions of development never carry him the length of questioning the fundamental principles of that system. He is only more ruthlessly consistent in working out their content than his natural-rights antagonists in the liberal-classical school. His polemics run against the specific tenets of the liberal school, but they run wholly on the ground afforded by the premises of that school. The ideals of his propaganda are natural-rights ideals, but his theory of the working out of these ideals in the course of history rests on the Hegelian metaphysics of development, and his method of speculation and construction of theory is given by the Hegelian dialectic.

Based on this general assessment, it seems fair to state that Veblen’s overall interpretation of Marx’s theoretical system, which is identified with Hegelian dialectics and the English system of natural rights, is a specific example of Pepper’s interpretation of the organicist world hypothesis. If nothing else, they both share a general approach to theorizing predicated on a set of progressive and ideal categories. In this instance of an organicist approach, the method of Hegelian dialectical reasoning discerns material forces in the social and economic realm that propel a historical process — a process that reflects the working out of an assumed set of natural rights.

Although a succinct characterization of Marx’s theoretical system, Veblen’s angle, left unqualified, leaves open the door for serious misinterpretation of Marx’s theoretical approach. Specifically, an overemphasis on the ideal categories (i.e., the assumption of some kind of natural right as constituting the desired ideal) leads to a potential caricature
of Marx's theoretical insights and predictions. According to Marx, the capitalist system is not a universal economic system; instead, it is a historically specific mode of production with a unique set of social relations. Marx defined these social relations in terms of two fundamental classes: the working class and the capitalist class. Moreover, due to the existence of internal contradictions between the working and capitalist classes over the distribution of society's economic output, Marx viewed the capitalist system as a dynamic accumulation process involving change and transformation. In regard to the capitalist accumulation process, Fine writes (1979:3):

Capital is itself a social relation: specifically it is the social relation involved in the self-expansion of value, the production, appropriation and accumulation of surplus value. Capital, being self-expanding value, is essentially a process, the process of reproducing value and producing new value.

Commenting on the driving force underlying Marx's conception of a process of self-expanding value, Foley writes (1986:1):

Marx conceives of the social reality he is analyzing as a process that evolves in response to its own internal contradictions. In other words, the phenomena he discusses cannot be understood independently of the history that produced them. This approach contrasts with the view that phenomena will tend to reassert themselves regardless of historical context. He sees the relations he is studying as being in a constant process of change, not just unchanging elements undergoing some rearrangement. Thus, Marx's aim is not to state universal principles that explain human and social interaction once and for all but to understand the regularities that govern the changes in specific social formations.

Marx's theoretical vision of the capitalist economic system has always been antithetical to the utilitarian perspective that portrays market capitalism in terms of general equilibrium and social harmony. Because of its fundamental opposition to neoclassical utilitarian thought, it is obvious why mainstream economists are both harsh and dismissive of Marx's
work, attacking the most obvious weaknesses in his theoretical system or portraying Marx as claiming that capitalism would inevitably collapse. Even those apparently sympathetic to Marx's work sometimes inadvertently present caricatures of his theoretical system.

The problem arises when one mistakenly interprets Marx as claiming that the progressive historical process is deterministic, and as a result, is moving inexorably toward either collapse or toward the absolute ideal of a classless society. Based on this mistaken line of criticism, the socioeconomic system is supposedly partaking in a historical process that will inevitably resolve the pressing class contradictions and transform capitalism into socialism and ultimately communism. In other words, in Marx's system, the concealed set of natural rights would reveal themselves through class revolution. Even though relatively sympathetic to Marx's work, in The Worldly Philosophers, Heilbroner flirts with this type caricature when he characterizes Marx's theoretical system in a chapter entitled "The Inexorable System of Karl Marx." According to Heilbroner, Marx came to his conclusion about the inevitable collapse of the capitalist mode of production by employing a materialist version of Hegelian dialectics (1982:143-146). The tendency to interpret those who operate in the organicist metaphysical framework with an overemphasis on the ideal set of categories is a point confronted by Pepper in World Hypotheses. Pepper writes:

"The early organicists, notably Hegel, thought that there was one and only one course of progress from maximum fragmentariness to ultimate integration. His books narrate the tragicomic drama of this fixed and inevitable progress. The drama is comic because the ultimate happy ending is inevitable, but tragic because the path is a path of conflicts and we struggling human beings never reach the final ending. Thesis — antithesis — synthesis is the ever-recurring form in each scene of this drama (1942:293)."
To the later organicists this drama is a caricature of what actually takes place. There is no single cosmic path to the truth or to the ultimate integration of fragmentary data. There is not one single inevitable opposite for each fragment. The progress of astronomy might have gone along a somewhat different route. There are many paths from error to truth. The thinner, more abstract, more isolated, or the vaguer and more confused the initial facts or fragments of cognition, the greater the variety of ways in which these may seek explanation. As the fragments get richer, the alternatives become fewer (1942:294).

Hegel was right, say these later organicists, in the inevitability of the trend of cognition toward a final organization in which all contradictions vanish. He was right in his observation that the nexuses of fragments lead out toward other fragments which develop contradictions and demand coherent resolution. He was right in his idea that these nexuses have a particular attraction for those relevant facts which are peculiarly recalcitrant to harmonization with facts already gathered. It was the aberrations in the orbit of Uranus, those recalcitrant data which refused to harmonize with the Newtonian laws, that particularly attracted the attention of astronomers and led to the discovery of Neptune. In all these things Hegel was right. But he was wrong and invited undeserved ridicule for the organismic program by his fantastic, arbitrary, and rigid picture of the path of progress (1942:295).

With this in mind, I proceed with a degree of caution to meet my primary purpose in this section, which is to lay the groundwork for interpreting Marx in terms of Pepper’s idea of the organicist world hypothesis. Pepper’s metaphysical account of organismism seems to immediately shed light on the nature and source of unfair and simplistic criticisms based on a one-sided interpretation of Marx’s organismic approach. Based on Pepper’s explanation of the history of the organicist world hypothesis, one might expect that such criticisms would be levied against the work of Marx by virtue of his connection with the work of earlier organicists such as Hegel.

Reacting to the ever-worsening conditions of the working class in Germany and the resistance of the German capitalists and the Prussian government to do anything to help the intolerable conditions of life for the working classes, Marx and Engels set out to
construct a materialist version of dialectical change. According to Hegel, change was the rule of life. Every idea, every force, irrepressibly bred its opposite, and the two merged into a unity that in turn produced its own contradiction. History was the expression of this flux of conflicting and resolving ideas and forces. Change — dialectical change — was immanent in human affairs. In his theoretical system, Marx transforms Hegel's idealistic version of dialecticism into a theory of change or social transformation called dialectical materialism. The philosophy is called dialectical because it incorporates Hegel's idea of inherent change, and materialism because it grounds itself not in the world of ideas, but on the terrain of social and physical environment. In a tract entitled "Anti-Dühring", Engels describes dialectical materialism. Engels writes (1959:22):

The materialist conception of history starts from the principle that production, and with production exchange of its products, is the basis of every social order; that in every society that has appeared in history the distribution of the products, and with it the division of society into classes or estates, is determined by what is produced and how it is produced, and how the product is exchanged. According to this conception, the ultimate causes of all social changes and political revolutions are to be sought, not in the minds of men, in their increasing insight into eternal truth and justice, but in changes in the mode of production and exchange: they are to be sought not in the philosophy but in the economics of the epoch concerned.

