EPISTEMOLOGICAL METAPHORS AND THE NATURE OF PHILOSOPHY

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Abstract: This article examines some of the most important metaphors and analogies that epistemologists have used to discuss the structure and validity of knowledge. After reviewing foundational, coherentist, and other metaphors for knowledge, we discuss the metaphilosophical significance of the prevalence of such metaphors. We argue that they support a view of philosophy as akin to science rather than poetry or rhetoric.

Keywords: epistemology, metaphor, analogy, metaphilosophy, foundations, coherence.

1. Introduction

Epistemology is the branch of philosophy concerned with the origins, structure, methods, and validity of knowledge. In order to theorize about the nature of knowledge, epistemologists have used numerous metaphors and analogies, from Plato's cave to Quine's web of belief. This article reviews some of the most important of these metaphors and discusses what they show about the nature of philosophy. Metaphors are used in many realms of discourse, ranging from poetry to political rhetoric to scientific theorizing. We argue that epistemological metaphors are best viewed as theoretical rather than poetic or rhetorical, so that their historical use supports a view of philosophy as the construction of descriptive and normative theories.

Epistemological theories can be classified as either foundational or coherentist. Foundational theories attempt to ground knowledge in a solid base, such as sense experience (empiricism) or a priori reasoning (rationalism). In contrast, coherentists argue that there are no foundations for our beliefs, whose justification derives from how well they fit together with each other. Many of the most influential foundationalists and coherentists have expounded and defended their theories using suggestive metaphors and analogies. In sections 2 and 3 we discuss foundational and coherentist metaphors, respectively, and in section 4

we examine additional epistemological metaphors, including ones that concern the nature of philosophy as a whole. In section 5 we then consider the metaphilosophical significance of the prevalence of metaphor and analogy in epistemology.

We make no sharp distinction between metaphor and analogy. Mundane metaphors, such as ''my job is a jail,'' need not involve much of the systematic relational mapping that is the hallmark of analogy, but fertile metaphors, such as ''Socrates is a midwife,'' are always based on underlying analogies (Holyoak and Thagard 1995, 217). Socrates is a midwife because his helping people to bring forth ideas is structurally similar to a midwife's helping mothers to deliver babies. Saying that knowledge has foundations is a metaphorical claim based on an analogy that we now explain.

2. Foundational Metaphors

The *Oxford English Dictionary* (second edition) defines a foundation as ''the solid ground or base (natural or built up) on which an edifice or other structure is erected.'' Many philosophers have sought a ground or base on which knowledge could be erected. To say that knowledge has or needs a foundation is to use a metaphor based on a systematic analogy between the development of knowledge and the construction of a building. Descartes (1984, 2:366) explicitly endorses this analogy:

> Throughout my writings I have made it clear that my method imitates that of the architect. When an architect wants to build a house which is stable on ground where there is a sandy topsoil over underlying rock, or clay, or some other firm base, he begins by digging out a set of trenches from which he removes the sand, and anything resting on or mixed in with the sand, so that he can lay his foundations on firm soil. In the same way, I began by taking everything that was doubtful and throwing it out, like sand; and then, when I noticed that it is impossible to doubt that a doubting or thinking substance exists, I took this as the bedrock on which I could lay the foundations of my philosophy.

Just as the architect who wants to build a stable house must find a firm base for it, so Descartes who wants to establish stable knowledge must doubt everything in order to find a firm base for his beliefs. This analogy involves many interconnected correspondences, including architect/epistemologist, house/knowledge, build/justify, base/indubitable knowledge, and sand/dubitable beliefs. See Newman 1999 for a discussion of Descartes' foundationalism.

Descartes (1984, 2:324) also used another analogy in defending his method of doubt, responding to a critic as follows:

> Suppose he had a basket full of apples, and being worried that some of the apples were rotten, wanted to take out the rotten ones to prevent the rot

spreading. Would he not begin by tipping the whole lot out of the basket? And would not the next step be to cast his eye over each apple in turn, and pick up and put back in the basket only those he saw to be sound, leaving the others?

