Dewey's Logical Theory

New Studies and Interpretations

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Dewey and Quine on the Logic of What There Is

John R. Shook

> I espouse a more thorough pragmatism.
>
> (W. V. O. Quine 1980, 46)

Standing apart from much of twentieth-century Anglo-American philosophy, both John Dewey and W. V. Quine hold that logic is a discipline relevant to the question of what exists. Logic is relevant to questions of existence, they agree, only because it is an integral component of an empirical-scientific understanding of the world, not some sort of non-empirical and rationalistic high road to existence. They have a common devotion to science and its fallibilism, they reject the correspondence theory of truth and epistemic foundationalism, and their naturalism opposes any "first philosophy" of metaphysical rationalism. Philosophers who have preferred to use logic rather than empirical science to decide questions of ultimate existence claim in effect that "logic is the science of what there is." Dewey and Quine would reverse this slogan, instead claiming that "science is the logic of what there is." And to those philosophers who would prefer to withhold logic from any relevance to existence, Dewey and Quine would argue that logic properly understood is indeed an important component of empirical science. The logic of scientific inquiry has a central, although indirect, bearing on deciding questions of existence.

Should Quine have a secure place in the pantheon of American pragmatists, as a worthy successor to the spirit of Dewey's philosophy? Possibly, but what cannot be ignored is the fact that Quine reaches many conclusions that Dewey expressly denied. This essay is concerned with two major disagreements between Quine and Dewey over scientific method and knowledge. First, Quine's philosophy argues that objects of scientific knowledge are never within human experience but always beyond experience. Dewey's philosophy instead finds objects of knowledge to be within hu-

man experience. Second, Quine holds that scientific practice demands a realistic construal of unobservable theoretical entities postulated by successful theories. Dewey's understanding of science precludes such a realist demand, as unobservable theoretical entities have only a hypothetically pragmatic meaning.

The ultimate cause of these disagreements, I propose, is the order of the dependencies among various aspects of their respective views. Quine's philosophy offers a rationalistic scientism, a naturalized epistemology, an empiricism, and a pragmatism, in that order. Dewey's philosophy, in contrast, offers a metaphysical empiricism, a naturalism, a functionalist epistemology, and a pragmatic realism. These two philosophies, despite having several fundamental agreements, advance two very different pragmatic logics of what there is.

Logic and Normative Epistemology

An examination of their differences on scientific method should proceed from a summary of their agreements on logic and epistemology. For many years Quine allowed the promise of evolutionary epistemology and cognitive psychology to support his contested claim that his epistemology would naturally be normative. More recently, Quine's sparse comments on his vision of the normativity of epistemology have taken a somewhat different direction. If we take Quine's two characteristic claims together, that pragmatic norms are among the subject-matter of epistemology, and that epistemology is a scientific enterprise, then Quine seems to be saying that the study of pragmatic norms is a component of science. There is more to science, after all, besides the postulated entities of theories. There must be pragmatic strategies to deal with occasions demanding either novel theorizing or theory adjustment. These strategies are not "given" to us, but rather historically and culturally situated as fallible and revisable. In *Pursuit of Truth* Quine distinguishes theoretical epistemology from normative epistemology while defending the normativity of his epistemology against critics.

> But they are wrong in protesting that the normative element, so characteristic of epistemology, goes by the board. Insofar as theoretical epistemology gets naturalized into a chapter of theoretical science, so normative epistemology gets naturalized into a chapter of engineering: the technology of anticipating sensory stimulation. (1992, 19)

Since Quine characterizes science as the theoretical effort to anticipate sensory stimulation, normative epistemology is the engineering technology that recommends and tests ways of improving the scientific method. Quine and Ullian's *The Web of Belief* (1978) offers just this sort of understanding of the strategic, pragmatic side of science. The philosophical effort to understand the logic of proper scientific method, to grasp exactly why theory alteration or creation is needed, and to formulate methods of regulating theory alteration and creation, is Quine's notion of the technology of normative epistemology. This philosophical activity is a necessary component of the scientific process. Pragmatic norms are formulated by normative epistemology, not by theoretical epistemology.

Quine has closely approached the spirit of Dewey's own understanding of the role of philosophy in scientific method. Dewey's functionalist epistemology is aptly described as an inquiry into the technology of knowing. Not only is science an aspect of technology, and not the reverse, but the very processes of science can be best understood as technologies. Technology is the intelligent fashioning of tools for useful purposes. According to Dewey, our habits of inference are no less human-made tools than are hammers or telescopes.[1] Such a view supports Quine's controversial claim that even logical principles are in principle revisable should theoretical success demand it.

> It can hardly be denied that there are habits of inference and that they may be formulated as rules or principles. If there are such habits as are necessary to conduct every successful inferential inquiry, then the formulations that express them will be logical principles of all inquiries. . . . They are formulations of ways of treating subject-matter that have been found to be so determinative of sound conclusions in the past that they are taken to regulate further inquiry until definite grounds are found for questioning them. While they are derived from examination of methods previously used in their connection with the kind of conclusion they have produced, they are *operationally a priori* with respect to further inquiry. (Dewey 1938, LW12:21)

The intelligent control and improvement of habits of inference constitute the subject-matter of logic proper as the inquiry into inquiry. In Dewey's philosophy, the field called logic is therefore just epistemology: the technology of the methodology of inquiry, aiming in particular at understanding and refining the processes of scientific inquiry. Quine's isolated reference to normative epistemology as a technology is fortuitous, but not coincidental. Dewey and Quine fundamentally agree on the nature and function of normative epistemology in a way that few other philosophers

do. Their commitment to a naturalistic and empiricist notion of science, combined with a repudiation of any metaphysical theories of experience, belief, knowledge, truth, and reality, compels both philosophers to locate all epistemic inquiry inside science itself. Both Dewey and Quine agree that logic/epistemology is an essential component of the science of what there is. Their disagreement rests rather on what each philosopher takes to be the materials available for the project of epistemology.

