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Pragmatic Existentialism in a Post-Newtonian World

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PRAGMATIC EXISTENTIALISM IN A POST-NEWTONIAN WORLD

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INTRODUCTION

For the last 3000 years Western philosophy has had an uneasy relationship with the methods of thought and investigation in natural science, mostly physics. Yet physics and philosophy represent two tracks of a single human endeavor—that of comprehending man's material and moral environment. A different metaphor would describe physics and philosophy as opposite sides of the same coin. Regardless of metaphor, however, there is no doubt that each discipline has advanced in tandem even if the degree of consensus achieved at any given historical period has not been the same.

The first section of this essay presents the two-fold thesis that advances in natural science have influenced social philosophy and that these influences have been largely (though not exclusively) unidirectional. The section justifies this thesis by tracing its origin. *Why* did the scientific advances 3000 years ago influence social science? *How* did this influence manifest itself? The second section examines the *nature* of this dynamic. What have been the *consequences* for philosophy given this dynamic? Has this influence been progressive or regressive? To what extent has post-Enlightenment physics *undermined* the philosophic doctrines based on pre-Enlightenment science?

The first section will demonstrate that, as the early Greeks speculated about nature and reality, in short, about man's *material* world, there was a natural human impulse to speculate about man's *moral* world as well. Given this tendency, it was natural to think that the latter was as knowable as the former. A brief outline of pertinent pre-Socratic thought will be presented, showing the early dynamics of the relation between physics and philosophy, and how it influenced post-Socratic philosophy and philosophic thought during the Enlightenment. The first section also explores the nature of the dynamic between physics and philosophy, namely, the extent to which post-Enlightenment physics has undermined philosophic doctrines based on pre-Enlightenment science. For example, how have scientific advances in the post-Newtonian era (such as quantum mechanics, Einstein's theory of relativity, and Heisenberg's uncertainty principle) undermined traditional Enlightenment era

doctrines such as subject/object distinction, objectivity in texts, the doctrine of a metaphysical reality beyond the senses, the Platonic body/soul distinction, and the Cartesian mind/body distinction? These and related questions will be examined in light of thinkers within the disciplines of science and philosophy, namely David Hume (whose pragmatism inspired the title of this essay), Werner Heisenberg, David Bohm, Hans-Georg Gadamer, and Ludwig Wittgenstein.

I. PHYSICS AND PHILOSOPHY: ORIGIN OF THE DYNAMIC

The inquiry begins several hundred years before the pre-Socratic period. This is the time when the great Greek poets and playwriters such as Homer, Hesiod, and Sophocles lived between the eighth and fifth centuries BCE. Their writings showed an awareness of a higher and normatively superior moral law, but its existence was sought to be proved through drama and tragedy rather than through any sophisticated social or moral theory.[1]

The pre-Socratic thinkers, however, were the first intellectual movement in the West to break with explanations of man's material world based on myth and superstition.[2] Beginning with Thales in 625 BCE,[3] all of these thinkers tried to reach for some fundamental principle or theory that could provide a unified explanation of nature and reality: What is reality? Why is the world (or nature) the way it is? How is change explainable? The effort to provide answers to these questions about the natural world on the basis of reason and logic rather than myth and superstition was itself an epistemological advance.[4]

However, some of the early Greeks made a second epistemological leap still within their rationalist paradigm. This was in taking the first step toward seeking knowledge of purely human affairs.[5] If the laws of nature were knowable, were "out there" awaiting discovery by the human mind, must not there also be "natural" laws governing human conduct and human affairs? Could they not also be similarly discovered? If there is only one distinct and correct answer to any question pertaining to the laws of physics, do not moral questions admit of single (and correct) answers? This phenomenon is the conflation of physical laws with moral law. The trend began with the laws of

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1. *See generally*, Sophocles, *Antigone*, *in* TEN GREEK PLAYS 51, 64–65 (Lane Cooper & H.B. Densmore eds., Robert Whitelaw trans., 1936) (demonstrating the conflict between secular and divine sources of law).

2. *See* JONATHAN BARNES, 1 THE PRESOCRATIC PHILOSOPHERS 3–4 (1979).

3. ISAAK DORE, THE EPISTEMOLOGICAL FOUNDATIONS OF LAW, at xvii (2007).

4. *See* BARNES, *supra* note 2, at 4–5.

5. *See id.* at 6–7.

nature expressed in terms of social and moral norms and, later, with a reverse transposition, moral and social norms were expressed simply as "natural law."[6]

The thought of three pre-Socratic thinkers is relevant in this regard. The first is Anaximander (610–546 BCE) who, in addition to propounding an astoundingly realistic theory of the origin of the universe as having emerged from a fiery ball that expanded outwards,[7] took the first step in the direction of expressing the laws of nature in moralistic terms. According to the following fragment attributed to Simplicius:

> Anaximander . . . said that . . . the things from which is the coming into being for the things that exist are also those into which their destruction comes about, in accordance with what *must be*. . . . For they give justice (*diké*) and reparation to one another for their offence (*adikia*) in accordance with the ordinance of time . . .[8]

The second pre-Socratic philosopher who conflated the laws of nature with moral law was Heraclitus (c. 540–480 BCE).[9] He espoused the notion that the *phusis*, or essential nature of natural phenomena, was explainable in terms of a single metatheory or "account" (*logos*).[10] Natural science also had a distinctly moral content, as exemplified by the following fragments by Heraclitus:

> Thinking is common to all.[11]

> It belongs to all people to know themselves and to think rightly.[12]

> Men who are lovers of wisdom must be inquirers into many things indeed.[13]

> Wisdom is one thing, to be skilled in true judgment, how all things are steered through all things.[14]

> Right thinking is the greatest excellence, and wisdom is to speak the truth and act in accordance with nature, while paying attention to it.[15]

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6. For a discussion of the ancient sources which underlie the works of early natural law theorist Thomas Aquinas, see generally Jan A. Aertsen, *Aquinas's Philosophy in its Historical Setting*, *in* THE CAMBRIDGE COMPANION TO AQUINAS 12–37 (Norman Kretzmann & Eleonore Stump eds., 1993).