Marx claimed that the historical progression could be understood as involving identifiable modes of production, each with a specific set of internal contradictions expressed through the conflict between the social classes contained in the society.

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129 In Chapter 8 of *Methodology and Economics: A Critical Introduction*, Phetsorn (1988) presents a discussion of Marx's method, which also focuses on Marx's materialist modification of the Hegelian dialectics. According to Phetsorn's interpretation (1988:117-118) Hegelian dialectics consists of three laws: (1) the transformation of quantity into quality, which emphasizes that small quantitative changes can lead to qualitative change; (2) the unity of opposites, which emphasizes the contradictory nature of reality, the impetus for change; and (3) the negation of the negation or thesis, antithesis and synthesis.
In order to develop his theory, Marx relied on a distinction between appearance and reality. According to Pepper, the organicist believes that events in the world are to be understood as a concealed organic process (1942:282). Recall that in Pepper's description of the organicist world hypothesis, appearance is taken to relate to the working out of the historical process by way of the progressive structural categories. By contrast, reality is associated with the final and conclusive integration of the successive organic wholes as observed in the absolute ideal. Reality is the appearance of the absolute ideal toward which the process is heading. Thus, the theory of the organicist focuses on the steps involved in the process and also the nature of the organic structure to be achieved. Pepper claims that the opposition between the progressive categories and the ideal categories is a crucial theme running through the analysis of organicists. Pepper writes (1942:283-284):

This opposition between what may be called the progressive categories and the ideal categories is an ineradicable characteristic of organicism and seems to be the source of all its difficulties. Ideally, the ideal categories should be the only categories of organicism. The opposition of categories just noted is often called by the organicist that of Appearance and Reality. There is a truth in these themes. The progressive categories would be appearance if the ideal categories could monopolize reality.

For his part, Marx had no delusion about the fact that the nature of the theoretical analysis (as well as the reality of the historical process) lay in the progressive state of affairs. Though he had a notion of the ultimate or absolute ideal, the journey to that point involved a process whose understanding was concealed from view. We get a partial glimpse of this in the manner of Marx's scientific method, which is based on the notion of a dichotomy appearance and reality. This general organicist approach, which is observed
in Marx’ method, is touched upon in Pheby when he highlights Marx’s analytical concern between what is ‘appearance’ and what is ‘essence’ when theorizing about the nature of population (1988:114-126). In his study of the economy, Marx begins by highlighting the difference between the nature of population (an appearance), as opposed to the underlying organic structure of the classes (a reality) that constitute the population. Marx writes (1975:72):

Population is an abstraction, if I omit the classes, for example, of which it consists. These classes are an empty word if I do not know the elements on which they are based. For example, wage-labour, capital, etc. These imply exchange, division of labour, prices, etc. Capital, for example is nothing without wage-labour, without value, money, price etc. Therefore, I begin with population, then that would be a chaotic conception of the whole, and through closer determination I would come analytically to increasingly simpler concepts: from the conceptualized concrete to more and more tenuous abstractions, until I arrived at the simplest determinations. From there the journey would be taken up again in reverse until I finally arrived again at population. this time, however, not [with population] as a chaotic conception of the whole, but as a rich totality of many determinations and relationships.

Foley echoes this in describing the methodological approach employed by Marx, which involves a careful structuring of “levels of determinations” used to differentiate between real and concrete events. Foley writes (1986:4):

This idea of abstraction is common in the social sciences, although the specific abstractions that are viewed as relevant, and their status, differ greatly among various theoretical traditions. For example, Marx views “value,” “labor,” “money,” and “commodity,” as fundamental abstractions that are vital for understanding the historical specificity of capitalist production; and neoclassical economics sees “tastes,” “technology,” “resources,” and the “market” as fundamental abstractions that are useful in understanding resource allocation in any human society.

Marx insists on the layering or ordering of abstractions or determinations in theory. For him, knowledge is an analyzed mental construct made up of fundamental abstractions or determinations. These abstractions are developed
and stated in a particular order and combined to reproduce important features of the real phenomenon in thought.

For Marx, this is a more penetrating way to conduct analysis, which can uncover the underlying class structure at the heart of the laws of motion of the capitalist system. This tension constitutes the force that propels the system along its historical process. Conflict arises from competing and antagonist claims between the classes for the economic output of a society — which is the production of goods and services. As these conflicts become more acute, pressure mounts between the existing classes and creates strain on the existing set of social relations among its classes. As time passed, new developments involving technological advancement (fragments) caused contradictions to emerge relative to the existing set of property relations. Foley writes (1986:11):

The second, deeper, effect of the dialectic in Marx's work lies in his understanding of the nature of reality and the nature of knowledge. Marx's vision of a reality that is a contradictory process of change rather that a static arrangement of preexisting entities exerts the most profound dialectical influences on his thought. Marx accepts as a matter of fact the idea that human knowledge, as a human construct, has the same characteristics of motion and change.

Thus, for Marx, the reality of capitalism and the property relations that defined it were not a universal system. Neither is the knowledge process by which one tries to make sense of the reality of capitalism.

Based on Pepper's explication of organicism, I conclude that it is possible to view Marx's theoretical contribution along the organicist lines. This is brought into particularly sharp relief by focusing on Marx's deployment of the progressive and ideal sets of categories. In addition, Marx self-consciously relies on methods that attempt to uncover a concealed organic process. These include making a distinction between appearance and
reality and articulating a knowledge process by which reality (as opposed to concrete events) can be uncovered through a careful layering of determinations. Whatever one believes or thinks about Marxian Economics or the Social Critique of Marx, the particular method he adopted to analyze the nature of a the capitalist economic system warrants the attention of serious students in the social sciences, including economics. This is a position with which Phibby concurs. Phibby writes: "I consider Marx’s very distinctive approach to be a real alternative to the sterility of much orthodox method currently undertaken" (1988:126). Following Pepper, we see why this is so. The structural categories identified in the organicist world hypothesis find their origin in the root metaphor of the historical process. The refinement of the structural categories over the history of cognition into an adequate and stable world hypothesis offers theorists a powerful and vital manner in which to organize evidence of observed phenomena. While Veblen approached social critique and the nature of the classes in terms of an inquiry into the cultural landscape of his time, Marx organized his social critique in terms of a highly defined and precise theory that addressed the manner in which we might expect capitalism to transform into something other than what it was. As long as some kind of final or ultimate cosmic integration does not occur, it would seem that there is more to be gained by the unfolding capitalist system in this manner.
Marshall’s Idea of Industrial Organization