Like the foundation analogy, this one serves to justify Descartes' procedure of trying to start from indubitable beliefs, which correspond to good apples, while abandoning dubitable beliefs, which correspond to rotten apples. A third metaphor used by Descartes (1984, 1:120) to expound his epistemology is that of a *chain* of reasoning:

> The long chains composed of very simple and easy reasonings, which geometers customarily use to arrive at their most difficult demonstrations, had given me occasion to suppose that all the things which can fall under human knowledge are interconnected in the same way.

Below we describe Peirce's critique of the conception of knowledge as based on a chain of inference.

Like Descartes, Spinoza thought that the foundation of knowledge lay in a priori reasoning, which he exposited by analogy to Euclidean geometry. His book *Ethics Demonstrated in Geometrical Order* proceeds by definitions and axioms that are used to justify a series of propositions, just as Euclid proved geometrical theorems. Like Descartes, Spinoza wanted philosophical knowledge to be as securely demonstrated as mathematics. Similarly, Leibniz (1981, 84 and 87) thought that distinct knowledge could be gained by the "light of nature" that provides knowledge of innate ideas, which are like veins in marble that wait to be uncovered.

Empiricist philosophers have looked for the foundation of knowledge in sense experience rather than a priori demonstration, and they have accordingly employed a different set of metaphors. Here is John Locke (1961, 1:77):

> Let us then suppose the mind to be, as we say, white paper, void of all characters, without any *ideas*; How comes it to be furnished? Whence comes it by that vast store, which the busy and boundless fancy of man has painted on it, with an almost endless variety? Whence has it all the materials of reason and knowledge? To this I answer, in one word, from *experience*: In that, all our knowledge is founded; and from that it ultimately derives itself. Our observation, employed either about *external, sensible objects; or about the internal operations of our minds, perceived and reflected on by ourselves, is that, which supplies our understanding with all the materials of thinking*. These two are the fountains of knowledge, from whence all the *ideas* we have, or can naturally have, do spring.

Here the main correspondences are paper/mind and writing/experience. Implicit in the comparison is the foundational presupposition that observation makes on the mind veridical impressions of objects. A similar analogy was used much earlier by Aristotle, who compared knowledge to

writing on a blank tablet (1984, 683, 430a). He also said that sense experience is like the impression that a signet ring makes on a piece of wax (1984, 674, 424a). The quote from Locke introduces another metaphor, in which observation and reflection are both *fountains* of knowledge. The implicit analogy underlying this metaphor involves the correspondences water/knowledge and shoots/produces.

Kant was fond of the foundation metaphor, as is evident in the titles of his books: *Foundation [Grundlegung] of the Metaphysics of Morals and Metaphysical Foundations [Anfangsgründe] of Natural Science*. Frege also used the metaphor in the title of his *Foundations [Grundlagen] of Arithmetic*. Moreover, in *The Basic Laws of Arithmetic*, he explicitly used it in attacking psychologistic approaches to mathematics (1964, 13):

> I understand by "laws of logic" not psychological laws of takings-to-be-true, but laws of truth. . . . If being true is thus independent of being acknowledged by somebody or other, then the laws of truth are not psychological laws; they are boundary stones set in an eternal foundation, which our thought can overflow, but never displace.

This passage amplifies Descartes' foundation metaphor by stressing the permanent nature of the foundation and specifying laws of logic as being as important as boundary stones. Similarly, Husserl (1965, 75–76), in his ambition to make philosophy a rigorous science, wrote:

> For with this blunt emphasis on the unscientific character of all previous philosophy, the question immediately arises whether philosophy is to continue envisioning the goal of being a rigorous science, whether it can or must want to be so. . . . Is it to be a philosophical "system" in the traditional sense, like a Minerva springing forth complete and full-panoplied from the head of some creative genius, only in later times to be kept along with other such Minervas in the silent museum of history? Or is it to be a philosophical system of doctrine that, after the gigantic preparatory work of generations, really begins from the ground up with a foundation free of doubt and rises up like any skilful construction, wherein stone is set upon stone, each as solid as the other, in accord with directive insights?

