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QUINE'S PHILOSOPHY: A BRIEF SKETCH

I. Introduction

As the twentieth century comes to a close it can be said with great confidence that Willard Van Orman Quine (b. 1908) truly ranks among the titans of this century's analytic philosophers, among, that is, the likes of Russell, Wittgenstein, and Carnap. Over his long career Quine has earned his place in history by authoring scores of influential journal articles, including such unrivaled classics as "New Foundations for Mathematical Logic" (1937), "On What There Is" (1948), "Two Dogmas of Empiricism" (1951), and "Epistemology Naturalized" (1969), and by producing twenty-one books, including *Mathematical Logic* (1940), *From a Logical Point of View* (1953), *Word and Object* (Quine's most famous book, 1960), *Philosophy of Logic* (1970), *The Roots of Reference* (1974), *Theories and Things* (1981), *The Time of My Life* (an autobiography, 1985), *Pursuit of Truth* (1991), and *From Stimulus to Science* (1995).

In his writings and lectures Quine has, for the most part, preoccupied himself with exploring the relations obtaining among mind, world, and language. As a result, he has made profound contributions to numerous subfields of philosophy, including philosophy of mind, philosophy of science, philosophy of language, metaphysics, epistemology, logic and set theory, philosophy of logic and set theory, and ethics. In spite of this broad range of subfields, Quine's numerous contributions have a certain systematic unity. Indeed, Quine has remarked that the bulk of his philosophy consists of corollaries to his commitments to naturalism and extensionalism.[1]

II. NATURALISM

Naturalism consists of a pair of theses, one negative, one positive. The negative thesis is that *there is no successful first philosophy,* that is, there is neither an a priori nor an experiential foundation outside of science upon which science can be grounded (i.e., justified or rationally reconstructed). The positive thesis is that *science is the measure both of what there is (ontology) and how we know what there is (epistemology).*

If the negative thesis is true, then epistemic programs as disparate as Descartes's attempt to deduce all of the truths of nature from a foundation of clear and distinct ideas, and Carnap's attempt to rationally reconstruct scientific discourse on a foundation of elementary experiences, count among the failures. Quine proffers various arguments and considerations designed to establish the untenability of Descartes-like and Carnap-like efforts. In short, Descartes-like efforts are suspect because, as Kurt Gödel has demonstrated, not even all the truths of arithmetic can be deduced from a foundation of clear and distinct ideas, so what hope can there be for deducing all the truths of nature? Carnap-like efforts are suspect because a theory's theoretical terms cannot be defined, even contextually, in terms of elementary experiences. This is so, Quine maintains, because many or most individual sentences of scientific theories do not have their own ranges of confirming and infirming experiential conditions in terms of which the reductive definitions of rational reconstruction must be formulated. The moral of the naturalist's negative thesis is, then, that the quest for a foundation outside of science upon which science can be grounded (i.e., justified or rationally reconstructed) is a will-o'-the-wisp and, therefore, ought to be abandoned.

Nevertheless, for Quine and like-minded souls who enjoy "the robust state of mind of the natural scientist who has never felt any qualms beyond the negotiable uncertainties internal to science",[2] all is not lost with the passing of first philosophy. Natural science remains. Thus, the naturalist's positive thesis is that it is up to natural science to determine what there is (ontology) as well as to account for how we know what there is (epistemology). Moreover, at the present time natural science proffers physicalism as the best theory of what there is and empiricism as the best theory of how we know what there is.

Quine's endorsement of *physicalism* means different things in different contexts. In the context of philosophy of mind it signals his repudiation of Cartesian mind-body dualism in favor of token materialism; in the context of philosophy of language it signals his repudiation of

mentalistic semantics in favor of a behavioristically based scientific semantics; in the context of epistemology it signals his repudiation of sense data in favor of activated neural receptors; in the context of ontology it signals his acceptance of the doctrine that "nothing happens in the world, not the flutter of an eyelid, not the flicker of a thought, without some redistribution of microphysical states".[3] Still, Quine's ontology countenances more than just physical states and objects. It also countenances the abstract objects of mathematics, numbers or sets—also sets of physical objects, sets of such sets, and so on. Quine's justification for admitting these abstract objects to his physicalist ontology is, simply, that science cannot proceed without them.

Quine's endorsement of *empiricism* includes the acceptance of two cardinal tenets: "whatever evidence there *is* for science *is* sensory evidence . . . [and] all inculcation of meanings of words must rest ultimately on sensory evidence".[4] According to Quine, these two tenets of empiricism are findings of contemporary science: "Science itself teaches that there is no clairvoyance; that the only information that can reach our sensory surfaces from external objects must be limited to two-dimensional optical projections and various impacts of air waves on the eardrums and some gaseous reactions in the nasal passages and a few kindred odds and ends".[5]

Furthermore, besides being a physicalist and an empiricist, Quine is also a *fallibilist:* he recognizes that science is changeable and that it conceivably could someday withdraw its support for physicalism and/or empiricism. Thus, Quine's commitments to physicalism and empiricism are firm but tentative—just what would be expected of someone who has given up the quest of first philosophy.

