

CHAPTER 1

World, Truth, and Science

Peirce's position is usually held to lie in radical opposition to the Kuhnsian interpretation of science. Depending upon one's opinion of Kuhn's views, this opposition has been seen as contributing to the strength of Peirce's position or as rendering it outdated. And, while some recent Peirce literature has pointed out flirtatious moments of reconciliatory pluralism in Peirce's position, such claims are brief and halting, tend to touch only the periphery of Peirce's thought, and are in the minority by far. This chapter proposes to lay out an interpretation of Peirce's philosophy of science that is inherently pluralistic, shows the philosophic kinship of Peirce and Kuhn, and points toward a solid philosophical grounding of the Kuhnsian interpretation of science.

The lack of such a philosophical grounding is in fact the basis for the by now well-plowed field of criticisms hurled at Kuhn's *Structure of Scientific Revolutions*. His denial of the empiricist dogma that there is a permanent neutral observation language, that there must be a neutral epistemological framework to evaluate competing theories and paradigms, or that there is a discoverable set of rules for the resolution of conflicting statements, combined with his notion of persuasion and his radical claim that at the most fundamental level of incommensurability scientists are practicing in different worlds and seeing different things, has led to charges of subjectivism, relativism, irrationalism, and the denial of scientific progress. Kuhn's own recognition of the dilemma of rejecting long held foundationalist interpretations of scientific method while having no adequate philosophical alternative to replace them is well evinced in his own words:

But is sensory experience fixed and neutral? Are theories simply man-made interpretations of given data? The epistemological viewpoint that has most often guided Western philosophy for three centuries dictates an immediate and unequivocal Yes! *In the absence of a developed alternative*, I find it impossible to relin-

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quish entirely that viewpoint. Yet it no longer functions effectively, and the attempts to make it do so through the introduction of a neutral language of observations now seem to me hopeless.¹

It is precisely such a “developed alternative,” which undercuts the objectivism-relativism, foundationalism-antifoundationalism issue, that will be provided by the present interpretation of Peirce’s position. And, since Kuhn holds that at the most fundamental level of incommensurability scientists are practicing in different worlds and seeing different things, it is with Peirce’s concept of ‘world’ that the ensuing endeavor can best begin.

Peirce never explicitly clarifies his understanding of “the real world,” though he refers to it frequently throughout his writings. Such a lack of explicit clarification can well go unremarked, for it is a commonsense term that slides easily—indeed too easily—into a commonsense identification with “what is the case” or “what there is.” The ultimate nature of “what there is” may receive various philosophic labels, depending upon whether one interprets Peirce as a realist, an idealist, or a phenomenalist, but the unquestioned commonsense identification of “what there is” with Peirce’s statements concerning the real world is the unquestioned basis for the application of these labels in many instances. When such an identification is questioned, however, and Peirce’s various statements concerning the real world are interrelated for a development of their systematic import, it will be seen that “the real world” fits inadequately within the confines of any of the above labels, for it is a distinctively pragmatic world.

The following discussion proposes to show that Peirce, in rejecting the role of humans as spectators, in understanding experience as a unity of interaction between humans and that facticity that gives itself within experience, can hold at once that the real world is the perceived world,² that the real world has an independence from mind,³ and yet that the perceived world is partially dependent upon the noetic act and is thus relative in its nature to the mind.⁴ The supposed incompatibility of these three characteristics of the relation of thought to the real world stems from failure to radically and once and for all reject the presuppositions of a spectator theory of knowledge.⁵ Peirce’s absolute and radical rejection of the spectator theory of knowledge gives rise to, and is in

turn brought into clearer light by, an understanding of his pragmatic concept of 'world'.

That the real world is the perceived world is clearly indicated by Peirce in several succinct passages. He states that "The real world is the world of sensible experience;"⁶ or, in other terms, the real world is the world of "insistent generalized percepts,"⁷ which are not representative of any underlying reality other than themselves.⁸ The real world can be characterized, also, as the world of perceptual facts, for "what I carry with me" of the percept "is the perceptual facts."⁹ Such a world is a consistent system of facts rigorously obeying the laws of non-contradiction and excluded middle, for "Dichotomy rules the ideal world,"¹⁰ and "it is part of the process of sensible experience to locate its facts in the world of ideas."¹¹ Such a grasping of the sensible world in terms of a system of ideas is of the very essence of the sensible world. As Peirce stresses, "This is what I mean by saying that the sensible world is but a fragment of the ideal world."¹²

Further, the system of ideas or meanings in some sense limits the facts which may occur "in the world," for "We know in advance of experience that certain things are not true, because we see they are impossible. . . . I know it is not true, because I satisfy myself that there is no room for it even in that ideal world of which the real world is but a fragment."¹³ Thus, what can occur "in the world" must conform to the possibilities allowed for by the world of ideas or the system of meanings in terms of which we approach it. To better understand what can possibly occur in the world, it will be helpful at this point to turn to a closer examination of the various senses of "possible" in Peirce's philosophy as they relate to the issue of world.