7. JAMES N. JORDAN, WESTERN PHILOSOPHY 8–10 (1987).

8. BARNES, *supra* note 2, at 29 (quoting Simplicius) (emphasis added).

9. THE PRESOCRATICS 64 (Philip Wheelwright ed., 1966).

10. *Id.* at 58–60 ("Listening not to me but to my account it is wise to agree that everything is one.").

11. RICHARD D. MCKIRAHAN, JR., PHILOSOPHY BEFORE SOCRATES 119 (1994) (presenting several translated fragments from the work of Heraclitus).

12. *Id.*

13. *Id.*

14. *Id.* at 120.

15. *Id.*

For this reason it is necessary to follow what is common. But although the LOGOS is common, most people live as if they had their own private understanding.[16]

What understanding (NOOS) or intelligence (PHREN) have they? They put their trust in popular bards and take the mob for their teacher, unaware that most people are bad, and few are good.[17]

One ought not to act and speak like people asleep.[18]

The above fragments are representative of the view of nature in moralistic terms, a trend which culminated in the notion that moral truths are just as eternal as natural truths. The key ideas in the above fragments are "right" thinking, love of wisdom, grasp of the logos, and "good" and "bad" persons, the former being those who possess true judgment/wisdom, and the latter being those who do not. These ideas inspired the two great post-Socratic philosophers, Plato and Aristotle, to undertake the philosophical quest for what is the best life and ultimate goal for a person.[19] According to Heraclitus, all persons must strive to grasp the logos and its underlying truth.[20] Plato and Aristotle similarly answered the question by asserting that the pursuit of truth and wisdom should be the highest goal of life, i.e., that the highest virtue was intellectual in nature.[21]

Parmenides (c. 515–450 BCE)[22] continued the quest for truth in a famous poem, part of which is dedicated to the "Way of Truth."[23] In it, he described truth as trustworthy rational discourse.[24] Equally important was Parmenides' assertion that there exists a permanent and unified reality.[25] This reality is, according to Parmenides, unchanging, because "Justice has permitted it . . . neither to come to be nor to perish, relaxing her shackles, but holds <it> fast."[26] This is another example of a conflation of natural laws with moral law, reminiscent of Anaximander's metaphysical account of "justice and reparation" between natural events showing destruction and regeneration.[27]

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16. MCKIRAHAN, *supra* note 11, at 116.

17. *Id.* at 117.

18. *Id.* at 118.

19. *See* Catherine Osborne, *Heraclitus, in* 1 FROM THE BEGINNING TO PLATO 89 (C.C.W. Taylor ed., 1997) (noting that Heraclitus inspired Plato).

20. *Id.* at 88, 96.

21. DORE, *supra* note 3, at 152–53, 157–59, 207–08, 210–11.

22. THE PRESOCRATICS, *supra* note 9, at 91–92.

23. BARNES, *supra* note 2, at 155–56.

24. *See* MCKIRAHAN, *supra* note 11, at 151; *The Way of Truth, in* THE PRESOCRATICS, *supra* note 9, at 96–98.

25. *See* MCKIRAHAN, *supra* note 11, at 151–55.

26. *Id.* at 153–54.

27. *See supra* note 8 and accompanying text.

It is beyond the scope of our inquiry to examine the thought of the other pre-Socratic philosophers. The three mentioned above were chosen because they expressed the laws of nature through moralistic notions which history shows led to the eventual claim that moral rules (like physical laws) had a permanent and eternal existence and were therefore, above all, knowable. [28] These philosophers also claimed that physical reality not only existed independently of the mind, but could be explained in terms of objective truths. As noted above, both notions influenced Western philosophical thought, beginning with Plato and continuing through the Enlightenment project.[29]

Thus Plato postulated the distinction between the body and the soul, only the latter having access to permanent knowledge of unchanging reality represented by the forms.[30] René Descartes, one of the earlier figures of the Enlightenment, also tried to construct a philosophical system that would yield fundamental knowledge.[31] In his *Discourse on the Method* and *Meditations on First Philosophy* he put forward his method of doubt and logical reasoning that he hoped would lead to a new philosophical system that would guarantee knowledge.[32] His method of doubt questioned everything, including his own existence.[33] On the latter question of his own existence, however, he came to his famous conclusion: *cogito ergo sum*, which claimed that he could not doubt his existence due to the very fact that he was thinking.[34]

Having established the *res cogitans* (the thinking self), Descartes contrasted it with *res extensa*, the external world beyond the senses.[35] Descartes posited that there *was* such a reality and the challenge was simply that of gaining knowledge of it.[36] Descartes thus substituted the mind/body distinction in place of Plato's body/soul distinction. Both distinctions were, however, dedicated to the identical claim that a metaphysical reality beyond the senses really did exist and that it could be the object of knowledge.

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28. *See supra* notes 5–21 and accompanying text.

29. *See* DORE, *supra* note 3, at 295 (discussing the influence of Plato and Aristotle's theories on Western thought).