Like Descartes, Spinoza, Kant, and Frege, Husserl wanted philosophical knowledge to be an unchallengeable edifice built on an unassailable foundation. However, not all philosophers have thought that a foundation for knowledge is achievable or desirable, and they have used a wealth of metaphors to outline an alternative view of the nature of knowledge.

3. Coherence Metaphors

In 1860, Charles Peirce published an incisive attack on Cartesian epistemology, rejecting the method of universal doubt. Peirce criticized the idea of a chain of reasoning that Descartes derived from mathematical

proof. According to Peirce (1958, 40–41), reasoning should be understood as a cable rather than a chain:

> Philosophy ought to imitate the successful sciences in its methods, so far as to proceed only from tangible premises which can be subjected to careful scrutiny, and to trust rather to the multitude and variety of its arguments than to the conclusiveness of any one. Its reasoning should not form a chain which is no stronger than its weakest link, but a cable whose fibers may be ever so slender, provided they are sufficiently numerous and intimately connected.

The cable metaphor is a powerful antidote to the chain and foundation metaphors that have dominated much of epistemology. What matters is not the strength of a particular proposition but its connections with numerous other propositions. The metaphor that reasoning is a cable is based on a complex analogy that involves interrelated correspondences: fiber/beliefs, cable/set of interconnected beliefs, and strength of cable/validity of knowledge. These elements are causally related, in that just as the number and interconnection of fibers is what makes a cable strong, the number and interconnection of beliefs is what makes them justified. Justification is then a matter of coherence rather than foundations.

In the twentieth century, the most influential coherentist metaphor was Otto Neurath's ship, which Neurath used in arguing against empiricist foundationalism based on protocol statements concerning sense experience. In the 1930s, Neurath (1959, 201) wrote:

> There is no way of taking conclusively established pure protocol sentences as the starting point of the sciences. No *tabula rasa* exists. We are like sailors who must rebuild their ship on the open sea, never able to dismantle it in dry-dock and to reconstruct it there out of the best materials. Only the metaphysical elements can be allowed to vanish without trace. Vague linguist conglomerations always remain in one way or another as components of the ship.

The analogical correspondences here include: sailors/scientists, ship components/beliefs, and ship repair/belief revision. Like Peirce, Neurath takes scientific knowledge as canonical, rather than mathematics, where the axiomatic method suggests the possibility of a foundational approach. But where Peirce used the cable metaphor to challenge rationalist foundationalism, Neurath used the ship metaphor to challenge empiricist foundationalism.

Neurath's metaphor was popularized by W. V. O. Quine (1960, 3–4): "Neurath has likened science to a boat which, if we are to rebuild it, we must rebuild plank by plank while staying afloat in it. The philosopher and the scientist are in the same boat. . . . Our boat stays afloat because at each alteration we keep the bulk of it intact as a going concern." In developing his critique of the analytic-synthetic distinction, Quine (1963, 42) used a series of metaphors. The totality of our knowledge is "a man-made fabric which impinges on experience only along the edges. Or, to

change the figure, total science is like a field of force whose boundary conditions are experience.'' Quine and Ullian (1970) called their book on argumentation *The Web of Belief*, using another metaphor that suggests that knowledge is a matter of multiple interconnections rather than foundations. They explain belief revision by analogy to what automobile mechanics do (1970, 8):

> Often in assessing beliefs we do best to assess several in combination. A very accomplished mechanic might be able to tell us something about an automobile's engine by examining its parts one by one, each in complete isolation from the others, but it would surely serve his purpose better to see the engine as a whole with all the parts functioning together. So with what we believe. It is in the light of the full body of our beliefs that candidates gain acceptance or rejection; any independent merits of a candidate tend to be less decisive.

Here beliefs correspond to engine parts, and the validity of a set of beliefs depends on their all working together like the parts of an engine.

Other epistemologists and philosophers of science have used different metaphors to inspire a nonfoundationalist picture of knowledge. Karl Popper (1959, 111) wrote:

> The empirical basis of objective science has thus nothing "absolute" about it. Science does not rest upon rock-bottom. The bold structure of its theories rises, as it were, above a swamp. It is like a building erected on piles. The piles are driven down from above into the swamp, but not down to any natural or given base; and when we cease our attempts to drive our piles into a deeper layer, it is not because we have reached firm ground. We simply stop when we are satisfied that they are firm enough to carry the structure, at least for the time being.

