

BOOK REVIEWS

The Ubiquity of Coal in the Mid-Atlantic

Home Fires: How Americans Kept Warm in the Nineteenth Century. By SEAN PATRICK ADAMS. How Things Worked series. (Baltimore: Johns Hopkins University Press, 2014. 200 pp. Illustrations, maps, notes, index. Cloth, \$44.95; paper, \$22.95.)

Fueling the Gilded Age: Railroads, Miners, and Disorder in Pennsylvania Coal Country. By ANDREW B. ARNOLD. Culture, Labor, History series. (New York: New York University Press, 2014. 286 pp. Illustrations, notes, index. \$49.)

Routes of Power: Energy and Modern America. By CHRISTOPHER F. JONES. (Cambridge, MA: Harvard University Press, 2014. 320 pp. Illustrations, maps, notes, index. \$39.)

I RECENTLY FOUND MYSELF in front of an exhibit of cast iron stoves at the Cumberland County Historical Society, thinking about the social systems embedded in their bulky forms. The display included an early nineteenth-century “ten-plate” model made by Peter Ege at nearby Pine Grove Furnace. This stove, which took advantage of manufacturing innovations to include a small oven, emerged out of a pivotal moment in the nation’s first energy transition. German immigrants were accustomed to using stoves for home heating, though not for cooking, but immigrants from England’s milder climate brought with them a cultural attitude that valued the less effective open fireplace and did not heat with stoves even during the cold winters of their new home. Urban residents increasingly shifted to more efficient stoves as easy access to wood supplies slowly declined—a decline that in turn laid the foundation for even more profound transitions to coal, natural gas, oil, and, eventually, electricity. At each stage, a number of recent works have argued, the mid-Atlantic region, marked by its entrepreneurial spirit as well as its enormous mineral

resources, shaped this process as it slowly gave rise to the energy intensity of our contemporary world.

Taking stoves such as Pine Grove Furnace's ten-plate as his inspiration, Sean Patrick Adams links the domestic hearth of the average family living in one of the nation's growing cities with the broader process of industrialization. In *Home Fires: How Americans Kept Warm in the Nineteenth Century*, he puts to rest the notion that the move from wood to coal for home heating was either a product of simple market forces or the result of a singular breakthrough technology, such as Ben Franklin's famous "Pennsylvanian fireplace" (which, it turns out, blew smoke into the room and required constant tending). Explaining the rise of the "industrial hearth," as the author describes it, instead requires attention to the enormous capital and labor expended in transporting anthracite over hundreds of miles, the dirty and dangerous work done in iron works and coal mines, and "the bare-knuckle negotiations between colliers, railroads, wholesalers, and customers" (9). After overcoming the bias toward open fires, energy entrepreneurs faced technological hurdles in manufacturing effective appliances. These problems were not resolved until new transportation systems helped move the iron production process closer to retail customers. The substitution of finicky anthracite for wood took several more decades to achieve and "required a sustained transformation of everyday household practices on par with the most radical changes that the Industrial Revolution brought to the workplace" (41).

As the first volume in Johns Hopkins University Press's new *How Things Worked* series, the book is accessible, appropriately succinct, and modestly illustrated. Despite the expansive title, Adams makes clear that his story is really about the subset of Americans living in the urbanized Northeast and Great Lakes regions, where cold winters and dense populations drove the transition away from wood heat. Indeed, even as urban attitudes began to shift, coal's ascendancy over wood required first that the anthracite coal-fields of northeastern Pennsylvania be connected to the Atlantic seaboard by canals and then that the cost of coal be driven down by both cutthroat competition and the labor repression epitomized by the infamous Molly Maguire trials. In *Fueling the Gilded Age: Railroads, Miners, and Disorder in Pennsylvania Coal Country*, Andrew Arnold picks up the story of coal's rise in the closing decades of the nineteenth century, but shifts attention to central Pennsylvania, especially Clearfield County, a hundred miles northeast of Pittsburgh. Arnold chronicles the workers, mine owners, and railroad

men who jostled for control of the region's high-quality bituminous coal even as industrial consumers gradually shifted to the enormous reserves of southwestern Pennsylvania and West Virginia for their coal. His goal is to unravel the complex, mutually dependent relationship between coal and railroads at the heart of the American industrial revolution as well as to explore the often overlooked agency of miners and operators in shaping the age of steam. Of course, their actions often manifested as resistance to the tidy plans of railroad managers seeking predictability and profitability, but Arnold emphasizes a "constructive role" in developing the ideas and systems at the root of industrial capitalism (6).

Fueling the Gilded Age's three sections focus on the ways in which these important constituencies tried and failed to impose their own visions of coalfield order by cooperating at some points and competing at others. Part 1, "Hubris," begins with a landmark strike in 1872 that undermined the tenuous balance of power in Clearfield County, traces the collapse of formal miners' unions under the weight of pernicious legal decisions, and concludes with the rise of the secretive Knights of Labor among a group of entrenched activists that were "well-regarded as leaders by the coal miners, and well-respected as permanent members of the community" (86). This partial victory for workers in the face of what appeared to be organized labor's total defeat was made possible, in part, by the rebellion of regional coal operators against the attempt of the railroads to impose price concessions—a story explored in part 2, "Humility." Amid the infamous labor violence of 1886's Great Upheaval, Arnold unearths an important compromise that allowed elected representatives to monitor company weighmen at each coal tipple. This agreement moved central Pennsylvania's operators and miners toward a pragmatic relationship "that was more functional than revolutionary" (115). The book's final part, "Stalemate," traces uneasy settlements achieved by the new United Mine Workers of America, the Seaboard Coal Association, and consolidated networks of the Pennsylvania and New York Central railroads that "froze a disorderly system in place" near the turn of the century (219).

