The Energy Capital of the World:
A History of Grass, Oil, and Coal in the Powder River Basin

By

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"All right, it all comes back to this question of energy doesn't it, a concept that can't be understood without a grasp of the second law of, yes? Can't you hear me in the back there?"

—William Gaddis, *JR*

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ABSTRACT

From coal to oil, from wind to uranium, the American West has long been an important node of American energy extraction. This has become increasingly true over the last few decades, as thermodynamic havens such as the Bakken oil fields and the Gillette area coal mines have entered onto the global stage. Nevertheless, there has been little scholarship on the role that such energy production has played in the history of the region. This dissertation addresses this absence by taking one small slice of the West—the Powder River Basin, a geological declivity that spans across parts of northeastern Wyoming and southeastern Montana—and using it as a spatial lens through which to examine the region's thermodynamic past. Employing a bioregional framework, it examines the basin through a deep time scale, homing on particular energy sources and transitional moments. Each chapter takes as its subject a formative event in the history of the American West and the basin more specifically. It begins with the rise and fall of the nineteenth-century Crow, examining the tribe's unrecognized role as protectors and benefactors of a thermodynamic utopia in the midst of one of the most unforgiving environments on the continent. It then moves to the paradigmatic range conflict of western lore, the Johnson County War, revealing the deep energetic roots of the quarrel. Next, it analyzes the greatest political scandal in American history, the Teapot Dome affair, showing its complex imbrication in the region's early oil industry and its broader

thermodynamic past. Finally, it addresses the modern Gillette coal empire—since the 1970s the largest energy producer in the world—unearthing a history of attempts to market the region's unique low-sulfur coal that reaches back to the early-twentieth century. By analyzing diaries, newspaper articles, oral histories, company records, environmental reports, and government documents, this work challenges current beliefs about the role of energy in the history of the region. Using a thermodynamic lens through which to view that past, it overturns the long-accepted paradigm of boom and bust as a model for understanding historical development in the American West, replacing it with one of continuity and cyclical change. Instead of a region of aridity and romanticized conflicts, it presents the West as one of the energy capitals of the world, thereby establishing a new paradigm for its place in American history.

INTRODUCTION

The Buried History of Western Energy

On the edge of a prairie meadow, wedged down into the southeastern corner of the Montana plains, there sits a massive pile of bleached bones. Some of them are so bright that they are hard to look at, an incandescent white from extended exposure to the sun, though most are more of an old-coin gray, with bits of terrestrial residue caked to their surface like mold. Piled together in a haphazard manner, they have that swollen-silhouette-look of an average county dump; move closer, though, and you can see that they are animal remains—bison to be exact—the last organic vestiges of thousands of indigenous hunts in what is now southeastern Montana. And there are so many of them because of this precise location, within a narrow drainage basin, abutting a horseshoe of eroded sandstone, at the point where geography and hunting efficiency auspiciously collide. It is in the bosom of a mythic country: just north of the Bozeman Trail, east of Little Bighorn, and west of Devil's Tower. Moreover, it is in the energetic heart of the world, in the midst of the largest coal mines the planet has ever seen.

This place, the Sarpy Creek Bison Kill Site, a 2,000-year-old relic on the Crow Indian Reservation, was inadvertently uncovered amidst a surge in coalfield expansion in 2005, as various companies sought to satiate an ever-increasing domestic and foreign demand for affordable energy. The outfit operating the excavation, the Colorado-based

Westmoreland Coal Company, had long been a major economic player on the Crow Reservation, owning the strip mine that, since the 1970s, had steadily grown into a quiet if reliable producer of coal, perennially hovering around the top twenty domestic producers.[1] Operating some two-dozen mines across the United States and Canada, Westmoreland leased the land via public auction from the Crow Nation. In return, the Crow received royalties amounting to approximately two-thirds of the tribe's annual budget.[2] As with so many relationships between local communities and multi-national corporations, there were certainly problems, with each side often feeling that they were not getting their due. But if not a perfect relationship, it was, up to this point, at least a marginally symbiotic one, a partnership with thirty-plus years of contractual history undergirding it.[3]

But the bones changed all of this. In line with the 2008 Data Recovery Plan—a federal-level legal agreement approved by the Tribal Historic Preservation Office, Westmoreland, the Bureau of Indian Affairs, and the Office of Surface Mining—Westmoreland consulted with a handful of Crow tribal members, most notably Tribal Historic Preservation Officer Dale Old Horn. They then contracted the recovery work to G.C.M. Services, a small company specializing in archaeological and historical research management headed by one Gene Munson, who had been conducting mineral-related

[1] In 2014, it produced 6,557,844 short tons, compared to nation's (and world's) largest mine, the North Antelope Rochelle Mine, just outside of Gillette, which produced 117,965,515 short tons. U.S. Department of Energy. U. S. Energy Information Administration. *Annual Coal Report 2014*. By Lance Harris, JanAlyse Arena, Sundar Thapa, and Brian Park (Washington, D.C.: United States government Printing Office, 2016), 15.

[2] Levi Flinn, "Crow Tribe General Council Meeting," *Big Horn County News* (Hardin, MT), October 29, 2015.

[3] The vexed history of Crow (and Northern Cheyenne) political relations with coal companies and the United States government over the past fifty years is admirably detailed in James Robert Allison III, *Sovereignty for Survival: American Energy Development and Indian Self-Determination* (Yale University Press, 2015).

excavations on the northern plains since the late seventies.[4] Over the course of the next two summers, the company quietly excavated the site, eventually unearthing more than 30,000 pounds of bones and 13,000 pounds of fire-cracked rock, most in the form of atlatl darts, the weapon of choice for Late Archaic Peoples (3,000-1,600 years before present). When the excavation was complete, they filled a semitrailer with the most historically valuable materials, then used a backhoe to consolidate the remaining bones and rock—what had been deemed "redundant material"—into a pile abutting the pit. From there the expansion continued on as planned, with the new annex preparing to go online within the next few years.[5]

Four years later, in the summer of 2012, word of the bones began to trickle out to the rest of the tribe.[6] Within a few weeks, a handful of local and national media outlets had picked up the story, and archaeological and anthropological specialists were brought in to survey the cultural rubble. *Outside* magazine ran a feature piece in their November

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[4] "GCM Staff," http://gcmservicesinc.blogspot.com/p/gcm-staff.html. Accessed August 15, 2017. The requisite work here was archaeological, in order to survey the proposed area of excavation "to recognize, save, and protect historic places in communities all over the United States." Since 1996, Indian nations have been able to apply for funding through the Historic Preservation Fund whereby they sign an agreement with the National Park Service that funds this work via a Tribal Historic Preservation Officer whose job is "to protect and conserve important Tribal cultural and historic assets sites." National Conference of State Historic Preservation Officers, "Historic Preservation Fund," http://ncshpo.org/issues/historic-preservation-fund/. Accessed October 15, 2018; "Tribal Historic Preservation Grants," National Park Service, https://www.nps.gov/thpo/grants/index.html. Accessed October 15, 2018. In yet another instance of thermodynamic circularity, "Funding for the HPF does not come from taxpayer dollars, but rather from offshore oil and gas lease revenues. The idea is that the use of one non-renewable resource is somewhat counter-balanced by the benefits of preserving other irreplaceable resources." National Park Service, "Tribal Historic Preservation Office: Historic Preservation Fund Grant," October 1, 2017, 5, available at https://www.nps.gov/thpo/grants/index.html.

[5] Leslie Macmillan, "Bison Bones, a Backhoe, and a Crow Curse," *Outside Magazine,* November 9, 2012. Article available at https://www.outsideonline.com/1910586/bison-bones-backhoe-and-crow-curse.

[6] According to Two Leggings, Dale Old Horn "was supposed to work the cultural director and the cultural committee and the tribal elders, and none of that was done. My office was just across the hallway from his office at the time, and I was never aware of the Sarpy Creek site. Nobody was aware of it, even the chairman [of the tribe] wasn't aware of it. Dale Old Horn made the decision by himself." Quoted in Ron Catlett, "War on Coal: Tribal Politics Spell Demise of Ancient Bison Bone Bed, Liberal Groups Blame Coal Company," *Mediatrackers*, October 29, 2012, http://mediatrackers.org/montana/2012/10/29/war-on-coal-tribal-politics-spell-demise-of-ancient-bison-bone-bed-liberal-groups-blame-coal-company.

issue under the title, "Bison Bones, a Backhoe, and a Crow Curse," with images of the moldering remains juxtaposed with the doleful faces of Crow onlookers.[7] According to most of the scientists, reporters, and activists who flocked to the site, the archaeological dig had been shockingly incompetent, conducted in what they interpreted to be a purposely slipshod manner in order to save time and money, all beyond the purview of the Crow people (with the exception of that limited coterie consisting of the Old Horn family and the Tribal Historic Preservation Office). In the words of Burton Pretty on Top, the tribe's cultural director at the time, "It's disgusting what happened here. It's sacred land here. They had ceremony here. It's like someone going in and destroying St. Peter's Basilica." One of the most vocal critics was an outside academic, Judson Finley, an anthropology professor at Utah State University, who panned G.C.M. and everyone involved for what he deemed a reprehensible act of legal evasion. "Technically, it's true," he said, "they did it by the book. But it was a faulty process at best." Instead of the next Head-Smashed-In-Buffalo Jump, a potential U.N.E.S.C.O. World Heritage Site and critical tourism destination, what the Crow were left with was a botched exhumation, a desecration conducted behind their backs and without their blessing.[8]

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[7] This sensationalized title, occurring, as it did, with only the vaguest of connections to any "ghost story," is a prime example of a phenomenon remarked upon by both Jared Farmer and Coll Thrush. While Farmer observes the desire of American settlers to imbue the past with (often made up) indigenous stories, Thrush alludes to the cultural and ideological dimensions of the "ghost stories" that writers and settlers often impose upon the past. "This is the power of ghost stories," he writes, "they tell us more about ourselves, and about our time, than they tell us about other people or the past…hauntings are among the most telling of cultural phenomena, expressing powerful anxieties, desires, and regrets." Jared Farmer, *On Zion's Mount: Mormons, Indians, and the American Landscape* (Cambridge, Mass.; London: Harvard University Press, 2010); Coll-Peter Thrush, *Native Seattle: Histories from the Crossing-over Place* (Seattle: University of Washington Press, 2007), 6-7.

[8] Lorna Thackeray, "2,000-Year-Old Bison Bone Site Mired in Controversy," *Billings Gazette* (Billings, MT), October 23, 2012; Adrian Jawort, "Sacred Bison Honoring Site Destroyed for Coal Underneath," *Indian Country Today,* October 29, 2012, http://indiancountrytodaymedianetwork.com/2012/10/29/sacred-bison-honoring-site-destroyed-coal-underneath-142867.

As the months passed and the story began to percolate out across the country, picked up and distributed via various regional and national news outlets, two competing narratives emerged. The first, that propagated by Westmoreland, Old Horn, and many of the others involved in the excavation process, took what can be deemed a modern utilitarian outlook.[9] It presented the dig and the resultant dispute as an unfortunate but necessary sidebar to the more important—they would say critical—issue at hand: the affordable extraction of coal, a fossil fuel that quite literally powered the world, including the homes and devices of even its most vehement opponents. According to this reasoning, the excavation was conducted in accordance with all of the requisite rules and regulations, those that had been put in place and agreed upon by each and every one of the concerned parties in the interest of achieving a larger goal: providing a vital energy resource to the country, even, in the long run, fulfilling something of a patriotic purpose.[10] This narrative was a more liberal—perhaps some might even say enlightened—version of what historian David Nye has described as a founding American myth: "America conceived as a second creation built in harmony with God's first creation…They [narratives of second creation] express in secular form the beginnings of a new social world, and they establish the ideal ground rules of the society."[11] According to such an interpretation, Old Horn and company were simply bringing this narrative into its

[9] This view, of course, was promoted and summed up by Jeremy Bentham: "An action then may be said to be comfortable to the principle of…utility when the tendency it has to augment the happiness of the community is greater than any it has to diminish it." This, of course, leads to the corollary question: what is the community? Jeremy Bentham, *An Introduction to the Principles of Morals and Legislation* (Clarendon Press, 1879), 3.

[10] This is an area that I look to develop more in my dissertation—the concomitant narrative that, by mining these resources domestically, workers, companies, etc. are providing a critical industrial community in the wake of the country's waning manufacturing industries. This is most typically exemplified by, on the larger scale, Wyoming branding itself as the "Saudi Arabia of Coal," and on the smaller scale, the town of Gillette, Wyoming, dubbing itself "The Energy Capital of the World."

[11] David E. Nye, *America as Second Creation: Technology and Narratives of New Beginnings*, New Ed edition (Cambridge: The MIT Press, 2004), 3–4.

transmogrified, twenty-first century form, performing their duty as laborers in a new energy regime.[12]

While this view worked its way through the community, a competing narrative began to take form. Opined by much of the Crow Nation, the media, and the various environmental groups that descended upon the reservation, this narrative portrayed the excavation as yet the latest in a long history of Big Coal and Big Oil destroying the land in the interest of short-term profit—an example of what was, in the words of one author, "The Rape of the Great Plains."[13] In the wake of the discovery, a number of environmental organizations issued statements to this effect: the National Wildlife Federation proclaimed that situations like Sarpy Creek "allow for-profit companies to destroy tribal and public resources that should be celebrated and protected for generations," while the Montana Environmental Information Center similarly declared, "This is an absolute tragedy, and very sad consequence of coal mining in Montana."[14] In short, Big Coal knowingly desecrated priceless cultural artifacts in the name of short-

[12] Intriguingly, as larger archetypes, these two competing narratives have a lengthy lineage within environmental history, most prominently in the early-twentieth century debates over Hetch Hetchy Dam and other western conservation battles. These arguments pitted a utilitarian perspective, headed by Chief Forester Gifford Pinchot, that emphasized preservation and the efficient use of natural resources against a more naturalistic perspective, headed by Sierra Club founder John Muir, that emphasized conservation and the complete unadulterated protection of natural resources free from commercial interest. Crucially, in the Hetch Hetchy example, Pinchot won out. See Donald Worster, *A Passion for Nature : The Life of John Muir* (Oxford University Press, 2008). In some ways, this first narrative is one remarked upon by Richard White, who argues that "One of the great shortcomings—intellectual and political—of modern environmentalism is its failure to grasp how human beings have historically known nature through work. Environmentalists, for all their love of nature, tend to distance humans from it. Environmentalists stress the eye over the hand, the contemplative over the active, the supposedly undisturbed over the connected. They call for human connections with nature while disparaging all those who claim to have known and appreciated nature through work and labor." Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1996), x.

[13] K. Ross Toole, *The Rape of the Great Plains: Northwestern America, Cattle, and Coal* (Boston: Little, Brown, and Co, 1976).

[14] Catlett, "War on Coal."

term capital gain. It was yet the latest instance of cultural myopia in the interest of some abstract greater good.

Not surprisingly, the conflict over these narratives has continued through the present, with both sides claiming to be in the right. These are raw, convoluted issues, problems that have been steeped in a deep history of settler colonialism, broken treaties, and asymmetrical power relations. But it is important to realize that they are not the only matters that the conflict has raised. In the midst of all of the clamor over cultural desecration and eminent domain, a number of ancillary questions have been unearthed, ones that look to the past as much as the future. For instance, what do bison hunting and coal extraction have to do with each other? What would it look like to widen the field of view such that both activities fall under the same analytical category: the extraction of energy by human beings from their environment? And finally, what would such an examination do to our current understandings of the American West and its place in the larger thermodynamic landscape? This latter is the leading question that this dissertation addresses, for as we shall see, although energy sources of all varieties have played a critical role in the story of the American West, they have gone almost wholly unacknowledged in the larger historiography. This dissertation provides one of the first forays into this topic, using the Sarpy Creek incident as a starting point, a portal of sorts into the neglected thermodynamic history of the American West. By examining the role of grass, oil, and coal in the region's seminal conflicts, it argues that not only does energy play a critical, heretofore unrealized role in the American West, but that a thermodynamic examination has the power to reshape our understanding of the region as a whole.

Energy and Narrative in the History of the American West

As a field, environmental history has long probed questions of the Sarpy Creek type. Although its roots reach well back into the early-twentieth century, it did not begin to officially take off and develop a coherent, consciously fashioned intellectual foundation until the 1970s, when the mid-century environmentalist movement and works such as Rachel Carson's *Silent Spring* (1962) prompted such a move.[15] At its core, it seeks to do what other histories have failed to, "plac[ing] human society firmly in, rather than beyond or above, nature."[16] The result is a dialectic relationship between people and their environment, revealing not merely how humans have affected ecology through time, but, conversely, how ecology has affected humans. This approach can clearly be seen in one of the field's first and most beloved texts, William Cronon's *Changes in the Land: Indians, Colonists, and the Ecology of New England* (1983). The aim of this study was to provide "an ecological history of colonial New England…a history which extends its boundaries beyond human institutions…to the natural ecosystems which provide the contexts for those institutions." Moving beyond traditional histories of early America, Cronon examined not only how colonists interacted with the natural world and the adaptations that they made as a result, but also the ways in which these connections "involved fundamental reorganizations—less well known to historians—in the region's

[15] Although there is endless debate about the specific works that reified environmental history into its own viable subfield, there is little argument over the importance of Alfred Crosby's 1975 monograph *The Columbian Exchange: Biological and Cultural Consequences of 1492*. As many historians have observed, it is rare that any scholar, especially one who is writing in a marginal field, is able to coin a term that becomes common parlance among those within the discipline and, to some degree, within society at large. And yet this was the case with "Columbian Exchange." J.R. McNeill, "The State of the Field of Environmental History," *Annual Review of Environment and Resources* 35, no. 1 (2010): 349.
[16] Donald Worster, "History as Natural History: An Essay on Theory and Method," *Pacific Historical Review* 53, no. 1 (February 1984): 6.

plant and animal communities." The result was a (for the time) powerful and in many ways revolutionary argument: Indian peoples consciously manipulated their environments too, planting crops, burning forests, and modifying habitats for better hunting. Although early Europeans saw an unpolluted primeval landscape that awaited colonization, in actuality they were dealing with ecosystems that had been carefully manipulated for millennia. [17]

In the three decades since *Changes in the Land's* publication, the field of environmental history has, in the words of one scholar, "grown like kudzu on a hot July day."[18] In the process, it has birthed a glut of disciplinary sub-fields: animal studies, marine histories, history of diseases and sickness, the study of the conservation movement, urban environmental histories, etc. Among these, one of the least familiar—and yet, as it applies to the Sarpy Creek incident, most intriguing—is the inchoate field of energy history. Although not always codified as its own discipline, the study of energy has long been a central focus of environmental history. [19] Drawing upon the work of physicists, who began developing theories of thermodynamics in the mid-nineteenth century, historians have typically defined energy as the capacity to do work.[20] But as more capaciously minded scholars have pointed out, "almost every form of energy that

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[17] William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983), xv, 22.
[18] Paul S. Sutter, "The World with Us: The State of American Environmental History," *Journal of American History* 100, no. 1 (June 1, 2013): 95.
[19] Note, however, that there is a broader, umbrella field known as "energy humanities," which, in addition to history, encompasses the work of philosophers, literary scholars, geographers, artists, and more. In the words of one scholar, energy humanities is "an emerging field of scholarship that overcomes boundaries between disciplines and between academic and applied research [by] highlight[ing] the essential contribution that the insights and methods of the human sciences can makes to areas of study and analysis that were once thought best left to the natural sciences." Dominic Boyer, and Imre Szeman. "The Rise of Energy Humanities: Breaking the Impasse." University Affairs, 12 February 2014. Available online: http://www.universityaffairs.ca/opinion/in-my-opinion/therise-of-energy-humanities/.
[20] See, for example, White, *The Organic Machine: The Remaking of the Columbia River*, 6.

we use comes, directly or indirectly, from the sun."[21] From this viewpoint, most early environmental histories—from Cronon's *Changes in the Land* to Alfred Crosby's *The Columbian Exchange* to Carolyn Merchant's *The Death of Nature*—were dealing with shifts in energy production through time, albeit in the context of larger environmental change.[22] More recently, however, a handful of historians have narrowed their approach, arguing "that energy has played a specific, hitherto under-explored, and consequently not well-understood role in shaping the values, habits and beliefs that have generated the human-environment relationship."[23] Under this view, energy is *the* defining driver of history—not just one among many environmental factors—a subject that historians and associated academics have neglected in favor of more established methodological approaches.[24] The result has been a number of critical reinterpretations of the past ranging

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[21] Merle Rubin, review of *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy,* by Alfred W. Crosby, *Los Angeles Times,* January 30, 2006.
[22] Alfred Worcester Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport Conn.: Greenwood Press, 1975).
[23] Imre Szeman, "On the Energy Humanities: Contributions to the Humanities, Social Sciences, and Arts to Understanding Energy Transition and Energy Impasse," SSHRC Imagining Canada's Future Initiative (May 13, 2016), 7. For example, see Martin V. Melosi, *Coping with Abundance: Energy and Environment in Industrial America* (New York: Knopf, 1985); Peter A. Shulman, *Coal and Empire: The Birth of Energy Security in Industrial America* (Baltimore: Johns Hopkins University Press, 2015); Christopher F. Jones, *Routes of Power: Energy and Modern America* (Place of publication not identified: Harvard University Press, 2016); Christopher J. Manganiello, *Southern Water, Southern Power: How the Politics of Cheap Energy and Water Scarcity Shaped a Region* (Chapel Hill: The University of North Carolina Press, 2015); H. Lee Scamehorn and Lee Scamehorn, *High Altitude Energy: A History of Fossil Fuels in Colorado* (Boulder, Colo: Univ Pr of Colorado, 2002); Thomas Parke Hughes, *Networks of Power: Electrification in Western Society, 1880-1930* (Baltimore, Md.: Johns Hopkins University Press, 1993); Martin V. Melosi and Joseph A. Pratt, eds., *Energy Metropolis: An Environmental History of Houston and the Gulf Coast* (Pittsburgh, Pa: University of Pittsburgh Press, 2007); Alfred W. Crosby, *Children of the Sun: A History of Humanity's Unappeasable Appetite For Energy* (New York: W. W. Norton & Company, 2007); Astrid Kander, Paolo Malanima, and Paul Warde, *Power to the People: Energy in Europe over the Last Five Centuries* (Princeton University Press, 2014); Jason P. Theriot, *American Energy, Imperiled Coast: Oil and Gas Development in Louisiana's Wetlands* (Baton Rouge: LSU Press, 2014); David E. Nye, *Consuming Power: A Social History of American Energies* (Cambridge, Mass.: The MIT Press, 1999); Rolf Peter Sieferle, *The Subterranean Forest: Energy Systems and the Industrial Revolution*, trans. Michael Osmann (Cambridge: White Horse Press, 2010).
[23] Vaclav Smil, *Energy: A Beginner's Guide* (Oneworld Publications, 2017), 8–9.
[24] As Dale Jamieson puts it, "the story of human development has been the story of the increased use of energy." Dale Jamieson, "Energy, Ethics, and the Transformation of Nature," in *The Ethics of Global Climate Change,* ed. Denis G. Arnold (Cambridge University Press: Cambridge, 2011), 16.

from Vaclav Smil's prolific body of work on energy transitions to Martin Melosi's examination of urban power generation structures to, more recently, Andrew Needham's multi-award-winning *Power Lines: Phoenix and the Making of the Modern Southwest*, a powerful reimagining of southwestern history through an examination of electric infrastructure development, one that elucidates the potential that energy histories have to fundamentally challenge and restructure our understandings of the region.[25] For the purpose of this dissertation, however, perhaps the most important energy history is Richard White's slim but potent volume *The Organic Machine,* which elucidates the history of the Columbia River by focusing on the concepts of energy and work through time. White's larger goal is to understand the place of labor in the natural world, to push back against environmental histories that portray work as by definition antithetical to nature. In doing so, he attempts to reconcile the natural world with capitalism and industrial development, promoting a strain of environmentalism that does not seek to distance humans from nature or return to a mythic bygone era. In his own words, "What this book suggests is that if we want to understand what we have done and how we have acted in nature, we might want to spend more time thinking about Ralph Waldo Emerson and Lewis Mumford and less about Henry David Thoreau and John Muir."[26] By approaching a well-worn story through the lens of energy, White opens the path toward new histories and relationships with the natural world, in the process revealing the power

[25] Andrew Needham, *Power Lines: Phoenix and the Making of the Modern Southwest* (Princeton University Press, 2014).
[26] White, *The Organic Machine: The Remaking of the Columbia River*, xi.

that an energy-centric examination has to reshape our understandings of both history and the modern world.[27]

Like many but not all environmental histories, *The Organic Machine* focuses its efforts on a narrowly delineated space: the Columbia River. One of the field's most established and well-respected scholars, Dan Flores, has attempted to take this traditional approach and to refocus it, generating a methodology unique to environmental history. He calls such an approach "bioregional history," which he defines as "a precise spatial application of Fernand Braudel's longue durée…the 'big view' not so much through wide geographic generalizations in shallow time, but through analyzing deep time in a single space."[28] Crucial to this is a preference for ecologically delineated boundaries as opposed to the more prevalent political borders of most studies, the latter of which tend to warp and ignore environmental biomes that stretch across state and national divisions. Put simply, a bioregional history examines a small slice of land over a large span of time. By strictly limiting the spatial scope of the study, and by abiding by ecological borders instead of the more archivally and historically convenient political borders, Flores hopes

[27] This energy-centric view has also reshaped one aspect of Native American/Western history, that of eighteenth- and nineteenth-century equestrianism. See Dan Flores, "Bison Ecology and Bison Diplomacy: The Southern Plains from 1800 to 1850," *The Journal of American History* 78, no. 2 (1991): 465–485; James E. Sherow, "Workings of the Geodialectic: High Plains Indians and Their Horses in the Region of the Arkansas River Valley, 1800-1870," *Environmental History Review* 16, no. 2 (1992): 61–84; Elliott West, *The Contested Plains: Indians, Goldseekers, & the Rush to Colorado* (Lawrence, Kan.: University Press of Kansas, 1998); Pekka Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," *The Journal of American History* 90, no. 3 (2003): 833–862; Pekka Hämäläinen, "The Politics of Grass: European Expansion, Ecological Change, and Indigenous Power in the Southwest Borderlands," *William & Mary Quarterly* 67, no. 2 (2010): 173–208; Pekka Hämäläinen, *The Comanche Empire* (New Haven: Yale University Press, 2008); William A. Dobak, "Killing the Canadian Buffalo, 1821-1881," *The Western Historical Quarterly* 27, no. 1 (April 1, 1996): 33–52.

[28] Dan Flores, "Place: An Argument for Bioregional History," *Environmental History Review* 18, no. 4 (December 1, 1994): 10.

to reveal a set of historical changes and trends that have been obviated by methodologies that are less in tune with environmental rhythms.[29]

Although Flores claims that "no one so far has quite written the kind of history I have in mind here," he goes on to give a number of examples of pseudo bioregional histories—Richard White's *Land Use, Environment, and Social Change: The Shaping of Island County, Washington*; Timothy Silver's *A New Face on the Countryside: Indians, Colonists, and Slaves in South Atlantic Forests, 1500-1800;* and Robin Doughty's *Wildlife and Man in Texas: Environmental Change and Conservation*.[30] But he singles out one work in particular—William deBuys's *Enchantment and* Exploitation—as a paragon of what a bioregional history can do. The text—a revised dissertation—takes on a massive timescale, roughly 1500-1980, and provides a cogent case for why this place, New Mexico's Sangre de Cristo Mountains, should matter to a general reader: "no other region in all of North America so richly combines both ecological and cultural diversity."[31] It is a powerful text, one that, in Flores's words, is "place specific, temporally deep, [and] examines environmental change across sequential cultures…with effortless style."[32] But it is also one that can be occasionally abstract and frustrating. Its central claim—the assertion that, "in an unforgiving environment, small errors yield large

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[29] Some of the most prominent bioregional histories include William deBuys, *Enchantment and Exploitation: The Life and Hard Times of a New Mexico Mountain Range* (Albuquerque: University of New Mexico Press, 1985); William deBuys and Joan Myers, *Salt Dreams: Land and Water in Low-Down California* (Albuquerque: University of New Mexico Press, 2001); Thomas G. Andrews, *Coyote Valley: Deep History in the High Rockies* (Cambridge, Massachusetts: Harvard University Press, 2015); Richard White, *Land Use, Environment, and Social Change: The Shaping of Island County, Washington* (Seattle: University of Washington Press, 1979); Mikko Saikku, *This Delta, This Land: An Environmental History of the Yazoo-Mississippi Floodplain* (Athens: University of Georgia Press, 2005).
[30] White, *Land Use, Environment, and Social Change*; Timothy Silver, *A New Face on the Countryside: Indians, Colonists, and Slaves in South Atlantic Forests, 1500-1800* (Cambridge ; New York: Cambridge University Press, 1990); Robin W. Doughty, *Wildlife and Man in Texas: Environmental Change and Conservation* (College Station: Texas A&M University Press, 1989).
[31] deBuys, *Enchantment and Exploitation*, 6.
[32] Flores, "Place," 14.

consequences"—is so widely applicable as to be almost impotent.[33] Fortunately, however, there are a number of studies not cited by Flores that seem to embody the true promise of a bioregional history. The most apposite seems to be Cronon's *Nature's Metropolis: Chicago and the Great West*. In part, Cronon chose Chicago for this work because it represented a broader set of transformations that swept the continent—the evolution of urban-rural relationships, the commodification of natural and agricultural products, the interwoven impact of culture and geography. But he also chose the city because it was the preeminent example of the changes that he sought to track. In other words, instead of making a broad claim about the ecological region as a whole, he picked a certain issue to trace through time, thereby obviating the broad, overly abstract claims made by deBuys et al. Consequently, *Nature's Metropolis* hints that, for a bioregional approach to really work, there needs to be something special about that place, a quality, event, or resource that justifies the study of that particular location for a non-local audience.[34]

But there is another reason that *Nature's Metropolis* is so effective. Part of the appeal of Cronon's history—as compared to deBuys's—is its focus on narrative. As David Nye puts it, "During the past decade, environmental historians have become interested in how narratives express values. Increasingly, they have realized that narrative is not merely a literary concern. People tell stories in order to make sense of their world, and some of the most frequently repeated narratives contain a society's basic assumptions about its relationship to the environment. To change our relationship with nature,

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[33] deBuys, *Enchantment and Exploitation*, xix.