As we have seen, Quine repudiates first philosophy (i.e., foundationalist epistemology, both rationalist and empiricist). However, he does not go so far as to repudiate epistemology altogether. Rather, he advocates "an enlightened persistence . . . in the original epistemological problem",[6] the problem of relating evidence to theory. Quine refers to this enlightened persistence as naturalized epistemology. The naturalized epistemologist is enlightened because, having repudiated the goal of first philosophy (viz., the goal of grounding science on something firmer than science), the naturalized epistemologist recognizes the legitimacy of using the findings of psychology and allied sciences (e.g., biology, neurology, genetics, psycholinguistics) in constructing an answer to the central question of epistemology, namely, 'How do we acquire our overall theory of the world and why does it work so well?'.

Furthermore, according to Quine, naturalized epistemology is not a purely descriptive endeavor, it is also partly normative:

> The normative is naturalized, not dropped. The crowning normative principle of naturalized epistemology is nothing less than empiricism itself; for empiricism is both a rule of scientific method and a scientific discovery. It is natural science that tells us that our information about the world comes only through impacts on our sensory surfaces. And it is conspicuously normative, counselling us to mistrust soothsayers and telepathists.
>
> For normative content of a more technical kind we may look to mathematical statistics. These norms, again, are at the level of science itself. Normative epistemology, under naturalism, is simply the technology of science, the technology of predicting sensory stimulation. It is scientific method.[7]

Quine's own (partial) answer to the central question of epistemology calls for naturalizing empiricism. But before looking at that endeavor it should be noted that according to Quine natural science and empiricism "contain" one another, but in different senses. Natural science contains empiricism on at least three counts. First, empiricists presuppose (they do not try to prove) the existence of the external world. Second, the two cardinal tenets of empiricism noted above are themselves findings of natural science. Third, sensory receptors, the human subject's contact points with the external world, are themselves physical objects belonging to the ontology of natural science, namely, anatomy and physiology. On the other hand, natural science is contained in empiricism in the sense that the ontology of natural science is a projection from the very same kind of sensory input accorded the human subject studied by the epistemologist. And if that sensory input is construed as the activation of nerve endings, as Quine does, then this latter mode of containment "arouses certain logical misgivings: for is not our very talk of light rays, molecules, and men then only sound and fury, induced by irritation of our surfaces and signifying nothing? The world view [i.e., natural science] which lent plausibility to this modest account of our knowledge is, according to this very account of our knowledge [i.e., empiricism], a groundless fabrication".[8]

However, such misgivings are merely the illicit reinstatement of the starting point of first philosophy (or the ending point of global skepticism), and nothing could be further from the spirit of Quine's naturalism: "the recognition that it is within science itself, and not in some prior philosophy, that reality is to be identified and described".[9] Accordingly, the naturalized epistemologist who is intent on providing an account of the relation between evidence and theory is free to rely on talk of light rays, molecules, nerve endings, and so on, for these things belong to the ontology of the natural science of the day. And it bears repeating that epistemological findings regarding the sensory input for natural science do not as a matter of course undercut the initial ontological lore within

which those epistemological findings were articulated: "On the contrary, our initially uncritical hypothesis of a physical world gains pragmatic support for whatever it contributes towards a coherent account of lorebearing or other natural phenomena".[10]

To this point, I have been relating Quine's admonition to naturalize ontology and epistemology and how, in Quine's hands, their naturalization requires their reciprocal containment. Now I want to focus more narrowly on Quine's naturalization of epistemology. As we have noted, for Quine epistemology aims to provide a scientific account of the method and evidence that we do and ought to rely on in supporting our claims about what exists and how what exists behaves. Moreover, since natural science constitutes our currently best claims regarding what exists, so the central task of epistemology is to provide a scientific account of the method and evidence we have for current science. Thus, for Quine, "[e]pistemology is best looked upon . . . as an enterprise within natural science. Cartesian doubt is not the way to begin. Retaining our present beliefs about nature, we can still ask how we can have arrived at them".[11]

Quine's own epistemologizing, his philosophical-*cum*-scientific sketch of how evidence is related to the scientific theory it supports, begins with his naturalizing empiricism. Thus, in contrast to some of his prominent empiricist predecessors, who studied the relation between sensation and reflection (Locke), or between impressions and ideas (Hume), or between elementary experiences and theory (Carnap), Quine advocates externalizing empiricism by studying the relation between a person's neural input (surface irritations) and his verbal output:

> 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 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.[12]

It is at this point that Quine urges philosophers to adopt a linguistic

> strategy for investigating the relation of evidential support, between observation and scientific theory. We can adopt a genetic approach, studying how theoretical language is learned. For the evidential relation is virtually enacted, it would seem, in the learning. This genetic strategy is attractive because the learning of language goes on in the world and is open to scientific study. It is a strategy for the scientific study of scientific method and evidence. We have here a good reason to regard the theory of language as vital to the theory of knowledge.[13]

Once this linguistic turn is taken, studying the relation between the meager input and the torrential output becomes a two-step project: there is the study of the relation between neural inputs and observation *sentences,* and there is the study of the relation between observation *sentences* and theoretical *sentences.*

The seemingly innocent first step, the proposal to study the relation between neural inputs and observation sentences, has been somewhat problematic for Quine, however. The crux of the problem is that over the years he has tended to define the notion of an observation sentence relative to two incompatible standards: subjective stimulus meanings, and intersubjective observationality.