30. PLATO, PHAEDO 186–87 (C.J. Rowe ed., 1993); PLATO, TIMAEUS 56 (H.D.P. Lee trans., 1965); *see generally* DAVID J. MELLING, UNDERSTANDING PLATO 96–113 (1987); Robert Heinaman, *Plato: Metaphysics and Epistemology*, *in* 1 FROM THE BEGINNING TO PLATO, *supra* note 19, at 356, 360.

31. René Descartes, *Meditations on First Philosophy*, *in* DESCARTES: SELECTED PHILOSOPHICAL WRITINGS, 73 at 76 (John Cottingham et al. trans., 1988) [hereinafter Descartes, *Meditations*].

32. *Id.* at 20, 21, 76.

33. Descartes, *Meditations*, *supra* note 31, at 127.

34. *Id*. at 80.

35. *See* DORE, *supra* note 3, at 315 n.47.

36. *See* René Descartes, *Principles of Philosophy*, *in* DESCARTES: SELECTED PHILOSOPHICAL WRITINGS, *supra* note 31, at 164, 189.

Although the rationalist paradigm of Ancient Greece dominated pre- and post-Socratic philosophical thought—and beyond—it was bound to crumble. The onslaught of scientific advances in gaining knowledge of the nature of reality and the methods and means of providing such knowledge made it evident that man could not live on reason alone and that experimentation and observation were indispensable in achieving scientific progress.[37] As if on cue, major figures within the Enlightenment period swung behind empiricism. Experience rather than reason thus became central to the philosophical thought of Hobbes, Hume, Berkeley, and Descartes.[38]

The main purpose of the above sketch is to outline the pre-Socratic origins of the claim that advances in natural science influenced claims to knowledge in social science. Indeed, pre-Socratic philosophy made four separate claims: First, that the natural world was knowable; second, that the natural world could be understood in moral terms; third, that man's moral world could be understood in natural terms; and fourth, that both moral laws and natural laws were knowable.[39] Ever since that time, Western philosophy, whether during the period of the Ancients or during the period of the Enlightenment, has labored under the influence of these claims in one form or another. While there are notable exceptions (as seen below), the philosophical linkages between the natural and social sciences show that the moving force in social science was the development of natural science and not the other way around.

A.   *Nature of the Dynamic*

The above section sketched how science influenced philosophy. The influence was both progressive and regressive. The present section examines the negative/regressive aspects of this influence. More specifically, it examines the *extent to which* post-Enlightenment physics has *undermined* philosophic doctrines based on pre-Enlightenment science. It shows that while doctrines such as the subject/object distinction, the claim of objectivity, the existence of a metaphysical reality independent of the senses, the body/soul distinction, the mind/body distinction, etc., have been severely undermined—if not discredited entirely—philosophy (and science) have not been left in such disarray as to prevent humans from flourishing in both the scientific and

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37. *See generally* THOMAS L. HANKINS, SCIENCE AND THE ENLIGHTENMENT 1–16 (1985) (discussing scientific advances and the new importance placed upon observation during the Enlightenment).

38. *See generally* JAMES COLLINS, THE BRITISH EMPIRICISTS: LOCKE, BERKELEY, HUME (1987); David Fate Norton, *David Hume, in* THE BLACKWELL GUIDE TO THE MODERN PHILOSOPHERS 148, 149–53 (Steven M. Emmanuel ed., 2001) (discussing the empiricism of Hume in the context of Hobbes and Berkeley). It is beyond the scope of this inquiry to pursue these developments. It suffices to note that the epistemological shifts in natural science had a definite impact on philosophical inquiry and that this impact was largely unidirectional.

39. DORE, *supra* note 3, at 13, 37.

social/philosophic contexts. What is remarkable about this conclusion is that it draws support from the philosophic as well as the scientific community, as represented by David Hume, Werner Heisenberg, David Bohm, Ludwig Wittgenstein, and Hans-Georg Gadamer. The thought of each of these philosophers is examined within the limitations of the inquiry set forth above.

II. THE PROBABILISTIC EPISTEMOLOGY OF DAVID HUME

It is perhaps appropriate to begin with a brief discussion of a major figure of the Enlightenment era itself, namely David Hume. Only that part of Hume's philosophy that is relevant to the topic under discussion is presented here.

Hume was of the belief that all human understanding consisted of the search for the relations which objects and events bear to one other.[40] Hume thus divided human understanding into "relations of ideas" and "matters of fact" propositions.[41] The former are self-evident or intuitive propositions, whose denial of the predicate in the relation would result in a contradiction; examples of "relations of ideas" include 2 + 2 = 4, "lead is metal," "bachelors are unmarried," etc.[42] They do not have any bearing on what exists or does not exist. Matters of fact propositions, on the other hand, do have existential import and their denial does not lead to a contradiction, such as the idea that "the sun will rise tomorrow."[43] Unlike relations of ideas, matters of fact propositions can be verified by observation and experience, or by inductive inferences.[44] Furthermore, unlike relations of ideas, one cannot have demonstrative knowledge of matters of fact propositions:

> *That the sun will not rise to-morrow* is no less intelligible a proposition, and implies no more contradiction, than the affirmation, *that it will rise*. We should in vain, therefore, attempt to demonstrate its falsehood. Were it demonstratively false, it would imply a contradiction, and could never be distinctly conceived by the mind.[45]

In other words, in mathematics one has demonstration, but in the empirical sciences one has "causal" inference, which is ultimately validated by experience. Hume indeed attacks the common belief that everything that exists must have a cause.[46] The proposition, he argues, is circular and begs the

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40. *See* DAVID HUME, ENQUIRIES CONCERNING HUMAN UNDERSTANDING AND CONCERNING THE PRINCIPLES OF MORALS 23–24 (P.H. Nidditch ed., 3d ed., Open University Set Book 1975) (1777) [hereinafter HUME, ENQUIRIES].