[34] In terms of Chicago's unique place in American history, Cronon claims "Chicago became the link that bound the different worlds of east and west into a single system. In the most literal sense, from 1848 to the end of the nineteenth century, it was where the West began." For its representativeness, he writes, "this book about Chicago has also been a book about The City, in its largest, most mythic sense as a place somehow separate from that other key human landscape, The Country." William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton, 1992), 91, 384.

therefore, we need to change our stories."[35] Among others, Cronon has focused a great deal on how historians tell their own stories, elucidating the different narrative structures that they impose on the past, ultimately arguing that "the special task of environmental history is to assert that stories about the past are better, all other things being equal, if they increase our attention to nature and the place of people within it."[36] And while this provides an important starting point for the role of narrative in environmental history, other scholars have moved beyond such an academic understanding of the topic, focusing instead on how historical actors—not historians—have narrated environmental change.[37] This understanding proceeds from Nye's contention that "environmental history charts oppositions between different ethics, embodied in contrasting narratives that are rooted in incompatible conceptions of space."[38] Put another way, the narratives that we tell about environmental change not only shape the past and the present, but they fundamentally alter the future as well.[39]

A prime example of this latter view comes from two of the field's preeminent practitioners: Jared Farmer and the prolific fire historian Stephen Pyne. Although much

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[35] David E. Nye, "Technology, Nature, and American Origin Stories," *Environmental History* 8, no. 1 (2003): 8.
[36] William Cronon, "A Place for Stories: Nature, History, and Narrative," *The Journal of American History* 78, no. 4 (March 1, 1992): 1375.
[37] It is also important to note that most cultural environmental histories analyze narratives, whether they explicitly state it or not. For instance, Joseph Taylor, in his study of the Pacific salmon industry, has written, "The way people used nature also reflected their technological sophistication and intellectual concerns. How they made collective sense of these and other issues is what we call *culture*. Seemingly ethereal matters of the mind, it turns out, matter greatly when trying to understanding the material consequences of everyday life. This is as true of the aboriginal first-salmon ceremony as of the capitalist commodification of nature, the development of scientific salmon management, or the preservation of ecosystems." Joseph E. Taylor, *Making Salmon: An Environmental History of the Northwest Fisheries Crisis* (Seattle: University of Washington Press, 1999), 7.
[38] Cronon, "A Place for Stories," 1375.
[39] For one example of this perspective, see Kent Curtis, "Producing a Gold Rush: National Ambitions and the Northern Rocky Mountains, 1853-1863," *The Western Historical Quarterly* 40, no. 3 (October 1, 2009): 275–97. While not as explicitly cultural and linguistic as I have in mind here, Curtis definitively shows how the Montana gold rush needed to be "produced" in order to take place.

of Farmer's work is concerned with story, *On Zion's Mount* provides the best place-based history.[40] The text looks at the cultural construction of place by examining the Mormon migration and, more specifically, the twentieth-century creation and transformation of Mount Timpanagos from a "mountainous *space*" to "the mountain-*place* called 'Timp.'" Emerging out of the creation and propagation of a specious Indian legend in the early-twentieth century, Brigham Young University Athletic Director Eugene Roberts, the B.Y.U. community, and the town of Provo culturally produced a landmark that drew upon—but crucially manipulated—the region's history. In instances such as this, Farmer writes, "collective memory involves forgetting as much as remembering."[41] Beginning with the early Mormon migration and Indian interactions, Farmer surveys the broader historical landscape within which the Timp legend proliferated during the twentieth century, from the rise of mountain veneration to the spread of quasi-Indian place names and stories in folklore. In doing so, he traces both the popularization of the landmark and the conscious manipulation of Mormon historical memory; by the twentieth century, what began as a bounteous ecological milieu in the mid-nineteenth century had become memorialized as the divine conquest of a malignant desert environment.

Similarly, Stephen Pyne has made cultural production the focus of much of his scholarship. This is perhaps most evident not in the numerous fire histories that he has produced but in a smaller volume, *How the Canyon Became Grand: A Short History,* which attempts to recast the history of the beloved canyon from the perspective of the stories that have been told about it. In doing so, Pyne portrays "a cultural Canyon, the

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[40] Also see Jared Farmer, *Glen Canyon Dammed: Inventing Lake Powell and the Canyon Country* (Tucson: University of Arizona Press, 2004); Jared Farmer, *Trees in Paradise: A California History* (New York: W. W. Norton & Company, 2013). Beyond Farmer, another example of this approach can be seen in W. Barksdale Maynard, *Walden Pond: A History* (New York: Oxford University Press, 2004).
[41] Farmer, *On Zion's Mount*, 3, 12.

Grand Canyon as a place with meaning…[that] has been shaped by ideas, words, images, and experiences. Instead of faults, rivers, and mass wasting, the processes at work involved geopolitical upheavals and the swells of empires, the flow of art, literature, science, and philosophy, the chisel of mind against matter. These determined the shape of Canyon meaning. As they converged in place and time, they distinguished the Canyon from among hundreds of other, competing landscapes."[42] This is a decidedly cultural approach to environmental history, one that views the landscape as not simply material but cultural as well.[43] It is in many ways antithetical to the more materially minded approach of most energy histories. And yet this is not the way that it has to be: as we shall see, it is a combination of these two approaches that has the potential to unravel the enigma that is the Sarpy Creek incident, in the process yielding new understandings of the history of energy in the American West.

Place, Methodology, and Scope

From a bioregional perspective, Sarpy Creek is part of an isolated expanse known as the Powder River Basin. Bisected by I-90, it is a geologic depression spanning large chunks of northeastern Wyoming and southeastern Montana, topographically bounded by

[42] Stephen J. Pyne, *How the Canyon Became Grand: A Short History* (New York, N.Y.: Penguin Books, 1999), xii. Even in his abundant fire histories, Pyne has made narrative one of the central concepts, outlining how our understanding of fire is based on the stories we tell, particularly the martial metaphors we tend to fall back on. See "Words on Fire: Toward a New Language of Wildland Fire," speech given November 2, 2012, Oregon State University, https://liberalarts.oregonstate.edu/feature-story/dr-stephen-j-pyne-words-we-use-describe-world-fire, and Pyne, *Between Two Fires: A Fire History of Contemporary America* (Tucson: University of Arizona Press, 2015), 442.

[43] Also see Jan Bender Shetler, *Imagining Serengeti: A History of Landscape Memory in Tanzania from Earliest Times to the Present* (Athens: Ohio University Press, 2007), 4, 24, who makes a similar observation: "The power of people to shape the landscape is dependent on how they imagine the landscape, which, in turn, is reproduced on the landscape." Shetler's stated goal—"My goal is to produce an account of the past that speaks to current debates and the concerns of common people's lives"—provides an important distinction from the more historiographical view of Cronon.

the Bighorn Mountains and the Black Hills. And although its boundaries are, even to the most erudite geologists, somewhat equivocal, it spans an area roughly 230 miles long and 100 miles wide, in total comprising more than 20,000 square miles of territory. Demographically, it is a chronically under-populated, arid expanse, dotted with a handful of midlevel cities—Gillette, Buffalo, Sheridan, Casper, Douglas—and two Indian reservations—the Crow and the Northern Cheyenne. Outside of the region, it is little known.

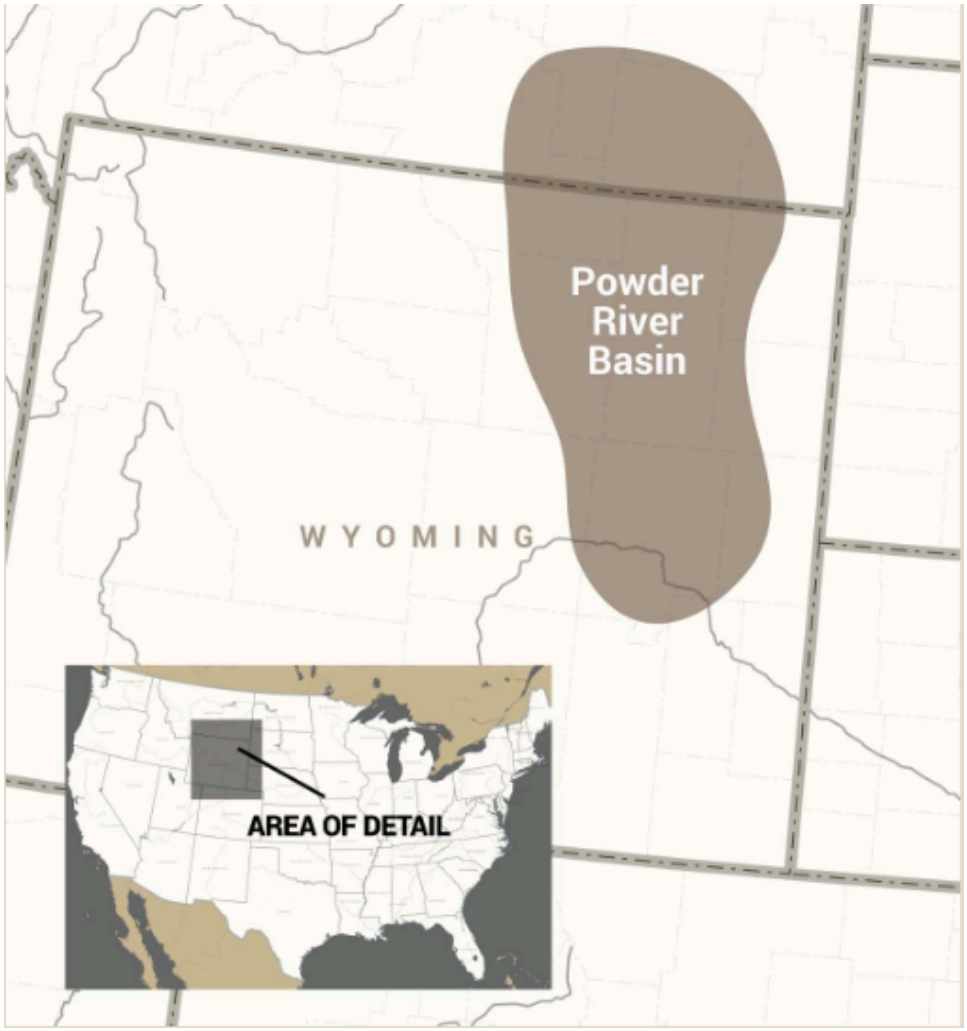

Figure 1: Map of the Powder River Basin
https://www.elephantoilandgas.com/operations

And yet over the past century and a half it has been the subject of much historical study, with scholars and amateurs alike producing reams of work since the region was first colonized by Euro-Americans in the 1860s. Part of the basin's appeal has been the number of mythic western history events that have taken place there: it was the home to some of the last great bison herds of the West, the Johnson County War, the Battle of Greasy Grass/Little Bighorn, the largest oil refinery in the world, the Bozeman trail, and now the largest coal mines in the world. Not surprisingly, the bulk of the region's studies have focused on these events individually, with special preference given to the Indian Wars of the 1860s and 1870s.[44] Although there are rare exceptions, the monographs that have centered upon the region have in large part been popular as opposed to academic texts, with publication dates that skew toward the first half of the twentieth-century.[45] With the exception of broad-scale county- and city-histories, none of these works has examined such events together; more tellingly, none have approached them from the bioregional perspective of the basin as a whole.[46]

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[44] In addition to the innumerable histories on Little Bighorn/Greasy Grass, see Dorothy Johnson, *The Bloody Bozeman the Perilous Trail to Montana* (Mcgraw-Hill, 1971); Paul L. Hedren, *Powder River: Disastrous Opening of the Great Sioux War* (Norman, OK: University of Oklahoma Press, 2016); John D. McDermott, *Red Cloud's War: The Bozeman Trail, 1866-1868* (Norman, Okla: The Arthur H. Clark Company, 2010); Helena Huntington Smith, *The War on Powder River* (Lincoln: University of Nebraska Press, 1967); Margaret I. Carrington, *Absaraka: Home of the Crows*. Chicago: Lakeside Press, 1950.

[45] The scale of these is too numerous to list here. For examples on the Johnson County War, see Jack Flagg, *A Review of the Cattle Business in Johnson County, Wyoming, Since 1882, and the Causes that Led to the Recent Invasion* (Cheyenne: The Vic Press, 1892); Robert B. David, *Malcolm Campbell, Sheriff*. (Casper: Wyomingana, Inc., 1923); Ernest Staples Osgood, *The Day of the Cattleman* (Minneapolis: University of Minnesota Press, 1929; John W. Davis, *Wyoming Range War: The Infamous Invasion of Johnson County*. (Norman: University of Oklahoma Press, 2012). For Teapot Dome, see Burl Noggle, *Teapot Dome: Oil and Politics in the 1920's* (New York: W.W. Norton & Co., 1962); Ed Bille, *Early Days at Salt Creek and Teapot Dome* (Casper: Mountain States Lithiograph Company, 1978); Laton McCartney, *The Teapot Dome Scandal: How Big Oil Bought the Harding White House and Tried to Steal the Country* (New York: Random House, 2009);

[46] For county histories, see Heritage Book Committee. *Pages From Converse County's Past* (Laramie: Wyoming Historical Press, 1986); Alfred James Mokler, *History of Natrona County, Wyoming, 1888-1922; True Portrayal of Yesterdays of a New County and a Typical Frontier Town of the Middle West. Fortunes and Misfortunes, Tragedies and Comedies, Struggle and Triumphs of Pioneers*. (Chicago: R.R. Donnelley & Sons Company, 1923).

This dissertation seeks to provide such a view. It does so by drawing upon the theoretical tools of energy studies, bioregional history, and narratology. At the same time, however, it attempts to overcome the shortcomings of each. In this section I will examine what I see as the drawbacks of these existing approaches; I will then outline the ways in which I intend to overcome them, combining the various approaches and methodologies to suit the Powder River Basin's mottled thermodynamic past.

As noted earlier, the field of energy history provides an important correction to traditional historical understandings by focusing specifically on thermodynamic resources. Nevertheless, in doing so, many of its works have relied upon a form of technological determinism, focusing on the material construction of energy infrastructures at the expense of more amorphous cultural factors.[47] This can be seen in the work of Smil and Crosby, whose scholarship focuses so heavily on what they term "prime movers," the technologies that utilize energy and therefore drive larger thermodynamic systems, and quasi-Turnerian progressions—known in the field as "energy transitions"—in which one fuel gives way to another. (E.g., the often-cited early-twentieth-century transition from coal to oil.) A number of scholars have challenged this materialism—most notably, David Nye has built his career by examining the "different stories we tell each other to make sense of the transformations that accompany the adoption of new machines."[48] Nevertheless, technological determinism has remained so widespread and perhaps unconscious that even many of the more culturally inclined

[47] See for instance Vaclav Smil, *Creating the Twentieth Century: Technical Innovations of 1867-1914 and Their Lasting Impact* (Oxford ; New York: Oxford University Press, 2005); Vaclav Smil, *Energy and Civilization: A History* (Cambridge, Massachusetts: The MIT Press, 2017); Vaclav Smil, *Making the Modern World: Materials and Dematerialization* (Chichester, West Sussex, United Kingdom: Wiley, 2013); Melosi, *Coping with Abundance*; Brian Frehner, *Finding Oil: The Nature of Petroleum Geology, 1859-1920* (Lincoln: University of Nebraska Press, 2011); Hughes, *Networks of Power*.
[48] David Nye, *Narratives and Spaces* (New York: Columbia University Press, 1998), 3.

energy historians have unwittingly upheld it, giving lip-service to the more abstruse, cultural factors of energy systems while in reality upholding extant approaches.[49] As one scholar puts it, "instead of a social analysis of energy regimes, the field seems to be a captive of euphoric technological visions and associated studies of 'energy futures' that imagine the pleasing consequences of new energy sources and devices."[50] In spite of all of the valuable changes that energy historians have brought about, their circumscribed approach has limited the power of those interpretations to affect our existing narratives.

At first glance, the explicitly cultural works of Farmer, Pyne, and other environmental historians provide a potent antidote to such material determinism. By foregrounding the power of cultural narratives to shape the natural world, they push back against narrowly empirical studies. Upon closer examination, however, these works have remained rather limited in their reach, even within the narrow confines of environmental history. On the one hand, scholars such as Cronon have focused on how they, academic historians, use narrative to mold their own stories; on the other hand, Farmer, Pyne, Barksdale Maynard, and others have examined specific landmarks—places such as the Grand Canyon, Walden Pond, and the Catskills—probing how the stories told about them have veered and clashed through time.[51] Such an approach lends itself well to studying these archetypal landmarks. And yet the problem is that it does not apply particularly

[49] See for instance, Christopher Jones's *Routes of Power*. Although ostensibly cultural, the real focus of the book is one the development of energy infrastructure systems—what he calls "landscapes of intensification"—during the late-nineteenth and early-twentieth centuries. As Jones puts it, "The *roots* of America's energy transitions can be found in the building of *routes* along which coal, oil, and electricity were shipped." By focusing on such energy transitions—the book is divided into three sections: coal, oil, electricity—Jones reinforces notions of neat, Turnerian progression in energy history. Christopher F. Jones, *Routes of Power: Energy and Modern America* (Cambridge: Harvard University Press, 2014), 2.
[50] Josh Byrne and Noah Toly, "Energy as a Social Project: Recovering a Discourse," in Byrne, Toly, and Leigh Glover, *Transforming Power: Energy, Environment, and Society in Conflict* (Transaction Publishers, 2011), 1.
[51] In addition to Pyne on the Grand Canyon and Maynard on Walden Pond, see David Stradling, *Making Mountains: New York City and the Catskills* (Seattle: University of Washington Press, 2007).

well to lesser-known places, the fly-over states and the thousands of towns, cities, and regions that do not possess a steady tourist stream, places such as the Powder River Basin, which people tend to drive *through*, not stop in, proceeding on their way to the more landmark-quality and narratively receptive locales of Yellowstone, Big Sky, and Glacier. In essence, it assumes that these places do not possess stories that are worthy enough to be heard.

In contrast, this dissertation moves beyond cultural environmental history's focus on landmarks—the Grand Canyon, Niagara Falls, Mount Timpanogos —in order to take on more impersonal, lesser-loved places and processes. To help achieve this realignment, it looks to the latest findings in the field of narratology. Founded as a literary sub-discipline more than half a century ago, narratology has evolved from its nascent structuralist beginnings—with the attendant focus on unearthing universal grammars and forms, discovering the "what" and the "how" of narrative—to a more diversified, sprawling, and complex interdisciplinary field. This latter approach—deemed postclassical narratology—draws upon many of the earlier theories and approaches of the structuralists, but it also dives into the "why" of narrative, in the process unearthing the complexities, contradictions, and implications of the ways in which narrative is used in the world.[52] From an environmental perspective, this means asking "how groups of people 'story' themselves into environmental relations, or how they understand their environmental connections, whether it is to defend or to exploit."[53] Drawing upon the work of Peter Brooks, Jerome Bruner, Ansgar Nünning, Monika Fludernik, David

[52] For an overview of the transition from structural of classical narratology to postclassical narratology, see Roy Sommer, "The Merger of Classical and Postclassical Narratologies and the Consolidated Future of Narrative Theory," *DIEGESIS* 1 no. 1 (December 4, 2012): 143-157.
[53] Raul Lejano, Mrill Ingram, and Helen Ingram, eds. *The Power of Narrative in Environmental Networks* (Cambridge, Massachusetts: The MIT Press, 2013): 2.

Herman, and Paul John Eakin, this dissertation foregrounds the various ways that people have made sense of, narrated, and represented material change to a little-known landscape: the Powder River Basin.[54] In doing so, it moves beyond the strictly historical and landmark-based perspectives of Farmer, Pyne, Cronon and the rest of the cultural environmental historians, embracing an understanding of environmental change that is not merely cultural but also narrative in its essence.[55]

In doing so, this dissertation overcomes a corollary deficiency of energy histories: a lack of engagement with the American West. Since the field's inception, environmental history has focused much of its work on the American West, producing discipline-defining texts such as Thomas Andrews's *Killing for Coal,* Sterling Evans's *Bound in Twine,* Mark Fiege's *Irrigated Eden,* David Igler's *Industrial Cowboys,* Timothy LeCain's *Mass Destruction,* and Greg Mitman's *Breathing Space*. At the same time, the West is a region that has been home to the bulk of the country's thermodynamic

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[54] See, for instance Peter Brooks, *Reading for the Plot: Design and Intention in Narrative* (Cambridge: Harvard University Press, 1992); Jerome Bruner, "The Narrative Construction of Reality," *Critical Inquiry* 18, no.1 (Autumn 1991): 1-21; Paul John Eakin, *How Our Lives Become Stories: Making Selves* (Ithaca: Cornell University Press, 1999); Monika Fludernik, *An Introduction to Narratology* (New York: Routledge, 2006); David Herman, *Storytelling and the Sciences of Mind* (Cambridge: MIT Press, 2013); Ansgar Nünning, Vera Nünning, and Birgit Neumann, eds. *Cultural Ways of Worldmaking: Media and Narratives* (New York: De Gruyter, 2010).
Thomas Andrews "Review of *Power Lines: Phoenix and the Making of the Modern Southwest,*" *Western Historical Quarterly,* 47, no. 2 (May 2016), 219

[55] The relationship between environmental change and narrative production in the form of memory is one of the central issues that I am interested in here. Somewhat surprisingly, it does not seem to have been dealt with extensively in the historiography. One notable example is W. Jeffrey Bolster, who has observed that, over the course of five- hundred years, declining fish catches in the Atlantic progressively led to each new generation viewing smaller numbers as "normal." That is, the relatively slow progression of environmental change masked the larger transformations over time and ultimately led to the distortions of short-term memory, or what Bolster terms "shifting baselines." At the same time, though, a slightly different form of this this relationship is crucial for our own current moment. The most notable example is the way that we make sense of and narrate climate change. The stories that we tell about this example of environmental change, I would argue, are critical in shaping our everyday behaviors, our perceptions of place (e.g., how we interpret this unseasonably warm Michigan winter), and the future actions that we will take. W. Jeffrey Bolster, *The Mortal Sea: Fishing the Atlantic in the Age of Sail* (Cambridge: Belknap Press of Harvard University Press, 2012), 34. For climate change, see, for example, Roderick McIntosh, Joseph Tainger, and Susan Keech McIntosh, eds., *The Way the Wind Blows: Climate, History, and Human Action* (New York: Columbia University Press, 2000).

resources for many years now—from the oil fields of the Bakken and Alaska to the coal fields of the Powder River Basin to (in the Canadian context) the tar sands of Fort McMurray. As such, it is surprising that the notoriously fecund cross-pollination between environmental history and the West has yet to trickle down to energy history. In spite of the West's abundant western resources, I have been unable to find a single article in the *Western Historical Quarterly* archives that is explicitly concerned with energy.[56] Of course, the major exception to this claim is Needham's *Power Lines,* which so convincingly reinterpreted the process and history of power generation in the Southwest. Nevertheless, it is important to note that *Power Lines* is more the exception than the rule, a brief glimpse into what a focus on historical energy development can offer to the New Western History; furthermore, it is far more of a technological/social history than an environmental one.[57] In other words, despite the field's seeming ability to reshape worldviews by highlighting a thermodynamic past, energy history seems to be one of the few branches of environmental history that has yet to infiltrate the West.

By combining the tools and methodological approaches of these disparate fields—bioregional history, energy studies, and narratology—this dissertation examines cultural conceptions of energy in the Powder River Basin through time. The bulk of the narrative stretches from the late-eighteenth century through the present, though here and there it dips into deeper geological epochs to elucidate material sources. Throughout, its focus is on understanding how people have interacted with and understood bison, coal, and the

[56] The closest seem to be Michael A. Amundson, "Mining the Grand Canyon to Save It: The Orphan Lode Uranium Mine and National Security," *The Western Historical Quarterly* 32, no. 3 (2001): 321–45.
[57] Note, too, however, that the focus of this book is largely material (on the creation of an infrastructure for both producing and moving electricity) and political (settler colonialism via the power industry). As Thomas Andrews has observed, "For all its strengths, *Power Lines* occasionally delves too deeply into the byzantine workings of the electrical utilities industry." Thomas Andrews "Review of *Power Lines: Phoenix and the Making of the Modern Southwest,*" *Western Historical Quarterly,* 47, no. 2 (May 2016), 219.

host of other thermodynamic resources that have defined the Powder River Basin through time. To achieve this goal it draws upon a variety of historical sources to trace ecological change and cultural perceptions of energy in the past: newspaper stories, environmental reports, magazine articles, diaries, letters, political speeches, environmental reports, classroom lectures, archaeological studies, novels, short stories, and the occasional film.[58] In doing so, it seeks to trace the cultural construction of land and energy via the first bioregional history of energy in the American West.

Chapter Outlines

The chapters of this dissertation are arranged thematically. Each one takes an important event or development in the history of the American West (and, more specifically, the Powder River Basin) and recasts it through the lens of energy and the cultural conflicts that surrounded that energy use. As a whole, they proceed roughly chronologically, though there are occasional overlaps. This latter has been done consciously, for as the incident at Sarpy Creek reveals, energy use by definition resists the clean elegance of both temporal and spatial delineation: throughout the history of the American West, disparate energy regimes have often overlapped in complex and unexpected ways. Understanding how and why this happened is one of the keys to understanding the role that energy has played in the West's larger development.

Chapter one draws most directly upon the incident at Sarpy Creek by examining the role that energy played in the development of the nineteenth-century Crow. During the late-eighteenth and early- to mid-nineteenth century, the Crow possessed some of the

[58] While this is a method practiced most notably by Farmer and Pyne, the best example of this methodological approach is David E. Nye, *America as Second Creation: Technology and Narratives of New Beginnings* (Cambridge, Mass.: The MIT Press, 2004), 12.

most bountiful horse herds on the ecologically hostile northern plains. And yet historiographically, they have almost without exception been portrayed as tertiary regional inhabitants who suffered and were driven by the actions of their more powerful neighbors: the Lakota, the Northern Cheyenne, and the Blackfeet. This chapter reexamines this long held understanding by approaching the Crow's rise and fall through the lens of energy use. While most northern plains indigenous histories have presented the region as a monolithic ecological entity, there were vast environmental differences between the Missouri and Yellowstone (Powder River Basin) ecosystems in the wake of American contact. The Crow viewed their Powder River homelands as being in "exactly the right place."[59] This chapter illuminates that claim from a thermodynamic angle, in the process recasting traditional understandings of Crow passivity and decline in comparison with the region's other tribes. As an energy history shows us, far from being passive victims of Lakota, Northern Cheyenne, and American attacks, the Crow were one of the first peoples to both realize and harness the Powder River's thermodynamic bounty.