When Peirce speaks of "possible experience," he at times means possible in the sense of "consistently thinkable" and at times in the nonepistemically related sense of metaphysically possible.¹⁴ However, "possible" in the sense of consistently thinkable is open to some misunderstanding if not further clarified. In addition to making the distinction between the consistently thinkable and the metaphysically possible, Peirce distinguishes between what he calls the "essentially" or "logically" possible and the "substantially" possible.¹⁵ This latter distinction cannot be equated with the former but can best be understood as a distinction within the

consistently thinkable. Essential possibility means, for Peirce, logical conceivability or the absence of self-contradiction. Substantial possibility, however, refers to the relation that something considered has to information of the present in the present. In this sense possible means consistent with everything known about the real world. Possible in this second sense seems to indicate a type of "physical possibility." And, while substantial possibility must imply essential possibility, essential possibility need not imply substantial possibility, for of those possible combinations that "occur in the ideal world, some do and some do not occur in the real world; but all that occur in the real world occur also in the ideal world."¹⁶

Here, however, it must be noted that if a proposition that is essentially possible but not substantially possible is combined with the body of given information, a logically or essentially impossible set results, for "Two propositions contradictory of one another may both be severally possible, although their combination is not possible."¹⁷ As Peirce further observes, "It is an anacoluthon to say that a proposition is impossible because it is self-contradictory. It rather is thought so as to appear self-contradictory because the ideal induction has shown it to be impossible."¹⁸ Thus, at any time, a range of what is substantially possible may be determined ideally or logically, though what specific possibility will in fact be actualized in the future cannot be determined in this manner, for there are, indeed, "future contingents."¹⁹

This point, however, leads directly away from the above issue of the human way of knowing to the related issue of reality's way of being, for to conclude from the above discussion "that there is nothing analogous to possibility" in reality, but that this mode appertains "only to the particular limited information we possess, would be even less defensible than to draw precisely the opposite conclusion from the same premisses. It is a style of reasoning most absurd."²⁰ Though substantive possibility, which in its broadest sense determines what may occur "in the world," cannot be understood apart from the knowledge structure that grasps, this does not lead to a conventionalism, for the real world is a special "part of the ideal world. Namely, that part which sufficient experience would tend ultimately (and therefore definitively) to compel Reason to acknowledge as having a being independent of what he may arbitrarily, or willfully, create."²¹ To further understand the

nature of the world as a consistent system of facts, then, it will be necessary to turn to an examination of the independently real and the metaphysical sense of the possibilities within the real world.

It has been seen that dichotomy rules the real world, because it rules the ideal world of which the real world is a part. Yet Peirce's view of the nature of the real as independent of the human mode of grasping it indicates that such hard discrete exactitudes do not exist, for reality, according to Peirce, is a continuum that "swims in indeterminacy."²² For this reason, the principle of continuity, which pervades the independently real, is "fallibilism objectified."²³ Further, the independently real as a continuum of events is precisely that to which neither the law of noncontradiction nor the law of excluded middle is perfectly applicable.²⁴

Thus, it would seem that though the hereness and nowness of events and the continuities that pervade them are independent of our conceptualizations and the possibilities that they allow, what the hereness and nowness can consistently be held to be is partially determined by the range of conceptual or ideal possibilities within which discrete facts can consistently emerge. As Peirce observes, what is demanded "above all is the fact and the admission that the world is reasonable—reasonably susceptible to becoming reasonable, for that is what it is, and all that it is, to be reasonable."²⁵ From this perspective, it can perhaps be said that what *occurs* must be metaphysically possible, while *what* occurs must be epistemically or conceptually possible as well.²⁶

The relation between the continuum of qualitative events that constitutes the character of the metaphysically real independently of the human mode of grasping, and the system of facts that constitutes the real world, is brought into focus by Peirce's discussion of the relation between events or occurrences and facts:

I must first point out the distinction between a Fact and what in other connexions, is often called an Event but which, owing to that word being used in the Doctrines of Chances in its stricter sense . . . must be here called an Occurrence. An Occurrence, which Thought analyzes into Things and Happenings, is necessarily Real; but it can never be known or even imagined in all its infinite detail. A Fact, on the other hand is so much of the real Universe as can be represented in a Proposition, and instead of being, like an Occurrence, a slice of the Universe, it is rather to be

compared to a chemical principle extracted therefrom by the power of Thought; and though it is, or may be Real, yet, in its Real existence it is inseparably combined with an infinite swarm of circumstances, which make no part of the Fact itself. It is impossible to thread our way through the Logical intricacies of being unless we keep these two things, the Occurrence and the Real Fact, sharply separate in our Thoughts.²⁷

Here lies the significance of Peirce's claim that "Nature, in connection with a picture, copy, or diagram does not necessarily denote an object not fashioned by man, but merely the object represented as something existing apart from the representation."²⁸ Mill's failure to recognize this mind relatedness of worldly nature, according to Peirce, led him astray in his analysis of the "uniformity of nature."²⁹