41. *Id.* at 25.

42. *See id.*

43. *Id.* at 25–26.

44. *Id.*

45. HUME, ENQUIRIES *supra* note 40, at 25–26.

46. *See id.* at 73 ("We have sought in vain for an idea of power or necessary connexion in all the sources from which we could suppose it to be derived.").

question by assuming the very thing that needs to be proven, namely, that anything that begins to exist must have a cause.[47]   It cannot, therefore, be proved by reason. It is thus experience and not reason that shows the relation of cause and effect, and it is through this relation that one can understand the world, including the world that exists "beyond the present testimony of our senses."[48]   For example, one cannot experience today that the sun will rise tomorrow. But repeated observation of the phenomenon leads to the belief that the sun *will* rise tomorrow. Yet this is merely an inference or belief, incapable of proof through reason. Because of the "constant conjunction" of events and their attendant consequences, the mind simply develops a habit or custom of drawing inferences, such as the notion that the future will resemble the past (as in the example of the sun rising tomorrow).[49]

Regularity in causal connections creates memories of previous instances and leads to customary expectations that "instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same."[50]   Yet the presupposition that the future will resemble the past and that nature will remain uniform is neither intuitively certain nor is it susceptible of demonstrative proof; it is only a belief.[51] According to Hume, one cannot prove the validity of the causal inference by a principle that cannot itself be proved or is not intuitively certain or demonstrable.[52]

In conclusion, Hume's argument may be summarized as follows: (1) The characteristics of the physical world is a question of fact; (2) questions of fact require experience to be answered; (3) our experience is limited to the perceived world only; (4) therefore, we cannot know the physical world—it is unknown and unknowable; (5) hence, we should adopt skepticism as to the characteristics of the physical world.

The principles of uniformity and of the future resembling the past would seem to suggest that the external world exists independently of the senses. On

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47. *See id.* at 62–79 (arguing that we may infer that one event causes another only after experiencing the "necessary connexion" between the cause and effect).

48. *Id*. at 26.

49. *Id.* at 78 ("But when many uniform instances appear, and the same object is always followed by the same event; we then begin to entertain the notion of cause and connexion.").

50. DAVID HUME, A TREATISE OF HUMAN NATURE 89 (P.H. Nidditch & L.A. Selby-Bigge eds., 2d ed. 1978) (1739) [hereinafter HUME, A TREATISE]. *But see* Robert J. Fogelin, *Hume's Skepticism*, *in* CAMBRIDGE COMPANION TO HUME 90, 95 (David Fate Norton, ed., 1999) (contrasting demonstrative reasoning with reasoning involving probability).

51. *See* David Hume, *An Abstract of a Book Lately Published; Entituled* A TREATISE OF HUMAN NATURE, &c. *Wherein the Chief Argument of that Book is Farther Illustrated and Explained*, *in* DAVID HUME, A TREATISE OF HUMAN NATURE, *supra* note 50, at 651 ("All probable arguments are built on the supposition, that there is this conformity betwixt the future and the past, and therefore can never prove it.").

52. *See id.*

the other hand, Hume's theory teaches us that the mind has access to this external world only through perception; it does not and cannot have access to the external world independently of perception.[53] To the extent that the mind does have such access, Hume's theory of custom as guide for life insists that a probabilistic world is sufficient for human flourishing. Hume does not adopt skepticism in its most radical sense. Indeed, the following statement by Hume is a good example of his existential pragmatism. Notwithstanding his skepticism, he asserts, he still likes to play backgammon, dine with his friends, and be merry!

> I dine, I play a game of back-gammon, I converse, and am merry with my friends; and when after three or four hour's amusement, I wou'd return to these speculations, they appear so cold, and strain'd, and ridiculous, that I cannot find in my heart to enter into them any farther.[54]

A.   *Hume on the Self*

Finally, Hume's empiricism also led him to deny the existence of an objective self.[55] Here Hume's views on personal identity have an almost postmodern ring and accord with the teachings of quantum theory.[56] So radical was his empiricism that it led him to assert that even experience cannot confirm the existence of the self.[57] One's personal identity, according to Hume, cannot exist apart from the various impressions and perceptions that suffuse the human mind:

> For my part, when I enter most intimately into what I call *myself*, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch *myself* at any time without a perception, and never can observe anything but the perception.[58]

In other words, Hume could never separate his personal identity from his perceptions, and this led him to place the existence of the former firmly in question. Building upon this introspective observation, Hume also observed that this "bundle or collection of different perceptions" which composed his

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53. *See* HUME, ENQUIRIES, *supra* note 40, at 18–19 (dividing perceptions between ideas and impressions and asserting that experience is the only vehicle for accessing the external world).

54. HUME, A TREATISE, *supra* note 50, at 269.

55. *See id.* at 253–59.

56. *See* J.M. Balkin, *Understanding Legal Understanding: The Legal Subject and the Problem of Legal Coherence*, 103 YALE L.J. 105, 106–7, 112–13, 175–76 (1994) (providing a postmodern perspective on the study of the law); DAVID BOHM, WHOLENESS AND THE IMPLICATE ORDER 143 (1980) (describing quantum theory).