Chapter two reevaluates what is perhaps the most iconic of the West's late-nineteenth-century cattle conflicts: the Johnson County War. The traditional interpretation of this event is that it was a fleeting instance of violence borne out of long-simmering class conflicts and rampant political greed: according to this view, the invaders, a group of wealthy cattle barons, attempted to physically eliminate a group they deemed "rustlers," often-poor, newly settled ranchers and farmers whom they accused of stealing cattle. But what is often lost in this interpretation is that there were also critical environmental changes that took place during—and in many ways that helped to propel—

[59] Crow leader Arapooish, quoted in Washington Irving, *The Adventures of Captain Bonneville* (Norman, Oklahoma: University of Oklahoma Press, 1961), 165. See chapter one of this dissertation for more information on Arapooish.

this path to violence. Viewed from a thermodynamic angle, the invaders attempted to replace the region's bison with domesticated cattle, viewing the latter animals as more civilized and efficient versions of the former. In doing so, however, they failed to realize that cattle are far less efficient conservers of energy in the harsh northern plains environment than bison. When the invaders' ranching system inevitably failed, it was replaced not by a group of uneducated small farmers, but by men and women who practiced a new thermodynamic approach for managing cattle, what was then known as the inchoate field of range science. Drawing upon the best agricultural and livestock science of Europe and the United States, these so-called rustlers were at the forefront of a new system for cultivating and managing an ecosystem's energy, one that would have important ramifications for the later oil and coal industries. As such, this chapter recasts this legendary class conflict from the perspective of energy extraction and an ecological relationship to the land. It looks at competing energy regimes in order to understand what the eventual conflict can tell us about larger shifts in energy imaginaries in the late-nineteenth-century West.

Chapter three examines one of the most infamous cases of political corruption in American history, the Teapot Dome scandal. During the second decade of the twentieth century, the U.S. Navy leased a number of oil reserves in California and Wyoming to serve as emergency fuel sources. In 1922, however, one of these leases, northeastern Wyoming's Teapot Dome, was secretly leased to private interests. The resulting case was a national sensation, one that eventually led to the first U.S. cabinet member in history to be sentenced for crimes committed while in office. It is a story that has been told countless times, one that is seemingly dredged up whenever there is even a hint of

political corruption in modern day Washington. But what is inevitably lost in these recapitulations is the local context of the case: the Teapot Dome lease was part of a much deeper history of the Powder River Basin's burgeoning turn-of-the-century oil industry. During the late-nineteenth and early-twentieth centuries, the Casper area witnessed a battle not unlike that of the Johnson County War: wealthy absentee prospectors attempted but failed to capitalize on the region's perceived oil wealth. As a consequence, experts out of Europe came in and leveraged a deep understanding of place and the latest scientific theories to locate and extract Salt Creek's thermodynamic bounty. It would take some twenty years, but by the second decade of the new century, Casper was home to the largest oil refinery in the world. The story of this rise and Teapot Dome's fall is the story of a larger energy history: increased extraction led to thorough understandings of landscapes and their subterranean ecologies; at the same time, however, increased fossil fuel use created that same energy's ultimate abstraction from place. This is the paradox of modern energy economies, and it began in the Powder River Basin.

The dissertation's final chapter examines the latter half of the Sarpy Creek incident: the rise of Powder River coal. Since the 1980s, the basin has been the largest coal provider in the world, contributing roughly forty percent of the United States' annual product.[60] Like most mineral rushes, this has come about thanks to a combination of geological bounty and shifts in coal's economic and environmental reputation: Wyoming coal contains some of the lowest sulfur percentages in the world, leading it to be viewed by many as a cleaner alternative to the eastern coal that had for so long driven the American economy. This chapter looks into the deep past of the Powder River coal

[60] "Powder River Basin Coal Field," *Wyoming State Geological Survey,* http://www.wsgs.wyo.gov/energy/coal-prb

industry, one that extends far beyond the post-1970 boom. Coal has been mined in the basin for well over a century, but never with the success or scale that has been seen over the past fifty years. In the early-twentieth century, Peabody Coal and a handful of other companies were among the first to leverage narrative techniques in an attempt to market the region's coal as a clean alternative to more popular eastern products. A decade later, the Northern Pacific used the latest industrial technology to open one of the first large-scale coal strip mines in the world at Colstrip, Montana. This chapter picks up where the previous one left off, examining the rise of narrative in energy production and distribution. Instead of scientific knowledge of place, technological might emerged as the key to mid-century coal success. By combining these two approaches—narrative and technology—into a historical framework for understanding the modern energy landscape, this chapter presents the post-1970 rise of Powder River coal not as something new, but as the fortuitous combination of erstwhile failures. In doing so, it seeks to close the loop on the region's energy history, revealing not only how and why the Sarpy Creek incident can be seen as the epitome of the Powder River's thermodynamic past, but also how the future of the region-as-energy-provider emerges as much out of its past as its present.

Conclusion

Among the chief criticisms of the Sarpy Creek incident was that it presented a lost opportunity. On top of the patent violation of a people, a landscape, and a past, Judson Finley argued that had it not been for the actions of Westmoreland, Sarpy Creek could have become a major tourist destination that gave visitors valuable insight into the region's past. Not only would this have provided a much-needed revenue stream into the

Crow Nation's coffers, but it would have filled an archaeological vacuum in the plains' deep history: the dearth of ancient cultural remains when compared to other more bountiful regions.[61]

Viewed from another angle, however, the Sarpy Creek incident can be seen to represent an as-of-yet unrealized opportunity. On top of all of the cultural conflicts, the exhumation of bison bones in the search for coal has—both figuratively and literally—unearthed the long buried, complexly intertwined history of energy in the American West. Taught for over a century now as a chronicle of boom-and-bust cycles, neatly delineated frontier progressions, and energy transitions, historians and the broader American public have come to view coal and bison as disparate entities, each belonging to its own distinct historical epoch. But as we examine the history of the region more closely, zooming in on the mythic events and places that have defined it, it becomes clear that the Sarpy Creek incident is not the only curious imbrication of energy in the basin's history. The Johnson County invaders marched across active oil fields in order to defend their cattle empire; Crow and Lakota horses battled with American steamboats for the same food sources; and Gillette area companies have similarly unearthed bison bones in their coal excavations.[62] Far from being anomalies, such energetic splicing highlights the connections that these heretofore disparate eras and events possess. By examining these and other critical moments in the Powder River Basin's past through a thermodynamic lens, this dissertation challenges our existing understandings of the region and its place in

[61] This is one of Pekka Hämäläinen's claims for why the "Comanche Empire" and others like it have been overlooked in most histories: they left no "ostentatious art and architecture…no imperial ruins to remind us of the extent of their power." Hämäläinen, *The Comanche Empire,* 4.

[62] In 1977, preliminary work for the Gillette-area Buckskin mine also uncovered a mass of buried bison bones and butchering tools dating back close to 9,000 years. Mary Kelley and the Campbell County Rockpile Museum, *Coal in Campbell County* (Charleston, South Carolina: Arcadia Publishing, 2013), 1990.

a broader continental history. Instead of the land of boom and bust or an untrammeled Edenic environment, it reveals a place of continuity, manipulation, and abundance. Instead of "the kindergarten of the American State" or the home of "independence, self-reliance, and individualism," it presents the American West as the energy capital of the world.[63]

[63] Richard White, *"It's Your Misfortune and None of My Own": A New History of the American West* (Norman: University of Oklahoma Press, 1991): 57-58.

TIMELINE

1700-1725: Crow reach the Powder River Basin

1829: Fort Union constructed on Missouri River

1830: Crow reported to have 10,000 horses

1832: B.L.E. Bonneville finds oil near present-day Lander

1851: Treaty of Fort Laramie

1850s: Crow migrate to Platte during summers

1859: F.V. Hayden notes the presence of coal on the Tongue River

1863: First reported oil sale in Wyoming near present-day Casper

1863: Crow kill two prospectors along Yellowstone River

1878-1879: First substantial cattle herds enter the Powder River Basin

1881: John Brisbin's *The Beef Bonanza* published

1882: Anticline Theory proposed by Israel White

1883: First claim filed at Salt Creek

1885: Cleveland's proclamation to remove open range fencing

1886: Peak of W.S.G.A. membership

1886: Salt Creek's first geological report

1886-1887: The Hard Winter

1887: Hatch Act

1888: Buffalo Land Office Opens

1888-1892: Major increase in Johnson County land filings

1890: First commercial well brought in at Salt Creek

1892: Johnson County War

1893: Sheridan Fuel Company begins coal mining

1896: First geological report devoted solely to Salt Creek published

1901: Burlington Northern modifies trains to burn subbituminous coal

1908: Big Dutch Strike at Salt Creek

1915: Teapot Dome becomes Naval Petroleum Reserve No. 3

1917: Second sands struck at Salt Creek

1922: Jack Peabody creates Kleenburn brand for Tongue River coal

1922: Casper's Standard Oil refinery becomes the largest in the world

1922: Teapot Dome Scandal breaks

1923: First Gillette coal mines open

1923: Peak of Salt Creek Oil

1924: Northern Pacific opens Colstrip mine

1925: Sheridan's Hotchkiss mine sets world record for mining efficiency

1935-1942: C.C.C. Camp 886 fights coal fires in Gillette

1937: Ira Stephens Nelson publishes *On Sarpy Creek*

1953: Last Sheridan-area mine closes

1959: Northern Pacific closes Colstrip mines

1967: Belle Creek oil field discovered in Powder River Basin, igniting brief boom

1970: Clean Air Act Amendments Passed

1980s: Coal-bed methane production begins in Powder River Basin

1988: Wyoming becomes country's leading coal producer

2000-2010: 7,000 coalbed methane wells drilled in the Powder River Basin

2008: Powder River coal production peaks

2012: Sarpy Creek Controversy

2018: Vice President Mike Pence visits Crow coal mine

2018: Talk of Powder River oil boom

CHAPTER ONE

"In Exactly the Right Place": Crow Thermodynamic Control of the Northern Plains, 1770-1860

Early American travelers had little knowledge of the northern plains landscape, never mind of the intricacies of its complex thermodynamic topography. Time and again they relied upon the region's indigenous inhabitants, whom they regularly plied for maps, transportation, and basic nutrition. We can see this not only in the mythic travels of Lewis and Clark, but also in the countless trappers and traders who followed in their wake, traversing the Powder River Basin and surrounding environs in search of the promised game and riches. One such trapper was the Irish-American Robert Campbell, an employee of the Rocky Mountain Fur Company who depended upon members of the Crow Nation to help guide and enable his operations in the 1820s and 1830s. In particular, he looked to the great warrior Arapooish, head of the River Crow.[1] Unfortunately we know very little about these encounters; the archival records are woefully incomplete. However, one exception does exist, an eloquent instance in which

[1] Information and stories on Arapooish can be found in Dan R. Conway, "Arapooash: The Great Up-Sah-Ro-Ku and Medicine Man," Box 7, Folder 8, Joseph Medicine Crow Collection, Little Big Horn College Archives, Crow Agency, MT and Edwin Thompson Denig, *Five Indian Tribes of the Upper Missouri: Sioux, Arickaras, Assiniboines, Crees, Crows* (Norman: University of Oklahoma Press, 1975), 161–84. In most of the work his name is translated as "Sore Belly." In Denig, however, it is mistranslated as "Rotten Belly."

Arapooish outlined the Powder River Basin and its surrounding lands through the ever-important lens of energy:

> "The Crow country is a good country. The Great Spirit has put it exactly in the right place; while you are in it you fare well; whenever you go out of it, whichever way you travel, you fare worse. If you go to the south, you have to wander over great barren plains; the water is warm and bad and you meet with fever and ague. To the north it is cold; the winters are long and bitter and there is no grass; you cannot keep horses there but must travel with dogs. What is a country without horses? On the Columbia they are poor and dirty, paddle fish is poor food. To the east they dwell in villages; they live well, but they drink the muddy waters of the country; good water, good grass, plenty of buffalo. In summer it is almost as good as Crow country, but in winter it is cold; the grass is gone and there is no salt weed for the horses. The Crow country is exactly in the right place. It has snowy mountains and sunny plains, all kinds of climates are good things for every season. When the summer heats scorch the prairies, you can draw up under the mountains, where the air is sweet and cool, the grass fresh, and the bright streams come tumbling out of the snowbanks. There you can hunt elk, the deer and the antelope when their skins are fit for dressing; there you will find plenty of white bears [grizzlies] and mountain sheep. In the autumn when your horses are fat and strong from the mountain pastures you can go down into the plains and hunt the buffalo, or trap beaver on the streams. And when winter comes on, you can take shelter in the woody bottoms along the rivers; there you will find buffalo meat for yourselves and cottonwood bark for your horses, or you may winter in the Wind River valley, where there is salt weed in abundance. The Crow country is exactly in the right place. Everything good is to be found there. There is no country like the Crow country."[1]

It is a remarkable statement, not so much for its political import as for the dense environmental details that undergird it, the way that it paints the region from the perspective of someone who is intimately familiar with the land and its complex ecology. In an era in which indigenous voices are so often absent from the archive, Arapooish's words provide rare insight into early-nineteenth-century Crow geography. As such, they serve as an apposite starting point for reevaluating perceptions of Crow power on the northern plains.

[1] Quoted in Washington Irving, *The Adventures of Captain Bonneville* (Norman, Oklahoma: University of Oklahoma Press, 1961), 165.

Not that there is much power to reinterpret. In the typical historical narrative, the Crow are painted as passive actors, American pawns who suffered at the hands of Blackfeet and Lakota forces and formed desperate alliances with the U.S.[2] By taking an energy-centric perspective, and by comparing the Crow's place in the Yellowstone River's ecology with that of the neighboring Missouri River tribes, this chapter offers an alternative history, one that both portrays the Crow as critical and powerful cogs in the complex thermodynamic system of the northern plains. In doing so, it sheds light on Arapooish's remarks and the diachronic roots of the Sarpy Creek controversy. Part of this has to do with a geographic shift. Historiographically, much of the nineteenth-century history of the northern plains has been centered along the Missouri River corridor, a riverine system not only unique for the northern plains but also for the continent as a whole. In the context of the region, however, this body of water is an aberration, a fluvial leviathan in the heart of the "Great American Desert." To begin with, it is the only river that is truly navigable for large crafts, most notably the steamboat. One only has to recall that ubiquitous saying "a mile wide and an inch deep," which has been applied to virtually every other stream in the region. But in contrast to the Missouri's dominance, what is interesting about the Yellowstone is that it lies somewhere between these two poles—it is large and relatively deep and even, in a few places, seasonably navigable, but it resisted what we might call "steamboat colonialism" for nearly half a century after the

[2] For instance, Pekka Hämäläinen has written the following about the Crow: "their prosperity in horses was their undoing. Desperate to obtain guns and to block…incursions, Crows opened their lands to American fur traders and, inevitably, to the traders' microbes…[They] faced a rapid decline….and tried to escape annihilation by forging a series of desperate alliances." Pekka Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," *The Journal of American History* 90, no. 3 (2003): 854.

Upper Missouri gave way to the craft and its ecological corollaries.[3] As Arapooish argued, it is "in exactly the right place." For that reason, an alternative perspective needs to be applied to its history and, in consequence, to the Crow's. Instead of being a road to the northwest, the Yellowstone was most notable as a life source, an energy mecca in the unforgiving landscape of the northern plains, one whose existence and ecological impact provides important clues into the incident at Sarpy Creek.[4] Far from being passive victims of a Lakota and Blackfeet invasion, the Crow were the first peoples to recognize the thermodynamic bounty of the Powder River Basin. Centuries before Gillette coal would power the globe, the Crow were transforming the region's energetic glut into geopolitical power.

[3] The term "steamboat imperialism" comes from Maya Jasanoff's review of Walter Johnson's *River of Dark Dreams: Slavery and Empire in the Cotton Kingdom*. As Jasanoff writes, "Steamboats were to nineteenth-century empire-builders what caravels had been to the conquistadores, and what satellites and drones are to us: they extended political and economic power into hitherto inaccessible regions." And further, "Steamboats powered the push of white settlement into Indian territory, and facilitated the commercial development of the Mississippi Valley into perhaps the most profitable land in the world. The "Cotton Kingdom" was created by steamboat imperialism." Maya Jasanoff, "Our Steamboat Imperialism," *The New York Review of Books*. October 10, 2013, http://www.nybooks.com/articles/2013/10/10/our-steamboat-imperialism/.

[4] This claim owes much to Richard White, who, in writing of the Columbia River, remarks that "Like us, rivers work. They absorb and emit energy; they rearrange the world." White, *The Organic Machine: The Remaking of the Columbia River*, 5. To do so, I draw upon the work of geographers and cultural theorists to inform my thinking. In particular, Laura Benton, has described the "corridors and enclaves" of colonial control, emphasizing the patchwork nature of territorial control and knowledge in legal discourse. Lefebvre's work has stressed the intertwining of social spaces, what he describes as "a structure far more reminiscent of flaky mille-feuille pastry than of the homogenous and isotropic space of classical (Euclidean/Cartesian) mathematics."[4] In essence, I want to argue that historians' treatment of the northern plains environment has often been similar, favoring what, drawing upon Bahktin, could be described as the monologic over the polyphonic, mosaic patterns that Benton and Lefebvre proffer. Brute control of it as a thoroughfare wasn't nearly as important as was accessing its resources and adapting socio-political change to its ecology, an aspect which, I argue, the Crow excelled at during the first half of the nineteenth century, leading them not into the role of the imperial power of the Lakota and Blackfeet, but as dexterous diplomatic actors who reacted in concert with a particular ecological niche. Lauren A Benton, *A Search for Sovereignty: Law and Geography in European Empires, 1400--1900* (Cambridge; New York: Cambridge University Press, 2010), 1–39. Henri Lefebvre, *The Production of Space* (Malden, MA: Wiley-Blackwell, 1992), 86.

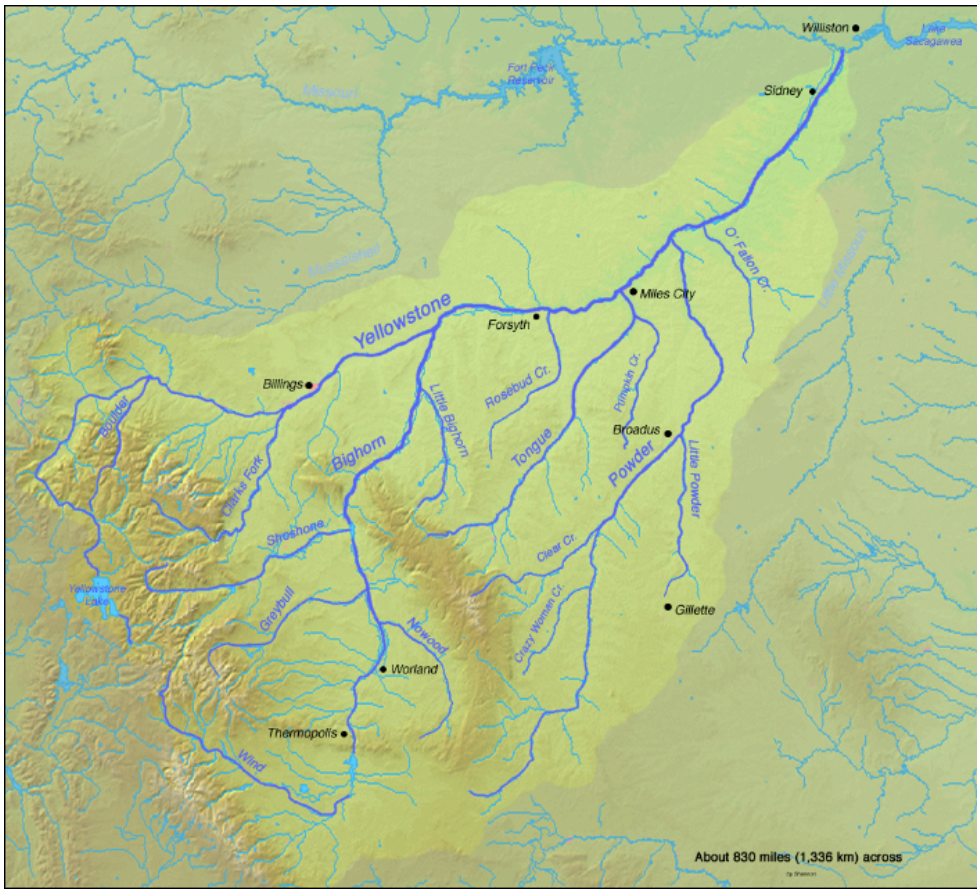

Figure 2: Map of Yellowstone River Watershed
Yellowstone River: A Wildlife Paradise, https://www.americanrivers.org/river/yellowstone-river/

The Northern Plains' Energy Hub

Like so many environmental histories, this story begins with simple ecology. Geographically speaking, historians of the American West have tended to delineate the plains via a latitudinal triad—the southern, central, and northern plains. And although the particular delineations of these sections vary according to the respective author and study, each is defined by its aridity.[5] Historically speaking, this meant that during the plains equestrian period, stretching from roughly the mid-eighteenth century through to the

[5] This goes back to Walter Prescott Webb's seminal 1931 study on the Plains, which, drawing upon John Wesley Powell's 1879 "Report on the Lands of the Arid Region of the United States," defines aridity as "The third characteristic, and in reality the most important one in determining a plains environment as exhibited in the United States, is a sub-humid or semi-arid climate; that is, a climate deficient in rainfall," which he defined as less than twenty inches of annual precipitation. Walter Prescott Webb, *The Great Plains* (Lincoln: University of Nebraska Press, 1931), 6.

1870s and the demise of the bison, of these three sections the northern plains harbored by far the fewest horses. In large part this was due to the notoriously brutal winters—climactic records along the Yellowstone record temperatures ranging from -50 to 108, with average precipitation in much of the region below ten inches annually—which stunted floral growth and made it increasingly difficult for both humans and animals to conserve and access the plains' limited energy sources.[6] But beyond the northern climate, a handful of other less obvious factors influenced this austerity. Most notably, the northern plains—and the Powder River Basin in particular—has, in the words of one scholar, "one of the most variable climates in the world."[7] In simple terms, this means that climactic conditions—most notably precipitation, the primary driver of floral growth and therefore of all life on the plains—can and do vary wildly from day to day, from season to season, from year to year. Large-scale droughts descend upon the region roughly every two decades, with historical-grade shortages arriving every forty to fifty years.[8] The result is the creation of immense "water stress," a diminution of the region's grasses that arises "when the rate of water loss by transpiration exceeds the rate at which it is replaced by absorption."[9] Over the course of even minor droughts, floral biomass can diminish substantially. To give but one example, during the 1930s Dust Bowl (which was

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[6] Peterson, D.A., Wright P.R., Edwards, G.P., Jr., Hargett, E.G., Feldman, D.L., Zumberge, J.R., and Dey, Paul, 2009, "Ecological assessment of streams in the Powder River Structural Basin, Wyoming and Montana, 2005–06," U.S. Geological Survey Scientific Investigations Report 2009–5023, 5; George Carr Frisson, "Archaeological Evidence of the Crow Indians in Northern Wyoming: A Study of Late Prehistoric Period Buffalo Economy," (Ph.D. Dissertation, University of Michigan, 1967), 8.

[7] Wendy Ann Swanson Sutton, "Economic and Social Change during a Critical Transition: The Protohistoric in the Powder River Basin and Big Horn Mountains," (Ph.D. Dissertation, Columbia University, 2004), 93. Similarly, Frisson observes, "The climate can best be described as that of violent contrasts." Frisson, "Archaeological Evidence of the Crow Indians in Northern Wyoming," 10.

[8] George M. Zeimens, Danny N. Walker, *Archeology of the Eastern Powder River Basin, Wyoming* (Bureau of Land Management, 1977), 23.

[9] R.W. Brown "Water Relations of Range Plants," in Ronald Sosebee, ed., *Rangeland Plant Physiology,* (Denver: Society for Range Management, 1977), 107.

notably less severe on the northern plains than on the central and southern plains) one study observed that forage yield in Montana dropped from 1,586 pounds per acre to a mere 222 pounds per acre.[10] Today this manifests as agricultural losses, but during the eighteenth and nineteenth centuries it meant a corollary variability in bison hunting. As the anthropologist Douglas Bamforth has observed, the predictability of grass density and therefore rainfall is the primary factor in establishing the success of year-to-year bison hunts. When dry years set in and grasslands wither, "animals move more often, farther, and faster" than they do during good or even average years. As a result, the hunt becomes more volatile, and the possibility of starvation begins to set in.[11]

To some extent this is all an old story: as American settlers in the 1930s found out, the plains can be a brutally harsh environment.[12] But what is most notable—and what provides us with a telling glimpse into the Sarpy Creek controversy—is that in this by all accounts merciless landscape, the Crow somehow managed not merely to survive but to paradoxically thrive, transforming themselves from a largely horticultural, Missouri-river dwelling tribe into one of the dominant equestrian powers on the continent. Both nineteenth-century traders and twentieth-century historians have remarked upon this anomaly, noting that at a time when the Comanche, inhabiting the far more hospitable southern plains, possessed on average eighty horses per family, the Blackfeet (to the Crow's immediate north) managed a scant one-to-five. On the northern plains, this was the norm, for "the long and cold winters reduced the quantity, quality, and availability of

[10] Robert T. Coupland, "The Effects of Fluctuations in Weather upon the Grasslands of the Great Plains," *Botanical Review* 24, no. 5 (1958): 288.
[11] Douglas B. Bamforth, *Ecology and Human Organization on the Great Plains*, Interdisciplinary Contributions to Archaeology (New York: Plenum Press, 1988), 48–49.
[12] See, for instance, William Cronon, "A Place for Stories: Nature, History, and Narrative," *The Journal of American History* 78, no. 4 (March 1, 1992): 1347–76.

forage, exposing the animals to starvation and causing heavy winter losses."[13] And yet even in such a harsh environment, it was "not uncommon for a single family [of Crow] to be the owner of 100 of these animals…[and] most middle-aged men have from 30 to 60."[14] The German Prince Maximilian estimated that by the 1830s the Crow had between nine and ten thousand horses in total, an equine bounty anomalous for the region.[15] What we have, then, is the story of an extraordinary metamorphosis, of a tribe somehow managing to flourish in one of the continent's most ruthless environments, where "the long and cold winters reduced the quantity, quality, and availability of forage, exposing the animals to starvation and causing heavy winter losses."[16] What we have is the beginnings of one of the West's more remarkable thermodynamic powers.

Unraveling this mystery requires a deeper understanding of Crow history and its relation to the region's ecology. According to the tribe's oral histories, by 1730 they had obtained their first mounts. The late tribal historian Joseph Medicine Crow has presented three different accounts for how this event came about. In the first, a Crow war party trekked across the Continental Divide and either traded for or stole an animal from one of the Columbia River tribes who, as a result of contact with the Spanish, were already in possession of them. Not surprisingly, the Crow were mesmerized by the animal, which "stood high as an elk but looked very different." One of the men got too close and was kicked in the stomach, thereby bequeathing the name "Kicked In The Bellies" to the individual and later to the Crow band, one that still exists today. In the second narrative, a

[13] Pekka Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," *The Journal of American History* 90, no. 3 (2003): 845-847.
[14] Blackfeet estimate from. Crow estimated from Edwin Thompson Denig, *Five Indian Tribes of the Upper Missouri: Sioux, Arickaras, Assiniboines, Crees, Crows* (Norman: University of Oklahoma Press, 1975), 144–45.
[15] Prince Maximilian du Wied, *Travels in North America,* Part I, *Early Western Travels,* edited by Reuben G. Thwaites (Cleveland: A. Clark Company, 1905), Volume XXII, 351.
[16] Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," 846.

war party traveled south to Salt Lake, once again either trading for or carrying off a horse from a tribe in the region, possibly the Comanche. They then returned to their homelands with the animal, incorporating it into tribal lifeways. In the final rendition, a story that has received far less traction in twentieth-century historical narratives, a Crow man dreamed of the horse. He then set out on a journey in search of such a creature, ultimately finding a band of them in a lake. There he captured the animals and brought them back to the tribe, providing an all-important bridge into the equestrian period.[17]

All three of these stories have own their historical merits, but the empirical validity is beyond our concern here. Regardless of how they obtained their initial mounts, within a decade the Crow had amassed a large enough surplus that they were able to trade with the Frenchman Pierre Gaultier de Varennes, Sieur de la Verendrye, and his company, who traveled amongst the Crow in the 1740s.[18] Over the next half-century, they took quickly to the equestrian lifestyle, regularly traveling across the continental divide to obtain mounts via trade and theft from the Nez Perces, the Hidatsas, and the Flatheads, while also venturing out in war parties in other directions. As a result, by 1805, when the North West Company trader Charles Mackenzie encountered the Crow at the Hidatsa villages, he deemed them "the best riders in the world."[19]

The key historical question is this: how were the Crow, living in the heart of one of the harshest environments on the continent, able to support such massive horse herds when the surrounding tribes struggled to harbor more than a scant two or three per

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[17] Joseph Medicine Crow and Herman J. Viola, *From the Heart of the Crow Country: The Crow Indians' Own Stories*, (Lincoln: Bison Books, 2000), 100-102; Hoxie, 42. As with most stories of early equestrianism, the details of early horse acquisition are debated. For an overview of the competing narratives, see Andrew Dewhirst, "A Society Under Siege: A History of Changing Crow Indian Land Boundaries, 1700-1904," (Master's Thesis, University of Wyoming, 1996), 24.
[18] Medicine Crow, *From the Heart of the Crow Country,* 102-104.
[19] "Charles Mckenzie's Narratives," in Wood and Thiessen, eds., *Early Fur Trade,* 245.

family? To arrive at an answer, we need to refer back to Arapooish's initial remarks: as he observed, the Crow country was in "exactly the right place." Once again, this is not to be dismissed as mere rhetoric or prejudice. Rather, for the purposes of historical study we are better off finding a way to translate his observations into the argot of twenty-first-century western thought and its fetishization of rational empiricism. In essence, the disparity in Crow wealth boiled down to what we would now call thermodynamics, the vast storehouses of energy that were—and, as the Sarpy Creek story reminds us, are—present in the Crow homelands.[20] In the three hundred years that preceded Arapooish's encounter with the Rocky Mountain Fur Company, the Crow had traveled over much of the Upper Midwest and Plains in search of land and energy. At some point they had been a part of the Hidatsa tribe, living in what is now southeastern Manitoba, near Lake of the Woods, surviving through a combination of farming and hunting. In the mid-sixteenth century, they broke off from the Hidatsa, traveling to present-day North Dakota and Devil's Lake. By the beginning of the next century, the Crow were on the Missouri River, living with the Mandan in their great villages at the mouth of the Heart. According to oral histories, they remained there for some years, until a remarkable individual named Chief No Vitals proclaimed, "it is time I heed the Great Spirit's instructions, I have tarried too long," referring to a vision in which the Great Spirit instructed him to move "towards the land of setting sun and to inherit a wonderful land of many mountains abound with game and many good things to eat." So the Crow traveled northwest along the Missouri,

[20] In simple terms, thermodynamics is "the science of energy flow and chemical kinetics," which is how I will use the term in this chapter. Of course from a scientific perspective, the concept is much more complex and often focuses on what has been deemed the second law of thermodynamics, that entropy increases over time. Eric D. Schneider and Dorion Sagan, *Into the Cool: Energy Flow, Thermodynamics, and Life* (Chicago: University Of Chicago Press, 2006), 4.

continuing up the Milk River and into present-day Alberta.[21] From there they wandered south to Salt Lake before once again returning north, to a land "Where There is Fire," a place that, according to Medicine Crow, "must have been an open and burning coal vein somewhere in southern Wyoming." Finally they ventured onto their final stopping place, the Yellowstone Valley, reaching what would become their homeland sometime between 1700 and 1725.[22] According to one scholar, "for the Hidatsa and Crow…the vision experience was both disintegrative and regenerative, an exercise of power in the permeable domains of politics and the supernatural by men and women actively engaged in creating their own world." As a result, "not only were they traversing a new land; No Vitals and his followers were constructing a new thought-world during their High Plains migration."[23] Emerging out of firsthand experience with the landscape and its thousands of different microenvironments, this worldview would lay the foundation for a new thermodynamic relationship, one that fully exploited the limited resources of the northern plains and paved the way for the Crow's subsequent wealth and power.