Quine's Scientism

Quine's attempted solution to many difficulties for logical positivism involves the elimination of the analytic/synthetic distinction.[2] Quine's holism exposes analytic propositions as just firmly held synthetic propositions functioning at the heart of scientific theories. The essence of scientific method according to Quine is basically Popper's falsificationist hypothetico-deductive method. Observation sentences are deduced from theories and compared against the evidence of actual experience. The observed evidence is never capable of verifying or even warranting any theory, because any number of theories can predict the same evidence (as the undetermination or "Duhem-Quine" thesis appears to imply). The evidence can only falsify theories, requiring scientists to alter theories or create new theories. The combination of holism and the hypothetico-deductive method together imply that no single theoretical proposition can be put on trial by evidence, since only an entire theory, including its deeply imbedded logic, is capable of supplying the premises for a deduction to a concluding observation sentence.

Like the positivists, Quine believes that a theory has scientific meaning only if it can be put on trial by empirical evidence. He suitably adapts the positivist tenet that the meaning of a scientific proposition lies in its truth-conditions by reformulating this tenet in light of holism. Since only whole theories are testable, only entire theories can properly said to be fully meaningful. Quine concludes that the meaning of a theory lies in its testability conditions, which are the sum of all predictions the theory can make. Quine's philosophy thus completely replaces the Kantian triad of analytic a priori, synthetic a priori, and synthetic a posteriori propositions with a single kind of intellectually meaningful entity: the scientific theory. Logic cannot be demarcated from science or assimilated to metaphysics, since it shares in meaning only insofar as it is scientific. Rationalistic metaphysics collapses because there are no genuinely a priori propositions. Phenom-

enalistic or positivistic metaphysics collapses because there are no foundationally true empirical propositions. All such metaphysical propositions simply fail to have scientific meaning and hence cannot refer to anything. Without ontological competition, the ontology of empirical science remains standing as the only measure of what exists. This is the significance of referring to Quine's philosophy as a form of "scientism."[3] This scientism has important consequences for the proper understanding of the nature of experience, and for the question of the reality of postulated scientific objects.

On the nature of experience, Quine finds that his scientism is eminently compatible and supportive of empiricism, provided that empiricism is purged of metaphysical and positivistic debts. Older traditions of empiricism have foundered when tempted to metaphysically guarantee the validity of scientific knowledge. With the possibility of metaphysics eliminated, the epistemological attempt to explain human knowledge cannot appeal to the a priori or the sense-datum. Instead, the epistemologist must take for granted current scientific practice and knowledge, to weave together a story about the growth of human knowledge using only causal relations among known scientific objects.

> This human subject is accorded a certain experimentally controlled input—certain patterns of irradiation in assorted frequencies, for instance—and in the fullness of time the subject delivers as output a description of the three-dimensional external world and its history. The relation between the meager input and the torrential output is a relation that we are prompted to study for somewhat the same reasons that always prompted epistemology; namely, in order to see how evidence relates to theory, and in what ways one's theory of nature transcends any available evidence. (Quine 1969, 82–83)

Quine's empiricism is therefore a consequence, and not a presupposition, of naturalized epistemology. Bereft of any mental entities, sense-data, or a priori propositions, the naturalized theory of knowledge will understand experience as physical, amenable to objective scientific inquiry. Naturalized ontology implies naturalized epistemology which in turn implies naturalized experience. At every turn the possibility of metaphysics has been erased by science: metaphysics can be neither a description of physical reality, an account of mental knowing processes, nor a portrait of phenomenal experience.

When Quine considers how discussion of scientific methodology may be conducted, he only allows scientists to ask whether theories successfully

predict observed phenomena, to compare theories on their features that permit such prediction, and to contrast new theories with old theories using scales of "conservatism," "simplicity," and other pragmatic norms. No questioning of the existence of entities that theories postulate is permitted on a meta-theoretical level, since Quine holds that only the acceptance of a theory enables one to ask and answer such questions in a meaningful way. Truth, like knowledge, is a denizen of scientific commitment, not metaphysics. But also, no questioning of the existence of entities that theories postulate is permitted on the theoretical level, according to Quine, because while doing science the existence of theoretical entities must be taken for granted. Therefore, since there is no meaningful metaphysical standpoint from which to make ontological commitments or debate truth, and since the only standpoint remaining is one of scientific commitment, we must be realists about postulated entities of currently accepted scientific theories. At the meta-theoretical level, we must be ontological relativists and pragmatists.

> We can improve our conceptual scheme, our philosophy, bit by bit while continuing to depend on it for support; but we cannot detach ourselves from it and compare it objectively with an unconceptualized reality. Hence it is meaningless, I suggest, to inquire into the absolute correctness of a conceptual scheme as a mirror of reality. Our standard for appraising basic changes of conceptual scheme must be, not a realistic standard of correspondence to reality, but a pragmatic standard. (Quine 1980, 79)

However, this appeal to pragmatic standards does not mean that Quine is offering a pragmatic theory of truth. While doing science one does not use pragmatic standards, and while using pragmatic standards one cannot make assertions about what does or does not exist.

Quine's unyielding stance on the real existence of theoretical entities has caused much consternation. Critics have had understandable difficulty reconciling this stance of scientism with two of Quine's other firm tenets: his scientific idealism, which states that scientific entities are created, not discovered, by the human imagination, and his fallibilism, which states that theories can never be taken to be absolutely true since they are underdetermined by any amount of evidence. Their reconciliation is mediated by Quine's realism, grounded by the absence of any alternative metaphysical source of knowledge.[4] Comparing his own philosophy with other pragmatists who were not realists concerning theoretical entities, Quine states that his scientific fallibilism and idealism are quite compatible with realism.

> For naturalistic philosophers such as I, on the other hand, physical objects are real, right down to the most hypothetical of particles, though this recognition of them is subject, like all science, to correction. I can hold this ontological line of naïve and unregenerate realism, and at the same time I can hail man as largely the author rather than discoverer of truth. (1981, 33–34)

Fallibilism would seem to undermine this "global" realism by denying the absolute truth of any theory. Without the possibility of finding a true theory, how could any theory be interpreted realistically? Quine rejects the metaphysical path to realism taken by the correspondence theory of truth, understanding "truth" only in the Tarskian deflationary sense (see 1992, 79–86). Fallibilism would also seem to undermine global realism by implying relativism; namely, if any theory suffers from competition from other empirically equivalent theories, how could it be thought that a theory's entities are more likely to exist? Quine rejects theoretical relativism by arguing that it is either self-refuting or tantamount to making a knowledge claim from a metaphysical perspective. If theoretical relativism is itself a scientific claim, this claim cannot be both absolutely correct and only relatively correct. If theoretical relativism is not a scientific claim, it must be a metaphysical judgment from a perspective that attempts to contrast reality as it really is with the portraits of reality generated by all theories. But no such perspective can actually be taken; all knowledge claims are made from within one theory or another. Quine is very careful to point out that his scientific fallibilism cannot be equated with theoretical relativism.