In *Word and Object,* Quine explained stimulus meaning, roughly, as follows. The class of patterns of a person's activated nerve endings which would prompt that person's assent to a queried sentence is the affirmative stimulus meaning (for that sentence, person, and time). The class of patterns of a person's activated nerve endings which would prompt that person's dissent to a queried sentence is the negative stimulus meaning (for that sentence, person, and time). The full stimulus meaning (for a sentence, person, and time) is the ordered pair of those affirmative and negative stimulus meanings. Also, note that the affirmative and negative stimulus meanings do not determine one another, for there are likely to be stimulus patterns belonging to neither.

Among the class of what Quine calls *occasion sentences,* sentences that are on some occasions true and on other occasions false, are those which Quine calls *observation sentences.* Quine has proffered different characterizations of observation sentences at different times, but in *Word and Object* he wrote: "in behavioral terms, an occasion sentence may be said to be more observational the more nearly its stimulus meanings for different speakers tend to coincide".[14] But even then Quine was acutely aware of a fly in the ointment, for what can 'tend to coincide' mean? Excepting conjoined twins, perhaps, different persons do not share nerve endings. In *The Roots of Reference* Quine wrote: "A sentence is observational insofar as its truth value, on any occasion, would be agreed to by just about any member of the speech community witnessing the occasion".[15] In "On Empirically Equivalent Systems of the World", Quine wrote: "The really distinctive trait of observation terms and sentences is to be sought not in concurrence of witnesses but in ways of learning. Observational expressions are expressions that can be learned ostensively".[16] In *Theories and Things,* Quine wrote:

> An observation sentence is an occasion sentence that the speaker will consistently assent to when his sensory receptors are stimulated in certain

> ways, and consistently dissent from when they are stimulated in certain other ways. If querying the sentence elicits assent from the given speaker on one occasion, it will elicit assent likewise on any other occasion when the same total set of receptors is triggered; and similarly for dissent. This and this only is what qualifies sentences as observation sentences for the speaker in question, and this is the sense in which they are the sentences most directly associated with sensory stimulation.[17]

A few of Quine's commentators complain that some of Quine's characterizations are inconsistent with one another. Lars Bergström, for example, points out that according to Quine's 1981 characterization, given in *Theories and Things,*

> a sentence may be observational for every speaker in a community, even though the speakers disagree about its truth value on many occasions. For example, some people may assent to 'It's cold' and 'That's a rabbit' on occasions when others dissent from these sentences. (People are not equally sensitive to cold, and many of us might easily mistake a hare for a rabbit.) In earlier writings, Quine had a different conception of an observation sentence: he required precisely that 'its truth value, on any occasion, would be agreed to by just about any member of the speech community witnessing the occasion.' However, this requirement is hardly consistent with his examples, and he has since claimed that the 'really distinctive trait of observation terms and sentences is to be sought not in concurrence of witnesses but in ways of learning. Observational expressions are expressions that can be learned ostensively'.[18]

In "Three Indeterminacies" and more fully in *Pursuit of Truth,* Quine responded to Bergström as follows: "As for the lacuna that Bergström noted . . . I retain my 1981 definition of observation sentence for the single speaker, and then account a sentence observational for a group if it is observational for each member *and* if each would agree in assenting to it, or dissenting, on witnessing the occasion of utterance. We judge what counts as witnessing the occasion . . . by projecting ourselves into the witness's position".[19]

Talk of projection (empathy, dramatic portrayal, *Verstehen*) has been a part of Quine's thinking about language learning and the propositional attitudes since the 1950s, but its use in connection with defining observation sentences is, I believe, new. However, by appealing to such introspective extrapolation in connection with observation sentences, Quine is able to build intersubjective observationality into his definition, something he could not do with subjective stimulus meanings (or neural input).

Still, one may press Quine for an explanation of why our confidence in empathy is not misplaced. Given the fact that different people have different nerve endings, and therefore different neural inputs, what

grounds are there for saying that someone else perceives what I would perceive were I in their position? Quine believes the answer lies with a sort of preestablished intersubjective harmony of subjective standards of perceptual similarity. The forces of human instinct (e.g., conditioning and induction) and natural selection (e.g., survival) have conspired to mould our shared standards into partial conformity with a shared environment.