Whereas Arnold begins with coal production and Adams frames his tale around domestic consumption, Christopher F. Jones in *Routes of Power: Energy and Modern America*, looks at the spaces in between, arguing that the "roots of America's energy transitions can be found in the building of routes along which coal, oil, and electricity were shipped" (2). In this story, as a result of decisions by entrepreneurs, industrialists, and political leaders

to ship energy long distances rather than build factories near sources of power, the mid-Atlantic played a pivotal role in shaping new energy systems in the United States. Sustaining energy transitions required a positive feedback loop between economic investments in transportation infrastructure, the actions of humans who benefited from these new arrangements, and new consumption practices that locked them into place—social, cultural, and environmental-technological frameworks Jones describes as “landscapes of intensification” (8). He begins with the anthracite fields of northeastern Pennsylvania, where transportation boosters sought to make their fortunes by developing canals along the Lehigh and Schuylkill Rivers that would link mines to the growing markets of the Eastern Seaboard. In a pattern repeated in subsequent energy transitions, the supply of cheap fuel drove demand as Americans began to “create new relationships between energy and society that were facilitating the sustained growth of an urban and industrial economy” (60).

For Jones, the rise of oil was another step toward this new mineral energy regime as the desire for better and cheaper artificial lighting and effective lubricants for bigger and faster factory equipment drove oil-field innovation. This, in turn, was made possible by the steam pumps, cheap iron for well casings, and railroad networks that had been founded upon the availability of cheap coal. The liquid properties of oil allowed greater abstraction and commodification of natural resources, as increasingly sophisticated pumps and the construction of pipelines required less and less direct human intervention in the production and transportation processes.

The final third of the book focuses on the damming of the lower Susquehanna River for electrical production in the first decades of the twentieth century. While the use of water power could be considered an update of the earlier organic regime, in Jones’s telling it becomes, instead, a hybrid energy system with users located far from the energy source, dam construction that required the use of mineral energy resources, and a distribution system that reinforced consumption patterns established by the use of coal and oil.

Taken together, these books suggest three key aspects framing the history of coal in Pennsylvania. First and foremost is its ubiquity. The enormous wealth of anthracite and bituminous coal offered both opportunities and challenges as the relatively low threshold for entering the industry drove fierce competition over price and made it virtually impossible for

even a group of powerful producers to fully control the market. While each of the authors grapples with this issue in one way or another, a key gap in the three volumes is the lack of systematic attention to the vast bituminous fields of northern Appalachia. I found it odd, for example, that an introductory map in *Routes of Power* labeled “Mid-Atlantic energy sources” ignores bituminous coal entirely (7), but the issue is most significant in *Fueling the Gilded Age*. Arnold never fully explains how his focus on a relatively small area of central Pennsylvania relates to the broader mining area of which it was a part. Arnold is at his best when unraveling the complicated legal decisions that took place on a variety of levels—for example, in explaining the legal basis for the county-by-county development of the system of checkweighmen. However, the haphazard explication of local and regional contexts, exemplified by the complete absence of maps in the volume, partly undercuts his analytical framework and results in a narrative that is too choppy to be fully effective.

Second, these three works make it clear that coal production cannot be understood unless equal attention is paid to the transportation systems that moved energy to consumers. The rise of coal was connected intimately with the canals and especially the railroads that carried it to distant markets. The economic logic of mineral energy meant that increased use did not require the types of social trade-offs necessitated by earlier organic regimes, where the amount of accessible land set aside for the growth of forests limited urban concentrations and industrial growth. Further, by first increasing the distance between energy production and consumption and later by obscuring even its transportation by burying pipelines and transforming dirty fossil fuels into clean electricity, it became that much easier for users to ignore environmental and social costs suffered by rural “sacrifice zones,” as Jones dubs them (12). One area left to explore (that is only suggested by Jones) is the increase of coal-by-wire power production that, especially after World War II, connected rural mid-Atlantic communities to ever more distant consumers.

Finally, understanding the ebbs and flows of coal production requires exploring a whole range of technological, social, political, and cultural networks. The energy regimes established in the transition to mineral energy have proven remarkably resilient—even forcing non-fossil-fuel resources, such as hydroelectric, solar, and nuclear power, to conform to consumption patterns and delivery systems predicated on unlimited, always accessible, and invisible power. Both Jones and Adams explicitly connect their stories

of energy transitions in the nineteenth and early twentieth centuries to the current debate over the future of coal amid environmental concerns ranging from mercury emissions to global warming. *Home Fires*, especially, would have benefitted from a greater use of the lens of environmental history, with its emphasis on the back and forth between humans and the rest of nature. That said, Adams makes a strong case for the need to understand technological change as consisting of both material improvements in the process of doing things and the social, political, and cultural structures necessary for those changes to happen. Indeed, his book concludes with a story that illustrates the complicated factors necessary for new technologies to catch on by focusing on district steam heat—an energy transition that failed to take off.

In the end we remain, as Adams declares of the 1860s, enmeshed in an energy regime in which individuals may choose alternative ways of consuming power, but in which scaling those alternatives up to the regional or even community level would cause widespread social disruption. On the other hand, the history of coal in the region reminds us that while the process may be slow, energy transitions are possible given the right combination of political will, social awareness, and technological innovation. In any event, the ubiquity of coal in the mid-Atlantic, as well as the region's prime position bridging the resource fields of the Appalachian Plateau (which now also includes the wind farms of the Allegheny Ridge and the fracking rigs of the shale gas boom) and the population centers of the Atlantic Coast, means that this landscape will continue to play a pivotal role in the history of energy.

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