By the early nineteenth century, then, after centuries of wandering and searching for the "wonderful land" that the Creator had promised to No Vitals, the Crow finally found and gained access to one of the great energy hubs of the northern plains, the

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[21] One account puts them at present-day Devil's Lake, North Dakota. See Dewhirst, "A Society Under Siege," viii.

[22] Joe Medicine Crow, "Crow Migration History," Box 7, Folder 8, Joseph Medicine Crow Collection, Little Big Horn College Archives, Crow Agency, MT; Joseph Medicine Crow "The Crow Country," Box 6, Folder 15, Little Big Horn College Archives. For more on the Crow Migration story, see Frederick E Hoxie, *Parading through History: The Making of the Crow Nation in America, 1805 - 1935,* (Cambridge: Cambridge Univ. Press, 1995), 36–39; Peter Nabokov, "Cultivating Themselves: The Interplay of Crow Indian Religion and History," (Ph.D. diss., University of California, Berkeley, 1989), 111-123; Raymond W. Wood, Alan S. Downer, "Notes on the Crow-Hidatsa Schism," *Plains Anthropologist,* 22 no. 78 (November 1977): 83-100.

[23] James Brooks, "Sing Away the Buffalo: Faction and Fission on the Northern Plains," in *Beyond Subsistence: Plains Archaeology and the Postprocessual Critique,"* edited by Philip Duke and Michael Wilson (Tuscaloosa: University of Alabama Press, 1995), 145.

Yellowstone River and its tree of tributaries—most notably for our purposes, Sarpy Creek and the larger Powder River after which the region is named.[24] It was a major geopolitical coup, for as we shall see the Yellowstone is a truly remarkable river, nearly five hundred miles in length, by far the longest tributary of the Missouri, one that descends down from the peaks of the Shoshone Mountains, just outside of present-day Yellowstone National Park, sliding and meandering until it finally makes its confluence with the Missouri in present-day Fort Buford, North Dakota, the nineteenth-century location of the famed Fort Union, which will factor so centrally into our discussion here. Traveling through the region in 1805, Meriwether Lewis praised the "wide and fertile vallies…which occasionally unmasked by the wood on their borders disclose their meanderings for many miles in their passage through these delightfull tracts of country…the whole face of the country was covered with herds of Buffaloe, Elk & Antelopes," while William Clark, in his characteristically terse manner, observed, "for me to mention or give an estimated of the different Spcies of wild animals on this river particularly Buffalow, Elk Antelopes & Wolves would be incredible. I shall therefore be silent on the Subject further."[25]

What the two men were noting was the key ecological feature of the region: its river bottoms, the nutrient-rich land that abutted the rivers and seasonally teemed with cottonwood, boxelder, sagebrush, peachleaf willow, and hundreds of other critical species.[26] Also called riparian ecosystems, they are among the most diverse, dynamic, and

[24] Such descriptions continue into the present day. Medicine Crow, for instance, refers to the Crow homeland as "The promised land." Joseph Medicine Crow Interview, OH 1862, Montana Historical Society, Helena, MT.
[25] Moulton, *Journals of Lewis and Clark,* 4:67, 8: 219.
[26] Dennis H. Knight et al., *Mountains and Plains: The Ecology of Wyoming Landscapes,* (New Haven: Yale University Press, 2014), 54–55. For instance, François Larocque, traveling with the Crow in 1805, wrote

complex ecosystems in the world.[27] But nowhere is their role more integral than in those locations where water is at a premium. In arid environments such as the northern plains, riparian ecosystems present as ecological anomalies, rare ribbons of forest and shrubland that blossom in the heart of the "Great American Desert."[28] While trees were notably absent out on the plains proper, along the Powder and the Yellowstone cottonwoods regularly reached four feet in diameter, and sagebrush often grew "taller than a man on horseback."[29] This is because these ecological strips, occupying less than two percent of the plains landscape, end up supporting more than eighty percent of the region's fauna.[30] In short, what these biomes are is natural energy factories, thermodynamic oases that slice through some of the world's most arid environments. Richard White has made similar claims about the relationship between the Columbia River and energy in the Pacific Northwest, observing that "like us, rivers work. They absorb and emit energy; they rearrange the world."[31] But the situation with the nineteenth-century Crow was different in important ways. Unlike the Columbia, which wends its way through one of the continent's more saturated environments, and where energy manifests as salmon and hydropower, the Yellowstone's energy presents as a year-round source of moisture and a slurry of rich, ever-changing deposits from the more nutrient-dense climes of the

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that "the Powder River is…large with plenty of full grown trees…so that on our arrival we perceived diverse herds of Elk Deers through the woods." François Antoine Larocque and Lawrence J. Burpee, *Journal of Larocque from the Assiniboine to the Yellowstone, 1805* (Ottawa : Government Printing Bureau, 1910), 30.

[27] Robert Naiman and Henri Decamps, "The Ecology of Interfaces: Riparian Zones," *Annual Review of Ecology and Systematics,* 28: 623.

[28] Pekka Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," *The Journal of American History* 90, no. 3 (2003): 847.

[29] George Carr Frison, "Archaeological Evidence of the Crow Indians in Northern Wyoming," 5-7. Cottonwood observation from Charles C. Bajza, "Powder River Basin: A Study in Regional Geography," (Ph.D. Dissertation, Indiana University, 1953), 147.

[30] *Wetland and Riparian Areas of the Intermountain West Ecology and Management Edited by Mark C. McKinstry, Wayne A. Hubert, and Stanley H. Anderson*, 2004, xi.

[31] White, *The Organic Machine: The Remaking of the Columbia River*, 3.

mountains. In this, the Yellowstone is particularly notable, flowing during the early-twentieth century with an average discharge of 10,250 second-feet and with a maximum of an astounding 96,300 second-feet. Compare this to smaller tributaries, streams like the Powder, which possesses an average discharge of 441 second-feet, and the Tongue, a mere 212.[32] In its course down from the mountains, the Yellowstone not only injects water into this arid landscape, but it also imbues a batter of rich mountain minerals—more than twenty-five million tons per years—into a landscape known for its alkali- and clay-based soils.[33] In doing so, it creates a riparian biome in which energy is stored *aboveground* and therefore readily available for humans and animals, even during the notoriously brutal winter months.[34] This is a crucial distinction, because unlike the eastern forests that were so familiar to Americans of the time, on the grasslands most of the biomass resides below ground, in the roots, an evolutionary adaptation in response to the plain's aridity and the barrage of ungulate browsing to which it was repeatedly subjected.[35] A single square yard of big bluestem—one of the major species of plains

[32] "Surface Water Supply of the United States, 1945, Part VI, Missouri River," (U.S. Government Printing Office, Washington, D.C.: 1947).

[33] Charles Bajza has an in-depth discussion of the different soil types within the Powder River Basin. In essence, along the river banks there was "Alluvial soil," which, "Of all the basin's soils their depth, fine sandy loam texture, and prismatic structure most readily qualify them for the easiest management, durability and largest capacity to produce crops. The rest of the basin is covered, in large part, by a mix of heavy clay soils, which are "extremely sticky and plastic when wet and hard and tough when dry. The fine texture provides abundant porosity but no permeability, an environment very unfavorable for soil water. Hence the sparse native mid- and short grasses, and the dry-farmed crops," and heavily alkali, badlands-type soils. Bajza, "Powder River Basin," 151-161. The estimation comes from 110-111.

[34] This is particularly apparent if you drive along I-90 or I-94 in Montana in the fall, when all of the cottonwoods along the Yellowstone turn gold and visually highlight the floral mass that these riparian environment possess.

[35] For an overview of the woodland/forest-bias in American and European thinking, see Simon Schama, *Landscape and Memory* (New York: Vintage, 1996) 23-244; Richard Manning, *Grassland: The History, Biology, Politics, and Promise of the American Prairie* (New York: Penguin, 1997), 1-10. Manning portrays the twentieth-century environmental movement as a direct descendant of "the European tree culture that ruled the nineteenth century."

grasses—can contain twenty-five miles of rootlets, root hairs, and roots.[36] During winter on the plains, this biomass is buried and made inaccessible to animals and humans; consequently, the potential for starvation increases. But as Arapooish claimed, along the Yellowstone, "you can take shelter in the woody bottoms…there you will find buffalo meat for yourselves, and cottonwood bark for your horses." Such an observation highlights two important thermodynamic effects of this riparian biome: (1) it made access to energy far more reliable by providing above-ground flora (cottonwood) and fauna (bison), and (2) it protected against wind, resulting in warmer temperatures than the upland prairies. In doing so, it acted as a moderating influence, protecting, warming, and feeding in winter, cooling in summer, and providing the basis of Crow power for much of the equestrian period.[37]

As a result of their control over this key thermodynamic haven, the Crow emerged as vital middlemen in the plains' late-eighteenth-century trade, ferrying horses, bison meat, and prisoners from the Flathead and other tribes west of the continental divide to their erstwhile kin, the Hidatsa, and their neighbors, the Mandan, whose Knife River villages became the center of seasonal indigenous trade.[38] In annual trips, the Crow would sell these horses, often commanding double the price they had paid and receiving a glut of European goods—guns, ammunition, kettles, and, of course, the carbohydrates

[36] Manning, *Grassland*, 40, 141.
[37] In more recent years, the late Crow historian Joe Medicine Crow has also highlighted the importance of local knowledge of Chinook winds in determining winter camping. As he observes, "Along the foot of the…Bighorn Mountains…is a Chinook belt that comes from the west. Warm winds comes [sic] along the northern slope…right through Tongue River. Winters are open most of the time, so…they'd go up there and camp around there." Joe Medicine Crow Interview, OH 1862, Montana Historical Society.
[38] For the Mandan and, to a lesser degree, the Hidatsa, see Elizabeth A. Fenn, *Encounters at the Heart of the World: A History of the Mandan People* (New York: Hill and Wang, 2014).

produced by the village tribes, corn—in return.[39] While staying with the Hidatsa in 1805, the Northwest Company trader Francoise-Antoine Larocque expressed awe over the sheer volume of goods that were traded between the Crow and the village tribes. In one encounter, he reported that the Hidatsa gave the Crow "two hundred guns, a hundred rounds of ammunition for each, a hundred bushels of corn, and other articles in return for which they received two hundred fifty horses and immense numbers of buffalo robes."[40] By serving as the middlemen in a trading mechanism that spanned the continental divide and the breadth of the plains, the Crow steadily built themselves into one of the wealthiest peoples on the northern plains, leveraging their access to the best horse herds and the most bountiful agricultural products north of the Platte.

At first glance, such a rise seems inherently paradoxical. But the key realization is that the northern plains, like all ecosystems, consists of a mosaic of smaller, individualized micro-environments, and that the landscape of the Missouri was not that of the Yellowstone. Although as a whole the northern plains was defined by its severity—its resistance to human and animal survival—at smaller scales it offered some of the most hospitable climes on the plains, and by the late-eighteenth century, the Crow had located one such "green belt," completing a multi-generation exodus that took them across the northern plains and beyond in search of "exactly the right place."[41] They had found such a location in the heart of the Yellowstone River valley and its energy-rich riparian ecosystem, a haven where they could tend to their bounteous horse herds and receive

[39] Theodore Binnema, *Common and Contested Ground: A Human and Environmental History of the Northwestern Plains* (Norman: University of Oklahoma Press, 2001), 180–81; W. Raymond Wood and Thomas D Thiessen, *Early Fur Trade on the Northern Plains Canadian Traders among the Mandan and Hidatsa Indians, 1738-1818: The Narratives of John Macdonell, David Thompson, Francois-Antoine Larocque, and Charles McKenzie* (Norman, Okla.: University of Oklahoma Press, 1999), 213.
[40] Quoted in Roy Meyer, *The Village Tribes of the Upper Missouri* (Lincoln: University of Nebraska Press, 1977), 42.
[41] The phrase "green belt" to describe these oases is from Bajza, "Powder River Basin," 107.

shelter from the worst of the northerly climate, all while neighboring tribes struggled to maintain a minimal equestrian lifestyle.

This line of thinking—of examining indigenous peoples in concert with ecological energy caches—is not unique. For the past few decades, historians of plains equestrianism have noted the thermodynamic transformations that these animals brought to indigenous peoples. Dan Flores was the first to latch onto this train of thought, claiming that "the horse-mounted Plains Indians…made very efficient use of the available energy on the Great Plains, something they seem instinctively to have recognized and exulted in." By using horses to transform latent floral energy into movement, tribes such as the Comanche, Cheyenne, and Arapaho "exploited a greater volume of the thermodynamic energy streaming from sunlight into plants than the economies of any of their competitors."[42] Building upon this study, James Sherow has similarly examined the Cheyenne, contending that as mid-nineteenth-century travelers crisscrossed the central plains on their way out to California, Oregon, and Colorado, the environment changed dramatically, the most obvious manifestation being the denuded riparian flora of the Platte. According to Sherow, while American invaders supplemented their horse feed with grains and hay during the trying winter months, the Cheyenne failed to adapt in a concomitant fashion. As such, "the [Sand Creek] massacre was also the result of the Indians' difficulties in adapting their horse-herding practices to the Great Plains."[43] Elliot West offers similar interpretations in his book-length study of the Cheyenne, taking a near-mystical approach to indigenous equestrianism, calling the

[42] Dan Flores, "Bison Ecology and Bison Diplomacy: The Southern Plains from 1800 to 1850," *The Journal of American History* 78, no. 2 (1991): 471-472.
[43] James E. Sherow, "Workings of the Geodialectic: High Plains Indians and Their Horses in the Region of the Arkansas River Valley, 1800-1870," *Environmental History Review* 16, no. 2 (1992): 63.

animals "living tools," and "centaurs…a fusion of human will and animal strength into something wholly new, a fundamentally different creature that cannot be understood as just an aggregate of man and beast."[44] More recently, these works have been reformulated in the scholarship of Pekka Hämäläinen, who portrays the advent of the horse as a cultural change that empowered indigenous peoples but was also freighted with all sorts of unseen costs. Atop a horse, he writes, "the world became smaller and its resources more accessible." Like those before him, Hämäläinen is sure to elucidate the solar potential that horses held for the Comanche, pointing out that in contrast to dogs, horses "drew their strength directly from plant life, allowing their masters to eliminate one arduous phase in their search for power. A conduit between immense, abstract solar energy and concrete, immediate muscle power, the horse redefined the realm of the possible, bringing Comanches a step closer to the sun."[45] In an instance of thermodynamic alchemy, they tapped into the region's for-so-long-unavailable pool of floral energy, transforming it into mobility and power.

The work of these scholars has revolutionized the way that we think about equestrianism on the plains, in particular its evolution in the tumultuous decades of the mid-nineteenth century, as American expansion intensified and settlers—in concert with existing indigenous patterns—increasingly blighted the fragile grassland- and riparian-ecosystems that constituted the region.[46] But almost without exception the focus of these

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[44] Elliott West, *The Contested Plains: Indians, Goldseekers, & the Rush to Colorado* (Lawrence, Kan.: University Press of Kansas, 1998), 45–55.
[45] Pekka Hämäläinen, *The Comanche Empire* (New Haven: Yale University Press, 2008), 25.
[46] Other important works include, James F. Brooks, "Served Well by Plunder: La Gran Ladronería and Producers of History Astride the Río Grande," *American Quarterly* 52, no. 1 (2000): 23–58; James Taylor Carson, "Horses and the Economy and Culture of the Choctaw Indians, 1690-1840," *Ethnohistory* 42, no. 3 (1995): 495–513; William A. Dobak, "Killing the Canadian Buffalo, 1821-1881," *The Western Historical Quarterly* 27, no. 1 (April 1, 1996): 33–52; Jeffery R. Hanson, "Adjustment and Adaptation on the Northern Plains: The Case of Equestrianism Among the Hidatsa," *Plains Anthropologist* 31, no. 112 (May

works has been limited to the central and southern plains. Due in part to the comparative scarcity of horses on the northern plains, scholars have spent far less time examining the region and its unique environmental conditions, opting instead to focus on the bountiful herds that fueled expansionist indigenous powers. And yet the northern plains is a decidedly different sort of environment. Hämäläinen nods in this direction, stating that the "most revealing dynamics among horse cultures is latitudinal rather than longitudinal," but he fails to follow this through to its ultimate conclusion.[47] Because of its large-scale riverine systems that stem and branch out from the Missouri, the northern plains saw geopolitical developments that differed markedly from those other latitudinal swaths, most clearly in the advent and development of the fur trade. While the greatest environmental threat for indigenous peoples on the central plains was overland travelers and the military expeditions that followed in their wake, on the northern plains the ecological trajectory was far more subtle, depending upon a network of continental trading practices and the vagaries of river navigability. As such, the thermodynamic narrative is distinct from that of the central and southern plains; it is a story that deserves to be told on its own, with a focus on the disparities of its various microenvironments. To fully understand it, then, we need to dip back into the early-nineteenth century, to the Corps of Discovery and the subsequent fur trade that it unleashed. For it was in this setting that the differences between the Missouri and the Yellowstone were accentuated, and that the thermodynamic haven that the Crow inhabited—the lands that were "in exactly the right place"—came to be among the most desired on the continent.

1, 1986): 93–107; Alan J. Osborn, "Ecological Aspects of Equestrian Adaptations in Aboriginal North America," *American Anthropologist* 85, no. 3 (September 1, 1983): 563–91; John C Ewers, *The Horse in Blackfoot Indian Culture: With Comparative Material from Other Western Tribes* (Washington: Smithsonian Institution Press, 1980).

[47] Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," 835.

Invaders: A Changing Thermodynamic Landscape

On their return trip east from the Pacific in the spring of 1806, Lewis and Clark decided to split up in order to increase the area surveyed.[48] Clark and eight others left the rest of the group, descending the Yellowstone, a body of water that the Corps had missed on the trip west. They observed great quantities of deer, antelope, beaver, and buffalo, noting "extensive Vally[s] open and fertile," especially in the vicinity of the mouth of the Bighorn river.[49] All went smoothly until July 19, when Toussaint Charbonneau, the French trader and husband of Sacajawea, reported seeing an Indian on a rise across the river. Later in the day, Clark announced that he had seen smoke coming from the same direction; nevertheless, he did not seem to think too much of it, and the Corps continued on their descent toward the Missouri, surveying the landscape, hunting elk and wolf, even building two new canoes along the way. Two days later, however, Clark and the men awoke to find half of the company's horses—roughly two dozen in total—missing. He sent out two men to search for the animals, but they returned a few hours later without finding any sign. Clark "worried that the indians have Stolen our horses, and probably those who had made the Smoke a few days passed," and sent out a party the next day as well, but "they serched for tracks all the evening without finding which course the horses had taken, the plains being so remarkably hard and dry as to render it impossible to See a track of a horse passing through the hard parts of them."[50] The men knew that they were

[48] For the specifics of the split, see Lewis's entry, July 1, 1806. Clark will "decend the Yellowstone river with Charbono the indian woman, his servant York and five others to the missouri." Reuben Gold Thwaites, ed. *Original Journals of the Lewis and Clark Expedition, 1804-1806,* Volume Five, (Antiquarian Press, LTD., New York: 1959), 176.
[49] Ibid., 256.
[50] Ibid., 280.

in Crow country, and as a group they desperately wanted to meet the tribe, one of only a few they had not encountered in the course of their travels, but no matter how hard they looked for their purloined horses or tried to locate a Crow camp, they were unsuccessful. Even though they knew they were in the heart of Crow country, traveling down the thermodynamic artery of the Yellowstone, they never found anything more than a few dated signs of the tribe's presence.

It was undoubtedly frustrating for the men. Lewis and Clark had long wanted to meet and exchange gifts with the Crow, whom they referred to as "the Yellowstone Indians," and had even prepared a lengthy diplomatic speech in which they planned to amicably but firmly declare American sovereignty over Crow lands, thereby opening what they hoped to be a beneficial trade relation. Ironically, one of the clauses in this speech read, "Children Your great father has derected [sic] me to tell you not to suffer your young and thoughtless men to take the horses or property of your neighbours or the white people, but to trade with them fairly and honestly, as those of his red children below," a section to which Clark, angry at his perceived mistreatment and apparently still hoping to meet with the tribe, emended, "Your Great father will be very sorry to here [sic] of the [blank space in MS.] stealing the horses of his Chiefs & warrors [sic] whome [sic] he sent out to do good to his red children on the waters of Missoure [sic.]"[51] It is an intriguing footnote to the much-studied peregrinations of the Corps of Discovery, one that is often overlooked or remarked upon only in passing—as we shall see, on the Missouri, Lewis experienced far different interactions with the region's indigenous peoples. But it is nevertheless a critical moment for understanding the Crow's place in

[51] The full speech, which was never delivered, is reproduced in Thwaites, 299-301.

the region's ecology and larger geopolitical web. In responding in the way that they did—by remaining out of sight and pilfering company horses—the Crow effectively set the tone for their future relations with the Americans. It was not that they were uninterested in trade—as later developments reveal, they most certainly were—but that they would do so only on their terms. Consequently, their actions—as unscrupulous as Clark thought them to be—were closely tied to concerns with energy and protecting a tribe that, by the early-nineteenth century, was already beginning to feel the impact of American invaders.

Part of this has to do with the northern plains' recent history. As Lewis and Clark entered onto the grasslands, they were coming into a region that was in the midst of immense geopolitical change. Although the Crow had firmly established their homelands along the Yellowstone and amassed surprising equine wealth, their political position was nevertheless precarious: compared to many of the abutting tribes, they harbored a small population, one that was made all the more vulnerable by recent disease. Just a few years prior to the Corps' arrival, a smallpox epidemic had hit the plains and devastated the Crow. Much more has been written about the 1780-1781 and 1837 epidemics, but in terms of timing and demographic harm, none had a greater effect on the Crow and their geopolitical position. According to most accounts, it started at the Great Lakes trading posts, on either Superior or Michigan, before spreading west across the plains, traveling down the Missouri and the out onto the rest of the grasslands. In the process, it decimated a number of tribes, reportedly killing half of the Osage and two-thirds of the Omaha.[52] And while many of the Missouri River peoples—most notably the Mandan and Hidatsa—

[52] Roland G. Robertson, *Rotting Face: Smallpox and the American Indian*, (Caldwell, Idaho: Caxton Press, 2001), 192.

would survive this plague with more manageable losses than they suffered in other epidemics, the Crow were ravaged. According to François Larocque, the disease reduced the tribe from 2,000 lodges (or 16,000 people) to mere 300 (2,400 people).[53] Furthermore, after they contracted the disease, it continued to travel west, infecting the Flatheads and many of the tribes of the Pacific northwest. One direction it did not travel was north. As such, many of the Crow's neighbors—the Blackfeet, the Cree, the Assiniboine—survived the plague relatively unscathed, maintaining and even augmenting their demographic power while the Crow were weakened, reduced from one of the more populous tribes in the region to one of the smallest.[54]

As Lewis and Clark arrived in the early-nineteenth century, then, the Crow were an energetically wealthy but numerically weakened tribe. New diplomatic relations offered them an opportunity to transform the Yellowstone's ecological bounty into material wealth. More surprisingly, however, it injected new sources of energy into the region. As we saw above, the Crow's response to the Corps of Discovery was decidedly different than that of any of the other tribes on the northern plains. The Mandan and Hidatsa have become well known for the hospitality that they provided, for offering food and shelter during the Corps' first winter. The Blackfeet and the Sioux, on the other hand, took a far different tactic. After the Teton Sioux attempted to physically halt the Corps' progress up the Missouri, Clark called the tribe the "pirates of the Missouri." Likewise, the Blackfeet were the recipients of the only instance of overt violence (in this case,

[53] Larocque and Burpee, *Journal of Larocque from the Assiniboine to the Yellowstone, 1805*, 55. Fred Hoxie estimates the losses at "as much as 14,000 Crows." *Parading Through History,* 47.
[54] Binnema, *Common and Contested Ground*, 180.

murder) during the Corps' three-year travels.[55] The disparities in these responses—the Mandan's hospitality; the Sioux and Blackfeet's relationship with violence, whether on the giving or receiving end; and the Crow's theft—goes back to Arapooish's claim that the Crow homelands were in "exactly the right place." All of the aforementioned peoples were primarily centered around the Missouri River, a body of water whose ecology differed sharply from that of the Yellowstone and its tributaries, the rivers that the Crow dominated for the first half of the nineteenth century. Although we often think of the Lakota and other tribes as encroaching upon the Yellowstone and Powder River Valleys, the reality is that during the first half of the nineteenth century the Crow controlled this region, effectively transforming it into a thermodynamic factory (see Figure 3). And while certainly notable in the early nineteenth century, these environmental differences became increasingly defined in the wake of American traders and the sociopolitical changes they effected.