By some accounts, Alfred Marshall’s writing on economic theory, especially in *Principles of Economics* (1990[c1920]), possesses sufficient allusions to the biological metaphor to be considered a precursor to what is commonly referred to as “evolutionary economic theory”. According to Hodgson, Marshall began to see the limitations of a mechanistic framework early in his career. Hodgson writes that through Marshall’s “investigations of increasing returns, it became increasingly clear to him that a movement up or down the long-period supply curve was irreversible” (1993:20). However, Hodgson does not interpret Alfred Marshall’s theoretical system favorably in terms of contributing to “evolutionary economics” or operating along the lines of “organicist ontology” (1993:13-20). After noting Marshall’s rhetorical affinity for and allusion to the biological metaphor as a source of inspiration, Hodgson writes (1993:20):

> The ease with which biology was later purged from the Marshallian system, to be replaced by a fortified metaphor from mechanics, suggests the highly limited degree to which truly Darwinian evolutionary ideas had been originally implanted by Marshall in his *Principles*.

Indeed, it is undeniably true that the majority of Marshall’s theoretical content stayed well within a mechanistic framework.

Nonetheless, I believe it is possible to interpret Marshall’s philosophical attitude, that is, his scattered allusions to the “biological metaphor”, as a potential example of the

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organicist world hypothesis developed by Pepper. To see this, it is necessary to tease out the organicist tendency in Marshall’s thought, because it is basically implicit. First, however, it is useful to reiterate the difference between the biological metaphor and organicism as a world hypothesis. As noted previously, this distinction is crucial to understanding how the structural categories derived from the root metaphor (i.e., the historical process) define a philosophical attitude or world hypothesis that is capable of operating in each domain of science: physical, life, and human/value. Stated differently, evidence of biological imagery in economic theory does not necessarily imply an organicist organizational scheme. It runs the risk of being too restrictive, thus missing the focal point of theoretical work organized around the root metaphor of organicism. As noted in the section on Capra (pg. 161), the confusion arises due to the fact that the subject matter of biology (a life science) has both mechanistic and organicist (as well as formist and contextualist) tendencies. In a recent dissertation written by James Neidhart, part of which focuses on what amounts to an organicist interpretation of Marshall’s writing, this issue is directly addressed. Neidhart writes (1996:47):

It is important to note that [Marshall] used the term biology in an organicistic sense. In other words he was appealing to a philosophy of organism: one which focuses on different levels of order (colloquially referred to as organic wholes) rather than merely the biological substructure of socio-economic phenomena. In order to see this, the distinction which Marshall makes between biological (i.e., evolutionary) and mechanical (i.e., equilibrating analysis) will need to be explored.

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This interpretation of Marshall is inspired by and follows closely the dissertation by James Neidhart (1996) at the University of New Hampshire. It is entitled “The Evolutionary Dimension Within Economic Thought.”
In this section, I focus on the following idea: Interpreted as a successive nesting of organic wholes, Marshall’s theoretical view of industrial organization is consistent with the structural categories outlined in Pepper’s description of the organicist world hypothesis.

Using a hierarchical framework involving various levels of order, it is possible to interpret the economic content in Marshall’s writings along the lines of the organicist world hypothesis. One can glean in Marshall’s writings the implicit conceptualization of a nested hierarchy to develop his ideas of economic organization. A nested hierarchy involves discrete levels of conceptualizations that reinforce each other through positive feedback loops. By building on the idea of a nested hierarchy and an ongoing historical process (i.e., the evolution of the extent of the market), it is possible to interpret Marshall’s idea of industrial organization consistent with what Pepper refers to as a successive integration of organic wholes. Recall that Pepper uses the progressive categories to indicate the historical process by which the ultimate organic whole is to be attained through the integration of previously less complete organic wholes. Marshall leans in this direction when he employs metaphorical imagery involving evolution/biology to describe a process and contrasts this approach with more simple mechanical metaphors describing supply and demand that are based on equilibrium. Thus, regarding economic forces as they pertain to the market, Marshall writes (1990[c1920]:269):

A business firm grows and attains great strength, and afterwards perhaps stagnates and decays; and at the turning point there is a balancing act or equilibrium of the forces of life and decay: the latter part of Book IV has been chiefly occupied with such balancing of forces in the life and decay of a people, or of a method of industry or trading. And as we reach to the higher stages of our work, we shall need ever more and more to think of economic forces as resembling those which make a young man grow in strength, till he reaches his
prime; after which he gradually becomes stiff and inactive, till at last he sinks to make room for other more vigorous life. But to prepare the way for this advanced study we want first to look at a simpler balancing of forces which corresponds rather to the mechanical equilibrium of a stone hanging by an elastic string, or of a number of balls resting against one another in a basin.

Applied to industrial organization or the extent of the market, the idea of growth and decay may refer to individual firms. The life of an individual firm comes and goes just like that of a young man. But, on the level of the industry as a whole, the next more inclusive level, another evolutionary process continues. From the perspective of this conceptually discrete level, this process is both independent of and dependent on the birth and death of these individual firms. The relationship between these discrete yet interdependent levels is one that requires the nesting of concepts. Understanding of the overall process should occur from the point of view of a nested hierarchy. According to Neidhart, this vision of reality and associated way of conceptualization:

...led [Marshall] to implicitly use a theoretical model of complementary circularities which was applied discretely to different processes within the economy: therefore he did not simply aggregate his conceptual model of the parts (e.g., individual firms) to form his concept of the whole (e.g., the industry) (1996:52).

To further this discussion, three distinct levels need to be identified as implicit in Marshall’s theory. These levels involve the: (1) quality of labor at the level of the family, (2) internal economies at the level of the firm, and (3) external economies at the level of the industry and beyond (e.g., the region, the state, the nation, etc.). Within each of these levels, a discrete process can be theorized in terms of complementary circularities. This is a point that can be seen in the theoretical work of Marshall. One can point to Marshall’s emphasis on organizational structure that materialized as a theoretical distinction between
the differentiating and integrative dimensions of the division-of-labor. For Marshall, an increasing division-of-labor involves both a subdivision of function, or differentiation, and a more intimate connection between the specialized parts, or integration. Marshall writes (1990[1920]:200-201):

...biology has more than repaid her debt; and economists have in their turn owed much to the many profound analogies which have been discovered between social and especially industrial organization on the one side and the physical organization of the higher animals on the other. In a few cases indeed the apparent analogies disappeared on closer inquiry: but many of those which seemed at first sight most fanciful, have gradually been supplemented by others, and have at last established their claim to illustrate a fundamental unity of action between the laws of nature in the physical and in the moral world. This central unity is set forth in the general rule, to which there are not very many exceptions, that the development of the organism, whether social or physical, involves an increasing subdivision of functions between its separate parts on the one hand, and on the other a more intimate connection between them. Each part gets to be less and less self-sufficient, to depend for its well being more and more on other parts, so that any disorder in any part of a highly developed organism will affect other parts also.