In sum, there are two requirements a sentence must meet if it is to be an observation sentence. One is that it "should command the subject's assent or dissent outright, on the occasion of a stimulation in the appropriate range, without further investigation and independently of what he may have been engaged in at the time. A further requirement is intersubjectivity: unlike a report of a feeling, the sentence must command the same verdict from all linguistically competent witnesses of the occasion".[20] The first requirement, that observation sentences command verdicts outright, is what makes them the final checkpoints of science; the second requirement, that observation sentences be intersubjective, is what makes science objective.

The second step taken by Quine's naturalized epistemologist who embraces the genetic approach to study the relation between the meager input and the torrential output is to focus on the relation between observation sentences and theoretical sentences. Theoretical sentences are standing sentences: sentences whose truth values do not routinely change from occasion to occasion, sentences such as 'Copper conducts electricity'. One aspect of the relation of observation sentences to theoretical sentences has to do with the ontogenesis of reference, another has to do with the testing of scientific theories.

In *Word and Object* Quine wrote cryptically of the child's contextual learning of the terms and particles bound up with divided reference as follows: "The contextual learning of these various particles goes on simultaneously, we may suppose, so that they are gradually adjusted to one another and a coherent pattern of usage is evolved matching that of society. The child scrambles up an intellectual chimney, supporting himself against each side by pressure against the other".[21]

It was Quine's dissatisfaction with "so brief and metaphorical an account of the matter"[22] which prompted him to write *The Roots of Reference*. In that book Quine more or less outlines the ontogenesis of reference, and along the way, he isolates categorical predication and the relative clause as the roots of reference. He explains how observation sentences which are holophrastically conditioned to patterns of neural input eventually come to share vocabulary with theoretical sentences. For example, how the one-word observation sentence 'Water' gives rise

to the singular term 'water' in 'Water is wet', and to the general term 'water' in 'That stuff is water'.

In *Pursuit of Truth* Quine explores another aspect of the relation between observation sentences and theoretical sentences, namely, the role observation sentences play in testing scientific theories and hypotheses. Antecedently acquired observation sentences can be combined to yield what Quine calls observation categoricals, sentences of the form 'Whenever this, that'. For example, 'Smoke' and 'Fire' can be combined to form 'Whenever smoke, fire'. "Though compounded of two occasion sentences, the observation categorical is itself a *standing* sentence, and hence fair game for implication by scientific theory. It thus solves the problem of linking theory logically to observation, as well as epitomizing the experimental situation".[23] If the antecedent of an implied observation categorical is fulfilled, but its consequent is not, then the observation categorical is falsified and steps need to be taken to ensure that the theory no longer implies that categorical. But what steps? Quine's answer to this question draws on his commitment to holism and to the maxim of minimum mutilation.

The primary reference for Quine's holism is his "Two Dogmas of Empiricism". In that essay, Quine famously rejects as dogmas the analytic/synthetic distinction and reductionism. The reductionism that Quine rejects presupposes that individual sentences of scientific theories can be confirmed and infirmed in isolation from their fellow sentences. Quine's holism contradicts that presupposition: his countersuggestion, as he calls it, "is that our statements about the external world face the tribunal of sense experience not individually but only as a corporate body".[24] And just how large is the corporate body? In "Two Dogmas" Quine maintained an extreme holism wherein "[t]he unit of empirical significance [i.e., the corporate body] is the whole of science".[25] However, by the time he wrote *Word and Object* he had come to see that a moderate holism was more faithful to scientific practice and still sufficient for undercutting reductionism. What is Quine's moderate holism?

> It is holism that has rightly been called the Duhem thesis and also, rather generously, the Duhem-Quine thesis. It says that scientific statements are not separately vulnerable to adverse observations, because it is only jointly as a theory that they imply their observable consequences. Any one of the statements can be adhered to in the face of adverse observations, by revising others of the statements.[26]

Quine's moderate holism is achieved by adding the following two reservations to this characterization of holism. Quine's first reservation has to do with the fact that

> some statements are closely linked to observation, by the process of language learning. These statements are indeed separately susceptible to test of observation; and at the same time they do not stand free of theory, for they share much of the vocabulary of the more remotely theoretical statements. They are what link theory to observation, affording theory its empirical content. Now the Duhem thesis still holds, in a somewhat literalistic way, even for these observation statements. For the scientist does occasionally revoke even an observation statement, when it conflicts with a well attested body of theory and when he has tried in vain to reproduce the experiment. But the Duhem thesis would be wrong if understood as imposing an equal status on all the statements in a scientific theory and thus denying the strong presumption in favor of observation statements. It is this bias that makes science empirical.[27]

Hence, observation statements enjoy double life. Considered holophrastically, they are conditioned to neural input; considered analytically, they are found to be linked to other statements, including theoretical ones, by virtue of a shared vocabulary.