[55] Gary E. Moulton, *The Journals of the Lewis & Clark Expedition* (Lincoln: University of Nebraska Press, 1983–2001), 3:418

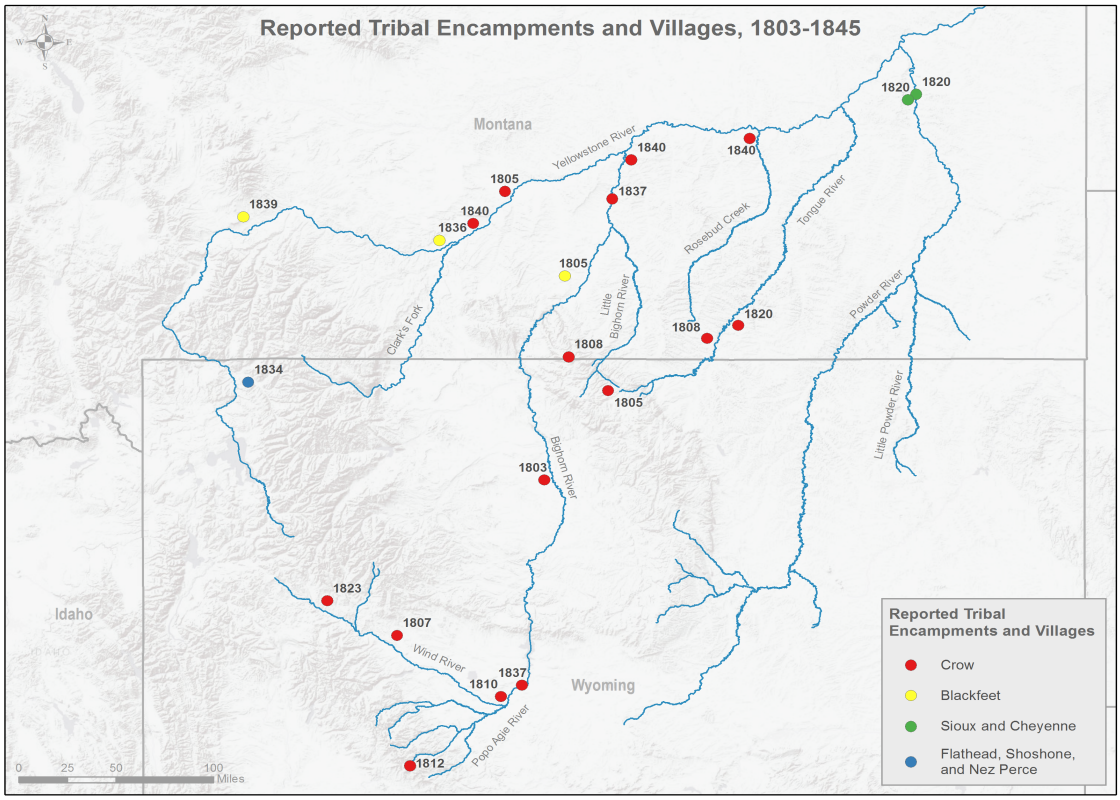

Figure 3: Reported Tribal Encampments and Villages, 1803-1845
Map by Tony Osterling, Kent Island, MD, 2017[56]

To unpack these claims and to understand the further developments that took place in the northern plains trade and the broader geopolitical environment, it is necessary to examine the particular ways in which the Crow's ecology differed from that of the neighboring Blackfeet and Lakota. In the wake of Lewis and Clark, American trade proliferated across the northern plains, spreading north and west from the central artery of the Missouri, into the various veins and capillaries of the river's tributaries, where beaver, especially in comparison to the trapped-out eastern streams, teemed.[57] And while the

[56] Based on data from C. Adrian Heidenreich, "Tribal Encampments in Montana and Beyond, 1805-1846," in *Selected Papers of 2010 Fur Trade Symposium,* (Three Forks, MT: Three Forks Area Historical Society, 2011), 83-97.
[57] The popular story among trappers was that beaver in Crow territory were so abundant that "they could be taken from the streams with clubs." David J Wishart, *The Fur Trade of the American West, 1807-1840: A Geographical Synthesis* (Lincoln: University of Nebraska Press, 1979), 29.

Blackfeet and Lakota were an integral part of this economy, trading and obtaining goods like all of the other tribes, their interactions with American trappers were most notable for their hostility: more than any other peoples in the region, they responded violently to American incursions, often killing trappers and attacking steamboats and woodhawks.[58] The Crow, on the other hand, were more likely to embrace traders—often directly integrating them into the tribe—but they did so on their own terms and in line with their position in the greater Yellowstone ecology.[59]

The root of the difference is thermodynamics. For the Blackfeet and the Lakota, the energetic artery was the Missouri, the longest river on the continent, flowing nearly three thousand miles through eddies and oxbows before dumping its contents into the Gulf of Mexico. Because of its size, the river proved to be *the* central thoroughfare of steamboat travel in the West, serving as the natural causeway for the nineteenth-century machines and their "annihilation of time and space."[60] In the South, New Orleans became the center of the industry, with St. Louis following as a close second. But on the northern plains it was Fort Union, the center of the American Fur Company's western operations, a massive wooden structure erected in 1829 at the point where the Yellowstone entered the Missouri, at present-day Williston, North Dakota. Rebuilt in 1833 to make the

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[58] In 1810 alone, the Blackfeet killed more than twenty trappers and took beaver traps, knives, clothing, and bank notes up to the Hudson's Bay Company posts, where they readily exchanged them for supplies. See Alexander Henry and David Thompson, *New Light on the Early History of the Greater Northwest: The Manuscript Journals of Alexander Henry ...* (F. P. Harper, 1897), 539–540. During this period as a whole, however, the evidence of Blackfeet and Lakota aggression is overwhelming. Trader Alfred Jacob Miller estimated the American losses to be forty to fifty men per season, his employees noting it as a good winter if only twenty perished. See George Catlin, *Letters and Notes on the Manners, Customs, and Condition of the North American Indians*, 1842, 74. Blackfeet attitudes toward traders is most succinctly summed up by the words of one Piegan leader to a group of traders in the 1830s: "If you will send Traders into our Country we will protect them & treat them well. But for trappers – Never." Francis A. Chardon, *Chardon's Journal at Fort Clark, 1834-1839* (U of Nebraska Press, 1932), 253.

[59] See, for instance, Greg Gordon, "Steamboats, Woodhawks, & War on the Upper Missouri River," *Montana; The Magazine of Western History* 61, no. 2 (Summer 2011): 30-46.

[60] Quoted in Walter Johnson, *River of Dark Dreams: Slavery and Empire in the Cotton Kingdom* (Belknap Press of Harvard University Press, 2013), 77.

original post larger and more secure, the fort measured 237 feet by 245 feet with twenty-foot tall pickets constructed from the river bottom's cottonwoods, making it, in the words of Edwin Denig, the "principal and handsomest trading post on the Missouri River."[61] American steamboats made their first trip to the northern plains with the *Yellowstone* expedition of 1819, but it was the construction of Fort Union—and the modification of the steamboat's design to accommodate the northern plains' notoriously shallow waters—that made such voyages an annual occurrence.[62]

In a region in which so many trading posts were defined by the ephemerality, Fort Union became a multi-generational stalwart, persisting for nearly half a century until American settlement rendered it moot in the 1860s. For many of the tribes in the area, it proved to be a boon, a dependable site of supplies in a region defined by its unpredictability.[63] But there were also a number of negative effects. The fort received hundreds of steamboat visits over the course of its career, a frequency that reaped far-reaching effects on the area's ecology. Despite their presumed efficiency, steamboats consumed massive amounts of fuel, typically requiring anywhere between twenty-five and thirty cords of wood for every twenty-four hours of running.[64] And because river bottoms proved to be both the most reliable and accessible providers of such fuel, steamboats inevitably harvested their supplies from these riparian environments over the

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[61] Barton H Barbour, *Fort Union and the Upper Missouri Fur Trade* (Norman: University of Oklahoma Press, 2002), 53.

[62] The key event in the development of the craft is the *Yellowstone*'s 1832 voyage from St. Louis to Fort Union, the first such trip to proceed without any major delays. This was, famously, also the voyage that carried the German artist George Catlin to the northern plains. William E. Lass, *A History of Steamboating on the Upper Missouri River*, (Nebraska Press, 1968), 10–11.

[63] Douglas Bamforth notes unpredictability, what he terms "patchiness," as a defining characteristics of the region. Bamforth, *Ecology and Human Organization on the Great Plains*, 18–19.

[64] A cord of wood is the equivalent of 128 cubic feet. Cut and stacked, it would be a pile four feet high, four feet deep, and eight feet long. Put into perspective, thirty cords of wood is the equivalent of 3,840 cubic feet of wood, or a pile four feet high, four feet deep, and 240 feet long. For typical steamboat consumption, see Lass, *A History of Steamboating on the Upper Missouri River*, 13.

course of the trip. As one captain lamented, they cut so much wood from these sites that "we are more hours at the Bank tied up than we are Running."[65] Eventually the system was codified, and woodyards began to proliferate as a variety of individuals—mostly young American males, but also a handful of Indian and Métis men and women—went about the process of transforming a capricious space into one that was increasingly structured and commodified.[66] From the perspective of travelers, such changes were obligatory. The average round trip from Omaha (slightly north of St. Louis) to Fort Union took just over three months in the best of circumstances, which added up to around 2,500 cords of wood per trip, or, in terms of actual forest coverage, between 60 and 65 acres-worth of trees per trip.[67] And so it is not surprising that by 1850, when trader Thaddeus Culbertson traveled through the present-day Dakotas on his way up to the fort, he wrote that "the banks [of the Missouri] are destitute of [wood] entirely. I have been told that they go from Fort Pierre, one hundred miles above, to get timber for their boats and other purposes."[68] Over the previous two decades, the Missouri's river bottoms had undergone significant degradation as cottonwoods were harvested for steamboat fuel and bison were slaughtered for both nutrition and simple expansionist recreation.[69]

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[65] William J. Petersen, "The Log of the Henry M. Shreve to Fort Benton in 1869," *The Mississippi Valley Historical Review* 31, no. 4 (March 1945): 561.
[66] Gordon, "Steamboats, Woodhawks, & War on the Upper Missouri River," 39.
[67] A cord of wood is a stack 4 feet tall x 4 feet wide x 8 feet long. The estimates of 25 cords/day and a trip length of thirteen weeks comes from Robert Kelley Schneiders, *Big Sky Rivers: The Yellowstone and Upper Missouri* (Lawrence: University Press of Kansas, 2003). The calculations and metaphor are my own.
[68] Thaddeus Culbertson. *Journal of an Expedition to the Mauvaises Terres and the Upper Missouri in 1850*. Smithsonian Institute, Bureau of American Ethnology, Bulletin 147. Washington: Government Printing Office, 88.
[69] Interestingly, thermodynamics as a field emerged in the early nineteenth century in response to the development of the steam engine, as an effort to increase efficiency by understanding exactly how energy flowed and therefore how to produce the highest, most consistent power. Schneider and Sagan, *Into the Cool*, 37–38.

For the tribes along the Missouri—most notably the Blackfeet and the Lakota—this was nothing less than an environmental disaster. In a rather bizarre instance of ecological entwining, these changes created very real competition between horses and steamboats for the same set of Missouri River nutrients.[70] Not surprisingly, there was a marked increase in Blackfeet and Lakota aggression. Trader Alfred Jacob Miller estimated the American losses to be forty to fifty men per season, his employees counting it as a good winter if only twenty perished.[71] In later years, as steamboat travel increased, American woodyards would see more than fifty workers killed annually.[72] There are numerous stories of such violence, but one of the most telling examples comes to us during this later period. In 1863, Indian Agent Samuel Latta ascended the Missouri aboard the *Robert Campbell Jr*. in order to deliver annuity goods to the region's tribes. After distributing the first batch at Fort Berthold, where the Mandan, Hidatsa, and Arikara were in a near starving condition from a recent Lakota attack, the steamer continued on to deliver the remaining annuities upriver to the Assiniboine, Crow, and Blackfeet.[73] On its way, however, it came under attack. For two straight nights the Lakota assaulted crewmembers as they were out cutting wood. The next day the ship came

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[70] Gordon, "Steamboats, Woodhawks, & War on the Upper Missouri River."
[71] See Catlin, *Letters and Notes on the Manners, Customs, and Condition of the North American Indians*, 74.
[72] James Wells, Reminiscence 1866-1870, SC 978, Montana Historical Society, Helena, MT. The Lakotas were the most well known perpetrators, but the Blackfeet also systematically harassed the settlements, with rumors that the tribe was killing trappers, pilfering their furs and pelts, and selling them to the British Hudson Bay and Northwest Companies. For an overview of Blackfeet violence in the fur trade during the first quarter of the century, see Ted Binnema and William A. Dobak, "' Like the Greedy Wolf': The Blackfeet, the St. Louis Fur Trade, and War Fever, 1807–1831," *Journal of the Early Republic* 29, no. 3 (2009): 411–440. For later, see Shirley Carter Ashby Papers, SC 283, Montana Historical Society, Helena, MT, 5-6. Ashby notes, for instance, that in 1865 alone, well after the period discussed by Binnema and Dobak, the tribe killed twelve woodcutters on the Marias River. The Blackfeet attitudes toward traders is most succinctly summed up by the words of one Piegan leader to a group of traders in the 1830s: "If you will send Traders into our Country we will protect them & treat them well. But for trappers – Never." Chardon, *Chardon's Journal at Fort Clark, 1834-1839*, 253.
[73] *Annual Report of the Commissioner of Indian Affairs, 1863,* 170.

around a bend to see the *Shreveport*, another steamer, stopped in the middle of the river, surrounded by several hundred Hunkpapa, Miniconjou, and Blackfeet Lakotas. As the *Robert Campbell Jr*. slid along the halted boat, Latta writes that the Indians "insisted that we land, saying that they had followed us three days; that we had as well give up, as they have us surrounded, and if we did not they would take us." Finding himself thrust into the role of mediator, Latta ordered the captain to send a yawl ashore. The idea was to retrieve a group of Indian leaders for a talk on the steamboat, where Latta intended to deliver what he hoped to be pacifying presents. The pilot assented, and six men reluctantly paddled the dinghy to the group onshore. Unfortunately for them, after shaking hands the Lakotas opened fire, killing three and badly wounding two. The crew of the *Robert Campbell Jr*. and the *Shreveport* returned the volleys with rifles and on-board cannons, killing a handful of Lakotas in the process. The confrontation continued for another couple of hours, until the Lakota finally decided to abandon the river, leaving the Americans "penned upon the boat like a lot of sheep in the fold, afraid to go on shore on account of the redskins."[74] As Latta recalled, "there is but little doubt, from the new white blankets, cadet coats and pants, that were worn by many of them, that a portion of them were of the parties who were present at Fort Pierre eleven days before, and had received their annuities."[75] As American steamboats increasingly denuded the river's valuable nutrients, such attacks on annuity-bearing vessels would become more regular, not merely challenging American expansion but threatening the promised annuities of the Crow and other tribes in the region.

[74] "Log of Steamer Robert Campbell Jr. From St. Louis to Fort Benton," *Collections of the State Historical Society of North Dakota,* (Bismarck, 1908), II, 208.
[75] Ibid., 170-171.

On the Missouri, then, violence emerged as a response to the thermodynamic competition that existed between the region's two kinetic vessels: the horse and the steamboat. But the Yellowstone presented a far different ecological landscape. In contrast to the staid presence of Fort Union, the Yellowstone River valley was beset by ephemeral—in essence, failed—trading posts. Fort Lisa, the first post in present-day Montana, was built at the mouth of the Big Horn River in 1807 but abandoned just four years later. For ten years there was no post in the territory, until 1822, when the Missouri Fur Company erected one on the same site as the now-defunct Fort Lisa, although this too was abandoned, in this case just one year later. In the M.F.C.'s place, the American Fur Company entered the region, building Fort Cass three miles below the mouth of the Big Horn. In 1835 it too was deserted, and Fort Van Buren was constructed at the mouth of the Tongue. This latter lasted until 1842, and the Yellowstone then went without a trading post until 1850, when Fort Sarpy was constructed along the Rosebud, soon to be overtaken by Fort Sarpy II, which was deserted in 1860.[76] During the first sixty years of the nineteenth century, when Fort Union dominated the Missouri, we see the construction and abandonment of nine separate trading posts along the Yellowstone and its tributaries, with the average lifespan being a scant 3.2 years. In short, trading posts in the Crow's Powder River homelands were without exception an interim affair.

In one respect, this all points back to the ever-lurking presence of the steamboat: whereas it was a regular sight on the Missouri, it was absent on the Yellowstone. Once again, Arapooish's remarks provide an important clue into the discrepancy. As he

[76] "Trading Posts Established in the Crow Country for Crow Trade," Joseph Medicine Crow Collection, Box 7, Folder 13, Little Big Horn College Archives, Crow Agency, MT. During this period, three other posts were constructed and then abandoned within a year: One built by the American Fur Company at the mouth of the Rosebud in 1839 and abandoned within the year; Fort Fremont at the mouth of the Tongue in 1840; and Fort Pease at the mouth of the Bighorn in 1875.

observed, the tribes living along the Missouri were forced to drink its "muddy water." The portion of the river that succumbed to the steamboat was a slow moving, mostly sand-bottomed section. William Lass, the preeminent historian of the craft, has dubbed this stretch the "Sandy River," in contrast to the uppermost portion of the Missouri (the non-navigable tract north of present-day Great Falls, MT), which he termed the "Rocky River." As Lass writes, "the 2,113-mile Sandy River, in contrast to the Rocky River, flows through an area of alluvial, easily eroded soil which muddies the waters of the stream. Since the banks are unstable and readily undercut, it is only natural that the river curves, or meanders."[77] The historic Yellowstone, on the other hand, was fast-flowing, possessing an average gradient that ranged anywhere from 3.5 feet per mile all the way up to seven. Consequently, it contained a number of ship-defying rapids—the most notable of which, Buffalo Rapids, was deemed by the U.S. Army Corps of Engineers as "the single greatest obstacle to steamboat navigation on the Yellowstone," and was the recipient of blasting and dredging during the late-1870s and early-1880s—which prevented steamboat expansion.[78] As a result, it never evolved into the transportation conduit that the Missouri did. Steamboat traffic didn't end up penetrating the river until the 1870s, at which point other factors had already altered the ecological and political landscape. Consequently, American traders not only never ended up traveling in the numbers that they did along the Missouri, but they also did not consume energy in the same manner or at anything like the same scale. Even well into the second half of the nineteenth century, as the Missouri was witnessing significant ecological destruction, the

[77] William Lass, *Navigating the Missouri: Steamboating on Nature's Highway, 1819-1935* (Norman, Okla.: Arthur H. Clark Co., 2008), 2.
[78] John Gordon MacDonald, "History of Navigation on the Yellowstone River," M.A. Thesis, University of Montana, 1950, 3; Andrew J. Dewhirst, "A Society Under Siege: A History of Changing Crow Indian Land Boundaries, 1700-1904," M.A. Thesis, University of Wyoming, 20. Schneiders, *Big Sky Rivers*, 228.

Yellowstone was noted for its abundant growth. As the Jesuit priest Pierre-Jean de Smet wrote, the Yellowstone "is a fair broad river, whose waters are pure as crystal. It traverses very extensive plains, well wooded on both banks and offering beautiful grazing grounds."[79] It was a veritable energy factory on the plains.

The difference is ecological. In fact, when viewed from a certain perspective, these traders can actually be seen to have injected energy into the Yellowstone Valley, not merely through the various trade goods that they distributed (i.e., chemical energy via food and gunpowder), but also via their own horses, that ever scarce and valuable resource on the northern plains. As Pekka Hämäläinen has claimed in regard to the Comanche, "raiding was not the antithesis of exchange but an alternative to it."[80] Raiding was similarly crucial for Crow diplomacy and geopolitical power, but it was different in important ways from that practiced by the Comanche. The Crow's use of such attacks was not merely a fallback strategy when peaceful exchange was not an option. Rather, it emerged as a means of controlling and limiting the traders who entered the Yellowstone Valley—of forcing them to conform to Crow expectations. And, like their interaction with and extraction of energy resources from the Yellowstone ecosystem, it seems to have been done in a more-or-less sustainable manner. Over the sixty-plus years of American trade in the Yellowstone Valley, we know of only a single trader who was killed by the Crow, and yet there are dozens and dozens of instances of Crows raiding horses and supplies from traders in the region.[81] As the Crow explained to the Americans, they did not kill them because if they did, "the traders would not come back and they [the

[79] Pierre-Jean de Smet, *Life, Letters and Travels of Father Pierre-Jean de Smet, S.J., 1801-1873* (Francis P. Harper, 1905), 239.
[80] Hämäläinen, *The Comanche Empire*, 82.
[81] Robert Stuart, *The Discovery of the Oregon Trail,* Phillip A. Rollins, ed. (New York: Charles Scribner's Sons, 1935), 284-285.

Crow] would lose the chance of stealing from us [the traders]."[82] They used the newcomers as energy caches from which they could periodically draw upon to supplement their own sources.

Consequently, the Crow developed a reputation among American fur traders as "the most arrant rascals in the mountains," a tribe who had "never been know to keep a promise or do an honorable act," and who were "turbulent and hostile at all times, never omitting to rob white men when opportunity served."[83] When viewed from a Crow perspective, however, the tribe systematically harvested energy from American traders, but they did so in ways that ensured a constantly available, relatively undiminishing resource.[84] In describing such practices, the previously mentioned De Smet took a slightly more enlightened approach: "the Crows are considered the most indefatigable marauders on the plains; they cross and recross the mountains in every direction, carrying to one side what they have stolen on the other…From their childhood they are practiced in this kind of larceny; they acquire an astonishing ability in it; their glory increases with the number of their captures, so that an accomplished robber is in their eyes a hero."[85] Among the Crow, Arapooish was known to be one of the great horse thieves. In perhaps his greatest triumph, he led a body of some 400 warriors north to a Blackfeet camp, attacking the camp and killing one hundred Blackfeet while also taking two hundred women and children prisoners and stealing five hundred horses. In this encounter, the

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[82] Quoted in Lewis O. Saum, *The Fur Trader and the Indian*, (University of Washington Press, 1966), 140.
[83] Thomas Farnham, "Travels in the Great Western Plains," *Early Western Travels, 1748-1846,* edited by R.G. Thwaites (Cleveland: Clark Company, 1905), Volume XXVIII, 264; William T. Hamilton, "A Trading Expedition Among the Indians in 1858," *Contributions to the Historical Society of Montana* (Helena: State Publishing Company, 1900), Volume III, 61.
[84] Still, the Crow did participate in large-scale intertribal conflicts. In the mid-1840s, for instance, the Crow attacked the Blackfeet's Small Robes band, killing all of the men and taking 150-200 women and children captive. John C Ewers, *The Blackfeet; Raiders on the Northwestern Plains*. (Norman: University of Oklahoma Press, 1958), 188.
[85] Smet, *Life, Letters and Travels of Father Pierre-Jean de Smet, S.J., 1801-1873*, 238.

Crow were only reported to lose twenty-two men.[86] Although viewed as the behavior of "rascals" by the Americans, such actions had their roots in a thermodynamic worldview: instead of driving their competitors out, the Crow used them as sources of much-needed energy.

In addition to the lack of steamboat competition, part of this discrepancy also had to do with the fur trade ontology. While beaver trapping along the Missouri was—as a result of the differing ecology—negligible, trappers flocked to the Yellowstone and its tributaries during the 1820s in an effort to establish what would later become known as the Rocky Mountain Trapping System. For the most part, the Crow welcomed such interlopers, even going so far as to use their own horses to pull the traders' keelboats up against the current of the Yellowstone.[87] During the initial year of trapping, eleven men shared winter quarters with the tribe, not only bartering for food and furs but obtaining valuable geographic information (from Crow leaders like Arapooish). After the Americans tried unsuccessfully to cross the continental divide in the depths of winter, the Crow informed them of a more manageable route just south of the Wind River Range. The trappers set out and successfully crossed the divide at this spot, what would become known as the famed South Pass. For the next few decades, employees of the American Fur Company, the Rocky Mountain Fur Company, and a handful of competing outfits would travel deep into the Rocky Mountains, spending long periods trapping along the Snake, the Green, and even some of the Yellowstone's own tributaries, most often the Bighorn and the Powder. They would then gather for an annual rendezvous, an occasion marked by "mirth, songs, dancing, shouting, trading, running, jumping, singing, racing,

[86] Denig, *Five Indian Tribes of the Upper Missouri*, 162–64.
[87] Keith Algier, *The Crow and the Eagle: A Tribal History from Lewis and Clark to Custer*, (Caldwell, Idaho: Caxton Printers Ltd, 1993), 56.

target-shooting, yarns, frolic, [and] all sorts of extravagances," where independent trappers would sell their furs to the larger conglomerations, who would then ship them, whether down the Yellowstone or overland along the Platte, to St. Louis.[88] While not always directly present at such rendezvouses, the Crow were consistently involved in such trade, either as direct participants, owners of the land, or as geographic aids.

As a result, the Crow were more likely than their indigenous neighbors to physically incorporate and subsume traders into their polity through marriage.[89] There has been a great deal of scholarship on these cross-cultural relationships in the Great Lakes region during the eighteenth century, but there has been much less on the northern plains. Among other, traders James Beckwourth and Edward Rose took Crow wives and were adopted into the tribe. But the most notable was Robert Meldrum, the Scottish-born American Fur Company trader who married into and lived seasonally with the tribe for close to thirty years, taking on the name Round Iron for the presents with which he always preceded trade.[90] According to James Bradley, the Crows called Meldrum, "the best white man that ever came to the Crow country." He lived with his wife's family, was in charge of their horse herds, and participated in battles against the Blackfeet. But he also spent a great deal of time working for American Fur Company trading posts, particularly in later years, serving from the 1840s to the late-1850s as the Crow's

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[88] David J Wishart, *The Fur Trade of the American West,* 115–66; Hoxie, *Parading through History*, 68–70; James Pierson Beckwourth and T. D. Bonner, *The Life and Adventures of James P. Beckwourth, Mountaineer, Scout, and Pioneer, and Chief of the Crow Nation of Indians* (New York, Harper & Brothers, 1856), 107. For a detailed overview of the rendezvous system, see Fred Gowans, *Rocky Mountain Rendezvous*, (Salt Lake City: Gibbs Smith, Publisher, 1988).

[89] Along with traders, the Crow were also more likely to take other tribes as prisoners rather than killing them. Denig, *Five Indian Tribes of the Upper Missouri*, 148.

[90] In 1876, Little Face said that Meldrum was the most well-liked white man that the Crow dealt with during the fur trade era. James H. Bradley, *The March of the Montana Column,* (Norman, OK: University of Oklahoma Press, 1961), 117. For Rose and Beckwourth, see Chittenden, Fur Trade, II, 856, and *The Life and Adventures of James P. Beckwourth* (New York, 1856).

representative at various forts, ranging up and down the Yellowstone, the Little Big Horn, the Rosebud, the Tongue, and the Great Porcupine.[91] In the historical records, there are numerous accounts of Meldrum being chastised by his superiors and coworkers for his wasteful use of gifts and his willingness to feed and house the Crow at the fort free of charge.[92] As a result, the Crow bragged to traders that the posts were depots "where all their goods were stored beyond the reach of their enemies, and whence they drew their supplies as often as they had need of them." They considered them "the property of the [Crow] nation, and that the whites who were in charge them were their own [the Crow's] agents."[93] Interestingly, then, by incorporating traders like Meldrum and by raiding horses, the Crow seemed to have developed an almost ecological perception of the forts, viewing them as yet another energy cache in the region, something to be drawn upon when needed. Nevertheless, their means for doing so involved raiding and trading, in contradistinction to the more overtly violent means employed by the Blackfeet and Lakota.

All of this emerged out of changes in the Powder River's thermodynamic landscape. During the first half of the nineteenth century, a chasm grew between the ecology and action of those tribes inhabiting the Missouri River and those living along the Yellowstone and its tributaries. For nearly half a century these two strategies remained different but stable: despite their attenuated numbers the Crow grew in power

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[91] Keith Algier, "Robert Meldrum and the Crow Peltry Trade," *Montana: The Magazine of Western History* 36, no. 3 (1986): 44; James Bradley, "Lieutenant James H. Bradley's Journal," in *Contributions to the Montana Historical Society,* Volume II (Helena: State Publishing Company, 1896), 201.
[92] See, for example, Rudolph Friederich Kurz, *Journal of Rudolph Friederich Kurz,* ed. J.N.B. Hewitt, *Smithsonian Institution Bureau of Ethnology Bulletin 115* (Washington, D.C.: Government Printing Office, 1937), 205.
[93] James Pierson Beckwourth and T. D. Bonner, *The Life and Adventures of James P. Beckwourth, Mountaineer, Scout, and Pioneer, and Chief of the Crow Nation of Indians* (New York, Harper & Brothers, 1856), 365. Also see James Chambers, "Fort Sarpy Journal, 1855-1856," *Contributions to the Historical Society of Montana,* 10 volumes, (Boston: JS Canner, 1966), 10: 100-126.

and wealth, while along the Missouri, both the Blackfeet and Lakota saw their own power multiply as well (in particular the Lakota). Nevertheless, as the first half of the century gave way to the second, changes began to surface. The steamboat had been in operation for nearly three decades along the Missouri, denuding much of that once-fertile riparian ecosystem during that time. Consequently, the Lakota saw their homelands stripped of the very thermodynamic resources that they depended upon for their expansion. Not surprisingly, their gaze shifted to the West, to the fecund banks of the Yellowstone, the Tongue, and the Powder River, where the Crow were still living and thriving in "exactly the right place."

"Life in a Tightening Circle": The Hazards of Energy Abundance

In the spring of 1855, the Crow gathered along the Yellowstone to await the annuities promised to them by the American government in the original Fort Laramie Treaty. The previous year, they had been forced to travel east to Fort Union to obtain their supplies, venturing across the land of the Lakota and the Blackfeet in the process, and on the return trek they were "attacked by enemies and had many people killed."[94] In 1855, then, they refused to leave their territory, instead forcing the Americans to come to them. As had been the case with their interactions with the Rocky Mountain fur traders, this energy exchange would be on their own terms.