Continuing his discussion, Marshall cited development of specialized skills, knowledge and machinery as examples of differentiation. As an example of integration, he noted the increased security of commercial credit, the advances in communication (both physical and mental), and ethics/morality. While differentiation is a characteristic of the individual parts of the process as distinct from one another, integration is a characteristic of the interrelation of these parts as a whole process. These two concepts are linked by the fact that the advantages of the differentiation between parts must be realized through their integration into a single process.

The tension created between the differentiating tendency (division-of-labor) and the integrating tendency (accumulation-of-capital) enters the story as an example of
Hegelian dialectics in the naturalized or idealized sense of Hegel. That is, unlike the Marxian interpretation of material dialecticism, this particular interpretation of dialectical tension in Marshall's description of the historical process of the extent of the market does not occur as a result of the material or economic conditions present in society. Instead, the driving tension is idealized in the form of a natural conflict between the requisites of specialty and organization. Regardless of the particular interpretation of Hegelian dialectics, in terms of Pepper's portrayal of organicism, I suggest we have the ingredients for an organicist interpretation of a historical process. On any given level of the hierarchy there are fragments (parts) that reach out into a nexus (i.e., the next most inclusive or complete organic whole). Together the fragments and the nexus exist in contradiction, which demands resolution in a more inclusive organic whole.

This then is an interpretation of Marshall's implicit conceptualization of industrial organization as a result of increasing returns to scale. On the least inclusive level, the nature of families/individuals must first be considered a whole in their own right. The individual/family is in its own right an organic whole. However, there exists an internal drive based on the tension between specialization and organization that forces them to become integrated as parts into a more inclusive whole within an individual firm. In this way, the firm can be seen to take advantage of internal economies of scale not available to

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[13] See Phets (1988) for a brief discussion of the idealist and materialist interpretation of the dialectic. Phets writes (1988:119): "Marx found Hegel's notion of the dialectic very useful, but he objected to Hegel's more idealistic way of employing the principle (Marx 1975:102). He favored a more 'materialist' interpretation of the dialectic — this means that 'the material world' is 'reflected in the mind of man, and translated into forms of thought.'"
the individual or the family. Based on this dialectic method of reasoning, the individual/family can be viewed as both an organic whole and as a part (fragment) relative to the next more inclusive level in the nested hierarchy. The parts/whole distinction becomes relative or a matter of perspective. For example, in terms of the internal economies of a firm, Marshall views the firm as an amalgamation of individual workers and capital that displays integrative qualities which cannot be attributed to the individual parts; although the firm is composed of these parts, this composition has a quality not reducible to the individual quality of its components. Adjusting for the misplaced emphasis Marshall places on the role of the capitalist, consider the following quote:

An able man, assisted perhaps by some stroke of good fortune, gets a firm footing in the trade, he works hard and lives sparsely, his own capital grows fast, and the credit that enables him to borrow more capital grows still faster...success brings credit and credit brings success...The increases in the scale of his business increases rapidly the advantages which he has over his competitors, and lowers the price at which he can afford to sell. This process may go on as long as his energy and enterprise, his inventive and organizing power retain their full strength and freshness, and so long as the risks which are inseparable from business do not cause him exceptional losses; and if it could endure for a hundred years, he and one or two others like him would divide between them the whole of that branch of industry in which he is engaged (Marshall 1990[c1920]:262-263).

The situation is similar from the perspective of the individual firm, which naturally seeks integration into a more inclusive whole in order to take advantage of external economies not available to the isolated, individual firm. That is, based on this same tension between specialization and organization, individual firms become integrated as parts into yet a more inclusive whole within the region, city, state or nation. This can be seen in Marshall’s conceptual framework, which incorporates greater inclusiveness or moves to successively higher layers of the nested hierarchy. Consider Marshall’s concept
of external economies, which expresses the idea that the organization of cities and broad regional economies serve to integrate their composite parts into a synthetic whole just as an individual firm organizes its resources (e.g., skills, materials, and machinery) in different ways to achieve greater productivity. However, these economies are external to an individual firm since they involve the integration of parts in which the firm is only one. An individual part can only create increased external economies in coordination with complementary changes in the other components of the integrated process. Marshall writes (1990[c1920]:264):

Meanwhile an increase in the aggregate scale of production of course increases those economies, which do not directly depend on the size of individual houses of business. The most important of these result from the growth of correlated branches of industry which mutually assist one another, perhaps being concentrated in the same localities, but anyhow availing themselves of the modern facilities of communication offered by steam transport, by the telegraph and by the printing-press. The economies arising from such sources as this, which are accessible to any branch of production, do not depend exclusively upon its own growth: but yet they are sure to grow rapidly and steadily with that growth; and they are sure to dwindle in some, though not in all respects, if it decays.

Therefore, this integration occurs at a level higher than the individual firm and thereby creates the environment in which the firm operates (e.g., city, region or nation).

In sum, a portrayal of the ‘biological thinking’ in Marshall’s thought, as it applies to industrial organization and the extent of the market, fits reasonably well into the general form of the organicist world hypothesis presented by Pepper. The concept of hierarchical nesting of discrete complementary circularities, which operate dialectically between the requisites of specialization and organization, generates an organicist interpretation of Marshall’s implicit vision. From this perspective, the story of the extent of the market is a
'historical progression' viewed as series of integrations moving from the level of the individual to the level of the nation. According to Pepper's metatheoretical perspective, this manner of organizing the world's evidence would constitute an illustration of organism, which is an adequate world hypothesis.
CONCLUSION

In a comment on Hodgson’s article “Metaphor and Pluralism in Economics,” Mirowski reminds his audience that the central message of More Heat Than Light goes beyond the question: Which metaphor is most appropriate for economics — physics or biology? (Salanti and Screpanti 1997:155-157). He does argue that the ‘proto-energetics’ metaphor, which underpins classical physics and neoclassical economics, is outdated. He also advocates the use of metaphors other than mechanism. However, the more pressing concern is an “institutional structure” with a strong bias toward economic analysis constructed in a mechanist image. Mirowski concludes: “the answer [problem] resides more directly in sociological than conceptual consideration....It would seem that the real issue is: What are the actual dynamics of appropriation of legitimacy in the history of economics?” (Salanti and Screpanti 1997:156-157). I surmise that the political strategy to overturn the ‘dominant paradigm’ must continue to focus on the question of power — better handled by a sociological perspective. The strategic effort must not naively rely on a mere transference of economic content from one metaphor to another. Mirowski “hits the nail on the head,” pointing out that the biological metaphor is suspect in any event, since it remains heavily under the influence of those committed to the mechanistic metaphor. As I have demonstrated with Capra’s metatheoretical critique, mechanism is not unique to the field of physics. It is migratory across all scientific domains, which is a trait common to all four adequate world hypotheses. However, mechanism
is ubiquitous and in a position of privilege in economics as it is elsewhere in the social sciences. Thus, a simple transference between metaphors would in all likelihood skirt the issue and permit traditional, positivist-oriented theories in economics (and the philosophy of science) to continue their dominance. Traditional metatheoretical accounts need only focus on more palatable “internalist” notions such as a “competitive marketplace of ideas”. and in doing so continue to decontextualize the problem of “market power”, a key factor to the sociological perspective in determining the distribution of research effort in the economics profession.