57. HUME, A TREATISE, *supra* note 50, at 252.

58. *Id.*

mind "succeed[ed] each other with an inconceivable rapidity" and were "in a perpetual flux and movement."[59] This led Hume to theorize that:

> The mind is a kind of theatre, where several perceptions successfully make their appearance; pass, re-pass, glide away, and mingle in an infinite variety of postures and situations. There is properly no *simplicity* in it at one time, nor *identity* in different; whatever natural propension we may have to imagine that simplicity and identity."[60]

The lack of a constant and identifiable state of "self" led Hume to conclude "that identity is nothing really belonging to these different perceptions, and uniting them together; but is merely a quality, which we attribute to them, because of the union of their ideas in the imagination, when we reflect upon them."[61]

As seen later, this view of the subject as merging with the object (i.e., that which is perceived) has great appeal to postmodern thinking. Instead of the subject understanding an object and giving the latter meaning, it is the object that gives meaning to the subject. Since perceptions differ, Hume's thinking seems to deny not only "objective" meanings given by the subject, but it also seems to admit a measure of relativism in ascribing meaning. Nevertheless, neither Hume's thoroughgoing empiricism nor his moderate skepticism "should ever undermine the reasonings of common life."[62]

III. The Probabilistic Epistemology of Werner Heisenberg

The historical context in which Heisenberg wrote witnessed a breakdown in the attainment of complete objective truth in the scientific realm.[63] This occurred with the onset of quantum mechanics, the theory of relativity, and Heisenberg's own Uncertainty Principle.[64] Quantum mechanics undermined the classical Newtonian view that atoms objectively occupied a certain position in space.[65] It held that matter at the subatomic level did not exist precisely at a certain location, but it only showed "'tendencies to exist.'"[66] Heisenberg's Uncertainty Principle held that the more precisely the position of a subatomic

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59. *Id.*

60*. Id.* at 253.

61. *Id.* at 260.

62. HUME, ENQUIRIES, *supra* note 40, at 41.

63. *See* JAMES T. CUSHING, QUANTUM MECHANICS 25 (David L. Hull ed., 1994) (describing the standard, or Copenhagen, interpretation of quantum mechanics as undermining the existence of an "objective, observer-independent reality").

64*. See* Joan C. Williams, *Critical Legal Studies: The Death of Transcendence and the Rise of the New Langdells*, 62 N.Y.U. L. REV. 429, 436–39 (1987).

65. *See id.* at 437–38.

66*. Id.* at 438 (quoting F. CAPRA, THE TAO OF PHYSICS 68 (1975)).

particle (such as an electron) is determined the less precisely its momentum is known, and vice-versa.[67]

Despite the apparent breakdown in the scientist's ability to determine objective truth, Heisenberg argued that objective truth was not a precondition in science.[68] He did so by distinguishing between "practical realism" and "dogmatic realism."

> We 'objectivate' a statement if we claim that its content does not depend on the conditions under which it can be verified. Practical realism assumes that there are statements that can be objectivated and that in fact the largest part of our experience in daily life consists of such statements. Dogmatic realism claims that there are no statements concerning the material world that cannot be objectivated. Practical realism has always been and will always be an essential part of natural science. . . . It is only through quantum theory that we have learned that exact science is possible without the basis of dogmatic realism.[69]

Thus, even though the classical theories of physics broke down in the face of the discoveries of the twentieth century,[70] physicists could rest easy because meaning (i.e., exact science) could still be determined through reliance upon the scientific method in the new probabilistic physical world.[71]

The shift from a Newtonian/Cartesian paradigm of nature has given way to a post-Einsteinian physics that views reality as an undifferentiated whole in which we are situated as participants rather than as observers.[72] As participants, we interact, if not "interfere," with nature.[73] But, to paraphrase Bohm,[74] once we accept that the "interference" with experimental conditions affects the "potentialities" of nature, we already seem committed to the view that there *is* a reality under study. What that reality is, and how we can understand it, whether that understanding can be complete and final, whether what understanding we have is of any use to us, are, of course, separate questions. It is quite apparent that Heisenberg can live within a probabilistic universe. Indeed, he explicitly states that the result of quantum theory is that "[n]atural science does not simply describe and explain nature; it is a part of the interplay between nature and ourselves; it describes nature as exposed to our method of questioning."[75] This possibility never occurred to Descartes;[76]

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67. *See* MILIČ ČAPEK, THE PHILOSOPHICAL IMPACT OF CONTEMPORARY PHYSICS 292–93 (1961).

68. WERNER HEISENBERG, PHYSICS AND PHILOSOPHY 82 (Harper Torchbook 1962) (1958).

69. *Id.* at 81–82.

70. *See* Williams, *supra* note 64, at 436–37.

71. *See* HEISENBERG, *supra* note 68, at 82.

72. *See* CUSHING, *supra* note 63, at 25.

73. *See* BOHM, *supra* note 56, at 143.

74. *See id.*

75. HEISENBERG, *supra* note 68, at 81.

therefore, this interplay makes a clean separation between mind and body impossible. But it also means that truth need not be final.

It is the Cartesian partition of mind and body that has led many, including eminent scientists like Einstein, to resist this fusion of the observer and the phenomena he is observing.[77] This partition has penetrated human thought so thoroughly that it has persisted for three centuries, and Heisenberg predicts that it will take time to erode.[78] Its central claim regarding the *res extensa*, as seen above, is that a metaphysical reality beyond the senses really does exist.[79] Heisenberg characterizes this claim as "metaphysical realism."[80] Thus while metaphysical realism may, in most cases, resemble dogmatic realism, Heisenberg's argument is that not just ordinary life, but scientific discourse as well, can flourish on the basis of only *practical* realism.[81]

