

## Never the Twain Shall Meet: Fact, Value and Subjectivity in Twentieth-Century Science

One can safely assert (at least) three things about science: 1) It values objectivity; 2) it holds that knowledge is desirable; and 4) it says that truth is good. All of these statements imply, or even demonstrate, that science itself is driven by values, in particular epistemological values, and yet, despite the suggestion that value and fact cannot be separated in science, as Dr. Henschel appears to support in her essay “Science and Values,” we are still hard put to show that science deals with values in the way that, for example, religion or ethical philosophy does. While we might successfully define value as an ideal, or as something we hold to be desirable, we cannot find any authority for value statements of the sort that religion and philosophy make in science. Neither can we demonstrate that value exists in the world in the same way that facts do.

When we observe nature in order to discover things about reality, as science does, what we discover are facts, laws and general principles that reveal how nature works. In other words, what is revealed is factual, descriptive. What we do not find in nature are values, as the Logical Positivist, A. J. Ayer, asserts in *Language, Truth and Logic*. Thus, for example, through scientific methods we can claim with some certainty that “people kill” but we cannot find a basis through an empirical process to claim that “it is wrong for people to kill.” Thus, while we may assume that scientists hold various values in their methods and goals, we must draw a distinction between those values and the facts or data that they discover in the world. Accordingly, the statement Dr. Henschel makes that “values influence the theories to which [scientific] methodology is applied” is too vague. That is, she does not distinguish between epistemological values to do with the way science is practiced and values to do with ontological realities.

Dr. Henschel gives an accurate picture of how, in various sciences, the idea that pure objectivity is possible has been supplemented by an acknowledgement of the role subjectivity plays in the collection of data. Where she seems to confuse things is with her conflation of subjectivity and value. We can say that science is driven by “value-laden theories” only in the sense that science always exhibits the fundamental values of truth, knowledge, and whatever objectivity is possible from a subjective point of view; that is, that it exhibits epistemological/methodological values. This does not imply that scientists “all presumably with different values,” bring a hodge-podge of different ontological assumptions to the table nor does it imply that scientists discover values in the world. Her argument does nothing to refute Ayer’s position that values are not objective realities in the world; that they do not refer to anything in nature. It only illustrates the role of subjectivity in the empirical process and demonstrates how the perceptual and theoretical bias scientists bring to their observations result in this subjectivity.

In her arguments Dr. Henschel does identify a current of thought, however, proposed by leading mid-century intellectuals in academia, perhaps most striking among them the philosopher Paul Feyerabend and the historian of science, Thomas Kuhn, whose classic, *The Structure of Scientific Revolutions*, irrevocably transformed the way science is viewed. Both Kuhn and Feyerabend demonstrate that there is a subjective conceptual element that determines the selection of facts which come to be considered relevant to a theory, and both do so without bringing value into the discussion.

Feyerabend's contribution lies in his dismissal of what he calls "radical empiricism," a methodology that insists that only a single set of theories be used, which he argues leads to the elimination of evidence that might be critical to a defended theory. In his essay, "Problems of Empiricism," he objects to the idea that "facts" are objective realities and argues for a "theoretical pluralism" that will allow for sharper criticism of accepted ideas than does comparison with a "domain of 'facts'" (150). For Feyerabend, there are no facts that can be given independent of theoretical considerations and experience can uncover no "factual core" that is independent of theories. Not only does he insist that the description of every single fact is dependent on some theory, he asserts that there exist facts that "cannot be unearthed except with the help of alternatives to the theory to be tested" (175). Whether in science or philosophy, Feyerabend disdains the kind of rigid "theoretical monism" that Ayer defends and goes so far as to say that the appearance of success of theories which eliminate alternatives "cannot in the least be regarded as a sign of truth and correspondence with nature" (178). Indeed for Feyerabend, such an empirical theory becomes almost indistinguishable from a myth; it has been turned into a metaphysical system of its own. It is successful not because it agrees with the facts but because no facts have been specified that would constitute a test.