Quine's second reservation regarding holism "has to do with breadth. If it is only jointly as a theory that the scientific statements imply their observable consequences, how inclusive does that theory have to be? Does it have to be the whole of science, taken as a comprehensive theory of the world",[28] as Quine maintained in "Two Dogmas"? Quine no longer thinks it does:

> Science is neither discontinuous nor monolithic. It is variously jointed, and loose in the joints in varying degrees. In the face of a recalcitrant observation we are free to choose what statements to revise and what ones to hold fast, and these alternatives will disrupt various stretches of scientific theory in various ways, varying in severity. Little is gained by saying that the unit is in principle the whole of science, however defensible this claim may be in a legalistic way.[29]

This passage omits mention of Quine's favored maxim of minimum mutilation, which addresses the task of restoring consistency to a theory that implies a false observation categorical. The maxim admonishes scientists to prefer those alterations to the theory that are least disruptive to one's web of belief.

In sum, Quine's moderate holism acknowledges (1) that a statement's susceptibility to tests of observation is a matter of degree, and, because observation statements are closely linked to observation by the process of language learning, they are indeed individually susceptible to such tests, and (2) it is more accurate of scientific theories to say that the unit of empirical significance is not the whole of science but, rather, significant stretches of science. It is these significant stretches of science (or

critical semantic masses) that are the corporate bodies which face the tribunal of sense experience by implying observation categoricals.

Quine makes use of moderate holism in a number of ways in his philosophy—for example, in one of his arguments for indeterminacy of translation—but one of his most interesting uses is in connection with mathematics. Recall that some of the logical positivists argued that the sentences of mathematics are devoid of empirical content yet true (by virtue of the meanings of their terms). In a word, mathematics is analytic. Recall, also, that analyticity is one of two dogmas of empiricism that Quine roundly rejects. So how is an empiricist like Quine to handle these two problems regarding mathematics? In "Two Dogmas in Retrospect", Quine wrote:

> I answer both with my moderate holism. Take the first problem: lack of content. Insofar as mathematics gets applied in natural sciences, I see it as sharing empirical content. Sentences of pure arithmetic and differential calculus contribute indispensably to the critical semantic mass of various clusters of scientific hypotheses, and so partake of the empirical content imbibed from the implied observation categoricals.[30]

Quine gives a similar account of the empirical content of applied mathematics in *Pursuit of Truth* (although as we shall see in his latest book, *From Stimulus to Science*, he seems to offer a slightly different account). What, now, of the second problem, the necessity of mathematics? Quine continued:

> This again is nicely cleared up by moderate holism, without help of analyticity. For . . . when a cluster of sentences with critical semantic mass is refuted by an experiment, the crisis can be resolved by revoking one *or* another sentence in the cluster. We hope to choose in such a way as to optimize future progress. If one of the sentences is purely mathematical, we will not choose to revoke it; such a move would reverberate excessively through the rest of science. We are restrained by a maxim of minimal mutilation. It is simply in this, I hold, that the necessity of mathematics lies: our determination to make revisions elsewhere instead. I make no deeper sense of necessity anywhere. Metaphysical necessity has no place in my naturalistic view of things, and analyticity hasn't much.[31]

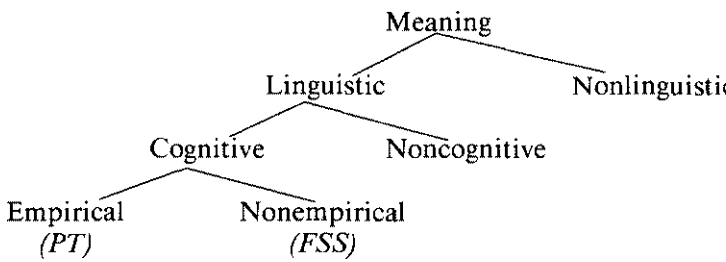
Thus, moderate holism is a doctrine which allows Quine to account for both the empirical content and necessity of mathematical truths, without abandoning empiricism or relying on analyticity.

However, as alluded to above, in his latest book, *From Stimulus to Science*, Quine seems to abandon the idea that even applied mathematics partakes of empirical content. Quine writes:

> The accepted wisdom is that mathematics lacks empirical content. This is not contradicted by the participation of mathematics in implying the

> [observation] categoricals for . . . such participation does not confer empirical content. The content belongs to the implying set, and is unshared by its members. I do, then, accept the accepted wisdom. No mathematical sentence has empirical content, nor does any set of them.[32]

This apparent conflict with Quine's *Pursuit of Truth* account might be merely terminological ('partake' v. 'confer') or it might reveal something more profound about Quine's conception of cognitive meaning and how his view differs from that of the logical positivists (or both). Quine would, I believe, accept the following gross taxonomy of meaning:



It appears that as late as *Pursuit of Truth* Quine considered applied mathematics to have empirical meaning, but that in *From Stimulus to Science* he places applied mathematics in the category of nonempirical meaning.

