the search for the conodont animal promises to be of great interest to specialist historians of the earth sciences. Among the study's most interesting contributions is the way it relates the material and theoretical aspects of paleontology, blurring the boundary between what a fossil is and what people understand it to be. One of the most compelling examples concerns a split in the way conodont fossils came to be used by stratigraphically minded geologists and more biologically inclined paleontologists during the early twentieth century. Because conodonts are so numerous and widespread, they came to be recognized as excellent index fossils, tools with which to correlate two stratigraphic layers located in different parts of the world. This made them especially important for petroleum geologists tasked with determining the relative age of a particular rock formation. At the same time, a number of paleontologists, including Harold Scott from the University of Illinois, were beginning to imagine various conodont fossils as having fit together and formed larger assemblages. The 1930s thus saw the same material objects take on two different identities, one biological and the other more utilitarian. Not only were they distinct, but these two identities were often at odds with each other. For example, the biological conodont became increasingly meaningful, as more and more individual fossils were associated with one another. In contrast, the stratigraphic conodonts' utility was maximized by maintaining clear-cut distinctions between each fossil, uniquely locating them in a particular geological horizon. In the decades that followed, people working on conodonts went so far as to begin arguing about the adoption of separate nomenclatures to distinguish between individual, utilitarian fossils and the putative biological organisms to which these were thought to belong.

Overall, then, *The Great Fossil Enigma* has much to offer historians of geology and paleontology. It is not, however, without its shortcomings. By his own admission, its author "wanted to explain fossils and their place in society not in terms of a history of ideas but more holistically." Identifying himself as a "museologist and cultural historian," Knell explains that he is more concerned with what the search for the conodont animal reveals about "the relationships between people, objects, and practices" than with the "contributions these fossils made to science" (p. xiii). As such, it is unfortunate that Knell's account, rich in detail though parts of it are, often fails to ground the history of conodont paleontology within a broader social and cultural context. Some of the difficulty may lie in the book's ambitious scope, which covers at least three continents (Europe, North America, and Africa) and 150 years. Each chapter introduces readers to a bevy of new names and discoveries, without always doing sufficient work to give a detailed sense of how the community of scientists who studied conodont fossils functioned and how its members related to one another. As such, although Knell takes pains to identify by name all of the paleontologists who debated the conodont animal's true nature, this book does not quite succeed as a cultural history. Indeed, despite Knell's own insistence that he did not attempt to produce a history of ideas, the latter may well serve as the best way to categorize the book he has written. These flaws notwithstanding, this volume contains a wealth of valuable information, and its author should be commended for the work he has done in bringing this complex and fascinating story to the attention of historians of science.

LUKAS RIEPPEL

Nikolai Krementsov. *A Martian Stranded on Earth: Alexander Bogdanov, Blood Transfusions, and Proletarian Science*. 184 pp., illus., bibl., index. Chicago/London: University of Chicago Press, 2011. $35 (cloth).

One of the most intriguing figures of the Russian revolutionary period, Alexander Alexandrovskii Bogdanov (1873–1928), born Malinovskii, was second only to Lenin as an influence within early Bolshevism. Bogdanov was also a significant cultural and organizational theorist and a writer of science fiction, to which the title of Nikolai Krementsov's book alludes. In contrast to the apparent single-mindedness of Lenin and Stalin, Bogdanov thought and acted broadly; indeed, Krementsov argues that the juxtaposition of his interests was unique. His seeming eclecticism has been both an inspiration and a challenge for Bogdanov's contemporaries and for scholars.

Quite a "Bogdanov industry" grew up in the 1980s. His major works were republished and translated, while his political activity and cultural theorizing were analyzed. Especially under the impetus of *glasnost'*, his alternative Marxist politics were scrutinized carefully. Just as Nikolai Bukharin seemed in the 1920s to present another path to socialism than Stalinism, so before the revolution Bogdanov promised a more culturally oriented Russian Marxism than Leninism. Bogdanov's greatest and longest-lasting contribution was tectology, a worldview that anticipated systems theory.