Mirowski should be saluted for his vigilance and intellectual prowess: he brings to the table questions of power and metaphor — matters sociological and conceptual. However, I cannot subscribe to the idea that metatheoretical accounts of the scientific process developed in the sociology of science, post-modernism, hermeneutics, or rhetoric are necessarily more or less persuasive than metatheoretical arguments developed in the philosophy of science (or the economics of science). If nothing else, the confrontation with “modernism” over the past decade and a half initiated by McCloskey (1997[c1985]) has injected a healthy degree of skepticism about conclusive accounts. Theories are theories even when they parade as metatheories and they possess the limitations of theories. In and of itself no metatheory can serve as essential or ultimate perspective; there are no crucial empirical tests for substantive theories, and a fortiori no crucial meta-empirical tests for metatheories. When the “foundation” is water not stone, the best that scientific theories can do is float. However, the evidence stands that the four world hypotheses and some substantive samples of each world hypothesis will indeed be
adequate and possess cognitive value, which is to say they, in the plural, can enhance the overall picture of the scientific process and economics. For this reason, I think it unwise to reduce this matter to an “either/or” situation. It strikes me as a reasonable assertion, perhaps a given in the current context, that the power structure of the academy, and the quest of individuals for power and prestige within the institutional structure, partially determines what passes for knowledge. Frankly, I do not see how it could be otherwise. So, while it is prudent to maintain “externalist” meta-critiques to expose and explain the current imbalance in distribution, the issue cannot be handled solely by confronting power; power cannot be eradicated from the institutional context. Thus, the game plan should be to contest the existing power structure along as many fronts as possible — both internal and external to the enterprise of science.

In the long run, an effective change in the distribution of research is predicated upon presenting a suitable replacement to the monist tradition. To advance the pluralist agenda, practitioners in the discipline must construct a reproducible and organized image of the pluralist tradition and start teaching it as such. I believe this starts with the articulation of a plurality of metaphysical world hypotheses such as that presented by Pepper. The lack of such a backdrop could be one explanation of why Institutional Economics has remained quagmired in a haze of philosophical confusion. The following quote in an article entitled “American Institutionalism: Premature Death. Permanent Resurrection.” I believe, strikes at the heart of the matter. Klein writes (1978:252):

We [Institutionalists] may still have no good name for ourselves: “Institutionalism” Clarence Ayres called “singularly unfortunate”; “instrumentsalism” is intolerably awkward; “evolutionary economics” describes
only part of our concern, and that none too clearly; "holistic economics" may well be a better term, but it is unlikely now to catch on; "heterodox economics" served once, but like "neo" is always in danger of becoming out of date. Many of us still refer to ourselves as "dissenters," and I shall be at pains here to suggest the limitations of that term.

Let us not forget that at this point indulgence in mechanism is a matter of institutional habit, an ingrained cultural routine. This is where economic methodology and its ‘internalist’ partner, the philosophy of science, can play an important and transforming role. I believe the quest for reason, evidence, truth — hallmarks of scientific integrity associated with the Western Rationalist Tradition (Searle 1993) — are genuine motivating forces upholding the scientific endeavor. Which begs the question: What role should the methodology of economics and the philosophy of science play in nurturing pluralism? Within the discourse of economic methodology, the prevailing attitude over the last few decades has been to ‘recover the practice’ of working economists. This has moved the methodological project away from its traditional normative role (i.e., advocating monism as well as judging theories) and toward a naturalistic purview of the economic profession’s output. Recovering actual practice seems to be a neutral ground, which in a time of intellectual crisis can be agreed upon by most conservatives, progressives and radicals in a fledgling pluralist environment. This new degree of tolerance signals an attitude through which the texts, speeches, lectures, courses, interviews and a variety of other research practices of economists have been accepted in a naturalistic fashion. The positivist contingent can no longer legislate away certain types of economics a priori. Criticism of ‘economic acts’ and subsequent pruning is always quick to follow, as it should. Let a “thousand flowers bloom” and only the “adequate” ones
remain. But this re-centering of the debate has extended greater validity to the actual practices of the contemporary economist. The next reasonable step in the discipline of economic methodology, I argue, is to substitute the stance of monism for the stance of pluralism.

The opening created by a ‘non-normative’ stance associated with a ‘recovering practice’ attitude serves to push the pluralist agenda along. The resulting pluralist turn has called attention to and stimulated a variety of approaches, all of which help to erode the hegemony of the traditional monist philosophical perspective and reorient the focus of economic methodology. Yet, pluralism is a double-edged sword. On the one hand, it points practitioners in a progressive direction. On the other hand, it threatens ‘modernists’ with a ‘correct’ agenda on the political left and the right. Pluralism frustrates appeals to anything like an absolute authority, such as a methodological canon, as an ultimate justification to either their particular substantive economic theory or, for that matter, their methodological (or meta-methodological) theory, which includes a belief in pluralism. Not unexpectedly, this development also alarms commentators who believe that the absence of monism leads directly to relativism — a position anathema to ‘scientific orientations’ such as falsificationism, positivism and modernism, and seemingly conflictive with scientific realism. Perhaps this fear has been heightened by the vocal cries from those such as Warren Samuels and Deirdre McCloskey for the complete abandonment of methodology — a position seized upon by diehard monists and used as a conservative ploy to deter progress. Whatever the case, the ‘problem’ of relativism is founded in mistaken belief that relativism offers the only alternative to monism. This is a possibility hinted at by Belloflori
in his comment on Samuel’s essay, “The case for methodological pluralism”, which in essence
avovcates an “anything goes” attitude. I think Belloflori believes Samuel’s relativist position
may play well into the conservative strawman strategy” (Salanti and Screpanti 1997:80-87). This
goes to the crux of an internalist strategy and the identification of a possible role for methodology.
Is it possible to define the plurality of competing theoretical persuasions in an orderly fashion?