Consider then Quine's idealistic stance on the creation of theoretical entities. Such idealism would seem to preclude global realism, since there could be no guarantee available to us (metaphysics aside) that a product of human theorizing might really exist. But Quine infers from the collapse of metaphysics just the opposite conclusion, that we as theorizers have no choice but to view nature as containing the entities postulated by our current theories. Keeping in mind Quine's stance on the nature of experience and the reality of postulated entities, the meaning of the term *theory* takes on heightened significance. In Quine's philosophy, *theory* refers not just to those judgments pertaining to unobservable entities (like quarks or the force of gravity) in the usual sense of *unobservable. Theory* instead refers to the entire collection of meaningful judgments about nature, which also includes ordinary observation statements about "medium-sized" physical objects. Quine declines an invitation to use the functional distinction between these two kinds of judgments to erect an ontological distinction, because his epistemology cannot distinguish between them. Both kinds are just scientific propositions that accordingly must answer to the evidence of sensory

stimulations. This epistemological stance implies that neither kind of judgment enjoys any special status over the other. If they have an equivalent privilege to make claims about reality, the ontological status of the entities referred to must also be the same. Put simply, if we want to be realists about houses and trees, we must also be realists about molecules and gravity. For Quine, all four things are theoretical entities, postulated by current theories, and judgments about all four things go beyond the available evidence of the senses.

Dewey's Empiricism

Dewey, like Quine, rejected rationalistic metaphysics and the two dogmas of logical positivism early in his own career. However, this did not bring him to Quine's scientism. His intellectual path from idealism to naturalistic pragmatism did not start out from neo-Kantianism, but from the absolute idealism of Hegel. The story of this evolution is too long to tell here,[5] but four central tenets of this idealism were retained in Dewey's later philosophy.

First, there can be no appeal to trans-experiential realities in scientific or philosophical explanation. The actualities and possibilities of human experience exhaust all matters of meaningful discussion. This opposes transcendentalism, which attempts to survey and discuss realities alleged to be forever beyond the reach of human experience. There are two categories of transcendentalism that especially earned Dewey's scorn: a philosophy asserting the bare thing-in-itself (e.g., Locke's or Kant's) and a philosophy asserting the existence of scientifically knowable yet transcendent objects. Dewey objected to the first category of transcendentalism largely on the grounds that it offers an empty conception. Quine's philosophy falls under the second category, since its notion of scientific knowledge demands that the object of knowledge exists beyond the range of human experience. We have seen how Quine's elimination of metaphysics led him to suppose that science alone can decide on what exists. But only his determined application of scientism to the notion of experience itself, as just a matter of bodily reactions to physical excitations, would account for his conclusion that human experience is a small, delimited realm beyond which lies all the other objects of scientific knowledge (like tables and stars). Dewey, in rejecting a physicalist psychology of experience, instead locates objects of knowledge within human experience.

Second, following from the rejection of the dualism implied by transcendentalism, Dewey's philosophy refuses to conceive of experience as neces-

sarily subjective. Subjective idealism cannot be formulated or defended without the notion of some sort of reality forever beyond what is privately available to a mind. Dewey argued that the only nonsubjective view of experience available is to find that experience is a mixture of the public and the private. If the private can only exist in contrast to the public, both kinds of experience must be available for those who can grasp the distinction. But this should be understood as a functional distinction arising within the totality of human experience itself, and not as a metaphysical distinction grounded on the problematic notion of the thing-in-itself. Publicly available experience can also be termed "social" or "cultural" experience, and not surprisingly Dewey's philosophy pays far more attention to it than private experience. Where epistemology is concerned with the object of knowledge, this object exists within social experience.

Third, when knowledge is achieved, the known object is a creation of the knowing process, generated out of the problem-solving methods of scientific inquiry. Dewey's functionalist epistemology agrees with Quine's philosophy that known objects are created by humans and that knowledge claims are scientific judgments. Our creation of known objects should answer the false supposition that known objects really lie beyond the bounds of human experience.

Fourth, Dewey did not believe that an ontology should only consist of actual and possible objects of knowledge. It was the mistake of a rationalistic absolute idealism, and of all rationalistic metaphysics, to declare that reality consists solely of known realities, or worse, solely of a priori conceptual categories that permit knowledge. Relatively little of human experience consists of known things, and even if this portion is growing, it could never be expected to engulf all experience. While the meanings of things are considerably enhanced when they are transformed into known objects, the meaning of an object is far broader than just the meaning established by knowing it.

This metaphysical view that things are what they are experienced to be, and not only what they are known to be, is Dewey's "immediate empiricism." Dewey thus denied that only known objects possessed meaning, and unlike Quine, he never thought that linguistic reference only held between known objects and utterances. Therefore, ontology is not the exclusive preserve of science, and successful reference is not limited to scientific propositions. Dewey's mature philosophy retained the term *metaphysics* to cover empirical inquiry into traits common across all experience and hence across all of the multifarious modes of knowing as well. Not all accurate descriptions of the traits of experience are scientific propositions. There are also "denotative" judgments, descriptions of traits of things that are not de-

signed to be held up to the scrutiny of science. Put another way, such traits denotatively described are not possible objects of knowledge.[6]

Dewey's alternative to rationalistic metaphysics is a pluralistic empiricism roomy enough for anything and everything of human experience, from the social to the private and from the known to the unknown. This empiricist metaphysics countenances the known things provided by science, of course. It also respects the doubtful experiences of things that provide the problematic material necessitating scientific inquiry, and the consummatory experiences signaling the successful resolution of inquiry resulting in the production of knowledge. Dewey's empiricism is naturalistic, but empiricism is the proper starting point for understanding his philosophy. The all-important difference between a naturalistic empiricism (Quine) and an empiricist naturalism (Dewey) is whether one's ontology consists solely of scientifically known or knowable objects. From Dewey's perspective, Quine's scientism and naturalistic empiricism is just as perniciously rationalistic as is traditional metaphysics. It cannot embrace the width and breadth of all human experience, and hence fails to locate the justification for the very existence of science within this expansive context.