Like foundationalists, Popper uses a building metaphor, but he gives it an antifoundationalist twist by denying that the base is firm. Susan Haack (1993, ch. 4) articulates a position she calls "foundherentism," intended as a synthesis of foundationalism and coherentism, by comparing knowledge to crossword puzzles. The correctness of a word depends on the correctness of all the words with which it intersects, requiring a kind of coherence.

In moral epistemology, the dominant metaphor has been John Rawls's 1971 notion of *reflective equilibrium*. According to Rawls, ethical principles are justified by balancing them against ethical intuitions, which in turn are justified by how well they fit with ethical principles. Principles and intuitions are to be balanced against each other until reflective equilibrium is reached. Rawls compared this coherentist approach to ethics to the proposal of Nelson Goodman (1965) that logical principles are justified not a priori but rather on how well they fit with inferential practice. So the most prominent current methodology in ethics and political philosophy is based on the equilibrium metaphor and an analogy to logical justification.

We thus have a wealth of coherentist alternatives to foundational metaphors for knowledge: cables, ships, fabrics, fields of force, engines, piles in swamps, crossword puzzles, and equilibria. None of these metaphors, however, suggests a means for actually carrying out belief revision. Foundationalists can provide specific models of what building an epistemological system looks like by pointing to deductive proofs in mathematics and logic, but coherentists have historically been much more vague about how beliefs might be justified by their interconnections with each other.

A recent theory of explanatory coherence, however, exploits analogies between belief systems and neural networks to develop a rigorous computational model of coherentist belief revision. Thagard (1989, 1992, and 2000) developed ECHO, a computer program that assesses beliefs with respect to whether they are part of the best explanation of available evidence, by analogy with artificial neural networks. The components of such networks are artificial neurons linked to each other by excitatory and inhibitory connections that spread activation among the neurons. Thagard realized that such networks could be used to compute explanatory coherence: propositions can be represented by artificial neurons, and the compatibility and incompatibility relations between propositions can be represented by excitatory and inhibitory links between neurons. The degree of activation of the neurons after they have repeatedly excited and inhibited each other corresponds to the degree of acceptability of the propositions that they represent. The result of the analogy between belief revision and neuronal processing is a computational model of explanatory coherence that has been used to simulate many kinds of reasoning in science, law, and everyday life.

4. Other Philosophical Metaphors and Analogies

The history of philosophy contains many other metaphors and analogies that cannot be classified as either foundationalist or coherentist. One of the most famous is Plato's cave analogy, from book 7 of the *Republic*. It is too long to quote, but here is a summary from Holyoak and Thagard (1995, 169–70):

> Plato used an extended analogy to try to undercut the commonsense view that knowledge is derived from sense perception. Plato imagined a long cave in which people spend their whole lives fettered to one spot, unable to turn their heads. All they can see is shadows cast upon a wall by the light of a fire burning higher up the cave. The shadows are of various puppets and implements that, unknown to the people in the cave, are carried in front of the fire by others. Plato argued that the knowledge we receive from our senses is like the beliefs that the prisoners in the cave have about this shadow. The prisoners assume from their limited experience that they are achieving knowledge of reality, when in fact they are only perceiving a dull projection of the outside world.

On the one hand, the cave analogy is an attack on empiricist foundationalism, designed to show the weakness of sense experience as a source of knowledge. Plato's aim, however, was not to espouse coherentism but rather to defend a kind of rationalist foundationalism via the theory of forms. Two other analogies in the *Republic* contributed to the same aim: the comparison of the sun and the good, and the divided-line analogy.