Peirce indicates the above position from a slightly different direction in his cryptic claim that "The inkstand is a real thing. Of course in being real and external, it does not in the least cease to be a purely psychical product, a generalized percept."³⁰ Or as he elaborates, a "this" is an object selected by a subject from the continuum of possibility.³¹ Reality independent of our thinking exerts an influence on our ways of thinking about it, but what facts and objects it contains is partially dependent upon the conceptual framework in terms of which we delineate objects and facts within the backdrop of a world. Indeed, according to Peirce "External Fact" can change in accordance with the way human minds "feel, think, or suffer."³² Peirce offers a helpful clarification about his limited intentions in his numerous statements concerning the independence of real objects, claiming that, the real object can be "an object shaped by thinking. . . ; but so far as it is Real, it is not modified by thinking *about it*."³³ Such an interactional context is highlighted in John Lachs' claim that for Peirce, "We thus find the world, partly at least, a social product and ourselves the divine co-makers of reality."³⁴

The failure to distinguish between the metaphysical possibilities contained in and giving rise to emerging occurrences and the logical or epistemic possibilities that allow us to grasp occurrences in such a way as to give rise to a consistent system of facts results in the identification of ontological possibility with some type of Platonic essence.³⁵ The possibility of the ideal world, of which the sensible world is but a fragment, is not another Platonic world that

in some way allows the actual sensible world to participate in reality but is an ideal world of logical possibilities whose structure is dependent upon human intelligence: "It has come about through the agencies of development that man is endowed with intelligence of such a nature that he can by ideal experiments ascertain that in a certain universe of logical possibility certain combinations occur while others do not."³⁶ Thus, it is through developing human intelligence that there is an "evolution of Platonic Forms."³⁷ Evolving concepts are analogous to "Platonic Forms," not in the sense of being metaphysical essences, but in the sense that each successive concept can itself be characterized as fixed, eternal, unchanging, and, indeed, "toward the side of math."³⁸ For, according to Peirce, meanings do not literally change; instead, a new meaning replaces an old meaning. Though the same words may be used, there is a substitution of the meanings or concepts attached to them.³⁹ Thus Peirce, in the context of discussing the semiotic interrelationship of ground, object, and interpretant, can hold that ideas are "to be understood in a sort of Platonic sense."⁴⁰

In short, the ideal world as indicating a realm of logical possibilities within which the actual world must be located is not some realm of metaphysical forms; indeed, it is not a topic for metaphysics at all but rather belongs to the area of epistemology. The ideal world is the conceptual world of the logically possible or the consistently thinkable within which the facts of experience must be located. To turn the conceptual realm into the metaphysical realm is a reification that obscures the character of the independently real, the character of our mode of grasping the independently real, and the character of the world as that which emerges through their interaction. From this backdrop, the following discussion can now turn to a general characterization of such an emerging world.

The above analysis has attempted to show that the real world is ontologically one with independent reality as an infinitely rich continuum of qualitative events. It is, metaphysically, that independently real. Yet a world is dependent upon the meaning system that grasps in a way in which reality as independent is not, for a world is that perspective of the infinitely rich reality that has been "fixed" or "carved out" by a system of ideas. Knowledge is abstractive and selective. A world, though concrete, is nonetheless selective in the sense that a world, as the concrete content denoted by a system of meanings, is a way in which the concreteness of reality can be

delineated or "fixed." A system, once chosen, limits the alternatives possible within it, but alternative systems may be possible. As Peirce notes, "Truly natural classes may, and undoubtedly often do, merge into one another inextricably,"⁴¹ and thus boundary lines must be imposed, although the classes are natural.⁴² The continuity is there; where the "cut" is imposed is, in part, our decision. Like the boundary lines of natural classes, the "boundary lines" that constitute the world may have been differently drawn, giving rise to different possibilities within the world. A world is delineated by a system of facts, but facts are not independent of the selective knowledge process, for facts are abstracted portions of a continuum of events.

A world is by definition consistent because a world is the concrete content that is delineated by a set of consistent propositions. The world answers to the laws of excluded middle and non-contradiction, and thus it represents the ideal of that which has been conceptually articulated—and hence made precise—to its ideal limit. "The world," then, is at once the basis for every experience and the ideal of a complete synthesis of possible experience. Perhaps it can be said, somewhat metaphorically, that while reality is the infinity of a continuum or ongoing process, the world is the logical fixation of an infinite number of possible cuts within it. Thus, the world is the context of meaning within which all other frameworks and objects may be articulated, in the sense that the world is the "outermost" content or encompassing frame of reference of the application of a set of meaning structures to the independently real and hence of the propositions that can delineate experience consistently within the context of these meanings. Such a world, then, opens in one direction toward the structures of the independently real and the possibilities it presents and in the other direction toward the structures of our modes of grasping the independently real and the possibilities such modes of grasping allow. What can occur in the world must conform to the possibilities available within the world we have structured—though the world we have structured has arisen through the successful interaction with the possibilities offered by the independently real. Peirce's concept of world has significant implications for issues of truth and science. The following pages will focus on each of these issues both in turn and in their interrelation.