Dewey's empiricism is no cousin to the subjectivist phenomenalism so rightly derided by Quine. Unlike a phenomenalistic attempt to make provision for a category of privileged judgments by postulating private mental states, Dewey's concept of experience is not characterized by privilege or privacy. Quine says, "Any subjective talk of mental events proceeds necessarily in terms that are acquired and understood through their associations, direct or indirect, with the socially observable behavior of physical objects" (1960, 264). Dewey agrees:

> The realm of meanings, of mind, is at home, securely located and anchored in an empirically observable order of existence. And this order stands in genetic continuity with physical and vital phenomena, being, indeed, these phenomena taken up into and incorporated within a wider scope of associated interactions. We do not have to read the mental back into the antecedent physical, much less resort to the desperate measure of making it so all-inclusive that the physical is treated as a disguised and illusory "appearance" of the mental. The social affords us an observable instance of a "realm of mind" objective to an individual, by entering into which as a participating member organic activities are transformed into acts having a mental quality. (1928, LW3:50)

Beyond this agreement on the failure of phenomenalism, Dewey and Quine have quite different views of the nature of experience. Their common use

of the "social" as primary over talk of "private" mental states can obscure Dewey's rejection of Quine's physicalist empiricism. The "social" for Quine means the "scientifically objective," and his conception of experience is solely a matter of sensory impacts. Thus experience for Quine can never be of physical objects, or alternatively stated, observed physical objects cannot be in experience but only capable of causing experience. On Dewey's conception of experience, observed physical objects are within experience, since there is nowhere else for them to be when they are observed. Thus Quine's elimination of phenomenalism does not imply a victory for his scientism, since Dewey's immediate empiricism stands as a viable third alternative.

There is another aspect to Quine's preference for scientism that should be mentioned here. Quine believes that only his scientism can defuse the challenge of skepticism, on two fronts: the Cartesian skepticism raised by dualistic metaphysics, and the naturalistic skepticism raised by questioning the ability of sense experience to supply knowledge of the natural world. Dualism evaporates with the demise of rationalistic metaphysics. Naturalistic skepticism offers a scientific hypothesis, grounded by a measure of scientific knowledge. It is this kind of skepticism which plays on the same field as Quine's own philosophy, and the question it raises is answerable by science itself. It thus earns Quine's respect as a coherent position, but not as a plausible position, because he contends that its scientific plausibility is very low. Dewey's empiricism similarly defuses Cartesian dualism and presents no threat of skepticism over and above the usual admission of the fallibility of all science. Quine's scientism enjoys no advantage over Dewey's empiricism in its ability to resist skepticism. Indeed, both may be classified as closely related forms of Pyrrhonist skepticism.[7] To summarize, Quine's deflation of rationalistic metaphysics does not eliminate all metaphysics and cannot eliminate Dewey's immediate empiricism in particular.

Dewey's empiricism is the foundation of a different approach to naturalism. While mental entities are likewise absent from his philosophy, physical objects are not automatically granted exclusive dominion. For Dewey, naturalism should not be confused with physicalism or materialism (see Dewey et al. 1945). Hence Dewey's agreement that all knowledge has its origin in experience cannot share in Quine's physicalist interpretation. Dewey reserves the metaphysically empirical right to speak of experience in a much broader sense than Quine, as Dewey does not conceive experience to be spatially and temporally limited to the activities of the nervous system. Rather, Dewey describes experience as continuous with and penetrating deeply into nature. Put another way, experience is wherever

both the experienced thing and the experiencer are. Quine's physicalist conception of experience would instead locate an experience of an object in the stimulation of retinas and other sensory membranes and perhaps further along into the nervous system. Quine's philosophy avoids idealism because of the claim that all reality is physical. Dewey's philosophy avoids idealism because experience is not taken to be in some non-natural realm and because experience is identical with only those regions of nature having experiencers as foci.

Dewey's metaphysical empiricism only declares that science and philosophy are not permitted to postulate anything permanently beyond the range of experience in its effort to explain experience or any features or events within experience. Rejecting transcendentalism is not sufficient; to be naturalistic, Dewey's empiricism must not collapse into idealism either. Such a collapse is prevented by the distinction in Dewey's philosophy between the transcendent entity and the independent entity. Unlike the transcendent entity, which by definition never comes into the range of experience, the permitted independent entity can naturally come into and pass out of the range of human experience. Nature extends beyond experience at any given moment, because Dewey does not mean to assert that experience exhausts reality.

It is important at this stage to forestall a typical objection made by many realists: That Dewey's distinction between the "transcendent" object, which is forever beyond experience, and the "independent" object, which must at least reside within experience occasionally, is a distinction without a real difference. If the object can drift in and out of experience unchanged, then the object possesses an existence entirely independent of human experience. Such complete independence makes its forays into human experience irrelevant to its actual nature, and thus the object would remain what it is regardless of whether it ever came into human experience at all. Thus, a realistic view of the object is by default a transcendentalist view, and Dewey's protest against transcendentalism reveals a bias toward idealism by assuming that experience must supply the object's reality. Dewey's reply is simple. It is the transcendental realist, not Dewey, who imports an assumption that we can know with certainty that an object retains its experienced qualities and traits when it is not in human experience. Our experience of most objects encourages us to believe that this is the case, but this can only be a fallible belief. Transcendental realism is unnecessary and indemonstrable, and Dewey's immediate empiricism is sufficient to guard against outright idealism.[8]

There is a third kind of "object" besides the transcendental and independent objects. This is the "postulated" but unobservable object that is

postulated by many scientific theories. Dewey's philosophy recognizes, against narrow positivism, that the sciences should be permitted to postulate transcendent entities that permit scientific explanation of experienced events. However, Dewey refuses to take a realistic attitude toward such "objects," while Quine encourages realism here. Dewey's naturalistic understanding of experience is the ontological claim, against dualism, that experience refers to a special kind of natural event involving a transaction between an organism and its environment. Accordingly, his naturalism is not limited to what is scientifically "objective," and it is concerned with far more than just linguistic behavior. Dewey considered the unit of meaning to be the act: a goal-directed interaction with the environment. On this immediate empiricist view, such interactions reveal to us the experienced traits of things. Dewey's rejection of scientism implies that objects as they are known do not exhaust our experience of them. Conversely, we experience things in a variety of meaningful ways besides through knowing them. This does not mean that Dewey has abandoned naturalism. His empiricism holds that there are many things in human experience that are not actual or possible objects of scientific knowledge.