However that apparent conflict might be resolved, the category of cognitive nonempirical meaning has become an important one for Quine. In *Pursuit of Truth* Quine cites with approval Natuhiko Yosida's contention that laws of science may escape evidence altogether, and in *From Stimulus to Science* Quine wrote:

> Much that is accepted as true or plausible even in the hard sciences, I expect, is accepted without thought of joining forces with other plausible hypotheses to form a testable set. Such acceptations may be prompted by symmetries and analogies, or as welcome unifying links in the structure of the theory. Surely it often happens that a hypothesis remote from all checkpoints suggests further hypotheses that are testable. This must be a major source of hypotheses worth testing. Positivistic insistence on empirical content could, if heeded, impede the progress of science.
>
> In softer sciences, from psychology and economics through sociology to history (I use 'science' broadly), checkpoints are sparser and sparser, to the point where their absence becomes rather the rule than the exception. Having reasonable grounds is one thing, and implying an observation categorical is another. Observation categoricals are implicit still in the predicting of archaeological finds and the deciphering of inscriptions, but the glories of history would be lost if we stopped and stayed at the checkpoints.[33]

These passages remind one that Quine has described himself as a revisionist of positivism, not a defector. He considers himself to be more consistent in his empiricism than were the positivists, in that he refrains from drawing an epistemological line between the truths of physics and the truths of mathematics. The old positivistic dogmas of the analytic/synthetic distinction and the principle of verifiability applied to individual sentences, which Quine repudiated in "Two Dogmas", are replaced in his later writings by the kinder, gentler, doctrines of moderate holism and cognitive but nonempirical meaning. In a similar vein, Quine's naturalized empiricism replaces the linguistic empiricism of the positivist thereby challenging the epistemological line the positivists drew between psychology (or science generally) and philosophy.

One measure of Quine's originality is his deeply ingrained aversion to drawing hard and fast distinctions where other philosophers have most wanted them; for example between (1) the truths of physics and the truths of mathematics, (2) science and philosophy, (3) science and metaphysics, (4) good versus bad science, (5) justified belief and knowledge, (6) the analytic and the synthetic, and (7) the meaningful and the meaningless. All of these distinctions are, for Quine, matters of degree.

Before turning to Quine's commitment to extensionalism, there is one more of his doctrines connected with naturalism that should be briefly mentioned here, and that is his doctrine of underdetermination of physical theory. Speaking intuitively, a theory is underdetermined if it is not entailed by its evidence. Typical physical theories are underdetermined. However, Quine maintains that even a global physical theory, one that entails all and only true observation categoricals, would be underdetermined by all possible evidence, and furthermore, if there could be one such global theory, there could be many. Suppose there were two global theories that were empirically equivalent, logically compatible, equally elegant and parsimonious, but not reducible to one another; would both such global theories be true? In *Pursuit of Truth* Quine outlines two responses to this question. One response, the ecumenical one, is to say that both theories are true. This response is driven by a commitment to empiricism: "reluctance to discriminate invidiously between empirically equivalent and equally economical theories".[34] A second response, the sectarian one, is to say that only one of the two theories is true; the other is false or meaningless. This response is driven by a commitment to naturalism: "we have no higher access to truth than our evolving theory, however fallible".[35] Quine has vacillated between these two positions, in part because "[t]he fantasy of irresolubly rival systems of the world is a thought experiment out beyond where linguistic usage has been crystallized by use".[36] However, on my

reading of Quine, he rightly tends to favor the sectarian line for the following two reasons: first, he believes truth is an immanent notion, relativized to a theory (or a language), and second, his commitment to naturalism runs even deeper than his commitment to empiricism.

III. Extensionalism

A great deal of Quine's philosophy presupposes his commitment to extensionalism. What is extensionalism?

> A context is *extensional* if its truth value cannot be changed by supplanting a component sentence by another of the same truth value, nor by supplanting a component predicate by another with all the same denotata, nor by supplanting a singular term by another with the same designatum. Succinctly, the three requirements are substitutivity of *covalence*, of *coextensiveness*, and of *identity, salva veritate*. A context is *intensional* if it is not extensional.[37]

For our purposes, we may define extensionalism as the view that extensionality is necessary, though not sufficient, for a full understanding of a theory.[38] By contrast, theories harboring intensional contexts go dim. Among the denizens of the dark are essences, attributes or properties, meanings, propositions, objects of propositional attitudes (at least *de re* attitudes), and the objects of quantified modal logic. Quine has written extensively about each of these, but in the end they all suffer from the same inadequacy: lack of clear cut identity conditions. "We have an acceptable notion of class, or physical object, or attribute, or any other sort of object, only insofar as we have an acceptable principle of individuation for that sort of object. There is no entity without identity".[39] For example, classes are identical when their members are identical, physical objects are identical when they occupy the same region of space-time. The positing of essences, attributes or properties, meanings, propositions, objects of *de re* attitudes, and objects of quantified modal logic are "accompanied by no clue as to the circumstances under which . . . [they] may be said to be the same or different".[40]

Quine has been writing on the topic of ontology, primarily on the epistemology of ontology, for almost as long as he has been writing philosophy—approximately 65 years. In this connection, he famously maintains not only (1) no entity without identity, but (2) everything to which we concede existence is a posit, (3) to be is to be the value of a bound variable, and (4) reference is indeterminate (or inscrutable), that is, ontological relativity.