The extent of the radical conflict of interpretations concerning

Peirce's theory of truth in the literature is perhaps best captured in Robert Almeder's claim that the literature on Peirce contains "no fewer than thirteen distinct interpretations of Peirce's views on the nature of truth."⁴³ Within Peirce scholarship, the acceptance of convergence and the final ultimate opinion transcends the realist-idealist controversy, though the understanding of the nature of the final ultimate opinion as that toward which inquiry on any subject will converge will vary according to camps. Thus, a realist interpretation holds that "The opinion reached in the final opinion, unlike opinions reached earlier, shall never be overthrown although the degree to which the final opinion *corresponds* to fact admits of indefinite, (but not substantial) refinement."⁴⁴ While, as has been stated from the backdrop of a coherence theory of truth, the true bedrock of pragmatism is "ultimately the entire framework of objective logic and objective idealism."⁴⁵

Before examining Peirce's theory of truth in relation to traditional alternatives of correspondence or coherence, it will be helpful to clarify at this point the type of realism involved in discussing the correspondence theory of truth, for it is not the realism that lies in opposition to nominalism and asserts the reality of universals. Nor is the point at issue the question of the externality of the real; rather, it is the relation of the externally real to the knower. What the present rejection of the label of "realism" does and does not imply can best be brought to light by way of comparison with Almeder's espousal of Peirce's "epistemological realism." He proceeds by showing that Peirce is not a phenomenalist and not an idealist and that Peirce offers a defense of belief in the existence of an external reality, a reality, moreover, with which the knower is in direct contact.⁴⁶ With these points the present interpretation agrees. But what this realism also includes for Almeder, as well as for most who accept the realist label, is that the sense in which the real external world we know "is dependent on mind turns out to be *trivially* true and necessary for any epistemological realism wherein it is a necessary condition that the external world be knowable."⁴⁷ Or as such a realism is elsewhere characterized, "There is a *world of objects* whose properties are neither logically nor causally dependent upon the noetic act of any number of finite minds."⁴⁸

It is these generally held assumptions associated with the realist label that are denied in denying that Peirce is a realist, for, as

seen above, the world and the objects within it are partially dependent upon the noetic acts of finite minds. Thus, while Peirce cannot be called an "idealist"⁴⁹ or a "phenomenalist," neither can he be called a "realist." For, though Peirce holds we are in direct contact with an external "brutely there" reality that limits our interpretations, thus rendering the coherence theory of truth incomplete, the relation of the knower to this known external reality cannot be understood in terms of correspondence. And, although it may well be an oversimplification to say that coherence theories of truth belong to idealism while correspondence theories of truth belong to realism, an interpretation of Peirce as an epistemological realist in the above sense indicated by Almeder and accepted by most others using this label leads to the view that at least the ideally true and final opinion on any matter would involve a relation of correspondence.⁵⁰ To the question, what alternative remains when one rules out the correspondence of realism as well as the coherence of idealism,⁵¹ the answer is, the pragmatic alternative. Peirce's pragmatic theory of truth is ultimately intertwined not just with his understanding of scientific method as the method of fixing belief but also with the entire gamut of his unique pragmatic epistemology and metaphysics.⁵²

Because for Peirce the here-ness and now-ness of events and the real connections they display is independent of, yet enters directly into interaction with, our conceptualizations and the possibilities they allow, coherence or consistency is not a sufficient criterion for the truth of empirical assertions. There must be a pragmatic interplay between our concepts and actual experience. There is an ontological dimension to what appears within experience that limits our interpretations in terms of workability. But true knowledge, even ideally true knowledge, could not be correspondence, for the nature of our intentional link with reality through conceptual structures, and the nature of reality as a continuum that "swims" in indeterminacy, makes the relation of correspondence literally senseless. Rather, Peirce claims that a true thought is one that *answers*, that leads to thoughts in harmony with nature.⁵³ The relation of "answering" is ultimately two directional. Reality answers our questions and determines the workability of our meaning structures, but what answers it gives are partially dependent on what questions we ask, and what meaning structures work are partially dependent upon the structures we bring. Truth is always

worldly truth, for “nothing else than a Fact possibly can be a ‘witness’ or ‘testimony,’”⁵⁴ and facts, it will be remembered, are always relative to the framework of a discriminating mind. Yet the witness of a fact is the real, “since it is truly in that which occurs.”⁵⁵