Quine has argued powerfully that the only type of knowledge is scientific knowledge of natural objects. But this stance has no bearing on whether all of human experience must be scientifically conceived solely in terms of physical and knowable objects. To assume so, as Quine does, simply begs the question of whether a legitimate description of experience must be capable of being scientifically valid. Dewey denies this view, holding that we can legitimately describe actual and real features of the world regardless of whether such descriptions could ever stand up to scientific scrutiny. Dewey's denotative method is not a matter of nature causing knowledge in us, since it is we who selectively attend to features of the world that may or may not meet the standards of knowledge. Immediate empiricism points out that if such features cannot withstand scientific scrutiny, they do not lapse into nonexistence or illusion; they remain real features of the world. Dewey's philosophy, to repeat, does not permit objects of present or future scientific knowledge to exhaust reality.

A Pragmatic Philosophy of Science

Dewey's functionalist epistemology finds that some kinds of propositions of scientific theories should not be construed realistically. A thorough examination of Dewey's logic of propositions is inappropriate here.[9] To contrast clearly Dewey's philosophy of science with Quine's, it is sufficient to

notice that Dewey's logical theory permits him to distinguish three senses of "theoretical" which are too often conflated or ignored. The notion that experience is "theory-laden" has been popular since the demise of naive realism in the early decades of the twentieth century. While Quine did much to eliminate confusions about this notion, he did not go far enough. A major obstacle to further progress is the requirement, laid down by Quine's naturalized epistemology, that all objects of knowledge lie beyond human experience. This requirement, Dewey argued, not only generates as much mystery as any old-fashioned transcendentalism but also is inconsistent with actual scientific practice.

While a theory is supposed to permit a "seeing," as befits the Greek meaning of *theoria,* the question of exactly what is seen remains vague. One prominent answer is that a theory permits an intellectual seeing of an entity that cannot be seen by ordinary human senses. This answer is not very precise and covers a lot of territory; both Democritus's atoms and Plato's Forms are theoretical in this sense. But it is a very common answer given by nineteenth- and twentieth-century scientists and philosophers. For example, the concept of an "electron" is taken to be a theoretical means of "seeing" what cannot ordinarily be sensed. Those ignorant of atomic theory cannot intellectually "see" electrons.

A second prominent answer is that a theory permits an intellectual seeing of an observable thing in a new way. For example, the concept of a "voltage meter" is a theoretical means of "seeing" an object in a way unavailable to those not yet initiated into the theory of electrons. Those ignorant of atomic theory cannot intellectually see a voltage meter. This convoluted talk of "intellectually seeing a voltage meter" is generated by the fact that an electrician can see a voltage meter while my toddler cannot, although both can look at that same physical object. A voltage meter is, in the second sense of "theory," a theoretical object that is observable to trained observers. Now, Quine would also call a voltage meter a theoretical object, but Quine uses only the first sense of *theory,* not the second sense. By a theoretical entity Quine always refers to a *transcendent* entity postulated by a theory, existing beyond the sensory evidence of everyone's experience. The second sense of *theory* permits discussion of a *transformed* object created by a theory, existing within the experience of those trained in the theory. The transformed entity is an independent but not transcendent entity, since it can be experienced, yet it is experienced as the sort of thing that exists whether or not it is experienced. Dewey's functionalist epistemology has room for both propositions about transcendent entities and propositions about transformed entities. To make the connection between propositions and observations a bit clearer at this stage, we can notice that

many kinds of scientific observations are made possible through transformative propositions, which may be assisted by transcendent propositions.

Dewey often uses astronomical examples. When an astronomer observes a star, this star is observed as being many light-years distant. The transformative proposition would be, for example, "Polaris is 300 light-years away." No one ignorant of modern astronomy would observe the star in this manner. A child, for example, could at best observe the star as *very* far away. The astronomer observes a more extensively known star than does a child, thanks to scientific training that includes the transformative proposition that stars are many light-years distant. Stars can be transformed into objects of knowledge within experience due to the science of astronomy. Astronomical science also includes the transcendent proposition that photons of light travel through space at a definite rate. This proposition is transcendent because it concerns "photons," which by definition are not observable, although their alleged effects on the retina are. This transcendental proposition, when conjoined with other transcendental propositions about the expansion of the universe and a measurement of a star's red-shift, can permit an astronomical calculation of a star's distance.

Transcendent postulated entities have four characteristics very different from transformed objects according to Dewey's functionalist epistemology: They can never be observed; they are only hypothetical entities; their meaning as hypothetical is exhausted by their definitions; and they are imaginative creations of theories that are not only fallible but underdetermined by any amount of practical success. Transcendent postulated entities have these characteristics because their meaning consists entirely of their role in "universal" and "hypothetical" propositions of scientific law.

Scientific laws concerning transcendent postulated entities are universal and hypothetical propositions in Dewey's terminology if and when such statements employ terms in a purely formal way, placing them in relations so that they mutually contribute to each other's definitions. Some scientific laws are not universal but "generic" in nature. Generic propositions make reference to traits of observed things (e.g., "metals are shiny"). They originate in series of specific observed cases, and therefore they can be shown to have exceptions through further observation. It is consistent with the function of generic propositions that they can be falsified by possible future observation. This is not the case for universal propositions, which cannot be falsified by further observation. This is not merely because, as Quine would have it, they are deeply imbedded in scientific theories and hence cannot be held individually accountable to observation. Universal propositions are not answerable to observations because they do not make existential claims in the first place. The proposition that "mammals are vertebrates"

would not be falsified on the discovery of some mammal-like organism lacking a spine, since this proposition currently functions in biology in such a way that biologists would simply deny that this organism is a mammal because it lacks a spine. Nor would this proposition be falsified if all mammals were to become extinct. Its function can be captured in the rephrasing: "If a thing is a mammal, then it has a spine." That is why Dewey refers to universal propositions as hypothetical and nonexistential propositions, since they function in science regardless of their descriptive (in)accuracy or whether their terms actually refer to anything at all.[10]

Universal hypothetical propositions are science's equivalent of analytic a priori propositions, since their truth is grounded not in experience but in the relations between the employed terms. For example, when an elementary physics text declares that electrons have a charge of –1, it does not mean to say that all of the electrons observed so far have turned out to have a charge of –1. Rather, the text is explaining how science introduces a definition of an electron: "If a thing is an electron, then it has a charge of –1." A more advanced text may instead state that an electron has a charge of -1.602×10^{-19} coulombs. This is not intended to correct the elementary text, since the two propositions have somewhat different theoretical functions. The former suffices for electronics, while the latter is used in atomic physics. Still, neither proposition is based only on observations of electrons, and neither can be falsified by such observations. The proposition that an electron has a charge of -1.602×10^{-19} coulombs only shares *grammatical form* with a statement like "an adult male black bear has a weight of 750 pounds." However, a proposition's *genuine function* in a scientific theory may be obscured by its surface grammatical form. Since scientific theories are used to guide inferences toward predictions, it is instead best to examine how a proposition is actually used in inferences by scientists.