A similar approach is taken by David Bohm. Indeed, taking a step beyond Heisenberg, Bohm argues that scientific knowledge is no longer the only legitimate source of understanding.[82] The latter can be acquired in ways that go beyond the limits of science. Bohm argues that the theory of relativity and quantum theory have greatly undermined our sense of scientists as neutral observers.[83] He suggests that "both observer and observed are merging and interpenetrating aspects of one whole reality, which is indivisible and unanalysable."[84] He explains:

> As relativity and quantum theory have shown that it has no meaning to divide the observing apparatus from what is observed, so the considerations discussed here indicate that it has no meaning to separate the observed fact (along with the instruments used to observe it) from the theoretical notions of order that help to give 'shape' to this fact. . . . Fact and theory are thus seen to be different aspects of one whole in which analysis into separate but interacting parts is not relevant. That is to say, not only is undivided wholeness implied in the *content* of physics (notably relativity and quantum theory) but also in the *manner of working* in physics.[85]

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76. *See* DORE, *supra* note 3, at 315 n.47.

77. *See* CUSHING, *supra* note 63, at 25 (discussing Einstein's aversion to fusing the observer and the observed phenomena).

78. HEISENBERG, *supra* note 68, at 81.

79. *See supra* notes 28–29, 36 and accompanying text.

80. HEISENBERG, *supra* note 68, at 81.

81. *See id.* at 81–82.

82. *See* BOHM, *supra* note 56, at 143.

83. *See id.*

84. *Id.* at 9.

85. *Id*. at 143.

A.   *Heisenberg on Language*

Heisenberg is of the view that despite the "intrinsic uncertainty of the meaning of words" language as a *method of communication* between humans contains concepts that can be used as tools for meaningfully ordering daily life.[86] Almost in Humean terms, Heisenberg claims that when certain words are used repeatedly they acquire customary meanings.[87] Thus, for example, one can speak of "a piece of iron" or "a piece of wood," but one cannot speak of a "piece of water."[88] Thus customary expectations lead to the emergence of definitions which set boundaries of meaning.[89]

Yet, language in natural science has a specialized communicative function, according to Heisenberg.[90] He credits Aristotle for having created the basis for scientific language.[91] Aristotelian logic examined "the forms of language, the formal structure of conclusions and deductions independent of their content."[92] Scientific logic seeks to establish laws for deriving the particular from the general.[93] But the general laws of science must contain very precise concepts which can only be achieved through mathematical abstraction.[94] Heisenberg contrasts the language of science with the language of law.[95] In the latter, he argues, "complete precision is not needed" and "definitions in terms of ordinary language are sufficient."[96] Despite the rigors of scientific discourse, however, it has been already seen that Heisenberg is content to let practical realism (as opposed to metaphysical or dogmatic realism) provide the conditions for scientific and legal discourse to flourish.

Heisenberg's views on language are similar to those of Ludwig Wittgenstein. Wittgenstein asserted that just because one proposition about a particular concept is false, that does not necessitate the conclusion that other propositions about the same concept (or the meaning inherent in the concept itself) are also false.[97] This concept was illustrated in Wittgenstein's analysis of the name "Moses":

> We may say, following [Bertrand] Russell: the name 'Moses' may be defined
> by means of various descriptions. For example, as 'the man who led the

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86.   HEISENBERG, *supra* note 68, at 168–69.

87.   *Id.*

88.   *Id*. at 168.

89*.   Id.* at 169.

90*.   Id.* at 171–72.

91.   HEISENBERG, *supra* note 68, at 169.

92*.   Id.*

93.   *Id.* at 171.

94*.   Id*. at 172.

95.   *Id.*

96.   HEISENBERG, *supra* note 68, at 172.

97.   *See* LUDWIG WITTGENSTEIN, PHILOSOPHICAL INVESTIGATIONS ¶ 79 (G.E.M. Anscombe trans., 3d ed. 2001) (1953).

> Israelites through the wilderness,' 'the man who lived at that time and place and was then called 'Moses,' 'the man who as a child was taken out of the Nile by Pharaoh's daughter' and so on. And according as we assume one definition or another the proposition 'Moses did not exist' acquires a different sense, and so does every other proposition about Moses. . . . But when I make a statement about Moses,—am I always ready to substitute some *one* of these descriptions for 'Moses?' I shall perhaps say: By 'Moses' I understand the man who did what the Bible relates of Moses, or at any rate a good deal of it. But how much? Have I decided how much must be proved false for me to give up my proposition as false? Has the name 'Moses' got a fixed and unequivocal use for me in all possible cases?—Is it not the case that I have, so to speak, a whole series of props in readiness, and am ready to lean on one if another should be taken from under me, and vice versa?[98]

Wittgenstein's point in the above quotation is that language has flexible meanings and gives us a variety of props to convey it. In the above example, if one of the characteristics about Moses is shown to be untrue this does not by itself entail the conclusion that Moses did not exist or did not do some or all of the other activities attributed to him. The definition would then just shift to one containing the other attributes. Thus, the concept of "Moses" would retain meaning even assuming the fallibility of one of the definitions proffered for his existence.[99]

According to Wittgenstein, a particular concept's meaning is not dependent on perfect clarity, but it can serve merely to remove or avert a misunderstanding.[100] Thus his famous example that the phrase "stand roughly here," though inexact, nonetheless serves as a meaningful concept in everyday life, depending on context.[101] Indeed, for Wittgenstein, different contexts called for different meanings, so that no single meaning could account for every potential contextual contingency.[102]

IV. THE PROBABILISTIC ONTOLOGY OF GADAMER'S HERMENEUTICS

A parallel with the thought of Heisenberg and Bohm can be found in the philosophical hermeneutics of Gadamer. Inspired by Heidegger, Gadamer's philosophy shows strong affinities with holistic quantum theory.[103] He argued that interpretation is never an attitude of a subject projected in nature, but it is

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    98. *Id.*

    99. *Id.*

    100. *See id.* ¶ 88.