Thomas Kuhn also attacks the idea that facts can be independent of theory and demonstrates the inadequacy of observation and experience in determining a particular body of scientific belief. In *The Structure of Scientific Revolutions*, Kuhn shows how prevailing world views, the product of scientific revolutions that sweep away previously held assumptions about reality, not only shape the way we view science but also the way we perceive the world that science reveals. He critiques the methodological deficiencies of what he calls "normal science," that is, traditional empirically driven science that up to Kuhn's time was seen as cumulative, and questions the assumption that the scientific community "knows what the world is like" (5). Through the concept of the paradigm, an idea he pioneered, Kuhn shows how "accepted examples of actual scientific practice provide models from which spring coherent traditions of scientific research" (10). Not only do paradigms assist in effective fact-gathering, they determine which facts come to be seen as relevant. In a parallel to evolutionary theory, Kuhn suggests that paradigms select out which facts will be studied from the vast arena of natural phenomena. The problem with this is that the practice of "normal science" is then restricted to those phenomena and theories which the paradigm already supplies, forcing nature into an inflexible box (24). Whereas for Ayer, then, there exist objective, verifiable facts in a world that can be empirically revealed, for Kuhn, any fact which purports to reveal the nature of things is predetermined by a prevailing paradigm.

Even more striking than this insight is Kuhn's assertion that what changes with a new paradigm is not only the interpretation of what is observed, (which is fixed by the nature of the environment and by the perceptual apparatus employed,) but the very data itself. Reflecting current assumptions of quantum physics, (a recent paradigm,) Kuhn says that data are not unequivocally stable; that the immediate experience a paradigm highlights is not fixed and neutral but rather fluid. Thus, nothing is a "given." From the very world the scientist works within, to the apparatus he uses, the observations he makes, and the facts he gathers, all is selected by virtue of its relevance to the paradigm and the immediate experience that the paradigm has partially determined (125).

Finally, and equally damaging where Ayer is concerned, Kuhn points out the near impossibility of objectively recording what is observed. He decries the lack of a “pure observation-language” which is perpetuated by a theory of perception and of the mind which has not evolved since Descartes. Attempts to exhibit an actual language of observation, such as has been done in psychology, also presuppose a “host of expectations about nature” (126). Thus, again, whereas for Ayer there exists an objective world of verifiable facts that can be articulated truthfully through the use of logic and strict attention to the correct usage of language, for Kuhn, as well as for Feyerabend, no such assumptions can be made about the nature of perceived reality. No such “givens” are to be found.

Inhabiting as we do, then, a world well “beyond the edge of certainty,” what hope, if any, are we to glean from science when confronted with issues of value? While Ayer does provide some scant comfort with his assertion that truth can be found, it is a truth so devoid of any meaning on a human level that we are left empty and compass-less in the face of decisions about how we are to identify and choose among the many values presented to us in the world. While one may accept Ayer’s position, one that insists on the separation of fact and value and asserts that science, its own intrinsic values notwithstanding, deals with facts alone, one cannot *live* in his world. Moreover, given the advances in science and philosophy since Ayer’s time we are still left with questions science does not seem to be able to answer. Can we really get at the truth in a world where science has an unavoidable element of subjectivity? In what sense is there truth? While science values objectivity and truth, in what sense can it demonstrate that these ideals can be realized? Are we any closer to being able to ground our values in reality? Can we discover a firm basis for making value statements? Does science even demonstrate that the search for truth is a good thing?

Given these questions, we seem compelled to admit that we live in a subjectively driven, evolutionary world that is dynamic and ever-changing, a world where, indeed, the center cannot hold. If we cast about for direction and look to science for answers about the nature of things, while we may never attain certainty, we do find however that science, with its solid epistemological values, does more than any other system of thought to meet and ward off challenges to its authority. It is not a chimera. It is something we can cling to with at least some security in a sea of conflicting ideas about reality. Science, like philosophy, has as its very foundation the quest for knowledge and truth, and the search for an accurate understanding of reality. However we come to a decision about our own values, about how they guide the way we operate in the world, it is at least better to start from a foundation of truth, knowledge and honest inquiry. Because science makes these values its starting point, it offers the best, if not the only, hope for the survival, perpetuation and flourishing of our species.

## Works Cited

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