As physicists have already noted, the scientific theory of electrons cannot distinguish one electron from another, since no electron could possibly have any feature other than exactly what every other electron must also have according to the scientific laws regarding electrons. For all we know, there really is only one electron, and it is nearly everywhere at once! Well, Dewey's functionalist analysis of transcendent postulated entities shows that there is no need to suppose that science actually declares that even one electron exists. Science's inability to individuate transcendent postulated entities is not a shortcoming to be remedied. This is only a confirmation that propositions about such things are nonexistential and hypothetical in meaning. Another way to make the same point is to point out that the foundations of chemistry rest on the absolute interchangeability of all electrons,

for if any deviated from the strict definition or had additional influential features, the laws of chemistry would be threatened.

Where scientific practice alters its use of a proposition, its meaning necessarily changes as well. Universal hypothetical propositions are particularly vulnerable to scientific progress, since theoretical revolutions dramatically alter the meanings of key terms and abolish many others. A realistic stance toward terms in universal hypothetical propositions creates interminable confusion. For example, it can be asked whether the older versions of a theory permitted successful reference to entities that have been retained, with dramatically altered meaning, in current theory. Could J. J. Thomson, the discoverer of the electron, have actually been referring to electrons, since his notion of an electron shares so few common features with what we today call "electrons"? Puzzles of this sort have been exploited by global relativists eager to pursue the bizarre repercussions of theory "incommensurability."

The confusions evaporate when it is admitted that the meaning of *electron* has never been existential in import and hence cannot be captured by a realist's correspondence notion of reference. As a postulated entity, the meaning of *electron* is subject to theoretical advancement, and hence no universal proposition is "true" in the sense that no one must perpetually admit its existential validity. A pragmatic understanding of universal propositions discerns both their aloofness from actual observation and their vulnerability to theoretical progress. They are necessarily true but can also be abandoned. They earn allegiance only through their participation in successful theories. Allegiance ends when scientists alter the meanings of terms or simply drop the use of certain terms altogether. The term *phlogiston* notoriously shifted in meaning many times in the theory's brief history before being abandoned. The proposition, "metallic phlogiston has negative weight," for example, remains an analytic proposition, since anyone who comprehends the meanings of the terms must accept its truth. This proposition cannot be falsified by any observation, since metallic phlogiston by definition cannot be observed. But all this is quite consistent with the fact that no one accepts phlogiston theory today, since accepting the truth of this sort of universal hypothetical proposition does not entail any commitment to the existence of phlogiston. Only a philosopher devoted to the incorrect notion that the meaning of a term rests exclusively on its ability to semantically refer to an actually existing thing would deny this consistency. Quine has surely done a great deal to show how reference is relative to a community of language-users, as another of Quine's attacks on analyticity shows. He questions rightly whether a radical translator could learn the

analytic propositions of a foreign language from only empirical evidence. But analytic propositions are not learned by observation and ostension. That process can only instruct one in generic propositions. Analytic propositions are grounded on a community's decision to elevate generic propositions to analytic propositions and to use them in inferences accordingly. Access to such community decisions comes from joining the community; there is obviously no objective "fact of the matter" about the meaning of analytic propositions independent of community participation.

So long as a proposition is directly or indirectly answerable to experience, it cannot be a priori in any sense. But only by using the further assumption that all a priori propositions would be analytic, and vice versa, could Quine conclude that there are no genuinely analytic propositions. But that is false: Not all analytic propositions are a priori. A universal hypothetical proposition is instead an analytic a posteriori proposition, in the sense that it loses scientific allegiance when the theory in which it is imbedded is abandoned in a scientific revolution. Readers will recall that a universal hypothetical proposition was also categorized as an analytic a priori proposition, in the sense that it is not falsifiable by any observation. The notions of the "analytic" and "a priori" are indeed too vague, as Quine argues. In Dewey's philosophy of science, universal hypothetical propositions are analytic, nonexistential, nonfalsifiable, and abandonable propositions. They can also be termed "operationally a priori" because their immunity from testing is provisional while the community relies on them during inquiry. In contrast, generic propositions are synthetic, existential, falsifiable, and abandonable propositions.

To complete the contrast between Quine's and Dewey's philosophies of science, there is a third answer to the question of what a theory allows us to see. A theory, in a third sense of "seeing," can permit an intellectual seeing of an object that could possibly be observed by mechanically aided senses. Astronomers use propositions such as "A sunspot observed through a telescope is a cool surface area created by a strong magnetic field inhibiting the sun's convective forces." Geologists postulate tectonic fault lines lying miles underground to explain earthquakes. An example of a geological transformative proposition is "A fault line lies deep underground beneath Los Angeles." To give a different sort of example, the concept of an "atom" has recently expanded beyond its original transcendent meaning, because new technologies have allowed us to observe individual atoms using an electron microscope. Thanks to atomic theory and this instrument, a trained observer can indirectly observe an individual atom. The concept of an atom now has additional meaning provided by atomic theory in this third sense, because atomic theory permits an intellectual seeing of a me-

chanically observable thing by a trained observer. Many scientific theories have undergone this expansion thanks to technology.