Ironically, this long-time interest in the epistemology of ontology has

led Quine to a doctrine of ontological indifference: under certain conditions different ontologies can serve a particular theory equally well. Quine supports this ontological indifference with his so-called proxy function argument:

> A proxy function is any explicit one-to-one transformation, *f*, defined over the objects in our purported universe. By 'explicit' I mean that for any object *x*, specified in an acceptable notation, we can specify *fx*. Suppose now we shift our ontology by reinterpreting each of our predicates as true rather of the correlates *fx* of the objects *x* that it had been true of. Thus, where '*Px*' originally meant that *x* was a *P*, we reinterpret '*Px*' as meaning that *x* is *f* of *P*. Correspondingly for two place predicates and higher . . . We leave all the sentences as they were, letter for letter, merely reinterpreting. The observation sentences remain associated with the sensory stimulations as before, and the logical interconnections remain intact. Yet the objects of the theory have been supplanted as drastically as you please.[41]

The proxy function argument's epistemological moral "is that there can be no evidence for one ontology as over against another, so long anyway as we can express a one-to-one correlation between them. Save the structure and you save all".[42] But what are the consequences of this argument for the status of reference and ontology?

> Reference and ontology recede thus to the status of mere auxiliaries. True sentences, observational and theoretical, are the alpha and omega of the scientific enterprise. They are related by structure, and objects figure as mere nodes of the structure. What particular objects there may be is indifferent to the truth of observation sentences, indifferent to the support they lend to the theoretical sentences, indifferent to the success of the theory in its predictions.[43]

Does it follow that we never know the reference of our terms or the objects that are the values of our variables? No, for by following the norm of homophonic translation at home, we learn along with our fellow English speakers that 'rabbits' refers to rabbits and that rabbits are among the values of the variables of any theory that entails 'There is an *x* such that *x* is a rabbit'. However, after having acquired our mother tongue, if the proxy function argument is correct, we are free to supplant our home ontology by a strange and distant one without detriment to our theory; ontology is indifferent.

IV. Conclusion

Quine's writings, which have been steadily accumulating over the past 65 years, are now massive—as is the secondary literature on Quine. Thus there is no hope of covering everything in so brief a sketch as this. For

example, only in passing have I mentioned Quine's most famous and controversial thesis of indeterminacy of translation, I have not recounted his arguments against analyticity, and I barely mentioned truth. But I hope that what I have managed to include in this sketch indicates the profound breadth and depth of Quine's philosophical thought. He is indeed a towering figure of analytic philosophy, a figure of unrivaled stature in the second half of the twentieth century.

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JULY 1997

NOTES

1. See the first of seven VHS videocassettes, "Fara Interview", in the series *In Conversation: W. V. Quine,* produced and directed by Rudolf Fara, Philosophy in Britain, Philosophy International, Centre for the Philosophy of the Natural and the Social Sciences, The London School of Economics and Political Science, London, UK.
2. W. V. Quine, "Five Milestones of Empiricism", in *Theories and Things* (Cambridge, Mass.: Harvard University Press, 1981), p. 72.
3. W. V. Quine, "Goodman's Ways of Worldmaking", in *Theories and Things,* p. 98.
4. W. V. Quine, "Epistemology Naturalized", in *Ontological Relativity and Other Essays* (New York, NY: Columbia University Press, 1969), p. 75.
5. W. V. Quine, *The Roots of Reference* (La Salle, Ill.: Open Court, 1974), p. 2.
6. Ibid., p. 3.
7. W. V. Quine, "Comment on Lauener", in *Perspectives on Quine,* R. Barrett and R. Gibson, eds., (Oxford: Basil Blackwell), p. 229.
8. W. V. Quine, "The Scope and Language of Science", in *The Ways of Paradox and Other Essays,* revised and enlarged edition (Cambridge, Mass.: Harvard University Press, 1976), p. 229.
9. W. V. Quine, "Things and Their Place in Theories", in *Theories and Things,* p. 21.
10. Quine, "The Scope and Language of Science", p. 230.
11. W. V. Quine, "The Nature of Natural Knowledge", in *Mind and Language,* S. Guttenplan, ed., (Oxford: Clarendon Press, 1975), p. 68.
12. Quine, "Epistemology Naturalized", pp. 82–83.
13. Quine, "The Nature of Natural Knowledge", pp. 74–75.
14. W. V. Quine, *Word and Object* (Cambridge, Mass.: M.I.T. Press, 1960), p. 43.
15. Quine, *The Roots of Reference,* p. 39.