Worldly truth is thus perspectival, and other perspectives are always possible. Truth involves convergence, but convergence within a common world that we have partially made and continually remake in various of its aspects. Thus Peirce, in speaking of truth, whether “scientific, moral, metaphysical, or common sense,”⁵⁶ states that “the perfect truth of a statement requires that it should involve the confession that the perfect doctrine can neither be stated nor conceived.”⁵⁷ Again, Peirce claims that an essential ingredient of truth includes a confession of its “one-sidedness.”⁵⁸ That this is intended not as a factual limitation on present knowledge but as a theoretical limitation due to the nature of knowledge is found in Peirce’s comparison of the ideal limit of convergence, the ideal of a “final ultimate opinion,” to the ideal limit of pi. It is “an ideal limit to which no numerical expression can be perfectly true.”⁵⁹ It is an unattainable ideal not only in fact but also by the very nature of that which sets the ideal limit.⁶⁰ Thus Peirce can present the following hypothetical situation:

Suppose our opinion with reference to a given question to be quite settled, so that inquiry, no matter how far pushed, has no surprises for us on this point. Then we may be said to have attained *perfect knowledge* about that question. True, it is conceivable that somebody else would attain to a like perfect knowledge which should conflict with ours. This is conceivable.⁶¹

Peirce then goes on to say that though it is theoretically possible it is not practically possible “considering the social nature of man,” for we would “compare notes; and if we never do compare notes, and no third party talks with both and makes the comparison, it is difficult to see what meaning there is in saying we disagree.”⁶² That Peirce is not using the term “perfect knowledge” in a loose commonsense way can be seen from his explicit distinction between it and “practically perfect belief.”⁶³ Thus even the ideal of convergence to a final ultimate opinion, to perfect knowledge, is always convergence within an accepted framework or perspective. And there are always other and possibly better ways of cutting into

reality, of delineating the context within which convergence can occur. This is implied by the very nature of reality as a continuum that swims in indeterminacy. Thus convergence toward one final truth is "a regulative principle, an intellectual hope," and such a rule of hope must be followed, for "despair is insanity."⁶⁴ Yet even such a rule of hope, the "cheerful hope" that animates the followers of science, involves "*something approximating*" only,⁶⁵ for the "indeterminate" nature of reality may mean that concerning "*the answer, that is, the final answer . . . there is none.*"⁶⁶ H. S. Thayer's characterization of Peirce's concept of truth as having the function of Kant's regulative ideas "serving as a working standard of criticism" would apply here, but at a more radical level than that intended by his characterization.⁶⁷

The objects within our world do not copy the independently real but emerge through our modes of grasping the independently real. Nor do the modes of grasping via which emerge the objectivities within our world copy the independently real but rather they serve as conceptual tools for "cutting the edges" of the independently real continuum of events that "swims" in indeterminacy. The ideally true opinion would be that opinion that would perfectly work in anticipating possibilities of experience and would work, not because it adequately copied, but because it adequately "cut into" the independently real. Finally, the world within which specific meanings and beliefs arise, and within which objects or facts emerge for conscious awareness, is not a copy of an independent reality, nor is it identical with an independent reality in its character as independent. Rather, such a world is the encompassing frame of reference or field of interest of organism-environment interaction, the ultimate backdrop of rationality within which emerging facts are situated. And thus Peirce can proclaim that "In its proper meaning realism is a kind of idealism. It is the doctrine that ideas play a part in the real world."⁶⁸ This realism that is an idealism is in fact neither but is a manifestation of that thread of pragmatic pluralism that runs through his position, for this "realism [that] is a kind of idealism" emerges from his understanding of the pragmatic interplay between the indeterminately rich reality that offers its independent influence and the meanings by which we render it intelligible and suitable for our needs.

From the above pluralistic perspective, the concluding focus will turn to some issues in Peirce's philosophy of science. The lit-

erature on Peirce usually evinces the unquestioned assumption that he is a scientific realist. Thus, for example, Helmut Pape questions whether Peirce's conception of physical processes is consistent with his realistic interpretation of scientific concepts and theories,⁶⁹ while Robert Almeder claims that Peirce's position, in providing for the ontologically privileged position of science, runs counter to the relativity implicit in the commonly held view that there will always be competing alternative scientific theories.⁷⁰ Similarly, Bruce Altshuler claims that "the scientific spirit of Peirce's perspective" would "make his analysis less than attractive to many these days."⁷¹

Yet, in recent literature on Peirce, this acceptance of his "scientific realism" is combined with flirtations with pluralism. Peter Skagestad can serve as a good example here, as can be seen from the following exchange. Focusing on a passage from Peirce in which he stresses "How much more the word *electricity* means now than it did in the days of Franklin; how much more the term planet means now than it did in the time (of) Hipparchus,"⁷² Hjalmar Wennerberg objects that Peirce's theory "blurs the important distinction between logical analysis and empirical research."⁷³ To this view Skagestad responds that Peirce "does not blur this distinction in the least; he unconditionally denies that there is any such distinction."⁷⁴ He notes that Wennerberg's book was written before the appearance of Thomas Kuhn's *Structures of Scientific Revolutions*, thus resulting in his finding Peirce's position deficient because it does not hold to the distinction sufficiently clearly, while "Today, few thinkers familiar with the history of science would deny that scientific terms change their meanings through changes in scientific theory."⁷⁵

