jectives get attached to abstract nouns, and the end result is, well, inarticulate. Wisnioski is clearly a scholar with a promising future. I dearly hope that he will continue to explicate the lives of the engineers as his career proceeds and that, along the way, he will find someone to help him with his writing—and not the person (if there was one) who copyedited this volume.

RUTH SCHWARTZ COWAN

Hugh Everett III. *The Everett Interpretation of Quantum Mechanics: Collected Works, 1955–1980, with Commentary*. Edited by **Jeffrey A. Barrett** and **Peter Byrne**. xii + 392 pp., illus., apps., index. Princeton, N.J.: Princeton University Press, 2012. $75 (cloth).

Hugh Everett's relative state interpretation of quantum mechanics, more commonly known as the many-worlds interpretation, has for more than fifty years upset physicists and philosophers alike. His proposal that all possible outcomes of a quantum mechanical measurement are equally realized and that our commonsense conviction of a single stable reality is merely an appearance (that can be explained from the working of our memories as recording devices) has again and again been condemned as patently absurd. However, it has not gone away, and the more we have learned about the transition from the quantum world of microphysics to the classical realm of macroscopic phenomena, the less plausible have become the other contenders for understanding quantum physics. More and more people now believe that Everett's interpretation may be the last one left standing after the quantum revolution is completed.

Nevertheless, Hugh Everett himself, who left academia for a career in the Cold War military-industrial complex and died early in 1982, has remained a rather mysterious figure, in both his ideas and his life. Everett's life has been elucidated thanks to a biography by the journalist Peter Byrne (*The Many Worlds of Hugh Everett III* [Oxford, 2010]). Byrne, a coeditor of this volume of Everett's works, had discovered a rich trove of papers in the possession of Everett's son Mark (scans of these papers can be found online at ucispace.lib.uci.edu). In the present edition, Byrne and his coeditor, Jeffrey Barrett, present and annotate unpublished notes from this collection, together with the published versions of Everett's dissertation and additional material. The volume contains, after concise biographical and conceptual introductions, the two previously known versions of Everett's dissertation together with several unpublished drafts. This is followed by additional unpublished material: Everett's correspondence about his interpretation, transcripts of a discussion with Everett at a workshop at Xavier University in 1959 and of a conversation between Everett and Charles Misner about their student days, and some notes that Everett made on publications concerning his interpretation. The edition probably contains everything we will ever hear from Everett himself about his views on quantum mechanics. For this reason alone, it will be of lasting value for anybody interested in the ideas of Everett and in the interpretations of quantum mechanics.

Given this importance, it is somewhat regrettable that the editors have not attempted in the introduction and commentary to do more justice to the extensive discussion of Everett's interpretation in recent years—an increasing interest that the rather slim bibliography already indicates. In particular, the important contributions of physicists such as Dieter Zeh, Robert Geroch, David Deutsch, Lev Vaidman, Max Tegmark, and many others are neglected, so that the reader is left with the impression that Everett's ideas have been discussed only by a few philosophers. Even more remarkable is that the extensive historical and philosophical analysis by Stefano Osnaghi, Fábio Freitas, and Olival Freire, Jr. ("The Origin of the Everettian Heresy," *Studies in History and Philosophy of Modern Physics*, 2009, *40*:97–123), which covers a lot of the material presented here and offers additional context, is not mentioned.

The editors also would have done well to pay more attention to the time-honed practices of critical editions. One example is the incomplete and unclear presentation of text variants in the original ("long") dissertation circulated by John Archibald Wheeler in 1956 but only published by Bryce DeWitt in 1971 in a form slightly edited by Everett. The fact that Everett moved an important note about the uniqueness of the measure on the "branches" of the wave function into the main text for the 1971 publication can be seen only from the reproduction of the edits in the appendix. In the reproduced text itself this is not mentioned, and the reader is additionally confused by another variant of the text that is mentioned but is incomprehensible if one does not know about the first edit (footnote *bq* on p. 126). Another problem is that the correspondence is grouped into chapters nonchronologically. At times this is rather confusing, such as in Chapters 11 and 12, where two letters that Wheeler wrote to Everett on two consecutive days (and that are thematically closely connected) are separated into two chapters. The

reader also misses references to the location of the archival material published.