16. W. V. Quine, "On Empirically Equivalent Systems of the World", *Erkenntnis* 9 (1975): 316.
17. W. V. Quine, "Empirical Content", in *Theories and Things*, p. 25.
18. Lars Bergström, "Quine on Underdetermination", in *Perspectives on Quine*, p. 39.
19. W. V. Quine, *Pursuit of Truth*, revised edition (Cambridge, Mass.: Harvard University Press, 1992), p. 43.
20. Ibid., p. 3.
21. Quine, *Word and Object*, p. 93.
22. Quine, *The Roots of Reference*, pp. ix–x.
23. Quine, *Pursuit of Truth*, p. 10.
24. W. V. Quine, "Two Dogmas of Empiricism", in *From a Logical Point of View*, second edition revised (Cambridge, Mass.: Harvard University Press, 1980), p. 41.
25. Ibid., p. 42.
26. Quine, "On Empirically Equivalent Systems of the World", p. 313.
27. Ibid., p. 314.
28. Ibid.
29. Ibid., pp. 314–315.
30. W. V. Quine, "Two Dogmas in Retrospect", *Canadian Journal of Philosophy* 21 (1991): 269.
31. Ibid., pp. 269–270.
32. W. V. Quine, *From Stimulus to Science* (Cambridge, Mass.: Harvard University Press, 1995), p. 53.
33. Ibid., p. 49.
34. Quine, *Pursuit of Truth*, p. 99.
35. Ibid.
36. Ibid.
37. Quine, *From Stimulus to Science*, p. 90.
38. Ibid., pp. 90–91.
39. W. V. Quine, "On the Individuation of Attributes", in *Theories and Things*, p. 102.
40. W. V. Quine, "Speaking of Objects", in *Ontological Relativity and Other Essays*, p. 19.
41. Quine, *Pursuit of Truth*, pp. 31–32.
42. W. V. Quine, "Structure and Nature", *Journal of Philosophy* 1 (January 1992): 8.
43. Quine, *Pursuit of Truth*, p. 3.

REPLY TO ROGER F. GIBSON, Jr.

As expected, Gibson has done a masterly job of sketching my evolving views. There are just a few points that I would put differently or say more about. He was the first of my commentators, I believe, to note my inconspicuous point about mutual containment of science and epistemology. In his present rendering, however, it is rather science and empiricism. I favor the former rendering, since science and epistemology are coordinate pursuits whereas empiricism is a doctrine.

I want to add emphasis to the bit about preestablished harmony, because of a widespread failure to sense the problem that it solves. Two normal observers of a scene naturally see the same thing (we say), up to differences of perspective, and cameras similarly situated agree correspondingly. Our subject matter is distal.[1] We can go on from there, one supposes, skipping any talk of light rays, sensory receptors, and neural processing. If the cameras can do it, why shouldn't we?

We can explain the agreement of the cameras, having indeed designed and manufactured them alike; but our agreement as observers is not thus explained. People vary widely in the number and arrangement of their sensory receptors and in the topology of their nervous systems. How can our shared distant subject matter activate us so harmoniously through such disparate intervening mechanisms?

The camera analogy confers false comfort. There is no parallel assurance regarding the observers. Their verbal reports agree, but their words were likewise learned on the basis of similarly shared observations of distant events, simply pushing the problem back.

Typically the mother uttered the word when she and the child were observing such an event, and the child thus learned to utter it on the occasion of a sufficiently similar event—similar by his lights. The mother approves, likewise deeming them appropriately similar by hers. It is only here, in the rough intersubjective harmony of private standards of

similarity, that communication is rooted—a harmony that transcends the wild intersubjective diversity of nervous systems.

It is accounted for by natural selection, which molded our ancestors' private standards of perceptual similarity into harmony with trends of their shared environment, and hence into harmony with one another. It is the same action of natural selection that has rendered our inductive expectations so successful.

We have here a structuralism of communication: shared structure of subjective similarity standards. It puts me in mind of the structuralism that obtains in ontology: any isomorphic ontology will serve science equally well.

Gibson has found, to my chagrin but gratitude, a disagreement between my consecutive little books *Pursuit of Truth* and *From Stimulus to Science* regarding empirical content of mathematics. I rest with the later position, namely, that mathematics lacks empirical content. The point is that no set of mathematical truths implies any synthetic observation categoricals.

Regarding my oscillation between the ecumenical and the sectarian attitude toward the underdetermination of global science, Gibson is right in finding me settled into the sectarian. When he has me relativizing truth "to a theory (or language)", however, I grant language but balk at theory. A theory that I hold true may turn out false; such is usage, and I accept it. Insofar, truth indeed goes transcendental; but I acquiesce in this as a linguistic effect.

W.V.Q.

NOTE

1. A bastard word. See etymology.