What brings Peirce's position closer to Kuhn's ideas than even Skagestad allows, however, is precisely that Peirce neither ignores nor blurs the distinction but insists on upholding it, albeit implicitly so. What is operative in the process of meaning changes stressed above by Skagestad is precisely the distinction between the genetic origin of a system of concepts and the logical analysis of what they prescribe. If that which a meaning generates, or in other terms, contains, is too frequently inapplicable, our meanings may alter through the formation of new habits that creatively fixate inductively accumulated experiences in new ways. However, what we then have is a new meaning, or a new rule of generation of

conditions of verification, which now necessarily contains at least partially different schematic possibilities.⁷⁶ It was seen above that Peirce holds that though the same words may be used, the meanings attached to them are different.⁷⁷ And thus he further claims that through a change of some part of a network of meanings, though not necessarily of words, what is inconceivable today may become conceivable tomorrow.⁷⁸

Further, for Peirce, we test beliefs, not in isolation, but as parts of a whole set of claims.⁷⁹ Peirce holds that discrepancies between theory and observation can be interpreted either as observational errors⁸⁰ or as indicative of the need to alter the theory.⁸¹ We should anticipate that data will arise that do not fit the theory⁸² and hence that the above contextual decisions must be made. Something similar to auxiliary hypotheses in science is operative even in our commonsense awareness of the world around us. No part of a relevant corpus of knowledge is immune from change in the face of repeated disconfirming instances. Further, any part of a belief structure can be held in the face of disconfirming evidence by changing other parts of the structure.⁸³ Experience reveals that an improvement is necessary, but it does not specify which improvement is needed. Whether we change empirical generalizations in the face of disconfirming facts or restructure a set of meanings to allow the emergence of new facts is not itself dictated by the evidence, but is a pragmatic "decision" operative within the context of the encompassing intentional unity of humans and their world. And, indeed, experience usually proceeds without any awareness as to whether or not we have modified an empirical generalization by counterinstances, or have replaced a meaning to avoid having to "throw out" too much of experience as not real contents of a particular type, for such "pragmatic decisions" are implicit in modes of response.

The interconnected meanings of conceptual structure thus dictate what can conceivably be found in empirical research, while empirical research can lead to the overthrow of a system of logically interconnected meanings. Scientific revolutions are radical examples of the emergence of new conceptual structures, new meanings that legislate what facts conceivably may be or what facts are perceived. The recognition of such radical overthrows of conceptual frameworks is evinced in Peirce's emphasis on "Cataclysmal evolution,"⁸⁴ which, as opposed to both Darwinian and Lamarckian evolution, highlights the occurrence of breaks that are nonetheless

not haphazard.⁸⁵ Peirce holds that such evolution is the chief factor not only in the evolution of living forms but also in the evolution of institutions and ideas.⁸⁶ As Peirce stresses, science advances mainly by cataclysmal evolution.⁸⁷ "It advances by leaps; and the impulse for each leap is either some new observational resource, or some novel way of reasoning. . . ." Moreover, a novel way of reasoning can itself be considered "a new observational means."⁸⁸

The meaning structures of science change more rapidly and are more in conflict than the vague indubitables of common sense, though the dynamics operative in each level are the same. Common sense indubitables are "indubitable at the time being," and the changes are so slow that they can ordinarily be ignored.⁸⁹ Though the hypostatic abstractions or creative abductions that give rise to commonsense objects change so slowly that they can ordinarily be ignored, they are subject to alternatives nonetheless. Peirce gives examples from common sense and science to show that subjects are operations or qualities that have been transformed by hypostatic abstraction⁹⁰ and that hypostatic abstractions can be made in various ways, giving rise to different objects.⁹¹

Further, the world of science, far from being the ontologically privileged world, is dependent on the everyday world of common sense within which experience opens onto the indefinite richness of the ontologically real. The world of science is a second-level abstraction rooted in the world of common sense and opening onto the acritically indubitable but invariably vague beliefs of common sense. Peirce holds that the hypostatic abstractions of science are ultimately founded in the hypostatic abstractions that constitute percepts and, in fact, depend upon them for the very possibility of science. For "All science, without being aware of it, virtually supposes the truth of the vague results of uncontrolled thought upon such [commonsense] experience, cannot help doing so, and would have to shut up shop if she should manage to escape accepting them."⁹² Scientific theories, rooted in everyday experience, are more imaginative, more of the nature of ideas,⁹³ and more precise than the commonsense experience that founds them. As such, they are more dubitable than the beliefs of common sense, for "the acritically indubitable is invariably vague."⁹⁴ As he emphasizes, it is "easy to be certain. One has only to be sufficiently vague."⁹⁵

