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**Following the Steps to The Scientific Method**  
**Federica Bocchi and Alisa Bokulich**  
**Department of Philosophy, Boston University**

**Henry M. Cowles.** *The Scientific Method: An Evolution of Thinking from Darwin to Dewey*. 384 pp.. Cambridge: Harvard University Press, 2020. \$35.00 (cloth); ISBN 9780674976191.

This book tells the origin story of a myth still gripping popular culture today: The Scientific Method. In calling it a myth, Henry Cowles does not mean to suggest that scientists have no methodologies guiding their investigations. Rather, it is to deny a single method that unites the diverse fields of science and serves as the source of their authority. This story is a selective one, connecting Darwin's attempt to naturalize hypothesis formation in the framework of his theory of evolution to the rise of 19th century psychology and American pragmatism, culminating in John Dewey's *How We Think*, with its iconic five-step analysis of a "complete act of thought." The book, though well-written, lacks adequate signposting and systematic conclusions that would assist readers in following the overarching narrative. The book is rich in detail, but does not provide a practice-oriented look at the scientific methodologies of its main characters, such as William Whewell or Charles S. Peirce. Nonetheless, the book provides a rich and fascinating history with a compelling story to tell.

Cowles psychoanalysis of our methodological delusions begins with anxieties about the role of hypotheses and the increasing disunity of the sciences. As Whewell, in his review of Mary Somerville's *On the Connexion of the Physical Sciences* (where his neologism "scientist" first appears), laments: "the disintegration goes on, like that of a great empire falling into pieces; physical science itself is endlessly subdivided, and the subdivisions insulated" ("On the Connexion of the Physical Sciences by Mrs. Somerville," in *The Quarterly Review*, 1834, 51: 54-68, on p. 59). Forty years later, James Clerk Maxwell, also responding to Somerville's book, decides (justifiably or not) "The unity shadowed forth in Mrs. Somerville's book is therefore a unity of the method of science, not a unity of the processes of nature" ("Grove's Correlation of Physical Forces," in *Nature*, 1874, 10: 302-304, on p. 303). The story follows Darwin's anxieties about speculative hypotheses (perhaps sharpened by his failed speculation about the "parallel roads" of Glen Roy), which he ultimately assuages through a blurring of mind and nature, where "variations, like hypotheses, were tested in the realm of experience" (65).

The central role of the psychological sciences in Cowles's history is to undo the naturalization of speculative hypothesizing initiated by Darwin, in particular through the rise of behaviorism and "Morgan's Canon"—according to which no animal behavior should be interpreted as the expression of a higher cognitive faculty, if it can be accounted for in terms of a lower. Cowles cogently argues this becomes emblematic of a larger debate about "proper scientific" behavior, which required leaving behind the speculative, anthropomorphic, and anecdotal in favor of the purely experimental.

Dewey sought to ground logic in human psychology, identifying scientific methodology with general cognition, much as Darwin did. Moving to the University of Chicago in 1894, Dewey effected a convergence of philosophy, psychology, and pedagogy—unified in experimentalism—through the founding of his "Laboratory School," where children became its experimental subjects. It was in distilling the lessons of his Laboratory School that Dewey

developed his infamous five-step analysis of thought—originally conceived as a universal activity, but later transformed by others into a symbol of science’s exceptionalism. Cowles blames this “betrayal” of Dewey's steps on the burgeoning textbook industry, but these dots are left largely unconnected.

Surprisingly, one figure not found in Cowles’ book is the American geologist Thomas Chamberlin (1843-1928), who was recruited from his position as President of University of Wisconsin to the University of Chicago, just two years before Dewey arrived. In 1890 Chamberlin published a highly influential paper in *Science* called "The Method of Multiple Working Hypotheses," which—though considered a landmark work by many scientists—seems to have been overlooked by historians and philosophers of science outside the geosciences. Chamberlin contrasted his method of “multiple working hypotheses” with both the method of the “working hypothesis,” and the method of the “ruling theory.” Chamberlin’s account is an important chapter in the 19th century history of scientific methodology, discussions about the role of hypotheses in science, and their intersection with educational reform movements at this time. Indeed, Chamberlin saw his method of multiple working hypotheses as valuable far beyond science: “One of the greatest moral reforms that lies immediately before us consists in the general introduction into social and civic life of that habit of mental procedure which is known in investigation as the method of multiple working hypotheses” (“The Method of Multiple Working Hypotheses,” in *Science*, 1890, 15 (366): 92-96, on p. 96). Chamberlin can thus be seen as part of this same tradition of anti-exceptionalism about scientific methodology that Cowles traces through Dewey. His omission raises the question of how this 19th century history of scientific methodology might look different if geology, rather than psychology, were the central lens through which the story was told.

Cowles’s history of the rise of the myth of The Scientific Method reverberates with our own present anxieties about science denialism and being in a “post-truth” era. Cowles's lesson is that science is both a “flawed, fallible activity of some imperfect, evolving creatures and . . . a worthy, even noble pursuit” (279). With this book, the myth of The Scientific Method is indeed evolving.

**Alisa Bokulich** is Professor of Philosophy at Boston University, Director of Center for Philosophy & History of Science, and Associate Member of History of Science Department at Harvard University. She is author of *Reexamining the Quantum-Classical Relation* and writing a new book *Philosophy of the Geosciences: Data, Models, & Uncertainty*, supported by a 2021-22 Radcliffe Fellowship.

**Federica Bocchi** is a Ph.D. student at Boston University working on philosophy of science. She is currently writing her dissertation titled “Philosophy of Biodiversity: Conceptual and Practical Issues in Theory, Measurement and Data Comparison.” She is member of the B.U. Philosophy of the Geosciences research group.