Although Francis Bacon wrote before Descartes and Locke, he had a keen understanding of how knowledge requires both sense experience and reasoning. The synthesis is summarized in this brilliant analogy from 1620 (Bacon 1960, 93):

> Those who have handled sciences have been either men of experiment or men of dogmas. The men of experiment are like the ant; they only collect and use. The reasoners resemble spiders who make cobwebs out of their own substance. But the bee takes a middle course. It gathers its material from the flowers of the garden and of the field, but transforms and digests it by a power of its own. Not unlike this is the true business of philosophy; for it neither relies solely or chiefly on the powers of the mind, nor does it take the matter which it gathers from natural history and mechanical experiments, and lay it up in the memory whole as it finds it, but lays it up in the understanding altered and digested. Therefore from a closer and purer league between these two faculties, the experimental and the rational (such as has never yet been made), much may be hoped.

This passage involves a triple comparison: empiricists are like ants, rationalists are like spiders, and sensible epistemologists are like bees, which both gather food and transform it. Bacon's analogy shows the limitations of both empiricist and rationalist foundationalism, but it is not explicitly coherentist.

In Bacon's day, "philosophy" referred to what are now called the natural sciences as well as to philosophy. The relation between philosophy and the sciences remains controversial, and different metaphors are used to express different visions of it. It is still common to refer to philosophy as the "queen of the sciences." This metaphor dates back at least to Boethius (1969, 36) in the sixth century, who personified philosophy as a queenly figure with books in one hand and a scepter in the other. Competitively, other fields, including mathematics, politics, and theology, have been styled as the queen of the sciences. In contrast, Aquinas (1945) described philosophy and other sciences as a handmaiden to transcendent theology. In contrast, Locke (1961, 1:xxxv) viewed his philosophical efforts as subordinate to those of scientists, such as Newton: "It is ambition enough to be employed as an under-labourer, in clearing ground a little, and removing some of the rubbish that lies in the way to knowledge." Nietzsche (1966, 135–37) in turn derided the idea that philosophy should be reduced to theory of knowledge or subordinated to science. Rather, genuine philosophers are those who vivisect the virtues and assumptions of their age, who dare to create new values and be

legislators of the future. Our own preference is to see philosophy as neither superior nor subordinate to natural science but as a partner in understanding the world. This conception is developed further in the next section.

First we want to mention two famous metaphors for the enterprise of philosophy as a whole. Hegel (1952, 12–13) wrote:

> When philosophy paints its grey in grey, then has a shape of life grown old. By philosophy's grey in grey it cannot be rejuvenated but only understood. The owl of Minerva spreads its wings only with the falling of the dusk.

Minerva was the Roman goddess of wisdom, equivalent to the Greek goddess Athena. She was associated with the owl. Hence the owl of Minerva is a metaphor for philosophy. Hegel's point is that philosophy understands reality only in hindsight, or that it grasps the meaning of a particular intellectual and cultural period only as it passes away. For Hegel, philosophy was deeply bound up with intellectual history.

The most famous twentieth-century metaphor for philosophy is probably Wittgenstein's (1968, 103): "What is your aim in philosophy?—To shew the fly the way out of the fly-bottle." The point of the metaphor is clear from his previous ones: "Philosophical problems arise when language *goes on holiday*" (19); "Philosophy is a battle against the bewitchment of our intelligence by means of language" (47). Both metaphors suggest that philosophical problems arise from linguistic confusions, so the solution to them comes from escaping the confusions. Philosophy is then like a kind of therapy against itself. On this view, philosophy is focused on language and operates independently of the sciences.

5. The Nature of Philosophy

We now want to consider what conclusions can be drawn from the fact that metaphors and analogies have played such a prominent role in epistemology. One possible conclusion is that this prominence is a sign of philosophical weakness. Ogden Nash says in his poem "Very Like a Whale,"

> One thing that literature would be greatly the better for
> Would be a more restricted employment by authors of simile and metaphor.

Is the same true of epistemology and philosophy in general? The fact that some of the most esteemed of all philosophers, from Plato to Quine, have employed metaphors and analogies in developing their epistemologies suggests otherwise. We need a conception of philosophy that explains why metaphors are valuable, not why they should be reduced or eliminated.