Unfortunately for the Crow, getting the goods turned out to be rather onerous. Although he traveled up the Missouri with the tribe's goods, the Crow's assigned agent, the Washington territorial governor Isaac Stevens, reported that he was unable to

[94] George E. Hyde, *Red Cloud's Folk: A History of the Oglala Sioux Indians*, (University of Oklahoma Press, 1967), 90.

personally deliver them "in consequence of the great risk and danger from the numerous war parties of the Sioux on the Yellow Stone river." Lakota war parties "had assembled there with a view of stopping and robbing the boat as is passed up with the annuities and goods…intended for trade with the Crow bands." Rather than risk such an encounter himself, Stevens contracted with a group of seven men from the Pierre Chouteau Fur Trading Company (formerly the American Fur Company), who still had employees ascending the Yellowstone. On May third, the traders loaded up the Crow's goods and began their journey west. Within a week, however, they too were attacked by groups of Hunkpapa and Blackfeet Sioux, who seriously wounded two men before stripping the entire party of their arms, ammunition, and clothing, and forcing them to return to Fort Union naked.[95] Instead of receiving their annual injection of food and supplies, the Crow now found themselves physically cut off, lacking one of their key thermodynamic resources.

In many respects, this ignominious encounter sums up the changes that came to the region in the 1850s rather nicely. As the first half of the nineteenth century gave way to the second, the Yellowstone-as-Crow-thermodynamic-haven began to give way to the Yellowstone-as-contested-territory. The geopolitical factors that had led to the Yellowstone's preservation—its isolation, its lack of navigability—meant that by this time the Missouri had become heavily denuded, with bison populations and forage reduced to sub-livable levels. As such, indigenous peoples such as the Lakota, then at the apex of their continental power, pushed westward, searching out not merely, as is so often assumed, bison populations, but energy more broadly conceived—the forage and

[95] *Annual Report to the Commissioner of Indian Affairs*, 1855, 74-75.

flora that fueled society. As Frederick Hoxie, the preeminent scholar of Crow History, writes, this was a period of "life in a tightening circle" for the Crow.[96]

Many of these changes can be seen in the proceedings of the 1851 Treaty of Fort Laramie. This massive gathering, encompassing more than two weeks of negotiations and some ten thousand indigenous peoples, was an attempt by the U.S. government to impose a set of fixed territorial boundaries on plains peoples and thereby to attenuate much of the conflict in the region. In addition to the Lakota, Cheyenne, Mandan, Arikara, and nearly a dozen other tribes, the Crow were among those present. Led by Big Robber and accompanied by the ever-present Meldrum, the Crow acquired annual provisions worth $50,000 from the U.S. government. Further, their delineated territory matched up well with their own conceptions of their home: the Crow lands encompassed nearly the entire Yellowstone River system, stretching on the west from the base of the Continental Divide in present-day Yellowstone National Park, south past the head of the Big Horn, skirting the northern edge of the Platte east to the Powder River, and north all the way to the Musselshell, one of the Missouri's major tributaries (see Figure 4).[97]

[96] Hoxie, *Parading through History*, 60. Keith Algier, whose work came out two years before, forms an oddly similar metaphor for this period, referring to it as "ever-constricting circles." Algier, *The Crow and the Eagle,* 165.
[97] Chelsea D. Frazier, "'One Does Not Sell the Land People Walk On': The Troubled History of U.S.-Lakota Relations, 1750-1890," (Master's Thesis: University of Wyoming, 2014): 32-34; Algier, *The Crow and the Eagle,* 138-141.

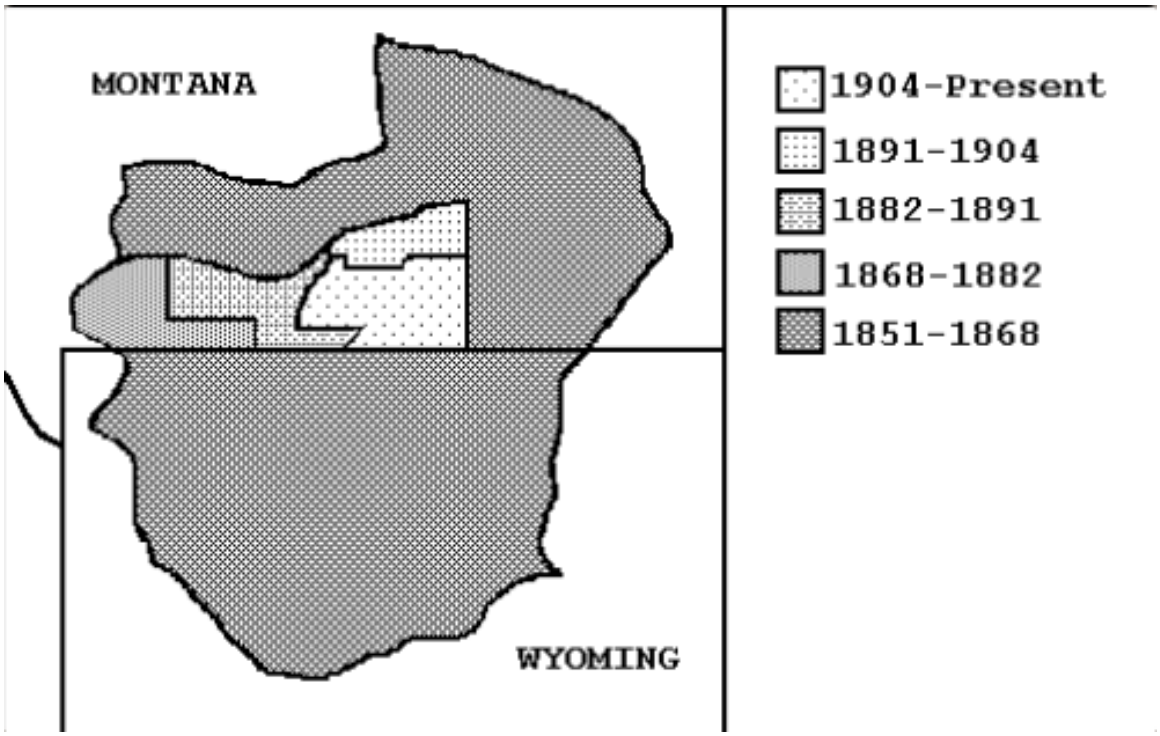

Figure 4: Map of Crow Lands Following Treaties
Maps of the Apsáalooke, http://lib.lbhc.edu/index.php?q=node/159

As was always the case with such negotiations, however, these designations were conducted from an imperial center, far removed from on-the-ground realities. More telling than the official American reports is the inter-tribal negotiations that took place in concert with—and outside of—the official American-sanctioned spaces. In that same year, many of the Lakota winter counts list a single event: peace with the Crows.[98] In what has been dubbed "Lone Horn's Peace," the Lakota and Crow conducted their own treaty beyond the bounds of American influence, one that attempted to overcome the tensions resulting from ecological change, disease, and the influx of American travelers. Largely spearheaded by the Miniconjou Lakota leader Lone Horn and the aforementioned Big Robber, this agreement seems to have created a region of joint-use—roughly the land

[98] Garrick Mallery, "Pictographs of the North American Indians: A Preliminary Paper" in John Wesley Powell, *Fourth Annual Report of the Bureau of Ethnology,* (U.S. Government Printing Office, 1886), 120–21.

stretching between the Powder River and the Black Hills—what Dan Flores, Richard White, and other scholars have highlighted as one of the game-rich "buffer zones" that existed relatively undisturbed between warring tribes, "intermediate zone[s], variously described as war grounds or neutral grounds."[99] These were the Powder River's energy havens, and as the Missouri withered they became increasingly attractive abutting peoples.

From a historical perspective, such territories existed because they were areas where "only war parties dared to venture."[100] Nevertheless, this observation belies a deeper thermodynamic layer, one that harkens back to the Missouri-Yellowstone dichotomy. By the mid-nineteenth century, the Lakota were at their most powerful; at the same time, however, their lands were nearly devoid of bison, their traditional protein source and the victual foundation of expansion. The Crow, on the other hand, still had plenty of faunal resources, but their access to American energy sources—most notably food and firearms/powder—was being systematically cut-off as trading posts along the Yellowstone folded. Consequently, they were forced to risk traveling through land that was now possessed by their enemies—the Blackfeet, Cheyenne, Arapaho, and, in the years prior to 1851, the Lakota. Access to Fort Laramie and other trading posts to the south—such as the Salt Creek posts run by American traders Joseph Bissonette and John Richard—now became of paramount concern if the Crow were to defend their increasingly attractive lands.

The result was one of the more intriguing developments for the Crow: a move away from the Yellowstone and toward the Platte. Estimates show that up to two-thirds

[99] Flores, "Bison Ecology and Bison Diplomacy," 475-476; White "Winning of the West," 334-5.
[100] Richard White, "The Winning of the West: The Expansion of the Western Sioux in the Eighteenth and Nineteenth Centuries," *The Journal of American History* 65, no. 2 (September 1, 1978): 334–35.

of the tribe annually moved down to the North Platte during this period for trade amongst the American forts. Once again, though, much of this seems to have been a result of thermodynamic concerns and the increasing pressure that was being thrust on the traditional riparian biomes of the Yellowstone River Basin. Just as the Crow had injected new energy sources into their camps during the 1820s and 1830s via trade with Rocky Mountain trappers, during the 1850s many bands spent summers down by the Platte, "begging from emigrant trains along the Overland Trail." While perhaps not as effective as the raiding that had defined the Crow during the first half of the century, this can be seen as yet another attempt to augment tribal energy resources, particularly at a time in which—thanks to increasing pressures from both surrounding indigenous tribes and the inchoate encroachments of Americans—long-held thermodynamic caches were beginning to wane.[101] No longer receiving horses, food, and powder, the Crow altered their strategies, doing everything in their power to maintain their way of life amidst a rapidly shifting energy landscape.

Nevertheless, this period of relative peace also belies the tensions that would later overtake the Crow homelands. Even during the reprieve, certain Lakota divisions operated independently, preying upon Crow peoples and their herds. This was most evident amongst the northern Hunkpapa and Blackfeet Lakota, who continually plagued the Crow, attacking traders and members of the tribe while preventing annuities from being delivered to Crow homelands. Such feelings were summed up in 1860 by the Crow leader Great Bear, who, complained to W.F. Raynolds, then on his expedition up the Yellowstone:

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[101] Kingsley M. Bray, "Lone Horn's Peace: A New View of Sioux-Crow Relations, 1851-1858," *Nebraska History; Lincoln* 66, no. 1 (Spring 1985): 30–36.

> Our hearts are bad. The White man is no longer a friend to the Crow Indian. The Great Father has deceived us. We have not received our annuities. My people are sick and dying…We made a treaty with the Great Father many moons ago, in which the Great Father at Washington told us that we must leave our own country. They have not been sent to us this year, but the Great Father had sent them to our enemies' country, where we cannot get them; for our enemies are stronger than we are. The white man has set our enemies upon us; some of our warriors have been killed. We could go there and trade with the white without being killed by our enemies; but now we have no presents; we cannot trade our robes for blankets anywhere. The Sioux will not let us trade at Fort Union.[102]

By 1856, as American troops increasingly clashed with the Lakota and their allies and the Crow found themselves forced far from their promised annuities, Lakota winter counts recorded another very different conference with the Crow. In this encounter, the Crow leaders Two Face, Bear's Head, and Big Robber met with Man Afraid of His Horses and a number of other Lakota headmen.[103] Due to the clandestine nature of this meeting, the details remain obscure. Nevertheless, the result is clear: the brief period of peace and shared land use came to an end; the Lakota and their allies began to encroach upon Crow lands, forcing the latter up into the safety of the Big Horns and north to the now depleted Missouri. As the Cheyenne would later tell American officials, "we stole the hunting grounds of the Crows because they were the best. The white man is along the great waters [the Missouri], and we wanted more room. We fight the Crows because they will not take half and give us peace with the other half."[104]

Such changes in Crow geopolitical relations emerged in response to larger ecological transformations, most notably the gradual denuding of the Missouri over the second quarter of the nineteenth century. The Crow struggled to deal with a series of

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[102] W.F. Raynolds, *Report on the Exploration of the Yellowstone River* (Washington, D.C.: Government Printing Office, 1868), 166-167.
[103] Ben Kindle Winter Count, in Frederick W. Turner III, ed., *The Portable North American Indian Reader* (Harmondsworth & New York, 1977), p. 150. Related Counts are numerous; for a handy summary see James R. Walker, *Lakota Society,* ed. Raymond J. DeMallie (Lincoln, 1982), pp. 117-120.
[104] Grace R. Hebard & E. A. Brininstool, *The Bozeman Trail* (Cleveland, 1922), Vol. I. p. 264.

indigenous invasions, but such adaptations were made all the more difficult in the 1860s, as gold and other metals were discovered in the Deer Lodge Valley of what is now western Montana, igniting a stream of more than thirty thousand settlers and miners. The problem was getting people there, of "Producing a Gold Rush."[105] On the northern plains, the lack of preexisting trail systems meant that settlers had to construct their own, and this led to the invariable question of what the best route would be. The most obvious option was to build upon the Platte River Road's infrastructure by constructing a cutoff from the Fort Laramie area across the Powder River Basin and into the gold fields. In 1863 American prospector John Bozeman, trader John Jacobs, and guide Rafael Gallegos attempted to build such a route to the mining town of Virginia City (near present-day Ennis). Their first effort ended in failure after a group of 150 Indians (most likely Lakota or Northern Cheyenne) immobilized the train and provided the emigrants with an unnerving choice: turn around peacefully or continue on and be killed.[106] Certainly a portend of things to come, the Lakota and their allies enforced their territoriality by excluding the American entrepreneurs, even as they claimed to be merely "passing through."[107] Although another attempt the following year successfully blazed the trail, it did so only tenuously. Speaking to Indian Agent Samuel Latta in 1862, a Lakota

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[105] Kent Curtis, "Producing a Gold Rush: National Ambitions and the Northern Rocky Mountains, 1853-1863," *The Western Historical Quarterly* 40, no. 3 (October 1, 2009): 275–97.

[106] While the identity of these Indians is not known, they are thought to be either Crow or Lakota and Northern Cheyenne. For an overview of the 1863 efforts to open the trail, see Susan Doyle, ed., *Journeys to the Land of Gold: Emigrant Diaries from the Bozeman Trail, 1863-1866*, (Helena, MT: Montana Historical Society Press, 2000), 45–63.

[107] Pekka Hämäläinen has defined the Lakota and other powerful indigenous groups as "kinetic empires," or "a power regime that revolved around a set of mobile activities: long-distance raiding, seasonal expansions, transnational diplomatic missions, semi-permanent trade fairs, recurring political assemblies, and control over shifting economic nodes." Although this description encompasses the activities of most nomadic peoples, the key distinction is that certain groups, notably the Comanche and Lakota, used mobility to become a geopolitical power, what Hämäläinen would call an empire. See Pekka Hämäläinen, "What's in a Concept? The Kinetic Empire of the Comanches," *History and Theory* 52, no. 1 (February 1, 2013): 85.

delegation declared "that no emigration was ever contemplated either by land or water; and they would not submit to it, as emigrants brought disease and pestilence into their country, which destroyed their people, and, upon the other hand, the buffalo would not return to that section of country where they had been pursued by white men."[108] As Samuel Word, a fellow traveler on Bozeman's initial expedition recalled, the Lakota "warn us not to proceed further through their country—that they were combined to prevent a road being opened through here—that if we went on we would be destroyed."[109]

Not surprisingly, then, as the Lakota increasingly occupied the Yellowstone River Valley and American emigrants crisscrossed the Crow's traditional homelands, we also see a marked shift in Crow geopolitical strategy, one that can best be seen in one particular encounter with American invaders. In May of 1863, a group of Crows attacked a party of prospectors led by Granville Stuart, who was travelling along the Bighorn and the Yellowstone, trying his hand at prospecting. The Crow had been observed in the area trying to steal horses, and that night they attacked. In Stuart's words it was "one of the most fearful tragedies that ever occurred in the mountains." As was typical for the Crow, they stole the party's horses, but in contradistinction to nearly all of their previous encounters with Americans, they did not do so stealthily; instead they fired upon the miners, wounding half a dozen or so and killing two. The Americans quickly abandoned their plans and returned back up through the Big Horns.[110] More importantly, however, this marked a major shift in the Crow's thermodynamic world: instead of strategically

[108] United States Office of Indian Affairs. *Annual Report of the Commissioner of Indian Affairs to the Secretary of the Interior for the Year 1862* (Washington: Government Printing Office, 1863), 196.
[109] Samuel Word Diary, 20 July 1862**,** Samuel Word Papers 1862-1866, SC 284, Montana Historical Society, Helena, MT.
[110] Granville Stuart, "The Yellowstone Expedition of 1863," *Contributions to the Historical Society of Montana,* 1:193-210.

purloining energy in a sustainable fashion, they now began to ape the more aggressive Missouri River raiding tactics of the Lakota and the Blackfeet.

This marked increase in violence belied the major geopolitical shifts that were taking place in the region. Such transformations reached a crucial fork in 1866, when, following the aborted treaty talk at Fort Laramie (to which the Crow had not even been invited), the Lakota visited the Crow not as a war party but as part of a diplomatic mission, one in some ways akin to the short-lived Lone Horn's peace. According to the Crow leader Half-Yellow Face, the Lakota joined the Crow along the Tongue River and made presents of horses and arms. In return, they "earnestly urged [the Crow]…to join them in a war of extermination upon the whites." Nevertheless, the Crow rejected this offer, and within a few weeks they attacked the Lakota and "took five Sioux scalps and then sent word to the Sioux…that they would hold no farther [sic] communication with them, that the Crows should destroy every Sioux who fell into their hands, and that they expected the Sioux to do the same by them."[111] Once again, this was the onset of a new geopolitical strategy for the Crow, one that had far-reaching effects for both the Powder River and the Crow's thermodynamic worldview.

As Red Cloud's War gradually came to dominate the Powder River Basin and the lands abutting the Bozeman Trail, the Crow then made a momentous decision: instead of joining with the encroaching Lakota, they would aid the Americans in an effort to retake their traditional homelands, the thermodynamic center of the northern plains. As one scholar has observed, "the Crow ultimately allied with the United States, but their allegiance was not unconditional. Instead, it was based on Crow desires to protect the

[111] "Bradley Manuscript—Book 'F,'" *Contributions to the Montana Historical Society,* 8: 223-5.

land and resources central to their way of life."[112] After the Fort Fetterman battle and the Lakota dominance of the former Bozeman Trail, Congress decided to pursue diplomatic negotiations instead of engaging in a drawn-out campaign on the plains. The Crow were among the tribes invited to the preliminary negotiations for the 1868 Treaty of Fort Laramie, and after being told that they would have their territory significantly reduced, the Crow leader Blackfoot addressed the Americans: "Do not speak to us of confining us in a corner of our territory! First give up the route of Powder River. Recall your young man…and all those who seek gold there….We are not you slaves, we are not your dogs!"[113] The meeting adjourned, and by the time the Crow returned in the spring of 1868, the U.S. Army had decided to abandon the Bozeman Trail in return for a Lakota assurance that they would live on a reservation. In consequence, the Crow were told that this new treaty would cut their land holdings from the thirty-eight million acres promised by the 1851 treaty to a mere eight million. Nevertheless, the Crow signed the agreement. Among the key designations was the protection of still-prime buffalo hunting lands (energy centers) and a guarantee that all future annuities would be distributed on Crow lands via an agency that was to be located on the reservation. In other words, the Crow were to retain certain of their traditional homelands while also regaining the now-missed energy injections from the Americans. Furthermore, they were promised protection from the Lakota, the peoples who had, for the past two decades, been systematically encroaching upon their territories. As Hoxie has observed, of the ten Crows who ultimately signed the treaty on behalf of the tribe, six had been scouts for the American

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[112] Frank Rzeczkowski, "The Crow Indians and the Bozeman Trail," *Montana: The Magazine of Western History* 49, no. 4 (December 1, 1999): 30.

[113] Quoted in A. Glen Humphreys, "The Crow Indian Treaties of 1868," *Annals of Wyoming,* 43 (Spring 1971), 78. These preliminary negotiations took place in the fall of 1867, after the Medicine Lodge Treaty. The final negotiations and the signing of the treaty took place in spring 1868.

army against the Lakota. Consequently, "they had assessed the military situation first hand and would have reasonably concluded that this was the best treaty they could hope to achieve."[114]

Two years later, the Crow were on the reservation, occupying eight million acres that radiated out from a central government storehouse located on Mission Creek, near the modern-day town of Livingston. In this environment, they attempted to live as they had for the past half-century, hunting and trading while supplementing their supplies with the treaty-guaranteed rations. Increasingly, however, they found their territory overrun by both white settlers and the ever-encroaching Lakota. According to one report, the latter—no doubt thinking back to the Crow refusal to join them in their war against the Americans—regularly taunted the Crow, laughing at them and saying, "look at us. We are rich and ride fat horses and have plenty, while you are friends to the white and are poor and have no horses."[115] Nevertheless, the Crow remained on their reservation. According to one scholar, they did so not out of weakness but out of a desire to "control their own destiny," for by the late 1860s, "the Crows found themselves in close contact with an alien culture (that of the whites) which threatened control of the Crows' society and its future."[116] A glut of intruders—both indigenous and Euro-American—had forced the Crow to alter their long held thermodynamic relationships. For over a century, they had been "in exactly the right place," but by the 1860s, everyone else wanted to be there too.

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[114] Hoxie, *Parading through History*, 90-92.
[115] *Annual Report of the Commissioner of Indian Affairs, 1870* (U.S. Government Printing Office, 1870), 299.
[116] Rzeczkowski, "The Crow Indians and the Bozeman Trail," 47.

Conclusion

More than two thousand years before any of these events took place, indigenous peoples began to systematically harvest energy along Sarpy Creek, driving great herds of bison down an arroyo, along the natural drainage lines of the land and into a horseshoe-shaped outcrop of sandstone. Once the animals reached this trough, they no longer had any real chance of escaping. The hunters were deft in their methods of harvest: they employed heavy spears with smaller detachable shafts that could be launched through the air with mortal force. This done, they transported the corpses to a processing site, where they then butchered the animals, breaking apart the meat, extracting fat, and crushing the bones for the nutrient-dense marrow and grease. Finally, they moved off to a nearby campsite, where they dried the meat, pounding it down into pemmican, "an energy-rich, cheap food source [consisting] of dried meat, soft fat (unsaturated fats derived from bone marrow) and hard fat (saturated fats taken from body fat and converted into tallow), *bosses* (fatty hump meat, and/or *dépouille* (strips of fat that lay along the spine of the animal))," and transformed the bones and hides into tools and clothing.[117] Over the course of nearly three hundred years, the hunters returned to this place again and again, ultimately harvesting more than 2,000 bison before—for unknown reasons—they abandoned the site.[118] There it would sit undisturbed, accumulating layers of sediment and debris until two millennia later, when humans would once again return to harvest energy,

[117] George Colpitts, "Provisioning the HBC: Market Economies in the British Buffalo Commons in the Early Nineteenth Century," *Western Historical Quarterly* 43, no. 2 (May 1, 2012): 183.
[118] Andrew J. McElroy, "A Prehistoric Arms Race: A Study of the Technological Organization of Projectile Points from the Late Archaic Sarpy Bison Kill Site (24BH3078)," (Master's Thesis, University of Montana, 2015), 21-22. The actual estimate is 2,221 bison harvested.

albeit in a far different but nonetheless connected manifestation—in the form of coal, the fossilized solar energy of long-dead floral life.[119]

This is a different sort of indigenous story. In recent years there has been a trend in Native American history toward trumpeting indigenous force, power, and what has been called "indigenous imperialism," demonstrating different groups that were empires and arguing that it was only "weak people [who] desired the kinds of compromises inherent in a middle ground."[120] One of the results is that many historical peoples—in particular those who relied more heavily upon trade and alliance for their survival—have been marginalized in the scholarship, even threaded into narratives of declension. As one of these recent scholars has written about the Crow, "their prosperity in horses was their undoing. Desperate to obtain guns and to block…incursions, Crows opened their lands to American fur traders and, inevitably, to the traders' microbes…[They] faced a rapid decline….and tried to escape annihilation by forging a series of desperate alliances."[121] Even Hoxie has voiced a similar, albeit more nuanced, opinion: by the 1860s, "the Crows had been drawn into a web of increasingly uneven military, economic, and political relationships. As they lost the ability to act independently and freely, bandleaders found themselves anchored to a narrowing geographical environment and forced together with unprecedented force. The fur trade had kept them close to traders and their posts, and the expansion of other tribes had confined them to a shrinking portion of their aboriginal

[119] Interestingly, Sarpy Creek—Crow name, "Where White Flanked Horses are Caught." It was said that in the early 1900's a herd of stray horses roamed here with many having distinctive white marking on the flank. These were apparently well-bred animals and Crows often captured 'slicks' and tamed them as saddle horses. "Notes on Cultural Resources in Areas of Proposed Strip," Joseph Medicine Crow Collection, Box 8, Folder 2, Page 4, Little Big Horn College Archives, Crow Agency, MT.
[120] Kathleen DuVal, *The Native Ground: Indians and Colonists in the Heart of the Continent* (Philadelphia: University of Pennsylvania Press, 2006), 5.
[121] Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," 854.

hunting grounds, but never before had their movements been so restricted."[122] Such statements undoubtedly contain a great deal of truth—it is hard to argue with the basic facts. And yet at the same time they neglect a crucial part of the story: from an energy perspective, it is not enough simply to talk about the ecology of the northern plains. To truly understand the environmental factors, it is necessary to narrow the lens, to focus on the unique composition of microenvironments and how the thermodynamics of the various biomes affected its inhabitants. While there can be little doubt that the Crow's ecological position helped precipitate events in the second half of the nineteenth century, painting them as "desperate," "facing inevitable decline," and "inevitably suffering," does a gross disservice to the nuances of the historical reality. As Medicine Crow writes, "to the Crow, war was not for conquest; it was not for imperialism…War was a game of wits, of chivalry, and of honor between tribes. The fact is, it could hardly be called 'war,' in the sense in which we think of war today. It was only a dangerous game!"[123] Put another way, just because the Crow were not imperialist does not mean that they did not possess their own brand of northern plains power.

In a recent work, the Richard White shrewdly observed, "we need to think about what did not happen in order to think historically. Considering only what happened is ahistorical, because the past once contained larger possibilities, and part of the historian's job is to make those possibilities visible; otherwise all that is left for historians to do is to explain the inevitability of the present."[124] Even more than most other environments, the northern plains is ecologically defined by heterogeneity. Far from being a single biome, it

[122] Hoxie, *Parading through History*, 95.
[123] Joseph Medicine-Crow, "The Effects of European Culture Contacts Upon the Economic, Social, and Religious Life of the Crow Indians," Master's Thesis, University of Southern California, 1939, 63.
[124] Richard White, *Railroaded: The Transcontinentals and the Making of Modern America* (W. W. Norton & Company, 2011), 517.

contains thousands of different microclimates, each one unique in its composition. Taken as a whole, it is a decidedly unforgiving environment, one of the most variable in the world; but in certain of these microenvironments, it is surprisingly forgiving. Unlike the central and southern plains, the northern plains is cut by two of the continent's biggest river systems: the Missouri and its ever-turbulent kin, the Yellowstone. Thanks to the influx of moisture and rich mountain sediments that these systems perennially inject, they can be seen as the region's own energy factories, not unlike the power plants of today (one of which is located in Colstrip, just over the northern boundary of the Crow Reservation). Over the course of the nineteenth century, as Americans entered the region in increasing numbers and indigenous peoples were pushed farther and farther west, the Missouri and its tributaries were systematically denuded, resulting in a substantial loss of available energy resources. But during this same period the Yellowstone endured, escaping the ravages of American and indigenous imperialism and providing the Crow with a reliable source of energy, one that fueled some of the largest horse herds that the northern plains had ever seen. As the first half of the nineteenth century gave way to the second, however, and the Missouri became increasingly stripped of its resources, the Yellowstone became the region's last remaining energy haven. It became a cache for all.

What we have, then, is a classic double bind. The Yellowstone remained such a potent energy nucleus because of the scarcity of trading posts and its unnavigability; at the same time, that dearth (i.e., the Crow's isolation) meant that the Crow were constantly struggling to obtain the requisite trade goods. What all of this means it that the Crow lived—and continue to live—in a unique biome, an ecological anomaly in the heart of an unforgiving grasslands environment. It once held some of the most valuable grasslands in

one of the harshest environments on the continent; today it harbors some of the largest coal mines in the world. It was, and is, according to Arapooish, a place where "everything good is to be found." The only problem was that it was no longer unknown.