So the question remains, What happens to economic methodology stripped of its “normative
orientation”? Over what will it legislate if not economic theories? In the apparent absence of a
normative appeal, will methodology simply devolve into naïve description as Lawson laments?
Will practicing economists, deprived of an unelected governing body, go willy-nilly into a sea of
chaos? These are all the wrong questions. A better set of questions exists. Is it not time for
methodologists to switch their normative appeal from monism to pluralism? After all, on the
meta-level, advocacy of the monist tradition was an irrefutable normative exercise. Is Pepper’s
epistemological approach devoid of theory? Are there better or worse ways of advancing the
pluralist agenda? In contemplating the future of economic methodology, I see the discipline as
a powerful and viable vehicle. It is a community that can effectively, and in a relatively
transparent fashion, put on the table the options, or a theory of the options, available to those
who want to express ideas in the field of economics. Methodology from its relative position
within the larger discipline of economics can still play the role involving validation and
clarification. Where validation is concerned, the disciplines of methodology and economics
proper have labored for the better part of two generations in the context of
monist metatheories. Although, this seems to have had little effect on the production of a plurality of economic theories; it has most likely impacted the distribution of research effort. The monist normative stance has dramatically inhibited the economics profession in consciously identifying and promoting the analytical options available. Pluralism needs to be validated from within the enterprise even while it is being argued externally. But one might ask, ‘Is not validation a normative stance’? The answer of course is yes, but the playing field has changed. Methodological pluralism is a normative agenda and methodologists should become more concerned about describing a variety of adequate theories and less concerned about legislating over someone else’s. As Pepper points out, based on the notion of autonomy of the world hypotheses as they coalesce around their root metaphor, it is illegitimate to disparage one adequate world hypothesis using the structural categories of another. Finally, pushed to the end, I see no reason why methodology cannot continue to be a normative endeavor. After all, this is exactly what traditional methodology has done for most of its still young life relative to monism. Why should it stop being normative when confronted with the issue of pluralism?

However, for pluralism to become thoroughly established as an ethic or a norm, the pluralist landscape needs definition and this will likely happen through the education process, the shared institutions which links instructors, graduate students and undergraduate students. Moreover, even if pluralist attitudes were to be established for a plurality of economic theories as well as their promotion within the academe, pluralism will have to be viewed as a verb, not a noun, over the course of the next generation or two. The pluralist environment requires active participation. As I see it, this will become
the most viable mission of economic methodology over the next few decades. Monism and modernism have stultified pluralist pursuits to such a degree that much work needs to be done in laying out the landscape. The array of theoretical/conceptual options must be seriously classified and studied so that their cognitive value can be discerned and reflected on and appropriately criticized. It is only after such an effort that methodologists would be able to responsibly make claims as to the worth of pluralism. So, methodology does have a real purpose, even if it is "descriptive" in approach and humble about its capacity to legislate. Economists, trained to see economics as a theory of choice, well know that the quality of choice corresponds to the quality of information available about the choice to be made. The competition for recognition of ideas has no ultimate foundation in a truly pluralist environment. This being said, I submit we still have some distance to travel to take full advantage and constructively engage in a pluralist environment, in spite of the fact that I have argued for the existence of an "enduring nature of plurality of economic theories."

In this research I have appealed to a pluralist potential that most likely is unrealized in the actual non-pluralist environment. For those who, like Mirowski, say it is a question of power and not a matter of simply transferring economic content from one metaphor to another (i.e., from physics to biology), the point is accepted. However, the question of how to move beyond this balance of power, which is so firmly expressed within academia in promotion and funding decisions that allocate research effort, remains. For me, this boils down to a practical problem in need of a suitable solution. As the title of this dissertation suggests, the primary aim of this project is to locate an attitude, an
explanation, or as it turns out a pluralist metaphysical perspective, that would persuasively uphold the pluralistic nature of economic theory. If there is satisfaction to be gained herein, it is to develop a portrait of pluralism sufficiently persuasive to stand on its own two feet. The terrain for what is being called the ‘post-positivist era’ in the philosophy of science and economic methodology continues to be developed. What I have tried to do in this research is paint a picture of enduring plurality based on the articulation of four ‘root metaphors’ and their associated ‘world hypotheses’. The plurality of theories is thus supported through identifying four cognitive tendencies that Pepper claims have existed in philosophical thought for thousands, not hundreds, of years. The idea of a plurality of theory types is therefore not new to the philosophy of science, nor does it seem new to economics for that matter. However, as we enter the 21st century the problem at hand in the methodology of economics, and the discipline as a whole, is to overcome a dogmatic metalevel denial, which has lead to a certain habituation and a resulting ignorance of such a plurality. I believe the most serious obstacle to this end is that the current plurality is mostly unappreciated for lack of a coherent vision. The appeal of Pepper’s work relates to the fact that he assembled a description of his four adequate world hypotheses in the late 1930s and 1940s, prior to a time when the collective mind was thoroughly deceived by the self-proclaimed scientific dogma of positivism. Thus, Pepper offers an attitude that is unabashedly pluralistic. The brilliance of his work relates to the fact that he developed his metalevel taxonomy in a methodical and self-conscious fashion and assembled it primarily in the space of one book. Still more, we in the economics discipline have as evidence of Pepper’s adequate world hypotheses the texts of economists from the past
two centuries. In my mind, a ‘positivist’ philosophy of science, one comfortable with empirical/logical data as evidence, can continue to play a role in the construction of a pluralist landscape within the discipline of economics. Ironically, by searching the history of philosophy for his textual evidences, Pepper is part positivist. That is, these theoretical constructions or world hypotheses are to be treated as “objects of study” (1942:2). World hypotheses do not arrive without substantial empirical support, which without doubt should be utilized in defining a pluralist landscape within economics. By accepting the existence of metaphysics, Pepper’s mild brand of positivism permits him to see and explicate a plurality of metaphysical systems internally supported by what he call structural corroboration. The philosophy of science should take credit for its brilliant orphan child. It is their loss if they continue to ignore Pepper’s tolerant approach. If not the ‘substance’ of his structural world hypotheses.