Dewey's functionalist epistemology would recognize a proposition about a mechanically observable object as just a kind of transformative proposition, since the combination of theory and mechanical instrumentation transforms the trained observer's experience into one that includes observing the object. Furthermore, there cannot be a principled ontological distinction between the referents of propositions about ordinarily observable objects and referents of propositions about mechanically observable objects, because our sensory systems are themselves natural instruments of seeing, hearing, etc. And just like mechanical instruments, our natural sensory systems can be adjusted and trained to improve sensitivity and accuracy. Quine's philosophy of science does not recognize this third sense of "theory" either, since such objects of knowledge do not fall within observational experience. This contributes to his very strange claim that science asserts the existence of sets and numbers in the same manner and for the same reasons that it asserts the existence of germs and molecules. This bizarre claim contradicts the evident fact that scientists attempt to observe and track the properties of only the second kind of entities.[11] Transformative propositions, in Dewey's philosophy of science, are synthetic, existential, falsifiable, and abandonable propositions. They refer to objects that can possibly be experienced in ways other than by theoretically knowing them.

Quine's scientistic failure to distinguish between transcendent propositions and transformative propositions ensnares his philosophy in the difficulties surrounding the logical relations between theories and evidence. Critics like Davidson are right to complain that Quine's philosophy of science still requires an absolute theory/evidence separation, in order to keep the scheme of theoretical propositions safely at a logical distance from the content of unadulterated experience.[12] This lingering Kantian formalism, along with Quine's passion for forcing scientific theories into the Procrustean bed of extensionalist set theory and logic, condemns his philosophy as just another rationalism.[13] One of the characteristic traits of a rationalistic philosophy is its view that knowledge is the only relationship that we can have with the known object. And indeed, Quine's philosophy asserts that we cannot have any relationship with objects of scientific knowledge save through our intellectually knowing them by means of adopting a scientific theory. This scientific rationalism, by holding that theories consist only of transcendent propositions, is a profound departure from the spirit of Dewey's pragmatism.

Dewey adhered to an antirationalistic empiricism that sees theory and content only as aspects of experience. It is quite unnecessary to hold that

our experience of the natural world is entirely a construct of theory in the transcendental sense, once it is realized that theory in the transformative sense is a quite natural and unavoidable component of much of, but not all of, human experience. This is the true meaning of the oft-claimed but little understood point that observation is theory-laden. However, not all experiences are observations of known objects. Dewey's immediate empiricism makes it evident that we can have, and necessarily must have, a wide variety of ways of experiencing objective physical things other than by knowing them. This empirical denotative method permits meaningful and legitimate claims to be made about traits of all kinds of experiences. The denotative method breaks down the barren Quinean notion that a genuinely meaningful theory must have independently specifiable testability conditions. Through denoting characteristic traits of various modes of experience, meaningful discussion of inquiry is possible, without having to justify reflections upon inquiry with more inquiry and so on. The denotative method, for example, permits functional epistemology to examine the wider context of the process of inquiry and the functional role of theories in experience. Quine does emphatically say that our experience of the world is thoroughly infused with theory, but his rationalistic scientism prevents him from following this notion to its proper destination in the metaphysics of immediate empiricism.

Quine's failure to distinguish between transcendent propositions and transformative propositions thus prematurely forces him toward the position that science must take a realistic attitude toward theoretically transcendent entities. If all theoretical entities are transcendent, then Quine is forced into the limited options of global phenomenalistic relativism or global realism: either we cannot claim that any physical objects beyond experience exist, or we must claim that all objects posited by our best theories exist in addition to experience. Dewey's recognition of transformed objects resolves this dilemma by offering a third option: Our ontology should include, in addition to all things ordinarily experienced, those transformed objects experienced thanks to our most pragmatically warranted theories.[14] Dewey's empiricist metaphysics and rejection of rationalism demand that we respect all experiences of things as real in the contexts in which they are found. This "pragmatic realism" is the pluralistic consequence of immediate empiricism and functionalist epistemology. Pragmatic realism defeats the phenomenalism of a philosopher like Bas van Fraassen, whose "constructive empiricism" does not recognize the transformative roles of theory and mechanical instruments.[15] A pragmatic realist notion of contextualized knowledge also surmounts the arguments of thoroughgoing relativists like

Goodman and Feyerabend by removing any need to suppose that "different worlds" are ontologically created by divergent theories.

Pragmatic realism agrees with Quine that the fallibility of our theories does not entail any sort of antirealistic relativism, but disagrees with Quine's position that the only alternative to such global relativism is global realism. Known objects are quite real, in the contexts in which they are known, just as anything is real in its own context. To speak of "knowledge in a context" does not sneak relativism in through the back door. The refusal of pragmatic realism to grant absolute existence, independent of inquiry, to known objects is simply a manifestation of its foundation in metaphysical empiricism. Dewey agreed with Quine that global relativism is a metaphysically inconsistent contrivance. At any rate, Quine could not object to the contextualization of knowledge, as it is his own position as well.[16] The dispute under scrutiny here is Dewey's denial and Quine's affirmation that transcendent entities can be known.

Pragmatic realism and its realistic stance toward known objects is quite consistent with an attitude of antirealism toward transcendent theoretical entities. Known objects are capable of being experienced (e.g., manipulated, altered, and controlled) in a respectably objective manner. Transcendent entities, on the other hand, are only hypothetical and imaginative creations of theories that are not only fallible but underdetermined by any amount of practical success. Now, Quine does not dispute this, but only his scientific rationalism compels his allegiance to global realism. Dewey's metaphysical empiricism instead established an expansive territory of pragmatic realism between the extremes of phenomenalism and global realism. Standing firmly on this pragmatic ground and liberated from the rationalist strictures of scientism, Dewey's functionalist epistemology rightly interprets the transcendent propositions of science as only logical instruments, lacking existential import, but operating in such a way as to orchestrate the process of scientific inquiry. Like any instrument, they are altered or replaced as the progress of science demands by the procedures of pragmatic epistemology: the technology of scientific methodology.

Dewey's functionalist epistemology and pragmatic realism can successfully defuse a recently favored argument for global scientific realism. According to this argument, the fact that the history of science is replete with observations of previously theoretical entities, such as atoms or distant planets, lends great support to the notion that scientists should construe their theories realistically. However, this argument conflates transcendent propositions with *transformative* propositions about instrumentally observable objects. These propositions have very different functional roles in the

logic of scientific inquiry, as explained above. Many scientific theories have indeed formulated transformative propositions on the basis of originally transcendent propositions, and then those transformative propositions, together with the invention of required experimental tools, have led to the discernment of previously unobserved objects. Thus the realistic stance taken by pragmatic realism toward transformative objects cannot be carried over to any realistic understanding of transcendent entities.

