

Sporadic mining and smelting episodes during the early 1900s are discussed in appropriate detail, the significance being that not many locations in the Eastern U.S. feature as many as nine distinct copper-smelting campaigns. This coverage sets the stage for the final and most significant production from the Elizabeth Mine.

Renovated and developed to provide badly needed copper during World War II, in 1943 the mine started a final fifteen-year run using froth flotation. This period of the Elizabeth's history is well-described, with some of the mining and milling technology explained and illustrated. The acid mine drainage emanating from the large tailings pile since the mine's closure in 1958 necessitated the cleanup a generation later to improve local water quality.

The final portion of the book covers the steps of the lengthy EPA cleanup process, highlighting archeological investigation and preservation efforts. Readers will find this documentation quite interesting, as archeological investigations of historic copperas factories are rare. This section includes some helpful maps of the underground mine in relation to the surface and to the mine plant at the site, as well as ore movement and processing diagrams meant to illustrate technical details for the lay reader.

From Copperas to Cleanup includes numerous illustrations, from woodcuts to portraits. The reader will encounter both black-and-white and color period photographs, maps, and diagrams, as well as recent photos of the cleanup and archeological investigations while site work progressed. Several brief sidebar segments explain technological or historical details to educate the general public in topics more experienced mining historians may take for granted or need refreshing about anyway.

A popular report prepared under National Historic Preservation Act requirements certainly has its limitations. This one was not just prepared by some consultant with a contract, a budget, and a time limit, but by one knowledgeable of the his-

tory for a start, forced to pare two centuries of material down to its most important and interesting aspects. Well-conceived and written, *From Copperas to Cleanup* may just serve to whet the appetite of mining historians for more such work regarding mine site cleanups, as well as inform the general public of the overall history of a significant reclaimed copper mining site.

Johnny Johnsson
Finksburg, Maryland

Kent A. Curtis. *Gambling on Ore: The Nature of Metal Mining in the United States, 1860-1910*. Boulder: University Press of Colorado, 2013; 288 pp., 22 b&w photos, 3 line drawings, 4 maps, notes, bib., ind., cloth, \$40. ISBN: 9781607322344

In *Gambling on Ore*, Kent Curtis makes the compelling claim that the "nature" of the culture of producing gold, silver, and copper in the American West forged a national "mining society." To support this assertion, he revisits the well-worn narrative of Montana mining history. He argues that the placer industry initially formulated a "gold mining system" in the 1860s that became a template for dealing with as well as expanding the "uncertainties" of finding the precious metal. This "system" led to the establishment of mining districts that further exacerbated those uncertainties, and instigated rushes that drew tens of thousands of gold seekers, creating even more uncertainties in the emerging political economy.

This gold-mining standard based on taking risks pervaded the silver and copper eras of the 1870s to 1900s period. It empowered the industry to influence national mining laws, to give the appearance of legitimacy by evoking mining engineering as a science to mask monopolistic business practices, and to create markets for its products, especially copper.

According to *Gambling on Ore*, one "nature" of the copper industry was its efforts to create an

artificial demand for copper in the 1880s that antedated the age of electricity. The book faults “mining historians” for claiming that the proliferation of electricity created the unprecedented demand. It further claims that these same scholars have failed to see the links between mining’s emerging power and its influence on the origins of legal, business, and environmental laws and practices concerning natural resources in the United States.

Such criticisms are overstated, however. Mining historians, beginning with Charles Howard Shinn, have written on the key role of mining in the U.S. and the rest of the world for more than a century. Furthermore, mining historians, as well as mining officials, mining geologists, mining engineers, mining workers—all—have been acutely aware of the systematic efforts of the industry both to address the uncertainties (or risks) of mining and to produce new uncertainties, sometimes to take advantage of others, at other times in a genuine effort to behave above board.

A more careful examination of Clark Spence’s classic study on mining engineers, for example, would reveal these dualistic, alternating unethical and ethical mining practices; Eric Clements’ *After the Boom* would show the dangers of this system for communities and their natures; Gordon Bakken’s book on the Mining Law of 1872 reveals the legal power of the industry; Eric Nystrom’s work on mining engineers’ underground mapping would have enriched his discussion of the role of geology in formulating a mining society; other works on the industry’s conservation practices might have informed his analysis and helped to substantiate the industry’s inordinate influence in natural resource policy and the nature of its history.

In fact, the risk-taking mining culture has long been examined and analyzed by historians who have carefully argued that the industry has forged a modern society providing the metals necessary for innovative technologies like electricity, automobiles, airplanes, and computers. Moreover,

a more careful examination of mining histories would have brought greater breadth and depth to *Gambling on Ore*. Unfortunately, this inattention to this subfield of history reflects a disconcerting trend among environmental and western historians generally, who choose either to ignore traditional mining histories—and articles in the *Mining History Journal*—or simply fail to dig deeply enough into the rich veins of mining history.