The world hypotheses outlined by Stephen C. Pepper in World Hypotheses: A Study in Evidence (1942) are by no means new to philosophers of science nor many heterodox economists, who over the decades have taken seriously the exercise of being conscious of methodological differences, epistemological claims or ontological premises. However, the specific work of Pepper has not played an explicit role (or cited) role in methodological discussions. The work of Institutionalists and Feminists are aware of their contextualist heritage. Marxists are aware of the organismism of Marx’s explanation of the transition to Socialism. Both critiques and disciples of neoclassical economics realize that the approach is populated with mechanistic models. Most all scientists understand the fundamental utility of the formist tendency to develop systems of classification or identify
subsistent laws. However, I believe few economists, (or perhaps even philosophers) have ever had the luxury of being able to conceptualize simultaneously and express the unique underlying structures of these four commonly used world hypotheses. In addition, the fact that they were generated through the same root-metaphor method means that they are consistent in form possessing the potential of illustrating a coherence in a pluralist environment. In essence, it sets a workable middle course between an untenable monist past and the equally untenable relativist future. It strikes me as a grand opportunity for an activist, normative methodology. In a time when the profession is poised at an abyss between monism and relativism. Pepper’s pluralist epistemological system provides a powerful tool for methodology to further the education process within the discipline and effect a redistribution of the research effort. Pepper original contribution, unencumbered by a history of salvaging positivism (i.e., Popper’s falsificationism) and sufficiently structured so as to resist the relativism of rhetorical persuasion offers the possibility of a meaningful starting point for understanding the knowledge products produced through the application of economic theory. The Pepperian approach provides an orderly and logical bridge, while at the same time being as avowedly fallible as the person who originally put it to pen. In the near future, say the next century, the monist project does stand to crumble of its own intolerance and dogmatic design. Likewise, the utter skepticism fostered by the rhetorical approach will likely give way to a more reasonable partial skepticism admitting to some identifiable structures, lest it resorts to dogmatism to defend its claim. What will be left after the dust settles? I conjecture that it will be a coherent and workable notion of plurality for the discipline to enjoy. In my life, I have had the
benefit of learning two languages other than English. Granted, I am no longer fluent in either of them, but the process of learning them remains indelibly etched in my memory, as do the vistas they have opened up along the way. Likewise, I see the organizational system of Pepper as a pathway, which, if adopted by a student or a department or a research association, would facilitate the process of fluency in more that one ‘language’. The theoretical research effort within the discipline stands nothing to lose, saving a bad habit. Yet, this goes against what I have been told, either directly or through observation, by colleagues and mentors alike. The proper place for the graduate student is squarely within the normal activities of the ruling paradigm. Beyond this, it is the maturity and wisdom gained through the aging process that enables economists/scientists and thinkers in general to move beyond pedagogical orderliness provided by mechanism. I maintain that in time an orderliness much like that which has been established in the normal pursuit of solely mechanist theories, can be accomplished with some effort in a pluralist environment.

With these considerations in mind, I will present what I see as some possible areas of further research in a Pepperian tradition. These include but are not limited to some of the following:

- A joint project with interested parties in the philosophy of science to “fill in the terminological gaps” that have occurred between the time Pepper wrote *World Hypotheses* and the present. This research could include an effort to correlate the various philosophies of science to metalevel perspectives in economic methodology.

- A further elaboration of the ‘substantive economic content’ representative of the ‘ideal types’ in the Pepperian taxonomy. This research could include an effort to explore Pepper’s fifth adequate world hypothesis, selectivism. At first blush, this world hypothesis, which deals with ‘purposive action’ — or how to
make well-grounded decisions in human affairs — may have an affinity to the work of Hayek.

- The creation of syllabus and the offering of a self-contained unit in the "Methodologies of Economics", with emphasis on actively learning how to construct theoretical works consistent with each of Pepper’s root metaphors.
- A research project that attempts to further refine the meanings of “evolutionary economics” in terms of the structural categories present in the world hypotheses formism, organicism, and contextualism.

In conclusion, Hands discusses the increasingly blurred boundaries between philosophy and economics (1995:1-22). One of the philosophical analyses he points out is that of 'normative naturalism', a position advocated by Larry Laudan. It is a meta-methodological position claiming that various methodologies can be critically evaluated after the fact. Its importance lies in its penchant for avoiding the traditional methodological approach of attempting to discover a priori grounds for methodological practice. In so doing, it attempts to honor and validate the current attitude of ‘recovering practice’ and the multiplicity of research effort coming from the rank and file in the economics profession. However, according to Laudan: “it preserves an important critical and prescriptive force for the philosopher of science, and which promises to enable us to choose between rival methodologies and epistemologies of science” ([1987:19] quoted in Hands [1995:15]). Critical analysis should confine itself to an ex-post activity that attempts to choose methodologies that are better and worse. In principle, it is consistent with what Pepper calls ‘eclectic post rationalism’, which acknowledges that some world hypotheses may be better suited for handling certain types of evidence. However, this is a situation that must be argued and defended on a case-by-case basis. Yet, at the same time, I maintain that the time-honored adequate world hypotheses taxonomically displayed by
Pepper are all alive and well in the discipline of economics. I see no compelling reason why this enduring stability should or will come to a close. Thus, what we are left with is a matter of attitude; and insofar as the acquisition of knowledge in economics is concerned, the health of critical analysis and interpretation in general and its counterpart in methodology is not in doubt. Disturbingly, an attitude that views the various epistemological approaches in terms of intrinsic cognitive value remains tentative at best. It is the task of methodological pluralists remain vigilant and rectify this intolerance. To this end, the relatively concise taxonomy presented by Stephen C. Pepper is a powerful tool and an adequate first step.

By way of a final reflection, I would like to address the question: What is my interpretation of my own research? In laboring through this research, I became acutely aware that in the 'dance of knowledge', original analysis simply puts the show on the road. And what remains, the rest of the journey, presents itself as an endless process of interpretation. I would say the interpretative effort is my conception of normal science. Be that as it may, I feel compelled to offer some self-reflective parting comments. Staying with the taxonomic framework assembled by Pepper, I believe this presentation is first and foremost a creature of the contextualist spirit. Yet, one could rightly claim that the formalist in me constructed an argument using taxonomy. To this I reply that the taxonomy is a valued instrument, a sharp tool, and an effective means to a specific end, which could just as easily be seen as a beginning. For me, the key drama is being played out on many localized stages in academe each with its own focused audience. But on all of these disparate and sparsely linked stages, the intuited meaning of the present historical situation
— the specious present — strikes me as most likely quite similar: While pluralism is most definitely a universal potential, in what way, if any, should we strive to make it an actuality? And the need of solution speaks loudly. The pluralist attitude occupies an ethically sound and desirable position in the cultural context. I believe that when the day’s joust is over and the end of a day rolls around, most who participate in the academic experience would concur. However, I do not conclude, as does A. J. Mandt, that “pluralism in philosophy” — or anything else for that matter — “is inevitable” (1989:77-101). The organicist endgame calls for the realization of an absolute ideal, one that is pre-ordained. Although pluralism may be “inherent in the practice of philosophy” (1889:101), the choice to do it is not pre-ordained and pluralism does not strike me as an “absolute ideal”. The draw is appealing and might sustain the effort when times are hard, but the enticement just does not work for me. Today, the contextualist landscape calls for pragmatic action to compensate for a regrettable turn in the road a few generations ago. Thus, whereas the practice of monism takes the form of a noun, pluralism, by its very nature, will require some extra effort. Pluralism takes the form of a verb. Economists and methodologists will likely not know a “pluralist state” independent of the process that we would experience by actively participating in making it.