One conception of epistemology that would explain the centrality of metaphor allies philosophy with poetry and other kinds of literary

discourse. Metaphors are ubiquitous in and crucial to poetry (Lakoff and Turner 1989). So if philosophy is a kind of poetic discourse, we have an explanation of why metaphors are so common in epistemology. It is obvious, however, that the aims of the philosophers whose metaphors were quoted in sections 2 to 4 were very different from the aims of most poets. Plato, Aristotle, Bacon, Descartes, Spinoza, Leibniz, Locke, Kant, Hegel, Frege, Husserl, Peirce, Neurath, and Quine were not mainly trying to produce evocative language but rather were trying to deepen understanding of the nature of knowledge.

A second conception of philosophy that would explain its use of metaphor associates it with political rhetoric aimed at increasing the power and influence of a philosopher. Rhetoricians since Aristotle have noticed the major contribution that metaphor makes to efforts to convince other people. And part of the reason epistemologists use metaphors is that metaphors make views more appealing to readers and listeners. Foundational and coherentist metaphors are used to make their proponents' epistemological positions both clearer and more appealing to their audience. However, we do not think that the uses of metaphor in philosophy are *merely* rhetorical. Epistemologists aim to convince their readers not just for the sake of convincing them but also because they think they have a theory of the structure and growth of knowledge that is descriptively and prescriptively better than alternative theories. Metaphors undoubtedly have a rhetorical role, just as they have an evocative one, but they also have an explanatory role that we shall now discuss.

We contend that philosophical uses of metaphor and analogy are similar to scientific ones. Holyoak and Thagard (1995, ch. 8) distinguish four different uses of analogies in science: discovery, development, evaluation, and exposition. Analogies have contributed to such major scientific discoveries as Darwin's theory of evolution and Maxwell's theory of electromagnetic forces. Analogies have also contributed to the theoretical and experimental development of scientific ideas, as when Darwin used the analogy between natural and artificial selection better to understand evolution. Moreover, Darwin and such other great scientists as Galileo also used analogies in arguing for the acceptability of their theories. Finally, scientists and science educators often use analogies as part of their attempts to communicate ideas to others.

Similarly, analogies in philosophy have contributed to the origin and development of epistemological theories. Euclidean geometry suggested to thinkers like Descartes and Spinoza how they should develop their foundationalist epistemologies. Empiricist foundationalists took inspiration instead from wax tablets and white paper. Coherentist epistemologists have needed such metaphors as cables, boats, crossword puzzles, and neural networks to suggest how beliefs could be evaluated on the basis of their fit with one another.

In science, analogies are a relatively minor part of the evaluation of theories, which depends more on how well competing theories explain the relevant experimental evidence (Thagard 1992). In epistemology, however, there is not much empirical evidence directly relevant to the assessment of theories of knowledge, so metaphors and analogies carry much more of the evaluative burden than is the case in science. Because it is not clear just what foundational and coherentist theories are supposed to explain, much of their plausibility comes from the intuitive appeal of the competing metaphors. Whereas a scientist can lay out the empirical arguments for accepting a theory, philosophers adduce a variety of considerations, both descriptive and normative, that make their epistemologies plausible. Thus evaluation and exposition blur together more in philosophical discourse than they do in scientific discourse.

Describing knowledge as a cable both helps to expound an antifoundationalist view and to support its credibility in making sense of human knowledge. Richer analogies, such as the neural network underpinning of Thagard's 2000 coherence theories, make for expanded credibility by tying epistemological theories in with empirical results from cognitive psychology and neuroscience. The result is not a reduction of philosophy to the sciences, because epistemology includes an essentially normative component that differentiates it from the descriptive theories of the sciences. To expand Peirce's metaphor, we can think of science and philosophy as two intertwined and intermingled cables that jointly contribute to making sense of the human condition, in both descriptive and prescriptive aspects.

In sum, the uses of metaphor and analogy in epistemology and philosophy in general are much the same as their uses in science. Analogy is a powerful mode of thought that is indispensable in the formation, development, evaluation, and exposition of theories, in philosophy as well as science. Like science, philosophy is primarily theory development, not poetry or rhetoric, even though rhetoric and even poetry can sometimes be displayed in both fields. Philosophy is not the queen, handmaiden, or under-laborer of the sciences but rather a partner in a collaborative endeavor to understand and improve the world.

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