Functional epistemology is also capable of explaining why many theories never formulate transformative propositions, insofar as these theories' transcendent entities could never be modulated into transformative objects. Prominent examples would include theories about forces or space-time curvatures. There is an important difference between a commitment to understanding the world in light of hypothesized transcendent entities, and believing that scientists could empirically discern such entities if only an appropriate observational apparatus could be invented. A commitment to a theory and its transcendent propositions is not equivalent to a belief that a theory's transcendent propositions more or less accurately describe actually existing entities.

Conclusion

Quine's philosophy offers a rationalistic scientism, a naturalized epistemology, an empiricism, and a pragmatism, in that order. His philosophy of science thus cannot recognize the crucial distinction between transformative propositions and transcendent propositions. His scientific rationalism, while recognizing logic as the technology of scientific method, badly deforms this logic by misconstruing actual scientific methodology and the role of experience in it. Quine's logic of what there is can be classified as pragmatic only in the most marginal of senses and at best is perhaps only more pragmatic than Carnap's philosophy.[17]

What is far worse for Quine's philosophy than a paucity of pragmatism is the collapse of his scientific rationalism as the sole measure of what exists. His scientific rationalism is the only support for his physicalism, which in turn is the sole support of both his project of naturalized epistemology and his infamous doctrine of the indeterminacy of translation. And upon the fate of these rests the fate of much of the rest of his philosophy. Ironically, several aspects of Quine's system more congenial to Dewey's pragmatism could alleviate these difficulties. I have particularly in mind the fact that Quine has repeatedly expressed a fondness for the behavioral approach to meaning because of its naturalistic basis.[18] Yet Quine never pur-

sued the idea that language and theory are far better understood in terms of the purposive behavior of humans interacting together with a world of useful objects.[19] A behavioral approach, considering the undeniable plurality of human activities and purposes, would champion the sort of metaphysical and discourse pluralism inaugurated by classical pragmatism.[20]

Dewey's philosophy espouses a more thorough pragmatism by offering a metaphysical empiricism, a naturalism, a functionalist epistemology, and a pragmatic realism, in that order. By providing an empirical context for known objects, inquiry (as a process yielding knowledge) can be studied naturalistically as the production of solutions to problematic situations. Functionalist epistemology is Dewey's logic of inquiry. Since the meaning of propositions is not merely a matter of semantic reference, functionalism is able to discriminate the logical significance of transcendent propositions from transformative propositions. Pragmatic realism, the conjunction of immediate empiricism and a realistic yet fallible attitude toward known objects, offers a pluralistic ontological alternative to the stark extremes of global relativistic phenomenalism and global realism.

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Notes

1. An excellent discussion of knowledge as a technological artifact is found in Hickman 1990.

2. The reader is referred to two discussions of Quine and Carnap by Richard Creath (1990) and Neil Tennant (1993). On the evolution of Carnap's thought, see Richardson (1998).

3. The term "physicalism" is inappropriate as a label here, since Quine's philosophy countenances any entities required by scientific theories, such as those of logic and mathematics. The label of "naturalism" is also problematic, as Susan Haack (1993) explains. Where carefully defined, as attempted here, the label of "scientism" should carry sufficient meaning despite the fact that Quine rarely uses it.

4. Two helpful discussions of this issue are Hookway 1988, 203–220, and Hylton 1994.

5. That story is told in my work, Shook 2000.

6. Dewey announced his version of empiricism in his essay, "The Postulate of Immediate Empiricism" (1905, MW3:158–167). An explicit restatement of his position on empiricism, primary experience and known objects, and the denotative method, is found in *Experience and Nature,* particularly the first chapter written for the revised edition (1925, LW1:10–41).

7. Pyrrhonism has been understood in at least two opposed ways: as a refusal to have any beliefs, or only the effort to suspend belief concerning other philosophical schools' dogmatic standards of knowledge. I side with the latter interpretation, convinced by Fogelin 1994. Fogelin's "neo-Pyrrhonist" participates in the fallible practices of making and improving on knowledge claims, but disdains the "quest for certainty," as Dewey phrased it.

8. Dewey's complaints against transcendental realism are numerous. See Dewey 1911.

9. See Burke 1994. My terminology in what follows is not Dewey's or Burke's, but it may better convey Dewey's intentions for the limited purposes of this essay.

10. The more significant portions of Dewey's *Logic* (1938) for this discussion are LW12:300–307, 374–82.

11. Jody Azzouni (1997) has called attention to this peculiarity of Quine's philosophy.

12. For a survey of the Quine-Davidson dispute see Picardi 1994.

13. See Harold N. Lee's protest (1998) against Quine's logicist ontology. Quine's reply is characteristically oblivious to the perspective of a broader empiricism from which Lee speaks.

14. Rom Harré (1986) has formulated a sophisticated philosophy of science largely agreeing with this ontological outlook, similarly basing his approach on a three-fold distinction between propositions about ordinarily observable objects, instrumentally observable objects, and objects impossible to ever observe. Harré appears to be insensitive to the transformative power of theories on experience, however.

15. See Van Fraassen 1980. However, critics of Van Fraassen are legion. A good discussion of realism and instrumentation congenial to pragmatic realism is Ian Hacking's, "Do We See Through a Microscope?" (1985).

16. John Capps (1996) explores in detail the fertile notion that professed naturalists like Quine should be contextualists on knowledge along with Dewey.

17. Leemon B. McHenry (1995) also reaches this conclusion.

18. For example, Quine applauds the pragmatic notion of "behaviorist semantics" in "The Pragmatists' Place in Empiricism," (35–37). Quine singles out Dewey to praise his "behavioral view of meaning" in "Ontological Relativity" (1969, 26–29).

19. Quine's fixation on the role of sensory stimuli has disturbed many critics, but the complaints of his friends are most telling. Dagfinn Føllesdal (1975) argues

that belief and meaning are generated by social behavior. Donald Davidson (1984) has also emphasized how the public sociality of language is a better starting point than the particularity and individuality of one's sensations.

20. Two contemporary pragmatists, Huw Price (1992) and Robert Almeder (1997), have lamented the divergence of Quine's naturalism from an empiricist pluralism.

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