CHAPTER 2

Waiting for a Chinook:
The Johnson County War as Energy Conflict

By the spring of 1892, Cheyenne was beginning to look more like Boston or Baltimore than the frontier town it supposedly was. Instead of the clean Rocky Mountain air so many tubercular migrants had been promised, the streets were clogged with a sooty industrial fog that scumbled the sun; in place of the usual melee of stagecoaches and horses, people pulled into town on great mile-long locomotives, the trains so crowded that passengers were forced to cling to the roof rails, spilling luggage and layers as they barreled through the West. This were not your typical blend of itinerant, gold-seeking Americans and families but Eastern Europeans—Poles and Hungarians, Russians and Czechs—all of them looking for a new start out on the plains. In this they were largely disappointed: it was the late-nineteenth-century West, and in addition to dreams of mineral- and cattle-wealth, it was defined by its own sinister brand of frontier racism. The streets of Cheyenne were serried not merely with overseas immigrants but with hundreds of frontier locals, gunslinging cattlemen and ex-deputies who made it their business to physically and verbally assault any and all newcomers. And it was at this time—in the spring of 1892—that such tensions made the perilous shift from threat to reality: up in nearby Johnson County, on a small plains homestead, the Pole Michael Kovach had just

been shot in cold blood in front of his wife and children. And although the killers were never identified, what was worse was that the slaughter was said to be the first of many, a warning to all newly arrived settlers to leave the Powder River Basin if they wanted to live.[1]

Neither appealing nor historically accurate, this is the world of an alternative Wyoming, the nineteenth-century Natrona and Johnson Counties of Michael Cimino's infamous 1980 cinematic flop, *Heaven's Gate*.[2] As the follow-up to his Academy-Award winning *The Deer Hunter*, *Heaven's Gate* saw Cimino wield one of the archetypal events in the history of the American West—the Johnson County War—as fodder for his own revisionist epic. Depicting an onrush of Eastern European immigration—what Pauline Kael has rightfully described as a "bizarrely homogenous" group, noting that, "a whole community from some Bulgarian village seems to have moved to Johnson County, and another whole community from the Ukraine"—into this small, newly found county in northern Wyoming, the film depicts a Marxist take on the conflict between the downtrodden and the affluent, the landless and propertied in the epic narrative sweep of American expansion. The resulting film was one of the biggest disasters in Hollywood history: a bloated, plodding four-hour picture that came in over-budget and behind schedule, and which was so poorly received and critically castigated that, instead of allowing it to run as scheduled, the studio (United Artists) made the notorious decision to pull it from theaters after just one week, taking a more than forty-million-dollar loss on

[1] "You people go back where you came from," is a common refrain in the movie, hurled most notably by Christopher Walken's character to the immigrants trudging across the plains, as well as by other characters to the recently arrived Casper immigrants.

[2] As numerous critics, even those with only the shakiest understanding of the history of the American West, have observed, the relationship between the events of *Heaven's Gate* and those of the real-life Johnson County War are moderate at best. Kale, in what would become a representative view, rightly described Cimino as taking "a garbled version of the Johnson County war as his subject."

the project. The rest is the stuff of legends: *Heaven's Gate* has been blamed for everything from the bankruptcy and ruin of one of the most esteemed studios in Hollywood to the end of the era of the auteur filmmaker, paving the way for the arrival of the feckless action-heavy blockbusters that so dominated the 1980s and 1990s.[3]

And so it is odd that from a historiographical standpoint, there is actually a good deal of mimetic value to *Heaven's Gate*. The critic Christopher Sharett summed this point up nicely: in an effort to portray the film as "The most politically radical Western ever made in the United States," he explained that, while "Many Westerns have depicted the affair [the Johnson County War]…*Heaven's Gate* is truest to its broad contours."[4] Although the radical political nature of the film is certainly up for debate, Sharett is certainly correct when it comes to the Johnson County War's historiography: of the hundreds of books and articles that have been written on the subject—stretching all the way from 1894's *The Banditti of the Plains; Or, The Cattleman's Invasion of Wyoming in 1892* through 2010's *Wyoming Range War: The Infamous Invasion of Johnson County*—the majority portray the War as an archetypal class conflict, a clash between a group of wealthy, absentee ranchers and a whole county's worth of impoverished, small-land owners, each group fighting for their respective vision of the West's future.[5]

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[3] "Michael Cimino's Heaven's Gate and the Death of the Auteur Theory," http://www.criticsatlarge.ca/2012/02/michael-ciminos-heavens-gate-and-death.html; Claudia Eller, "The Costliest Box Office Flops of All Time," *Los Angeles Times,* January 15, 2014; Manohla Dargis, "The Second Coming of Heaven's Gate," *The New York Times,* March 17, 2013. For a detailed overview of the entire production fiasco, see Steven Bach, *Final Cut: Art, Money, and Ego in the Making of Heaven's Gate, the Film That Sank United Artists* (New York: Newmarket Press, 1999).

[4] Christopher Sharrett, review of *Review of Heaven's Gate*, by Joann Carelli and Michael Cimino, *Cinéaste* 38, no. 2 (2013): 58–60.

[5] The exceptions to this are rare. For instance, one ostensible example is Daniel Belgrad's "'Power's Larger Meaning': The Johnson County War as Political Violence in an Environmental Context." Although at first glance an environmental history, upon closer inspection, this piece is similarly class-based, in this instance taking a Marxist approach to political violence. Although his article is based in an understanding that "sees human actions as always embedded in the demands imposed and the opportunities afforded by the natural environment and its complex ecological interactions," his interlocutors are both the seminal Marxist

There is certainly something to be said for such an approach. Most obviously, there were very real wealth disparities between the two sides of the conflict. But there are also drawbacks: by attributing the role of central historical motivator to economic factors, historians have implicitly reproduced a Marxist take on temporal change. Instead of seeing contests over the ecological or the thermodynamic, we see landed aristocrats using violence in order to preserve their own established wealth from an onrush of impoverished immigrants. In other words, by presenting this class-based narrative as the *sole* interpretation of the Johnson County War, historians have unintentionally ablated a host of other critical factors, many of which point toward a more complex ecological narrative, one that reveals far more about larger historical changes in the region.

A return to the land reveals a number of these insights, shifting understandings of both the Johnson County War and its larger place in the region's thermodynamic history. In essence, the region's earliest open-range ranchers—the later invaders—attempted to replace the northern plains' bison with (mostly southern) cattle, assuming not merely that the two animals were interchangeable, but that cattle were in actuality superior versions of bison. This supposition was fundamentally mistaken—among other things, cattle are notably inferior to bison in cold climates—and as the concrete losses began to accrue, the open rangers erected a number of rhetorical stopgaps in a last-ditch effort to save their system of ranching. It was during this decline that not merely homesteaders and paupers but a whole new system of ranching entered the Powder River Basin. Beginning in the

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thinkers, from Gramsci on up to Raymond Williams, and the cultural theorists of political violence. In essence, Belgrad's argument is that cattle ranching pitted different ecological modes against each other, and the result was the outbreak of political violence. As he writes, "the cultural hegemony that stabilized cattle ranching as an ecological mode in northeast Wyoming in the early 1880s eroded in the second half of the decade." Daniel Belgrad, "'Power's Larger Meaning': The Johnson County War as Political Violence in an Environmental Context," *The Western Historical Quarterly* 33, no. 2 (July 1, 2002): 164.

late-1880s, settlers flocked to the region under the Desert Land Act and other associated land-leasing laws. They did so trailing a system of ranching that was not based upon ancestral bison but on the latest scientific findings (particularly the newly found field of range science) of Europe and the United States. It was this system—one predicated on management, prediction, and the conscious creation of plains energy—that not only spelled the end of the open range era, but that also provided a bridge for the energy frontiers that would follow: the oil wells at Salt Creek and the coal fields of Gillette. In other words, the Johnson County War was as much about energy and understandings of extraction as it was about any larger class conflict. Understanding this not only recasts the archetypal range conflict of the West, but it reveals the long-hidden thermodynamic connections between early-Powder River ranching and the fossil fuel industries that would follow.

Figure 5: Map of Johnson County
"Land Wars: Two Cases Shape Future of Land-Use in Wyoming,"
https://newwest.net/topic/article/land_wars_two_cases_shape_future_of_land_use_in_wyoming/C35/L35/

The Rise of Cattle and the Fall of Bison

Like most things concerning cowboys, cattle, and the Old West, the story of the Powder River cattle industry is tinged with its fair share of myth: if you browse the various county and oral history compendia throughout the region, you will find a healthy portion of tall-tales and folk yarns that, from an empirical standpoint, leave something to be desired.[6] Perhaps the most prominent of these involves a pair of innominate traders, men who passed through the northern plains in the mid 1860s, hauling supplies across present-day Nebraska and Wyoming on their way to Utah's Camp Douglas. According to the story, partway through the trip—in what would become Wyoming—the pair found themselves ensnared by the ice and snow of an early-season storm. They had planned to reach Utah before the seasons changed, but now, without much of a choice, they were forced to cache as many of their supplies as they could, to set the oxen free to fend for themselves, and to return back home to the relative comforts of the Midwest. There they spent the winter, resting and worrying amidst the bustle of the Missouri's trading entrepôt. When they returned the following spring, fully expecting to stumble upon cadavers and a few hidebound survivors, they found the oxen not only alive but thriving, bigger, fatter, and in far better shape than they had left them during that unfortunate storm. Convinced that they had happened upon some sylvanic western oasis, the two men

[6] See, for example, Alfred James Mokler, *History of Natrona County, Wyoming, 1888-1922* (Chicago: R.R. Donnelley and Sons Co., 1923); Robert A. Murray, *Johnson County: 175 Years of History at the Foot of the Big Horn Mountains* (Buffalo: Buffalo Chamber of Commerce, 1981); Campbell County Historical Society, *Campbell County: The Treasure Years* (Marceline, MO: Walsworth Publishing Co., 1991). It should be noted that many of these histories are excellent works that document much history that would otherwise be forgotten.

spread the news of the region's natural bounty, in the process catalyzing scores of Texas ranchers, who, eager to find viable postbellum land to exploit, eagerly trekked north.[7]

Founding stories like this tend to pack far more potency than their veracity suggests. As the eminent fire historian Stephen Pyne suggests, all places have meaning, "and that meaning depends less on the scene's physical geography than on the ideas through which it can be viewed and imagined." This was particularly true during the nineteenth century, when "American society…mustered the capacity and the will to match its discovered opportunity and transformed land into place and place into symbol. The outcome was neither obvious nor inevitable."[8] In other words, rather than geography, the power of these foundational stories lies in the larger associations they engender. In the case of this particular mythic story—a happenstance discovery of the region's thermodynamic bounty—we have the seeds of the open range cattle industry on the northern plains, the notion that not only could cattle *survive* on the northern plains, thereby replicating and replacing the erstwhile bison, but that they would make better and more efficient use of those grasses, not merely surviving winter but paradoxically *thriving* in it. As such, regardless of the historical validity of the story, it has come to be seen as the archetypal narrative of early Powder River ranching, setting the stage for the livestock revolution that would define the late-century plains. For time and again open-range ranchers would live its larger theme: the unwavering belief that the northern

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[7] Robert W. Macy, "Some Factors in the Development and Destruction of the 'Open Range,'" Wyoming Works Projects Administration, Federal Writers' Project Collection, File 369, Cheyenne, Wyoming, 2. This collection will be cited as WPA Collections. Also see John LeeRoy Waller, "Economic History and Settlement of Converse County, Wyoming," *Annals of Wyoming,* vol. 6, no. 2: 280-281. Waller not only mentions the above-described story, but also another similar incident five years later, when a group of Texas cattle were abandoned for the winter near present-day Cheyenne. Finally, another iteration occurs in Enid Bennette, "Cattle," WPA File 377.

[8] Stephen J. Pyne, *How the Canyon Became Grand: A Short History* (New York, N.Y.: Penguin Books, 1999), xiii.

plains—and the Powder River Basin in particular—was a modern-day Eden, a thermodynamic oasis in the heart of one of the harshest environments on the continent.

This did not happen overnight. The first step was to eliminate the ruminants that already inhabited the area: bison. Spurred on by the country's industrialization and the concurrent need for durable machine belts, during the 1870s western hunters became interested in bison qua leather-provider, not, as had previously been the case, as the source of the bulky and heavy full-robes of Missouri River lore. This subtle economic shift had important consequences for the species' population. Under the earlier system, hunting had been rigidly delineated along seasonal lines. During the summers, bison coats became too piebald and patchy to be worth the labor, and so the hunters vacated the plains and participated in myriad other tasks—e.g., farming or mining for gold—waiting to return until late fall, winter, and spring, when the coats were at their thickest and therefore the most valuable. But by the 1870s all of this had changed. With the bulk of the robes now destined for distant tanning factories, where they would be spalled and stripped into machine belts for the rapidly industrializing east, hunting dilated to a year-round affair.[9] Embryonic outfits fanned out across the plains during all months, at first limiting themselves to the more accessible regions of the southern plains before moving north by the end of the decade.[10] Not surprisingly, the industry boomed; the best shooters took two to three thousand animals a month, and with robes fetching up to four dollars a

[9] William A. Dobak, "Killing the Canadian Buffalo, 1821-1881," *The Western Historical Quarterly* 27, no. 1 (April 1, 1996): 34.

[10] Most environmental histories on the bison's demise concerns the central and southern plains. Among the best is that of Dan Flores, who paved the way for much of the later historical work on bison and equestrianism. Dan Flores, "Bison Ecology and Bison Diplomacy: The Southern Plains from 1800 to 1850," *The Journal of American History* 78, no. 2 (1991): 465–485.

hide, for a brief period outlaws and former pariahs managed to amass the sort of profits normally reserved for only the most elite and respected of fields.[11]

This vatic shift—and in particular the explicit focus on bison as laissez-faire prey—had important corollaries for the cattle industry that would follow. While hunters were out eradicating the species from the plains, politicians and public figures were praising that slaughter in an odd, pseudo-Darwinian cant, propounding the deep-seated view "that domestic livestock were destined to replace the bison." In the historiography, this sort of talk has often been relegated to an auxiliary role, a footnote alongside the more patent violence of the slaughter, but such claims—like the mythic stories that preceded them—served an important rhetorical function. According to this view, cattle emerged as the teleological successors to the species that had previously defined the plains. Bison, like the indigenous inhabitants they were so closely associated with, "fled before the conquering cattle."[12] Time and again federal officials deprecated the mythic animals for making less efficient use of the land and its chief energy resource: the plains' abundant grasses.[13] They couched their claims in the familiar cant of Manifest Destiny, arguing that bison "trample upon the plains upon which our settlers desire to herd their cattle and their sheep…[t]hey are as uncivilized as the Indian," and that the animals were, "at most, but game. Men have not been able to domesticate them so as to make them useful in any respect as a domestic animal. They take up as much room and consume as

[11] For hide prices by year, see M. Scott Taylor, "Buffalo Hunt: International Trade and the Virtual Extinction of the North American Bison," *American Economic Review* December 2011): 3179.
[12] Andrew C. Isenberg, *The Destruction of the Bison: An Environmental History, 1750-1920* (Cambridge; New York: Cambridge University Press, 2000), 130; Second quote is from a poem in Macy, "Some Factors," WPA File 369, 5. Also see Virginia DeJohn Anderson, *Creatures of Empire: How Domestic Animals Transformed Early America* (Oxford; New York: Oxford University Press, 2004).
[13] In comments such as these, there are strong echoes of the Lockean notions of property and labor that Euro-American settlers imposed, among other places, in early New England. See Cronon, *Changes in the Land,* 78-79, 95.

much provender as cattle and horses or any other character of useful domestic animals."[14] But just as important as these claims was their geographic ubiquity. Not only did such rhetoric litter the halls of Congress, but it similarly occupied the minds of Powder River settlers. Even in Johnson County we see articles on the importance of "substitute[ing] cattle for buffaloes, and ranch men with their assisting cowboys for the aborigines."[15] The focus here on substitution—on purported efficiency—reveals a more sinister, implicit, and economically enlightened logic, one that would prove central to Johnson County's earliest ranchers: bison and cattle are similar species; bison have thrived on the northern plains—and particularly (as the Crow, Lakota, etc. showed) in the Powder River Basin—for millennia; cattle are more efficient and civilized animals; therefore, cattle will not merely replicate the ecology of the bison but ultimately surpass it. It was a thermodynamic thesis that would come to define the early years of the Powder River's cattle industry, and one that would play a critical role in the lead up to the Johnson County War. Unfortunately, like the Darwinian thread that it was in many ways a part of, it was also badly mistaken.

The timing of these cognitive and physical shifts is important. Most stories place the first substantial settler cattle herds entering the Powder River Basin in either 1878 or 1879, dates that coincide precisely with the initial stages of the bison's demographic

[14] Quoted in Isenberg, *The Destruction of the Bison,* 155. Another representative article appeared in the *St. Louis Globe-Democrat:* "A good fat ox is a much more valuable animal any day than the biggest buffalo bull. The pastures which now support 2,000,000 or 3,000,000 head of buffalo will support an equal number of cattle, which, as better friends of man, have a better right to them than the ugly wild beast that has little to give us worth having besides its skin...Let the buffalo go—the faster the better—and let the grassy hills and plains of Montana and Wyoming be covered with herds of good, honest, civilized cattle." "The Buffalo Must Go," *St. Louis Globe-Democrat,* June 9, 1882.
[15] "The Cattle Crop," *Big Horn Sentinel,* May 28, 1887,

collapse.[16] By that time Texas was more or less overrun with pseudo-feral, postbellum cattle. But the problem was not simply the number of the animals that had colonized the region. As a result of overgrazing and a lack of care during the war years, most of the cattle were nowhere near healthy enough to be sold profitably for meat. And even if they had been, Texas did not possess the transportation networks needed to ship them north and east to more valuable markets—distant Midwestern hubs like Chicago and Kansas City, where they were processed and packaged for America's burgeoning population.[17] Consequently, ranchers began to look north to the central and northern plains, which were then being settled in the wake of the war and the various mineral rushes that had colonized the region.[18] During the late 1860s it was the central plains that first filled this newfound void, with Kansas, Nebraska, and Missouri benefitting most from the northward-drifting herds. But by the 1870s these ranges too had become overcrowded, and ranchers continued to look for new thermodynamic frontiers, this time to the northern plains, lands that were just then being seized from Indian peoples like the Crow. And so ranchers "turned their eyes toward northeastern Wyoming," in particular to the Powder

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[16] Helena Huntington Smith, *The War on Powder River: The History of an Insurrection* (Lincoln: University of Nebraska Press, 1966), 8-9. E.S. Osgood writes that, "Wyoming stockmen were down on the trail in 1879 buying up herds as they came in from the south, for their new ranges along the Powder, Tongue, and Upper Cheyenne." E.S. Osgood, *The Day of the Cattleman, a Study of the Northern Range, 1845-1890* (Minneapolis: University of Minnesota Press, 1929), 86. Many of the earliest ranches were in the vicinity of military forts, to whom they sold beef. For instance, in 1878 and 1879, H.G. Williams had a ranch on Crazy Woman Creek, a few miles from Fort McKinney, to whom he sold steers. Sheridan *Post,* October 18, 1910.

[17] W.E. Guthrie, "The Open Range Cattle Business in Wyoming," WPA Collections 377, 1. Of course the lack of railroads in the South was also one of the decisive factors in the Civil War.

[18] Although some scholars have criticized what they see as the mythic version of cattle coming to the northern plains from Texas, claiming instead that the bulk came from Oregon, it does seem that most of Johnson County's cattle came from the south (the critique seems more appropriate for Montana). As Harold Briggs has observed, "Although some eastern and western cattle were brought into Wyoming during the boom period by far the larger portion of the range stock came from Colorado and Texas. Wyoming stockmen went down the trail in 1879-1880 buying up herds as they came up from the south, for their new ranges along the Powder, Tongue, and Upper Cheyenne rivers." Harold E. Briggs, "The Development and Decline of Open Range Ranching in the Northwest," *The Mississippi Valley Historical Review* 20, no. 4 (1934): 527–28.

River Basin, where they "commenced prospecting for new ranges on Crazy Woman, Goose Creek, and other streams."[19] In 1878, just as pressure on the bison was increasing, territorial Governor John Wesley Hoyt remarked upon this northward movement of ranchers, describing the foothills of the Big Horns as "an Arcadia" that was "waiting for and only needing the herdsman and his flocks to make it complete." He noted that "little parties of adventurous pioneers" were already up there "exploring for good location with the intention of taking in herds of cattle next spring."[20] And while his remarks certainly echoed the booster rhetoric that would later plague Salt Creek (chapter three), in this case Hoyt was right. Within two years those same foothills would support just under a million cattle, leading to Johnson County's designation as "the mecca of the Texas cattle treks."[21]

The distinctive provenance of these first cattle would go on to play a major role in the development of the Powder River Basin's open range, eventually paving the way for the final confrontation in Johnson County. The animals were reared and cared for according to what historian Terry Jordan has dubbed "The Texas System," a place-based cognomen that has since stuck in the regional literature. This method, an amalgam of Spanish and English livestock practices (and, in the Americas, transplanted from Central America and the Carolinas), attempted to take advantage of both the natural bounty of the "free range"—i.e., land that was in the public domain—and the cattle's innate drive for survival to permit the animals to fend for themselves. As a rule, ranchers only actively intervened and herded during the spring—when they branded new calves—and the fall—

[19] Cheyenne *Sun,* March 6, 1880.
[20] "Report of the Governor of Wyoming Territory Made to the Secretary of the Interior," (Washington: G.P.O., 1878), 40.
[21] A.P. Dow, "The Cattlemen's Invasion of Wyoming 1892," WPA Collections 370, 2.

when those fattened and matured for market were shipped to the slaughterhouses.[22] The result was that irresistible speculative combination: minimal labor and maximum profit. James Brisbin's infamous *The Beef Bonanza: or, How to Get Rich on the Plains*, an 1881 bestseller, sums up this thermodynamic worldview best: "the profits are enormous. There is no business like it in the world, and the whole secret of it is, it costs nothing to feed the cattle. They grow without eating your money. *They literally raise themselves*." Brisbane claimed that an individual could start out with a $25,000 investment and, within six years, not only have made all of that money back, but come out with a profit of more than $50,000.[23] Such dogma was recapitulated by Johnson County's early residents. "In the old days ranching was nothing more than a desperate, if intensely interesting, gamble," one cattleman recalled. "The only investment was in the cattle themselves, and the only real labor took place in the spring, for the annual roundup in which new calves were branded."[24] Under this iteration of the open range system, the animals excavated their own energy surpluses. In effect, cattle became better bison.

The problem, however, is that there is something misleading about the Texas cognomen when it is applied to the Powder River Basin. As outlined in the previous chapter, much of the scholarship on the Great Plains has treated the region as a monologic whole, erasing the vast ecological differences that occur not just latitudinally but across the thousands of different microclimates that affect and fundamentally shape

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[22] Terry G. Jordan, *North American Cattle-Ranching Frontiers: Origins, Diffusion and Differentiation* (Albuquerque: University of New Mexico Press, 1993), 210-211; George Stewart, "History of Range Use," *The Western Range* (Senate Doc., 74th Cong., 2d sees., no. 199), Washington, 1936, 122-123.
[23] James S. Brisbin, *The Beef Bonanza; Or, How to Get Rich on the Plains. Being a Description of Cattle-Growing, Sheep-Farming, Horse-Raising, and Dairying in the West* (Philadelphia : J.B. Lippincott & Co.,1881), 200. Italics mine.
[24] Ida McPherren, "History of Grazing," WPA Collections 395, 3.

the thermodynamics of its space.[25] From a ranching perspective, this means that although similar in its broad strokes, the "Texas System" as practiced in Texas, Oklahoma, Kansas, Nebraska, and even Colorado differed significantly from that which was carried out in eastern Wyoming and Montana. For the region's indigenous peoples, the brutal conditions of the northern plains made horse care a wholly different entity than it was on the central and southern plains, where tribes like the Comanche and Kiowa kept herds far greater than anything that was conceivable on the northern plains. The same was true for cattle—the seasonal rounds and winter isolation on the northern plains versus, say, southern Colorado, made the northern plains system disparate enough to merit its own place-specific nomenclature.[26] Just as Crow equestrianism was different than Comanche equestrianism, so too was Powder River ranching different from that of the central plains.

As such, I refer to the initial open-range system of cattle ranching in the Powder River Basin not as the "Texas System of Ranching"—as it has heretofore been called—but as the Cattle-Bison System (C.B.S.) of ranching. This classificatory shift is more than mere semantics, for on the northern plains the temporal movements of most ranchers closely mirrored the seasonal rounds of the Crow and other equestrian bison hunters of the plains. This cycle of annual movement is well known among the indigenous studies literature, but it bears summary here. During a typical year, the Crow people would gather together in spring—typically May—as bison moved out from their winter shelters

[25] The macroscale approach can be seen in Pekka Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," *The Journal of American History* 90, no. 3 (2003): 833–862. Hämäläinen claims that "the most revealing dynamics" of Plains ecology are latitudinal—the traditional delineation into northern, central, and southern plains. As argued in the rest of this chapter, however, the more telling delineations are along microclimates.

[26] Note that this is also a problem with much of the scholarship on the cattle industry. See, for instance, Ernest Staples Osgood, *The Day of the Cattleman*, Minnesota Archive Editions edition (University of Minnesota Press, 1929); Terry G. Jordan-Bychkov and Terry G. Jordan, *North American Cattle-Ranching Frontiers: Origins, Diffusion and Differentiation* (Albuquerque: University of New Mexico Press, 1993); Walter Prescott Webb, *The Great Plains* (Lincoln: University of Nebraska Press, 1931).

and windbreaks and onto the plains for the early season grasses. Here they operated in bands, gathering roots and killing bison when possible, attempting to regain the nutrition they had lost over the harsh winter months. As spring gave way to summer—roughly June through September—the tribes broke into smaller groups to pursue these animals out on the plains, though they also occasionally came together in large groups for certain ceremonies. With the exception of such ritual gatherings, however, encampments remained small—family- or band-sized—and tended to be located along rivers and creeks. In the fall, they gathered into what were typically their largest groups of the year for communal winter-preparation hunts. If they did not possess enough horses for such a hunt, this would include pounds, where the methods—herding large groups of bison into natural or constructed enclosures—were oddly similar to those later practiced by cattlemen. Finally, as October came and fall gave way to winter, the tribes dispersed into smaller groups once again, sheltering themselves in the relative safety of the region's river valleys, staying warm and moving little if at all until the following spring, when the process started over.[27]

In most of the literature, these movements disappeared in the late-nineteenth century as the Crow and other northern plains tribes were forced onto reservations. But what is remarkable is just how closely this cycle mirrors the seasonal rounds of the Cattle-Bison System ranchers. In the spring—anywhere from mid-April to early-June, depending upon the severity of the preceding winter—as soon as the snow melted and the

[27] Scott Hamilton and B.A. Nicholson, "Aboriginal Seasonal Subsistence and Land Use on the Northeastern Plains: Insight From Ethnohistoric Sources," *Plains Anthropologist* 51, no. 199 (2006): 262–65; J. Rod Vickers, "Seasonal Round Problems on the Alberta Plains," *Canadian Journal of Archaeology / Journal Canadien d'Archéologie* 15 (1991): 61–65; John C Ewers, *The Horse in Blackfoot Indian Culture: With Comparative Material from Other Western Tribes* (Washington: Smithsonian Institution Press, 1980), 123–24.

grasses became accessible, cattlemen would venture out from their winter haunts to check on the herds. Once on the plains, they would gather all of the cattle in a given range so that the new calves could be branded. Such roundups were generally conducted by district, coordinated around certain rivers or sections of rivers, and were announced in the local newspapers. After this, the ranchers' and cowboys' only responsibilities for the next four or five months were odd and arythmic bits of maintenance: ensuring that cattle had access to water, grass, and salt; pulling the animals free from mudholes and other terrestrial sinks; prohibiting them from straying too far from camp. As summer then gave way to fall, the ranchers gathered for another roundup—in effect participating in a tamer, domesticized "hunting" of the animals—this time culling the herd's three-, four-, and five-year-olds to be shipped to market, typically via train.[28] This completed, the men prepared to return to their winters camps, where they holed up with supplies and waited out the bitter cold for the next five months.[29] This continued on until the snow melted and the following spring roundup came around, at which point they would brand the next crop of calves, thereby starting the cycle anew.[30]

One must assume that all of this was done unconsciously, for there is no evidence of ranchers knowingly replicating the movements and sustenance patterns of either bison or the region's mid-century indigenous inhabitants. And yet time and again they made explicit comparisons between the two ruminant species. This was done not merely among boosters and politicians but in the regional papers as well. At the height of the open range

[28] The Burlington and Missouri Railroad reached Gillette, the subject of chapter four, in 1891.
[29] According to one hand, "for the most part, we just laid around, ate and slept, and looked after our saddle horses… Life got pretty monotonous." Of course this is similar to accounts of winter camps for the region's indigenous peoples. B.W. Hope, "Joe Elliott's Story," *Annals of Wyoming* 45, no. 2 (1973): 147.
[30] Macy, "Some Factors," 7-8; Marcel Kornfeld, "Stockraising Settlement Strategies," Master's Thesis, University of Wyoming, Laramie, 1982, 60. For an example of roundup announcements, see "Roundups for 1887," *Buffalo Echo,* April 22, 1887, 2.

era, the local *Big Horn Sentinel* went so far as to print a report from a Manitoba man, S.L. Bedson, who outlined a systematic program for cross-breeding bison and cattle (what we would now call beefalo) into a sort of uber-animal for the northern plains ecology. According to Bedson, the offspring of such a match were "very hard, as they take the instinct of the buffalo during the blizzards and storms and do not drift like native cattle; they remain upon the open prairie during our severest winters, while the thermometer ranges from 30 to 40 degrees below zero, with little or no food except what they rustle on the prairie and no shelter at all." Here it seems was the perfect mutant for the cattle-baron era: the tractability of domestic cattle and the primal hardiness of plains bison. In ways that nobody could have predicted, this animal can now be seen as the ultimate symbol of the C.B.S.