That there can be incommensurable scientific worlds that nonetheless have a shared meaningfulness rooted in the common-

ality of the relatively “acritically indubitable” but “invariably vague” commonsense world⁹⁶ is indicated in Peirce’s claim that all humans have “some notion, however crude and concrete, of force, matter, space, and time,” as well as some notion of “what sort of objects their fellow beings are,” while “Modern science . . . has put us into quite another world; almost as much so as if it had transported our race to another planet.”⁹⁷ Any scientific world opens onto the commonsense world that provides our concrete access to the indeterminate richness of the reality within which we are embedded, and thus “The instinctive result of human experience ought to have so vastly more weight than any scientific result.”⁹⁸ Everyday experience, because it provides our concrete interaction with the indefinite richness of reality, founds the possibility of science and also provides the vague criterion of the shared meaningfulness and sense of workability of incommensurable scientific theories. Scientific knowledge is the paradigm for Peirce, not because he holds to scientific realism,⁹⁹ but because of the method by which scientific knowledge is achieved. The dynamics of science reflect and in turn help throw light upon the dynamics that give rise to the perceived world that founds the very possibility of science.

In the change of a scientific theory, according to Peirce, we apply methods and rules¹⁰⁰ whose operation cannot be subject to objective justifiability and eventual agreement. In accepting a theory for testing one incorporates such criteria as plausibility, simplicity, explanatory power, and economy.¹⁰¹ And, as Nicholas Rescher’s discussion of economy well indicates, there is a general, pervasive practice of economy in common sense that has not been achieved in science. As he states of the situation in general, “clever theoreticians” frequently “encounter perplexities to which the ordinary practitioner seems immune.”¹⁰² What holds of economy as well as other commonsense vague notions that form the backdrop for the highly criticizable claims of science holds as well for workability. Though the abstract articulations of workability and plausibility¹⁰³ take diverse and at times incommensurable forms, both in science and in the more reflective questionings of common sense, the vague and acritically indubitable¹⁰⁴ sense of workability serves, ultimately, as the ineffable but inescapable and inexhaustible wellspring of vitality by which reasons and practices are

worked out in the ongoing course of inquiry. And, as Peirce points out, workability is holistic in nature; observations do not determine the adjustments we make; workability is often best achieved by theories that are the most radically novel.¹⁰⁵

When a community is operating within a common system of meanings on any one issue, then investigation can tend toward an ideal limit of convergence. However, when different segments of interpreters experience different facts because of different sets of meaning structures for cutting into the indefinitely rich continuity of possibilities of ordering, such convergence cannot occur. The criterion for adequately cutting is workability, but workability can be established only relative to some meaningful network by which experience is "caught." Thus there may be a plurality of interpretations among varying groups of interpreters on any topic. For each group, identifiable by varying nets or perspective for the catching of experience, is variously structuring some contours of a world. Yet even the lines of demarcation of distinct groups of interpreters are difficult to discern, for such differing networks are embodied in differing attitudes of response and may be present when disagreeing interpreters think their differences can be resolved merely "by collecting the facts." In this way, the essential pluralism is often hidden from view in the misplaced drive toward a common conclusion based on "the evidence."

Such pluralism must ultimately be dealt with in terms of a generalized stance of agreement concerning what standards are to be applied in making decisions among "incommensurable" frameworks for delineating facts. Such standards may be difficult to elucidate, but as implicitly operative they can be elicited for clarification. However, perspectives may emerge that not only are "incommensurable" with another conceptual net for the catching of experience through the determination of what kind of facts exist in the world, but also incorporate standards and criteria and solutional goals, or kinds of problems important to resolve, that are "incommensurable" with those of another perspective. Thus, there are not only different facts, but also different methods, standards, and criteria for determining which system of facts should be accepted. This is the most fundamental sense of incommensurability in Kuhn's position. These divergent perspectives have indeed carved out divergent worlds—be they divergent scientific worlds

or divergent ways of life encompassing not just differing facts but differing goals, differing problems of importance, and differing criteria for resolving differences.

This deepest level of incommensurability, which has been shown by Kuhn to lie embedded in "the structure of scientific revolutions," leads to charges by his critics of irrationalism and the denial of progress in knowledge. Thus Skagestad, after a "piecemeal" flirtation with the linkage of Peirce with Kuhn via the questionable path indicated above, notes that "What is controversial is only whether such changes are progressive or arbitrary."¹⁰⁶ He concludes that Peirce, the realist, held the former, while Kuhn held the latter. Susan Haack similarly, but perhaps even more forcefully, distances Peirce from Kuhn here. Though acknowledging Peirce's recognition that historically growth in science sometimes progressed more cataclysmically than cumulatively, she is insistent that Peirce would have no sympathy for Kuhn's position of discontinuity and revolution in science and would have considered it to house a "covert commitment to nominalism."¹⁰⁷ The characterization of scientific progress for Peirce as radically opposed to the Kuhnsian position is perhaps brought home most forcefully in Resher's claim that Peirce holds a "cumulative-convergence" theory of scientific progress and that "Progress, on this view, consists in driving questions down to lesser and lesser magnitudes, providing increasingly enhanced detail of increasingly diminished significance. This at bottom is the Peircean vision of ultimate convergence in scientific inquiry."¹⁰⁸

