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The book gives us a lively portrait not only of Bethe but also of physics in the ‘happy thirties’ (an expression coined by Bethe himself). The making of nuclear physics and the consolidation of theoretical physics internationally are part of the story of this book. The Jewish question also permeates the whole narrative. And the reader is given many long quotations from recollections and conversations with Bethe and his contemporaries, many of them from the Archive for the History of Quantum Physics and the later interviews project at the American Institute of Physics. After almost four hundred pages, however, the story ends abruptly with the beginning of the war. The reader is left wondering about Bethe’s activities and participation in the Manhattan Project. From this point of view, the book is yet another example of what some historians call the ‘historiography of the bomb’: a narrative of physics in which the atomic bomb is presented as an inevitable consequence of a supposedly pure physics in the previous two decades (thus the ‘happy thirties’) and for which physicists themselves were not at all accountable.

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On page 244 of Patrick McCray’s captivating book is an image from a 1999 publicity brochure for the emerging (and, as McCray reminds us, heavily contested) field of nanotechnology. The seemingly incongruous word ‘NANOTECHNOLOGY’ appears in the midst of a celestial scene replete with the Earth, the Moon, and a comet. The foreground initially seems like the surface of an alien planet – but the regular series of troughs and peaks represent an equally novel scientific and technological frontier at the scale of the very small rather than the very large. The project of ‘shaping the world atom by atom’ – the subtitle of that brochure – shared actors, strategies and anxieties with the ambition of colonizing space in more ways than one.

The visioneering of the book’s title refers to McCray’s belief in a distinction between merely imagining a future and taking concrete steps to making that vision a reality. His neologism, which combines ‘vision’ with ‘engineer’, is apt. Building is the central concept here: building networks of intellectual and financial support, building microscopes and prototype space transport systems, and building public interest through publications and like-minded groups. Such constructions also serve as ‘political statements’, argues McCray (p. 16), allowing historians to analyse debates over the future in terms of contests within specific historical contexts. Elements of future-building are inherent in a vast range of scientific and technological practices, and the importance of assembling social–political–technological networks to realize desired futures is not exactly novel, but the concept of visioneering nonetheless provides a sound narrative anchor that focuses attention on the critical intersection between dreaming and doing.

The book’s first chapter focuses on the Club of Rome’s (in)famous 1972 report The Limits to Growth, which in McCray’s view served both as the culmination of 1960s concerns over the future of American society and as a catalyst for alternatives to a resource crunch. Among those responses was the proposal of the Princeton physicist Gerard O’Neill that humans found space colonies, the subject of Chapters 2 and 3. Drawing on access to O’Neill’s privately held papers, in addition to other sources, McCray paints a sympathetic portrait of a man who dreamed of transcending the limits posed by the Earth’s finite resources – and who took a range of steps toward making those dreams a reality. Like his colleague Freeman Dyson, O’Neill worked on designs for the vehicles that would transport and sustain humans in outer space. The ‘castles in the sky’ of the third
chapter’s title might appear castles in the air from the vantage point of the early twenty-first century but, as McCray argues, O’Neill augmented detailed engineering plans with an advocacy campaign that attracted significant public attention.

Chapter 4 is perhaps the most important in the book, for it is here that the intersection between space colonies and libertarian ideologies is first fully addressed. Escape from the limits to growth could also be a means of escaping from limits to political and social freedom. The late science magazine *Omni* (founded by the more recently departed Bob Guccione, proprietor of *Penthouse* magazine) is introduced as a forum that coupled science with science fiction. Whether that forum did more than feed imaginations is unclear, however, especially as McCray notes that *Omni’s* coverage of O’Neill’s plans for space colonies coincided with a shift in O’Neill’s focus—particularly toward geolocation technologies—and an increasing acceptance of militarization and national security amongst space enthusiasts. McCray’s poignant description of O’Neill’s ashes being sent into space in 1997 captures the sense of a life’s mission left incomplete.

Nanotechnology forms the backbone for Chapters 5 to 7. K. Eric Drexler, one-time student and disciple of O’Neill and prominent advocate of nano-scale science and technology, plays a key role in the narrative. McCray describes Drexler’s work on the solar sail, a means of propelling a spacecraft by the force of photons, as an example of visioneering through a combination of detailed technical studies—rooted in the possible—and building a community of supporters. In the late 1970s Drexler began to consider how biological systems might provide the structure for self-replicating machines at the very smallest scales. Again his work combined scientific and technical argumentation (much of it resisted by peers on the basis that Drexler could not ground his plans in the level of detail they desired) with public outreach, notably through the 1986 book *Engines of Creation*. McCray argues convincingly that Drexler played a key role in the development of nanotechnology and in describing a ‘nanotechnological future’ (p. 182), while failing to inscribe his vision upon the boom in funding for nanotechnology in the early twenty-first century. McCray’s description of how the chemist Richard E. Smalley envisioned a different form of nanotechnology—one rooted in physical and chemical rather than biological structures—draws skillfully on the social as well as the scientific divergences in their approaches.

McCray concludes with a thought-provoking assessment of the social contexts in which visioneers can thrive, with explicit attention to the location of technological visions within polities, whose interests as a whole may not (or may) be best served by the advance of the few. The libertarian streak of such activities reaffirms a sense that the visioneering described by McCray is quintessentially American in character. Whether similar stories could be told elsewhere remains a question worth exploring. In the meantime, historians of contemporary science, technology and popular culture—in addition to a wide non-academic audience—will find much to savour in this rich and well-written book.

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This book presents the proceedings of an interdisciplinary international conference, held at Ulm University in 2010, which aimed to reflect philosophically on the multifaceted origins of medical images of the human body and their role in diagnosis. It is divided into four parts. In Part I, two papers elaborate on technical descriptions of the main technologies used to visualize the human body internalities, such as X-rays, magnetic resonance imaging (MRI), ultrasound and many