MHA members may find Curtis’ arguments for a “mining society” enticing, however, for the logical reason that mining is at the society’s core. His reductionist interpretive approach, on the other hand, might lead to the conclusion that even more rudimentary human “natures” were at the heart of this “system.” Greed is the most basic deconstructionist example; Marxists might credit capitalists with the formulation of the mining society; or maybe, science could be at the center of it. In the end, Curtis espouses a declensionist interpretation that ignores the diverse social ecology that is certainly a key feature of the nature of the mining society.

Regardless, Curtis’ well-written, flowing prose makes for informative and interesting reading. His analysis of mining engineers and geologists offers a new layer of inquiry. He rightly claims that mining engineers—featuring Rossiter Raymond and the first generation of Freiberg-trained Americans—devised an environmental knowledge of nature, producing a new understanding of the “nature” of the subterranean world. Theoretical and practical examination of the Earth’s substratum, he confirms, deepens history’s understanding of nature. It also reflects the use of industry experts to create the impression among legislators, judges, and investors that their “science,” infused with uncertainties like the industry itself, was a legitimate source for corporate mining’s path to securing legal rights over others in society in the name of consolidated economic power.

This trend is highlighted in his discussion of mining’s impact on water rights, water pollution, and, to a lesser degree, air issues. Focus-

ing on court cases against the Anaconda Copper Company, Curtis reveals the industry's strategies for controlling land, water, and air resources and how the courts were complicit in redefining water rights favorably to industry. Riparian rights that fostered shared use of water based on the "social good" model were subverted in court rulings and reformulated as the prior-appropriation doctrine. The new creed clearly favored the rights of big mining over those of individuals to the precious liquid. Curtis could have broadened and refined his argument if he had examined corporate conservation strategies, which were almost always first focused on water. He also could have shown how industrial conservation had little to do with protecting the environment and was designed to maximize the extraction of as much ore of ever-decreasing grades as possible.

Curtis might also have considered examining, at least in passing, the nature of the mining industry after his concluding decade of the 1900s. Even a cursory discussion of the future would have revealed that eventually mining, rather than continuing in its unilateral, self-serving practices of creating uncertainties to protect corporate economic hegemony, reformed its practices to reduce the risks. Industry officials even began to make public disclosures about particular uncertainties, like the planned demise of towns that sat atop ore reserves, understanding the value of eliminating uncertainties acceptable in earlier generations. A comparison of mining engineers' conservation ethic and practices with those of foresters in the era of the gospel of efficiency would have revealed shared natural resource management strategies across industries. Lastly, miners and their "natures" are conspicuously missing from Curtis's narrative and surely they have been vital principals in the formation of the "mining society." An examination of these factors also would have revealed that the "controlled uncertainty" (198) that he hopes for has already been an industry-wide goal for generations, albeit with sometimes controversial results.

Gambling on Ore gives mining a more important place in history. It concludes, "The lesson I learned while researching this project is that we are all miners in the modern world, that mining made us possible" (xi-xii). Curtis' intellectual transformation dispatches his initial inclination as a graduate student to demonize mining, and the resulting book unveils a sensible understanding of the nature of the industry's history in Montana. This balanced approach should be valued and replicated by other environmental historians who venture into mining history. Despite some oversights, this volume should be very appealing to mining, western, business, and environmental historians with an interest in the industry and its impact in global history.

Chris Huggard
Fayetteville, Arkansas

Peter Alexander, et al. *Marikana: Voices from South Africa's Mining Massacre*. Athens: Ohio University Press, 2013; 165 pp., 14 b&w photos, 5 maps, chap. notes, paper, \$22. ISBN: 9780821420713

On 16 August 2012, thirty-four black South African mineworkers were killed and seventy-eight wounded when police opened fire on strikers demanding living wages at the Lonmin Mines in Marikana. Less than a year after the massacre, Lonmin, the UK-owned, third-largest primary platinum producer in the world, reported a pretax profit of \$54 million. The transnational company pays its chief executives multimillion rand salaries. The struggles of black South African workers against exploitative, unjust, and violent capitalist and state structures form the basis of *Marikana: Voices from South Africa's Mining Massacre*.

In this collection of oral testimonies, interviews, speeches, maps of the area, and images of the strike and its aftermath, Johannesburg scholars, researchers, and activists Peter Alexander, Luke Sinwell, Thapelo Lekgowa, Botswana