    101. *Id.*

    102. LON L. FULLER, THE MORALITY OF LAW 137–41 (2d ed. 1969) (citing Wittgenstein for the proposition that language carries with it certain tacit understandings that need not be spelled out in every case).

    103. Francis J. Mootz III, *Is the Rule of Law Possible in a Postmodern World?*, 68 WASH. L. REV. 249, 294–95 (1993).

in fact, something that "precedes and informs" subjectivity.[104] In other words, "interpretation is not an activity, it is a mode of being-in-the-world."[105] This effectively rejects the idea that the individual subject is "a self-directing center of knowledge."[106]

Interpretation is just one mode of "being" in the world. There are other ways of being that become evident as one examines the totality of existence. Hermeneutics is the study of the ways in which existence gives meaning to the world in which we live.[107] In this sense, it is ontological. Still though, the ontology is not presented as a grand or final narrative that is "superior" to all others.[108] Indeed, it seeks to strike a compromise, or bridge the gap, between two opposing enquiries as to meaning in life.[109] At one end of the pole is the claim of finality and objectivity (dogmatic/metaphysical realism) while at the other end is the charge of indeterminacy and subjectivity.[110]

The hermeneutic approach seeks to move beyond the subjective/objective dichotomy and, in law, to find meaning in the legal text without total surrender to subjectivism.[111] Gadamer's hermeneutics focuses on how the meaning is revealed, or more generally, how the world reveals meaning to those who live in it.[112]

In an approach reminiscent of Kant, who examined the conditions that made experience possible, Gadamer states his goal as not to propose a procedure of understanding, but rather, as "to clarify the conditions in which understanding takes place."[113] Also, just as the categories of cognition predate experience and are taken as given by Kant, the conditions that make interpretation in law possible are taken as given by Gadamer. What, then, are these conditions? These are the "prejudices and fore-meanings in the mind of the interpreter" (very much in the tradition of Heidegger).[114] Second is the "effective-history" of the text.[115] Gadamer urges the interpreter to transcend his own presuppositions and prejudices and take into account the historical

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104. *Id.* at 295.

105. *Id.*

106. *Id.*

107. HANS-GEORG GADAMER, TRUTH AND METHOD 263 (Garrett Barden & John Cumming trans., 2d ed. 1975) (1960).

108. *Id.*

109. *See id.* at 264–67.

110. *See id.*

111. Francis J. Mootz, III, *The Ontological Basis of Legal Hermeneutics: A Proposed Model of Inquiry Based on the Work of Gadamar, Habermas, and Ricoeur*, 68 B.U. L. REV. 523, 526 (1988).

112. *Id.*

113. GADAMER, *supra* note 107, at 263.

114. *Id.*; *see also* Mootz, *supra* note 111, at 534 n.42.

115. GADAMER, *supra* note 107, at 267–74.

conditions of the text.[116] Likewise, in any discourse, each party must try to understand "the otherness of the other."[117] Each side, then, will have its own "horizon" of understanding.[118] There will therefore be an inevitable tension between the horizon of the text and that of its interpreter, each separated by a "temporal distance."[119]

Meaning is given through a fusion of the horizons or through bridging of the temporal gap.[120] As noted above, however, no claim is made to its finality or superiority since all meanings are contingent and are constantly reappropriated and renewed:

> But the discovery of the true meaning of a text or a work of art is never finished; it is in fact an infinite process. Not only are fresh sources of error constantly excluded, so that the true meaning has filtered out of it all kinds of things that obscure it, but there emerge continually new sources of understanding, which reveal unsuspected elements of meaning.[121]

To explain further how understanding through the fusion of horizons takes place, Gadamer uses the notion of "play."[122] For example, a person examining a work of art will be "at play with [it]" before arriving at an aesthetic appreciation of it.[123] Each presents a claim of meaning to the other; it is as if each "dance[s]" with the other in order to achieve something that neither would be able to do on its own.[124] Yet each playful act has its rules of the game, depending on whether the artwork is a painting, a sculpture, a musical score, etc.[125]

The same analogy applies to the interpreter and legal text. Both reader and text are at play prior to arriving at an understanding. Just as the dance between two persons renders a picture which neither dancer could present on his own, so the meaning that emerges from the fusion of horizons of the reader and text is a meaning that cannot belong solely to either the reader or the author of the text.[126] Furthermore, like in any play, there is a measure of "risk."[127] The risk for the reader is that he may have to give up such presuppositions or preconceptions that he brings as part of his forestructure of meanings.[128] It

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116. *Id.*
117. *Id.* at 270.
118. *See id.* at 267–74.
119. *Id.* at 266.
120. GADAMER, *supra* note 107, at 258–74.
121. *Id.* at 265–66.
122. *Id.* at 91–119.
123. Mootz, *supra* note 111, at 531–32.
124. *Id.* at 532.
125. *Id.* at 533.
126. GADAMER, *supra* note 107, at 350.
127. *Id.*
128. *Id.*

must also be mentioned that, as noted in the analogy with Kant above, Gadamer was concerned with the conditions that make meaning emerge. Thus the play that occurs is not an act of will or purpose; it instead occurs naturally (i.e., it is given).[129] In other words, just as the human mind is hardwired with the categories of cognition that make experience possible, human beings are also programmed to be ontologically playful. As part of the process of playful fusion, the reader will first approach the text at a precognitive level. He will then impose a preliminary meaning to the text. Next, he will revise it after further examination and reflection. He will subsequently consider alternative meanings and, finally, will settle on one meaning for the case before him.[130]

