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As the title suggests, Gareth Leng and Rhodri Ivor Leng’s collaborative book, *The Matter of Facts: Skepticism, Persuasion, and Evidence in Science*, presents an insightful, critical, and detailed analysis of the building blocks that comprise statements and ideas broadly considered to be “facts.” Gareth Leng’s expertise in the field of physiology combines thoughtfully with Rhodri Ivor Leng’s work in the sociology of science to create a unique perspective on the beautifully faulty and faultily beautiful enterprise of modern science.

Informed by Gareth Leng’s prior work and publications in neuroendocrinology (including *The Heart of the Brain: The Hypothalamus and Its Hormones* [2018]), *The Matter of Facts* tells a compelling story, rife with rich examples, of the inner workings and networks of science. *The Matter of Facts* serves as a passionately critical work, taking aim at the reductive and misguided stagnation of scientific claims, known as “facts,” in favor of an open-minded approach which recognizes that science and scientific findings are always inevitably in motion. The authors argue that facts are “facts” because of their utility, not because these claims hold an eternal truth status. Spanning twenty-five chapters, the book engages with a series of critical inquiries into scientific progress and method, falsifiability, publication practices, biases, citation practices, experimental design, bibliometrics, and paradigm shifts. While the central critical analyses put forth in *The Matter of Facts* are not unique, the book stands out among similar critiques in its poignant and detailed examples, which serve as empirical evidence keenly supporting the authors’ claims.

*The Matter of Facts* begins its journey into the messy world of truth in science with three twentieth-century giants in the fields of sociology and philosophy of science: Robert Merton, Karl Popper, and Thomas Kuhn. Leng and Leng examine Merton’s “norms” of science, Popper’s claims concerning falsifiability, and Kuhn’s understanding of progress in science via “paradigm shifts.” Each of these monumental theories present a distinctive perspective on the knowledge accumulation processes of science, and *The Matter of Facts* employs each in turn to develop its own position concerning the uniqueness and utility of what is colloquially referred to as “the scientific method.” Rather than merely accepting one or more of these theories as an exhaustive description of the functioning of science, Leng and Leng use these theories as a point of departure for a broader analysis that places scientific “norms,” falsifiability, and “paradigm shifts” in the context of twenty-first-century scientific practices. The authors show that Merton’s “norms” of “communism,” “universalism,” “disinterestedness,” and “organized skepti-
cism,” while certainly descriptive of how one would imagine science ought to function, rarely hold up under twenty-first-century publication, citation, and funding pressures. Falsifiability, while also clearly an idealistic function of science, often falls by the wayside in contemporary times due to scientific journals’ unwillingness to publish papers with negative results because these papers are cited much less frequently than papers that show positive results. Far from idealized, Kuhn’s “paradigm shifts” prove once again useful in showing the messy ways science progresses and overcomes old theories, and The Matter of Facts provides a key example of this in a physiological context involving the hypothalamus and hormone production. Throughout the latter half of The Matter of Facts, however, the authors guide the reader through a number of other examples in which a scientific crisis and death of a theory is caused not by a rival theory contesting the current paradigm but by publication pressures and disinterest, which cause a theory and surrounding paradigm to fall by the wayside. Overall, the first half of The Matter of Facts does good work putting these three theories of science and its functioning to the test and showing how each of these theories do touch on something exceptional and fundamental about the nature of science.

Midway through The Matter of Facts, Leng and Leng pivot from analyzing the history and function of science as a whole to addressing a question that is clearly key to recent times: how have modern-day publication and citation practices affected scientific output? The strongest and unique analyses in the book are put forth in these latter chapters. Three major themes are addressed: publication, citation, and funding. Each of these three scientifically adjacent yet crucial systems have undergone significant changes in the last century. The Matter of Facts points out that journals, which used to be owned almost exclusively by scientific societies and were thus under the control of working scientists, experienced a commercial takeover in the mid-twentieth century. Journals also began to be measured by their “impact factor,” which quantifies how often papers in a given journal have been cited: the higher the impact factor, the more prestigious the journal. This, in turn, affected citation, which was already being used as a metric for individual scientists’ accomplishments. Once difficult to track, citation can now be found via a quick Google search and has become widely associated with credibility and success for both journals and scientists. Publishability thus relies on citability, and Leng and Leng guide the reader through detailed examples and statistics that show the type of research that is most likely to be published, that is, the research that is most likely to be cited, which is research that finds positive results. If positive results are most likely to be published because they are most likely to be cited, then they are also most likely to be funded, which puts additional constraints on scientists to only work on research that they can assume will bring positive results, and with them, publication, citations, additional funding, and prestige. As the authors point out, “truth” can get lost in this web. Given these uniquely modern problems, there are certainly moments throughout The Matter of Facts that sound as though the authors are romanticizing a lost age of science, a “before” times when journals were owned by scientists and negative results were still valued. A faint call can be heard in the pages, “if only we could go back,” but this call is tied in with a resounding hope for the future of science and its ability to overcome.

The Matter of Facts does an excellent job at showing through detailed examples and empirical evidence how these pressures are affecting the entire scientific community. As explicitly promised in the beginning of the book, The Matter of Facts does not strive to find an ultimate answer for these problems. Rather, the authors’ goal is clearly to present what one might call the “facts” and to give the reader hope that science is, in a way, an art of dead-ends and lost paths, and that it still
has, in leading us briefly astray, always managed to find its footing.

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