By profession, and intermittently in practice, Bogdanov was a medical doctor. As such, he championed the transfusion of blood, not just as an increasingly viable technique but as potentially transformative of society. This "comradely exchange of life" (pp. 45, 48) was a path to both individual longevity and greater collectivism. In the Baconian manner, he died for his scientific ideals—in this case from a transfusion experiment that went wrong. Yet although Bogdanov's enthusiasm for transfusion was long lasting and, ultimately, fatal, his involvement with it was occasional, his research flawed and superficial. Even his appointment in 1926 as the first director of the Soviet institute for blood transfusion was a happy coincidence. Appropriately, with just 127 pages of text, *A Martian Stranded on Earth: Alexander Bogdanov, Blood Transfusions, and Proletarian Science* is a short book. Blood transfusion was one of the remoter corners of Bogdanov's work, unlikely to sustain a longer analysis.

The manuscript itself was written in just five weeks, which gives it freshness and coherence. However, Krementsov has been pondering Bogdanov for a while. The relationship of this book to Krementsov's planned general account of early Soviet medical science somewhat resembles his earlier pairing of *The Cure* (Chicago, 2002), a sharply focused, detailed analysis of the research and politics of a Soviet anticancer drug in the later 1940s, with his *Stalinist Science* (Princeton, 1996), a broad survey of the intersection of the sciences, especially the life sciences, with the politics of the early Cold War.

Krementsov concedes that Bogdanov failed as a transfusiologist: he was a politician whose deep belief in science lay at the core of his politics, yet his understanding of science was too shallow to make him a credible researcher. He was not really even a technocrat. Just as Stalin, Molotov, and other Soviet leaders who retained their secretive, even conspiratorial, practices into the 1930s never left the Bolshevik underground politically, so Bogdanov never left it scientifically. His understanding of scientific research was subtly constricted by his experience in that conspiratorial milieu. For him, the research collective was simply a "circle of comrades" (p. 119), not Big Science with its institutional hierarchy and complex rules of clinical cooperation. Above all, research relations were personalistic.

Despite Bogdanov's limitations, *A Martian Stranded on Earth* persuades that his work in this area should not remain obscure. As an eminent Bolshevik, Bogdanov's presence was decisive for transfusiology in the moment of transition to Big Science in Soviet medical research in the later 1920s. In the hands of his more practical successor, Alexander Bogomolets, the transfusion institute anchored a mass network that assumed critical importance in World War II. One wonders about the role of the transfusion institute in the transition of Soviet medical research overall to Big Science, given that other institutes were founded or expanded at that time, but no doubt the relationship between them will be clarified in Krementsov's future survey. Bogdanov emerges from this marvelous study as inconsistent rather than eclectic. While Bogdanov's own research effort failed to meet his call that science be more practical, Krementsov nevertheless pinpoints the instrumental turn of Soviet science, especially under Stalin, as originating with his idea of "proletarian science." Although its intellectual origins were not acknowledged, Stalinist science was Bogdanovite.

CHRISTOPHER BURTON

Don Leggett; Richard Dunn (Editors). *Reinventing the Ship: Science, Technology, and the Maritime World, 1800–1918.* xiii + 224 pp., illus., index. Surrey: Ashgate, 2012. $124.95 (cloth).

This is an important work that belongs on the bookshelves of research libraries and historians, despite the eye-popping price of $124.95 that will, lamentably, make it harder to justify to gimlet-eyed bursars in this age of austerity. The justification is this: Don Leggett and Richard Dunn have assembled a crack team of scholars that moves the burgeoning field of maritime technology out of its "guns, steam, and steel" adolescence and into cultural maturity. "Between 1800 and 1914, Britain's ships were reinvented," declare the editors (p. 1). The essays that follow dissect this reinvention, along the way dispelling the maritime myths of heroic inventors and technological determinism, instead focusing on networks between engineering, politics, economics, and society.

Several of the essays follow the "maritime networks of trust" framework pioneered at the University of Kent. Crosbie Smith, the doyen of this approach, focuses his paper on the 1841 Royal Mail contracts for fourteen oceangoing steamers made with John Scott Russell's shipyard. The first purpose-built oceangoing steamship had come on the scene only three years earlier, so there was a lack of knowledge of what went into such a vessel. Requirements changed constantly; responsibility continued to shift be-