330

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GLOSSARY

Cognition — The mental faculty or process by which knowledge is acquired. Something that comes to be known as through perception, reasoning or intuition.

World Hypothesis — As developed by Stephen C. Pepper, a historically refined cognitive system that springs forth from uncriticized commonsense observation and possesses a unique set of structural categories through which the world's evidences (i.e. observed phenomena) are studied and interpreted. Pepper originally identified the structural categories of four adequate world hypotheses: formism, mechanism, contextualism, and organicism. A fifth world hypothesis, selectivism, was developed in a later work by Pepper.

Root Metaphor — The designation of an entity (or a notion) derived from common sense experience through which the structural categories of a world hypothesis (cognitive system) are developed. The four root metaphors explored by Pepper were similarity, machine, historical process, and historical event. Not necessarily a “metaphor” in the sense of transference from the “literal to the figurative” as understood in the discussion of metaphor and the various tropes studied in literature or rhetoric. It is more like an extended metaphor, which includes a system of models, theories and analogies. Also considered a refined or evolved cognitive system prevalent in the works of philosophers (and economists) for explaining or interpreting the world’s evidence. A term used by Pepper that associates a cognitive system with its structural characteristics.

World Hypotheses — As developed by Stephen C. Pepper, the four world hypotheses define a pluralist epistemological system due to the fact that each world hypothesis contains a unique special theory of truth consistent with its structural categories. Identified by Pepper in World Hypotheses: A Study in Evidence.

- Formism — perceived similarity allowing for taxonomy (classification) and the identification of generative subsistence forms in observed existents.
- Mechanism — efficient causation associated with modeling phenomena in terms of a discrete or a consolidated *machine* such as a lever or a dynamo (electrical generator).

- Organism — associated with an integrative *historical process*, to which the development of an organism from a simple to a complex entity offers a close but insufficient approximation.

- Contextualism — the process whereby we experience and understand an ongoing *historical event* in terms of its situated meaning and/or with reference to an action that solves a problem.

**Pepper’s Theory Types**

**Level 1: The Direction of Reasoning or Inquiry**

Analytical — The separation of a whole into its constituent parts for separate study. Reasoning from a perception of the parts and interrelations of a subject.

Synthetic — The combining of separate elements or substances to form a coherent whole or a new, complex product. Reasoning from a perception of a whole by maintaining the parts in their context. The resolution of a thesis and antithesis in a dialectical process, producing a new and higher form of a whole.

**Level 2: The Plan by which Facts or Evidence Enter an Inquiry**

Dispersive — For Pepper, tending to accept any form of evidence from wherever it arrives without reserve, thus increasing the scope of an inquiry at the expense of precision.

Integrative — To make or organize into a whole or unify by bringing all of the parts together. For Pepper, the tendency to limit evidence, or the scope of the world hypothesis, in order to make for a more precise definition for the purpose of permitting a coherent integration.

**Conceptual Domains:** A disciplinary orientation that places focus on levels of inquiry

- Physical — the layer of natural reality that characterized by inorganic matter.

- Life — layer of natural reality that possesses the stuff of the physical domain in addition to living material or organic matter, but no human consciousness.
• Value/Human — layer of reality that includes consciousness as reflected through individuals and the social institutions. Activity distinguished by the use of exosomatic entities such as tools and concepts.

Methodology Project — an intellectual effort employed by various disciplines within the social sciences that has historically attempted to discover the nature or structure of one given method that could generate certain truth or indubitable knowledge.

Epistemology — the general area within the philosophy of science that studies the nature of knowledge and the process by which it is obtained. Monistically, it is specifically interested in obtaining a single theory of truth through various positivist philosophies. Pluralistically, it can be viewed as a study of the terms and limits of various theories of truth. Relativistically, it can be viewed as the absence of a privileged theory of truth (the dual of monism) due to no reliable foundation or basis for assessment, or the description of potentially unlimited theories of truth resulting from the untenable nature of epistemology.

Hermeneutics — a philosophical approach to knowledge that focuses on the meaning of texts through their interpretation. The science and methodology of interpretation. Deconstruction is considered by some as a "negative" variant of interpretation.

Ontology — A theoretical discourse in the philosophy of science concerning the question of "what is" or "what exists." Inquiries, theories and reflections into what is deemed "real" in a particular mode of scientific explanation. Some examples include:

• Positivism — a philosophical view that defines realism in terms of objects (or empirical or event regularities) that can be directly perceived and maintains that the world exists independent of our knowledge of it.

• Transcendental/Critical Realism — a philosophical view attributed to Roy Bhaskar's and introduced to the methodology of economics by Tony Lawson. It identifies reality as being subsistence forms such as norms, laws, tendencies or generative mechanisms. It is critical of "empirical realism" - positivism. As with all realist philosophies, the existence of an objective and independent external reality is maintained; however scientific explanation proceeds at a subsistent level.

• Realism — a philosophical view opposed to constructivism (and contextualism), which maintains that the world exists independent of our knowledge of it and, therefore, can be represented by it directly through perceived objects and/or indirectly through subsistent forms.

• Constructivism — a philosophical view opposed to realism (and modernism) which maintains that there is no independent (or given) reality since in the

333

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knowledge process, concepts and theories partially create the same world that they attempt to explain. This leads to a dismissal of the belief in a distinction between mental states and the outside world and the call for 'pure description' as a substitute for normative methodology. Two main forms are postmodernism and rhetoric (Dow:1996:41)

- Contextualism — a philosophical view that maintains that reality is the result of the social processes accepted as normal in a specific context. As a result, all knowledge claims (all facts, truth, and validity) are intelligible and debatable only with their context, paradigm, or community of active practitioners.

Fallacy of Composition — Associated with a debate in economics concerning the microfoundations of macroeconomics. The fallacy is a statement that counters dogmatic tendencies, maintained in the doctrine of methodological individualism, that the only legitimate scientific explanation is one that reduces the objects of analysis to the foundational or individual units of analysis.

Justificationism — The epistemological orientation of the philosophy of science (and economic methodology) associated with positivism and belief in locating the rationality of science in certain knowledge. This program has been seriously challenged in recent decades by the idea that knowledge is uncertain and fallible.

Pluralism — A normative or prescriptive position taken on the desirability of the existence or potential existence of a plurality of things.

Plurality — A descriptive position taken on the actual or potential existence of a number of things within the same category or area of analysis. In our discussion, the existence of a plurality of theories about the Great Depression, or about the nature and process of knowledge will suffice.
LIST OF REFERENCES


Bhaskar, Roy. 1994. Entry on “Theory of Knowledge” (pp. 311-314) and “Realism” (pp. 547-548) in The Blackwell Dictionary of Twentieth-Century Social Thought edited by Outhwaite and Bottomore (1994).