Very much in the Humean tradition, man, as hermeneutical being, is always interpreting.[131] Even the primordial act of first perception is itself an interpretive act. All subsequent acts are second-order acts of interpretation. If we try to consciously reflect on that first-order perception we realize only too late that it was itself an interpretation:

> When we understand a text, what is meaningful in it charms us just as the beautiful charms us. It has asserted itself and charmed us before we can come to ourselves and be in a position to test the claim to meaning that it makes. What we encounter in the experience of the beautiful and in understanding the meaning of tradition has effectively something about it of the truth of play. In understanding we are drawn into an event of truth and arrive, as it were, too late, if we want to know what we ought to believe.[132]

In conclusion, it can be seen that Gadamer's philosophy has strong affinities with holistic quantum theory. In place of objective meaning or "dogmatic/metaphysical realism," Gadamer's hermeneutics advocates provisional and contingent meanings which are more akin to Heisenberg's version of practical realism.[133] This, in turn, means that the text, though indeterminate in any given instant, is not totally devoid of meaning.[134] Thus,

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129. *See id.*

130. *See* THOMAS MCCARTHY, THE CRITICAL THEORY OF JÜRGEN HABERMAS 172 (1978).

131. *See supra* Part II (outlining the Humean tradition).

132. GADAMER, *supra* note 107, at 446.

133. *See also supra* note 81 and accompanying text (explaining Heisenberg's version of practical realism).

134. Gadamer's philosophy in this regard is not unlike that of Ludwig Wittgenstein. Just as the former argues that the interpreter comes to the text with a fore structure of meanings, prejudices and traditions, so Wittgenstein claims that what meanings one gives to a rule is marked by one's culture and language:

> Is what we call "obeying a rule" something that it would be possible for only *one* man to do, and to do only *once* in his life?—This is of course a note on the grammar of the expression "to obey a rule". It is not possible that there should have been only one occasion on which someone obeyed a rule. It is not possible that there should have been only one occasion on which a report was made, an order given or understood; and so

even though there is a fusion of subject and object, Gadamar occupies the middle ground between indeterminacy and objectivity while at the same time claiming that this in no way prevents legal discourse from flourishing.

CONCLUSION

This Article has explored the relationship between epistemological shifts in natural science and their impact on social philosophy. It is beyond question that there has been an impact. The origins of these links were traced to the cradle of Western philosophy, eighth-century Greece BCE.[135] This era was marked by a natural human impulse to seek certainty in man's moral world in a way that reflected the certainty of his material world.[136]

The burden of this Article was to explore the nature of the dynamic and to examine the extent to which advances in natural sciences have undermined not the old dogmas within the scientific discipline, but rather, the extent to which such advances undermined social philosophy. That advances in natural science *did* undermine older dogmas within the scientific discipline is a self-evident truth and, as such, is of no epistemological import. For that reason, it was not discussed here. Given this truth, the more interesting question explored in this Article was the extent to which social philosophy has been buffeted by the currents of natural science.

The epistemological balance sheet for social philosophy appears to be very much in positive territory despite the onslaught of scientific advances. Why and how is this so? Two main reasons were sketched above. The first is that the potentially destabilizing effects of quantum theory, Heisenberg's Uncertainty Principle, and Einstein's theory of relativity did not bequeath onto us a world of scientific anarchy. Indeed, Heisenberg himself rejected the notion that there are no statements about the material world that cannot be objectivated.[137] He argued that quantum theory had, in fact, shown that scientific progress *is* possible without dogmatic realism.[138] He also rejected Cartesian metaphysical realism which posited that a metaphysical reality really did exist independently of the senses.[139] In place of both doctrines he advanced his preferred doctrine of practical realism, a realism which embraces a probabilistic epistemology and eschews certainty or infallibility.[140] Even if

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on.—To obey a rule, to make a report, to give an order, to play a game of chess, are *customs* (uses, institutions). To understand a sentence means to understand a language. WITTGENSTEIN, *supra* note 97, ¶ 199.

135. *See supra* text accompanying note 1.

136. *See supra* text accompanying notes 1–39.

137. *See supra* text accompanying note 69.

138. *See supra* text accompanying notes 68–69.

139. *See supra* text accompanying note 78 (noting that Heisenberg expects this theory to erode, albeit slowly).

140. *See supra* text accompanying notes 69, 75, and 81.

the dynamic between natural science and philosophy is understood as one of cause and effect, if practical realism rules within the scientific domain, it must also rule in the philosophic domain by analogy, if not by necessary implication. The analog to "practical realism" in philosophy is what I call pragmatic existentialism.

The second reason for the positive balance sheet is the modernistic currents of a pragmatic nature within philosophy itself. Heisenberg is not the only one who advances the view that legal discourse can flourish even in the face of a certain measure of indeterminacy. Bohm, Hume, Gadamar, and Wittgenstein complement his view. They all adopt an approach which eschews objectivity in language and embraces contextualism and contingency. The Gadamarian hermeneutic, with its twin notions of "play" and "fusion," shows a strong affinity with holistic quantum theory, which, despite the fusion of subject and object, does not abjure the quest for meaning. Hume's far-sighted philosophy of the *self* achieves the same goal. Hume's critiques of reason and causality throw cold water on claims to knowledge of matters of fact, but Hume's great principle of custom and the associative laws of the mind save mankind in the end. Hume's pragmatic existentialism is thus embraced by all philosophers discussed above.

It is not without reason, then, that it is often said that the *human* condition is a profoundly *Humean* condition.