The denial of the alternatives and characterizations offered above by Skagestad, Haack, and Rescher requires a brief consideration of progress and rationality versus arbitrariness and irrationality as implicit in Peirce's writings. Peirce's position implicitly reveals the way in which the rational cannot be confined to what can be explicitly formulated in a series of propositions, for facts and their propositional formulations emerge from the backdrop of a world or a horizon of meaningful rapport that by its very nature cannot be brought to such formulation. At its most fundamental level it sets the precondition for the emergence for both doubt and conscious belief, for questioning cannot occur without the world as the context within which the doubt and questioning and possible solutions make sense. The function of "persuasion" in the "choice" of a world, however, does not involve a contrast between

the rational and the non-rational but rather requires a new understanding of the nature of rationality. The irrationality of humans consists in “an exaggerated loyalty to their own principles”¹⁰⁹ rather than willingness to change in the light of the dynamics of scientific method. This method incorporates at all levels of its functioning the vague sense of workability and, as holistic in nature, is not reducible to rigid rules of procedure. Yet incommensurable perspectives, whether at the level of common sense or science, though in a sense structuring differing worlds, cannot, by the very nature of world as opening onto a natural universe with which we must successfully interact, be closed to rational discussion. In the ongoing course of experience some arguments or reasons gain vitality while others fall by the wayside. Though none are proved right or wrong, we “get over” some but yield to the force of others. Such a “getting over” or reinforcement is based on rational discussion, guided by a vague, elusive, but real sense of the inescapable criteria of workability. As Peirce well expressed the philosophic significance of such ongoing, ontologically grounded creativity, “we are neither forced into *idealism*, nor yet into *ontological ignorance*.”¹¹⁰ And thus Peirce appropriately held that his community of interpreters involves not a straight development but a self-corrective diversity of interpretations, abductive inferences, and arguments in constant process of adjustment as they interweave to form a fiber of understanding.¹¹¹

Knowledge as cumulative and knowledge as changing do not lie in opposition for Peirce. Rather, knowledge as changing is also knowledge as cumulative, for any novel world emerges from a cumulative process or history, which yields enrichment of intelligibility both of the old and of the new. To demand of such a cumulative process that it tend toward a final unchanging truth is to misunderstand the nature of the indeterminately rich natural universe, the nature of noetic activity, and the nature of world within which both are unified. This unification undercuts the dichotomy of foundationalism or nonfoundationalism and, along with it, the closely related dichotomies of realism or anti-realism and objectivism or relativism, since each, in its own way, represents the alternatives of an absolute grounding of knowledge or skepticism. The present position provides an orientation within which these sets of alternatives do not apply. Experience incorporates an ontological intrusion as one aspect ingredient in it. Also ingredient

in the very heart of human experience is an interpretive creativity that is at once unified with that ontological presence but renders its grasp in terms of any absolute grounding impossible. The unity denies the arbitrariness of anti-foundationalism or anti-realism, or relativism. The temporally founded creativity denies the absoluteness of foundationalism or realism or objectivism. Peirce's orientation provides a novel paradigm in which these popular but self-defeating dichotomies become irrelevant.

In one sense it can be said that the world within which conscious belief, questioning, and discussion emerge becomes many different worlds because of new meanings, shaping new worldly contours, that emerge from varying attitudes of response to developing problematic contexts. In another sense, however, such pluralism is not absolute but emerges within the backdrop of community. For, in its deepest sense, the questioning that changed the world could occur only within a context that did not change but lent the prereflective constancy and commonalty of its meaning in a general though vague sense to the meaningfulness of both the problematic contexts and the possible resolutions in terms of alternative structurings. It is the foundation for such a pluralistic community, rather than for the drive toward unanimity in final knowledge, that lies at the heart of Peirce's pragmatic position and provides the metaphysical and epistemic underpinnings for Kuhn's understanding of science.

These underpinnings reveal that Kuhn's understanding of the pluralistic nature of scientific change does not render such change arbitrary or irrational, nor does Peirce's understanding of scientific progress render such progress at odds with inherent pluralism. The deeply imbedded, pervasive strand of pragmatic pluralism that runs through Peirce's writings provides the foundation for the kinship of these two thinkers. It provides the epistemological and metaphysical tools for resolving many of the perplexities and dilemmas that have led to both the long held claims of their radical opposition as well as the recent piecemeal, halting attempts to effect a reconciliation. The following chapters will explore in detail these tools, some of which have been included in broad strokes in the above presentation, to reveal just how deeply and pervasively this strand of pluralism is embedded in Peirce's thought and how it weaves a unifying and clarifying pattern for understanding various of his claims and for providing an in-depth "new alternative."