Despite these problems in the presentation, *The Everett Interpretation of Quantum Mechanics* is eminently readable and presents—surprisingly, for an edition of collected works—a good introduction to Everett's thinking: the inclusion of the correspondence, transcripts, and notes helps to make the central points of Everett's dissertation comprehensible. The thorough annotation, with many cross-references, highlights the important topics and keeps the reader oriented in the various strands of Everett's argument. Everett's work, which has been almost buried under the discord of its many readings and interpretations, can shine again in its crystalline clarity and modernity.

CHRISTOPH LEHNER

Angela N. H. Creager. *Life Atomic: A History of Radioisotopes in Science and Medicine*. (Synthesis.) xvi + 489 pp., illus., bibl., index. Chicago/London: University of Chicago Press, 2013. $45 (cloth).

Angela Creager's latest book offers yet another powerful empirical push toward hybridizing the histories of twentieth-century medicine and the life sciences. *Life Atomic* is hardly the first volume to stake out such territory, but its resolute focus on the production, regulation, dissemination, and deployment of radioisotopes is both novel and engaging. Creager's argument that "the availability of radioisotopes shaped not only experimental methods, but also the ways in which life and disease were conceptualized" (pp. 15–16), is probably not self-evident to observers of contemporary biomedicine. If the midcentury enthusiasm for the traces left by radioisotopes brought "temporality itself to the fore as a frontier of biomedical and environmental knowledge" (p. 407), the materiality of such traces has proven "evanescent," having largely been superseded by other investigative and therapeutic techniques. *Life Atomic* thus reminds us how the rapid uptake of "the tracer method" (p. 312) by the medical and life sciences put into question all sorts of boundaries: Were radiotracers experimental or therapeutic? Were they environmental probes or contaminants? Did they reduce life to the molecular or restore it to the organismic? Was their application humanitarian or militaristic? Could they be extended by free-market principles or did they necessitate increasing government regulation?

Life Atomic offers no simple answers to these questions. Or, better put, it offers but one answer to them all: "yes." The subtle complexity here emerges more from Creager's determined archival spadework than a proclivity for theory. The "fugitive" and well-dispersed records (p. 10) of the U.S. Atomic Energy Commission (AEC) are at the core of *Life Atomic*, and Creager's subsequently thick historical description is a highlight of the book. In the first half, she describes how the Truman government presented radioisotopes as a peaceful benefit to be reaped from the otherwise grim harvest of souls following the nuclear attacks on Hiroshima and Nagasaki. Networks of radioisotope circulation predated the atom bomb and centered on E. O. Lawrence's Rad Lab at Berkeley (Ch. 2), which Creager analyzes in terms of a "gift exchange." Still, economics mattered, as Lawrence initially conceived of radioisotopes as a means to circumvent the high cost of radium therapy. This came to naught, but the low doses required to trace the absorption and excretion of radioisotopes through a living body intrigued physiologists. Military control of radioisotopes began in 1939, and the postwar management of the X-10 test reactor at Oak Ridge introduced the paradoxes of supply-side economics: the military (followed by the AEC in 1947) proceeded aggressively to tout the humanitarian and entrepreneurial potential of their surplus radioisotopes even while monopolizing production, regulating usage, and prohibiting export (Chs. 3 and 4). This awkward commodification of a public/private product was orchestrated to the triumphalist tune of an "atomic humanitarianism" offering new powers over physical and biological forces (Ch. 5). The Congressional hearings on radioactive fallout and the subsequent 1963 Test Ban Treaty started the reorientation of the AEC away from a focus on production and toward price-fixing, the better to enable private firms (GE, Union Carbide, New England Nuclear) to charge a premium for their already heavily subsidized radioisotopes (Ch. 6).

The second half of *Life Atomic* follows the expanding application of radioisotopes in biological research and medical therapeutics. Radioisotopes created novel experimental systems. Carbon dioxide tagged with carbon-14 helped elucidate the complexities of photosynthesis, while phosphorus-32 visualized the transfer of bacteriophage genes through multiple generations, conclusively identifying nucleic acid, rather than nucleoproteins, as the geneticist's holy grail (Ch. 7). The phage work was truly biomedical, in the sense that the phosphorus-32 system could as easily be applied to physiology (gene transfer) as to pathology (radiation-induced phage mutations or "suicide" experi-