For a number of reasons, by the late-1870s Johnson County had become the logical destination for cattlemen looking to ply the Cattle-Bison System, a place to transform abstract theory into concrete reality. Its first ranchers supplied the U.S. Army's Fort McKinney, a military outpost that had been erected in the wake of Custer's defeat on the Clear Fork of the Powder River, just a few miles west of present-day Buffalo. But by the late 1870s, the ranchers who were entering the region did so with the goal of shipping beef east, out to Chicago and other distant markets, where they hoped to turn a greater profit. Many of these early cattlemen were formerly in the employ of Fort McKinney. (The county's first officially recorded settler was the post's trader, an Ohioan by the name of Elias Snider.)[31] But as the 1870s gave way to the 1880s, settlers from across the country began to descend upon Johnson County, establishing a pattern of land use that

[31] Mrs. Charles S. Baker, "Early History of Johnson County," WPA Files 788, 6; Minnie Rietz, "Johnson County," WPA Files 996, 1.

would shape both the Johnson County War and its historiography: in the southern half of the country, closest to Cheyenne, large, wealthy outfits such as the Powder River Cattle Company, the Hardin Campbell Cattle Company, the Frontier Land Cattle Company, and the Converse Cattle Company reigned, while in the northern half—centered around tiny Buffalo—smaller outfits and farmers tended to hold sway.[32] It is in this geographic dichotomy that we find the first germ of the class-based approach taken by so many later scholars. But for now, it is important to realize that all these initial settlers readily embraced the Cattle-Bison System, setting their herds loose to graze on the natural bluestem, blue grama, and switchgrass that covered the region, in the process attempting to transform grass and latent energy into profits. As A.P. Dow, a cattleman from the Sheridan area, put it, "men planned on making this territory the greatest cattle haven in the world. There were to be no fences, the cattle were to be known by their brand," roaming the country to "its unfenced limits."[33] The subsequent ranges were based upon usufruct rights to land and fee simple title to cattle, a practice similar to the first-come first-serve notion that would be practiced at Salt Creek (chapter three), whereby use was ceded to the first person to use the land and develop it.[34] But the key difference in Johnson County was that none of this was official—it was all based upon unspoken observance and respect. In the words of one employee of the Six-Half Circle ranch, after claiming a particular range, ranchers simply "turned their cattle loose that spring and did

[32] John W. Davis, *Wyoming Range War: The Infamous Invasion of Johnson County*, Reprint edition (Norman: University of Oklahoma Press, 2012), 14.
[33] A.P. Dow, "The Cattlemen's Invasion of Wyoming, 1892," WPA Collections, File 1469.
[34] Randy McFerrin and Douglas Wills, "High Noon on the Western Range: A Property Rights Analysis of the Johnson County War," *The Journal of Economic History* 67, no. 1 (2007): 70. Interestingly, the notion of usufruct right to land is one of the key tenets that Cronon describes indigenous land use in New England by, contrasting it with European colonists' notion of private property. See Cronon, *Changes in the Land,* 62-74.

not see them again all winter." They were on their own until the spring melt, when the new calves were branded.[35]

It was this concept of land as usufruct and cattle as superior bison that would drive the C.B.S. through its various successes and failures, ultimately leading to the violence of the Johnson County War. The early 1880s were without question a time of hope and prosperity, when it seemed as though all of the boasts and grandiloquence of the politicians and boosters were true: every sign indicated that the migrant cattle *did* make better use of the land than bison, that they fattened and matured in ways previously unthinkable. But underlying this initial success was a far more troubling thermodynamic reality. Unfortunately for the C.B.S. ranchers, it was hidden by a number of place-based rhetorical strategies. The first of these was something called "book count," a regional method of accounting that was not merely a queer foible of the system—as it has heretofore been treated—but a thermodynamic strategy that played a crucial role in establishing the overblown optimism of the C.B.S. Without its quantitative fortification, the C.B.S. may very well have crumbled early on, and the Johnson County War may never have happened after all.

The Problem with Book Count

In simple terms, the book count was the number of cattle that ranch owners recorded in their official records. It was the quantity that they claimed to own. But beneath—or rather beyond—its simplicity existed a separate reality: the number of living, breathing animals that were out there on the range. One of the crucial and well-known

[35] Nora Neely, "The T7 and Other Ranches," WPA Collections, File 1194.

characteristics of the open range era was that these two quantities were often wildly disparate, varying by as little as 1/3 or as much as eighty percent, depending on whose accounts you look at.[36] For a long time they existed in separate phenomenological realms, never intersecting due to the simple fact that few ranchers ever went out and physically counted the animals in their herds. The only time the two quantities did overlap was during sales, when the range-bound animals were finally tallied and codified, and the bankruptcy of the book count was laid bare. One can see this in the case of W.E. Guthrie, one of Johnson County's earliest ranchers and a later participant in the Johnson County War, who liked to recall the story of a neighboring rancher who entered the Powder River cattle business by purchasing 1,200 head from another local. Within a couple of years, however, the new owner began to fear that he had nowhere near as many cattle as he paid for. As such, he sent Guthrie onto the range to count the animals. After working his way across the region, Guthrie was able to round up fewer than 200 of the supposed 1,200 animals, an experience that seems to have been more the rule than the exception. As Guthrie puts it, "in most cases where large herds were bought 'book count' the purchasers were given a good start towards [sic] bankruptcy, or at best the loss of a large part of their investments."[37] In cases where a sale was never made, the owners remained perennially ignorant of just how wildly their own numbers fluctuated from the empirical count.

In some ways, the whole concept of book count is representative of the C.B.S. and its thermodynamic worldview. Such an entity could only exist when owners were detached not only from their animals but from the landscape as a whole. Under the

[36] The 1/3 number comes from Macy, "Some Factors in the Development and Destruction of the 'Open Range," 6-7.
[37] Guthrie, "The Open Range Cattle Business in Wyoming," 5-6.

C.B.S., absenteeism was a well-known and rampant malady; many of the ranches' headquarters were located overseas, with the palatial Frewen Brothers ranch (England) in modern-day Kaycee and the nearby T.Y. ranch being the most well-known. (The latter held its annual meeting of directors not in the Powder River Basin but in London.)[38] According to one rancher, the companies "were owned by Eastern or English companies…[and] their managers, sent out from the East, hardly knew a cow from a buffalo. The foremen would put them to wrangling horses or at some such work where they would be out of the way. A great many of them were remittance men," scions of wealthy European nobles who sent their sons to America in order to get them out of the way.[39] These men were "Englishmen in knee breeches, accompanied by their general managers, buggy bosses and valets [who] rode around with an air of lordliness which was ridiculous."[40] This not only led to the statistical inaccuracies of book count, but it also created an ideological fissure between locals, who for the most part lived on the land, and absentee owners, who "hardly knew a cow from a buffalo." Once again, the language here is telling: the C.B.S. ranchers had seen—or rather, heard—of the millions of buffalo that had previously packed the plains; now they thought they could simply substitute cattle, animals that—as in the founding myth of the unnamed traders—would "take care of themselves." Unfortunately, many of these owners were horribly ignorant of the intricacies of the local landscape; they had little inkling not merely of the difference

[38] Oscar H. "Jack" Flagg, *A Review of the Cattle Business in Johnson County, Wyoming, Since 1882, and the Causes That Led to the Recent Invasion* (The Vic Press, 1967), 9. According to one local newspaper, the Powder River Cattle Company failed not because of the damage from the Hard Winter but because it was run "by a board of directors that were enjoying pleasant offices in London." *Big Horn Sentinel,* November 19, 1887.
[39] Neely, "The T7 and Other Ranches," 2. Of course this was similar to the absenteeism that would come to plague Salt Creek (see chapter three).
[40] Oscar Flagg, "A Review of the Cattle Business in Johnson County, Wyoming since 1882 and the Causes that Led to the Recent Invasion," 6, *Buffalo Bulletin,* May 5, 1892.

between the species but of the various microclimates of the plains.[41] To them it was more or less one great, grassy sea, and they intended to do everything they could to profit from it.

In much of this historical scholarship on the Johnson County War, this concept of book count is portrayed pseudo-comically, as one of a handful of the inane tenets that defined the open range era, ultimately leading to overstocking and exaggerated death counts. But from the viewpoint of the Cattle-Bison System, it was crucial. The C.B.S. was premised upon the notion of virtually unlimited abundance and gain; any sort of quantitative loss—whether natural or human-induced—disclosed the limitations of the system, in particular its long-term unsustainability and detachment from on-the-ground realities. As such, the concept of book count—and its corollary, an ownership class that was, for the most part, absent from the physical landscape—enabled the C.B.S. to continue to function as a viable worldview, regardless of how much it meshed with the empirical reality. Paradoxically, under this view the less contact owners and ranchers had with the animals, the better.[42]

Part of this detachment came out of necessity. Although the numbers tell us that the C.B.S. was a success—by the mid-1880s, the Powder River Basin was teeming with cattle; although specific numbers for the region are difficult to determine, a good estimate for the territory as a whole is between 1.5 and two million cattle, a good portion of which

[41] Even Nate Champion, the martyr of the Johnson County War, began his career in the Powder River Basin working for the C.A. brand, whose "money…come from overseas." Jack R. Gage, *The Johnson County War Ain't a Pack of Lies* (Cheyenne: Flintlock Publishing Company, 1967), 4.

[42] There are some similarities between this approach and that practiced by so many of the tycoons of the Gilded Age. For one such examination, see Richard White, *Railroaded: The Transcontinentals and the Making of Modern America* (New York: W. W. Norton & Company, 2011).

were in the P.R.B.—we need to remember that the numbers were often faulty.[43] Despite all of the overbearing rhetoric of boosters and politicians, cattle and bison were far from the same species. As the former moved into Powder River Basin by the hundreds of thousands during the late-1870s and early-1880s, they established a new ecology, replacing but—crucially—not replicating that of the bison. For despite what the C.B.S. ranchers believed, we now know that even out on the open range, without the fences that would later delineate the plains' cattle, "bison wander more, are less apt to regraze a site during a single growing season, will use steeper terrain, select and consume drier, rougher forage, and spend less time in riparian areas and wetlands."[44] Part of this has to do with the animals' similar but divergent evolution. Although a genetic history points to a common ancestor, the two species split more than thirteen million years ago, with the bison's subsequent movement taking it to the world's grasslands while cattle inhabited wetter woodland biomes. The results are telling: cattle are decidedly less mobile, more obese, and have a skeletal structure that favors short bursts of speed at the expense of more methodical long-distance travel. Further, they have notably negative effects on riparian ecosystems, those thermodynamic keystones that were outlined in the previous chapter.[45] As a consequence, not only are cattle more likely than bison to overgraze any given location, thereby inhibiting future use of that locale's thermodynamic resources, but during particularly trying times—whether it be drought or snow or some other type of energy-sapping factor—they have less ability to move and search out supplementary

[43] T. A. Larson, *History of Wyoming*, (Lincoln: University of Nebraska Press, 1990), 167.
[44] "Are Cows Just Domestic Bison? Behavioral and Habitat Use Differences Between Cattle and Bison," *Western Watersheds Project,* https://www.westernwatersheds.org/gw-cattle-v-bison/.
[45] J. Boone Kauffman and W. C. Krueger, "Livestock Impacts on Riparian Ecosystems and Streamside Management Implications... A Review," *Journal of Range Management* 37, no. 5 (1984): 430–38.

forage than their evolutionary cousins, the bison.[46] Perhaps most importantly for our next section, bison are more acclimated for the hardships of northern winters: they have a greater hair density in their coats and therefore a better capacity to survive in cold climates, they are noticeably better at foraging for food in snow, and they have the ability to digest food of notably lower quality than cattle.[47] In other words, for bison there was in a very real sense more energy available in a given environment than there was for the region's newfound cattle. Although the C.B.S. ranchers could praise the superiority of their animals as much as they wanted, the empirical reality told a far different story.

Consequently, although the Cattle-Bison System was ostensibly thriving, by the 1880s the stage was set for its first substantial challenge. Because of their detachment from the landscape and their reliance upon book count as a reflection of ecology, many C.B.S. ranchers came to the conclusion that the Powder River Basin was a modern-day Eden, a place where energy was, for all intents and purposes, limitless. What they did not realize was that by forcing the animals to fend for themselves, to forage locally for food in an unforgiving landscape, they were effectively killing them. For nearly a decade the inherent flexibility of book count hid this reality from those in power, forestalling any possible change. But as the owners of these vast cattle herds were about to find out, when

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[46] See, for instance, Norland, who notes that bison will rarely stay in the same spot for more than forty-eight hours, regardless of resources. As a result, certain areas were "potentially grazed only once, if at all, in a 3-4 week period." J.E. Norlan, C.B. Marlow, L.R. Irby, "Determination of Optimum Bison Stocking Rate in Theodore Roosevelt National Park, North Dakota," *Journal of Environmental Management* 1985), 21: 225-239.

[47] H.F. Peters, S.B. Slen, "Hair Coat Characteristics of Bison, Domestic x Bison Hybrids, Cattalo, and Certain Domestic Breeds of Beef Cattle," *Canadian Journal of Animal Science* 44, no.1 (1964), 48. Margaret Meagher, for instance, noted that snow rarely affected bison's ability to feed. She cites one study that records bison feeding in four feet of snow without any difficulty. Margaret Mary Meagher, *The Bison of Yellowstone National Park* (Washington: U.S. Dept. of the Interior, National Park Service, 1973), 73. According to Peden, bison "have a greater digestive power than cattle when consuming low protein…[and] poor quality forage." D. G. Peden et al., "The Trophic Ecology of Bison Bison L. on Shortgrass Plains," *Journal of Applied Ecology* 11, no. 2 (1974): 493.

conditions deteriorated and the Powder River Basin was at its worst, the strength of book count would quickly become its weakness. Instead of legitimizing the C.B.S., it would help lead to its undoing.

The Hard Winter: 1886-1887

One of the most celebrated paintings of the Old West pictures a single slat-ribbed bull standing knee-deep in snow, its body so thin and ligamental that his fur looks pocked. A pack of five wolves circle it, waiting for an opening or moment of weakness to make their kill. The resultant juxtaposition is acute. The cow looks terminally haggard, the only sign of life a faint wedge of mist emerging from its mouth. The wolves, on the other hand, seem oddly relaxed, almost serene. Three of them sit patiently watching the cow, while the other two trace a loose circle in the snow, moving with the confident nonchalance of apex predators. Entitled "Waiting for a Chinook," the work is a simple watercolor painted in the summer of 1886, after the worst winter in memory. More importantly, it is the first known work of Charlie Russell, one of the West's most august nineteenth-century artists. But what ultimately makes the work so powerful is the story that it represents, one diametrically opposed to that propagated by the C.B.S.[48] It is a painting of visceral pain and loss, of the limitations and austerity imposed by the winter of 1886-1887, what has since become better known as "The Hard Winter." More importantly, it is the first representation of a new thermodynamic worldview.

[48] Wallis Huidekoper, "The Story behind Charlie Russell's Masterpiece: 'Waiting for a Chinook,'" *The Montana Magazine of History* 4, no. 3 (1954): 37–39.

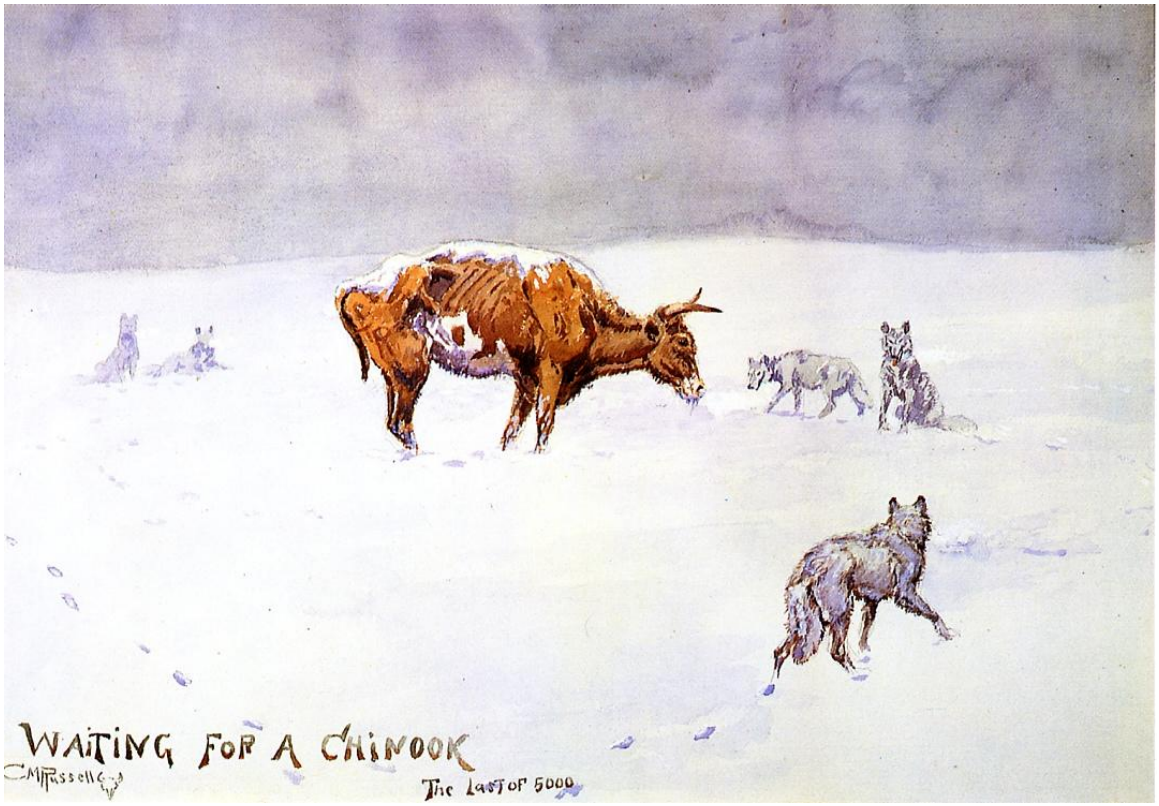

Figure 6: Charlie Russell's "Waiting for a Chinook"
https://collections.centerofthewest.org/view/waiting_for_a_chinook?offset=99&maxOffset=23622

From a historiographic standpoint, there remains a great deal of controversy over just how bad the Hard Winter really was.[49] It has become rather commonplace for scholars to claim that that winter's severity—and its corollary place in the historical

[49] The main argument against the "hard winter" thesis is quantitative. Geoff Cunfer, for instance, in one of the most well-known examples, calculates that in 1885 there were 7.5 million cattle on the plains, a number that would, five years later, drop to 6.3 million. But he argues that, if properly organized, the plains could, and has, supported herds of thirteen million, nearly twice what it held during the hard winter. He terms this balance "ecological equilibrium," and claims that it would be reached in the first part of the twentieth century, as the new method of ranching outlined by Webb took hold. This is an argument that, on the surface, seems to make sense. If we calculate the total available forage on the plains then we can calculate the total number of fauna it could support. But the problem with this is similar to that outlined in chapter one, when examining the historical Crow and the rise of the Yellowstone River as an energy factor. (I.e., that the northern plains as a whole is an incredibly harsh environment, particular for raising horses, but much of the Yellowstone river and its tributaries are some of the best.) In other words, calculating a carrying capacity for the plains as a whole tells us very little about the hard winter or the carrying capacity of any particular range. See Geoff Cunfer, *On the Great Plains: Agriculture and Environment* (College Station: Texas A & M University Press, 2005), 50–51. The methodology Cunfer uses is similar to that used to calculate bison population and carrying capacity in Flores, "Bison Ecology and Bison Diplomacy."

imaginary—has been exaggerated, that popular media, in particular the Russell painting, has promulgated a myth that has little to do with the empirical reality. By examining the period through a thermodynamic lens, however, this subsection pushes back against such claims, arguing that for many in the Powder River Basin—and, more specifically, Johnson County—the Hard Winter was very hard indeed. It marked the initial breakdown of the Cattle-Bison System, causing numerous ranchers to go bankrupt and flee the region. But it did not lead to the wholesale collapse of the C.B.S. Instead, it can be seen as marking the beginning of a transition period, a move away from the Cattle-Bison System and toward a new energy imaginary, that of the Range-Science Ranchers, a group of emigrants who will be examined in the next section. While the Hard Winter may not have had a major impact on the class-based divides preferred by many previous scholars, then, it did serve to highlight and exacerbate the thermodynamic bankruptcy of the C.B.S., helping to lead to its ultimate collapse.

According to most reports, the spring of 1886 was atypically dry, with the usually verdant spring grasses emerging sere and sparse, providing little of the nutrition necessary to revive cattle coming off of winter deprivation. Unfortunately the subsequent summer provided little relief, witnessing a scarce two and a half inches of precipitation, roughly half the seasonal average.[50] All the way up by the Canadian border, Fort Assiniboine—one of the few primitive weather stations in either Montana or Wyoming at the time—reported a maximum temperature of 108 degrees, the highest ever recorded. Such a seasonal diversion would have important consequences on the ensuing winter. From a scientific standpoint, in years when rainfall dropped below ten inches, the total

[50] Frederic S. Hultz, "Wyoming Livestock Production," typed manuscript, 5, WPA Collections, File 377; Alfred Larson, "The Winter of 1886-87 in Wyoming," *Annals of Wyoming* (January 1942), 6.

quantity (by weight) of grass per acre could fall to less than 1/6 of its normal capacity.[51] Consequently, as summer turned to fall and then winter, the range was all but devoid of available energy, lacking that critical cache of cured grasses that was so necessary to survive the northern plains' most trying season.[52] But not only did that summer's heat scorch whatever scant vegetation remained, leaving little in the way of nutrition, but it also catalyzed a spat of prairie fires that destroyed acres of range and, as a corollary, many of those clusters of energy.[53] As a result, cattle entered the fall roundup—when they would normally be at their fattest—in a severely weakened state. Not only were the animals that were shipped east of noticeably inferior quality to previous years, but those that remained were enervated and vulnerable to external pressures.[54] Even with a mild winter, cattle losses were sure to be significant.

But of course it would not be a mild winter. In November, Denver's *Field and Farm* observed that the northern part of Wyoming was "in bad shape for winter feeding…Grass is short and there is not much of it."[55] Ranchers in Buffalo echoed these sentiments, publicly hoping for a mild winter to help their livestock make it through. As one owner observed, "grass is very short in the greater portions of the country, and the cattlemen need an open winter to carry their stock through safely."[56] That month brought snow and a cold-spell that "revived the coal trade and brought out the sleighs with their

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[51] James E. Sherow, "Workings of the Geodialectic: High Plains Indians and Their Horses in the Region of the Arkansas River Valley, 1800-1870," *Environmental History Review* 16, no. 2 (1992): 69.
[52] Stewart, "History of Range Use," 123.
[53] Carolyn Cunningham and Mark Thompson, eds., *Montana Weather: From 70 Degree Below to 117 Degree Above* (Helena.: Montana Magazine Inc., 1982), 71. Fire is, at root, a process of rapid decomposition, reducing latent energy into heat. See Stephen Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire* (University of Washington Press: Seattle, 1997): 20-44.
[54] Harry Sinclair Drago, *The Great Range Wars : Violence on the Grasslands* (Lincoln : University of Nebraska Press, 1985), 251.
[55] *Field and Farm,* November 13, 1886. It is worth noting that most reports point to the northeastern quadrant of Wyoming as suffering worse than any other (the other notable victim was eastern Montana).
[56] Laramie *Daily Boomerang,* January 2, 1887.

merry bells."[57] It also marked the start of "The most prolonged windstorm ever known." From late-November on through February, a steady wind, "a good fair average of forty miles an hour" blew "from sunrise to sunset." In northern Colorado, it blew so hard that trains were swept clear off of the tracks.[58] In the midst of this zephyr, the plains were hit with a mix of snow and heavy rain. Although not typical for the late-fall/early-winter, this was not out of the ordinary: because of the Rocky Mountain belt and, more closely, the Bighorns, incoming weather patterns tend to drop their moisture on the windward or eastern slopes. The now moisture-light air continues down the leeward side of the mountain(s), warming as it does so, resulting in massive temperature swings over the course of a few hours (the famous Chinooks). Although typically dry, these winds do occasionally bring rain. Under normal circumstances, they are welcomed as a winter reprieve—the increased temperature has been known to cut-down on snow accumulation, often melting as much as a foot a day. But in the fall of 1886, the rain did not signify a full-on Chinook but rather an all-too-brief warming spell. As a result, instead of making forage easier to access, it created ice, layers and strata of the stuff that were, according to one ranch hand, "packed [as] in an ice house."[59] It effectively locked away the few nutrients that remained, leaving the bulk of them inaccessible to the region's cattle.

The new year only saw the situation further deteriorate.[60] The first major storm hit on January 9. The temperature dropped to negative twenty and snow lashed the landscape for sixteen straight hours. Two days later, the precipitation commenced once more, this time persisting for three days, during which time the temperature never topped the

[57] Davis, *Wyoming Range War*, 33.
[58] Larson, *History of Wyoming*, 7–8.
[59] William Peter Ricketts, "The Winter of 1886—A Tough One," WPA Collections, File 367, 2.
[60] In one of the great ironies of early Wyoming history, there were no official snowfall totals during the winter because the U.S. Signal Office recorder in Cheyenne was "sick." Larson, *History of Wyoming,* 6.

aforementioned twenty below. Snowdrifts of twelve and fifteen feet were reported, and when the precipitation finally stopped on January 15, the temperature dropped even further, hitting a punishing forty-six below zero. The stage to Buffalo was stopped by snow "four feet on the level," causing the *Sentinel* to worry that "unless a gentle Chinook pays us a visit, there is room to anticipate a heavy loss when the time comes to tally up at the spring round-up."[61] For much of February the temperature held steady in the -10 to -20 range, with temperatures in Miles City dipping to as low as -52. As a result, "all gulches and creek channels were leveled with snow, all grass covered and only the sage brush in sight." Ranchers described the sounds of the "bawling, drifting and starving cattle." From the safety of their cabins, "both day and night the cries for food were heard, but we were powerless to help them." [62] Because of the rigidity of their seasonal rounds and the larger thermodynamic worldview that they actuated, the ranchers were out of touch with their own animals; all they could do was hunker down and wait for the spring thaw.

Much of the prenominate suffering had to do with cattle's cold-weather inferiority when compared to bison. As noted earlier, from an empirical standpoint bison had far more energy available for use during the winter months than cattle. This was especially true in times of harsh weather, when the temperature dropped, the snow level increased, and ranch-hands took shelter in often-distant cabins to wait out the worst of the winter. In basic terms, the lower the temperature and the greater the wind, the more heat an animal loses and therefore the more energy that it needs to take in order to maintain its metabolism. Cattle will respond to these challenges by increasing their heart rate,

[61] Drago, *The Great Range Wars*, 253–54; Davis, *Wyoming Range War*, 34; Larson, *History of Wyoming*, 7.
[62] Ricketts, "The Winter of 1886—A Tough One," WPA Collections, File 367, 2-4; Miles City temperature from "Local and Personal," *Big Horn Sentinel,* February 12, 1887.

respiration, and blood flow, all of which requires consuming increased quantities food. (A modern "rule of thumb" is "to increase total digestible nutrients 1 pound for every 5 degrees below zero F").[63] The problem is that on the northern plains this period of greatest energy loss coincides with the season of least available energy. Accordingly, "the interplay between the heat loss of the animal and its feed energy intake as affected by the thermal environment is the essence of predicting the productivity of the animal."[64] And it is not simply the low air temperature but the strong winds of the plains that makes winter such a dangerous time. In short, the higher the wind speed, the higher the critical temperature of the animal and the minimum temperature at which an animal is able to survive.[65] In dry, calm conditions, cattle are able to survive at negative six degrees. But even at ten degrees *above* zero, a fifteen to twenty mile per hour wind will put the animals into danger.[66] During the Hard Winter there were regularly reports of forty-mile-per-hour winds in the midst of whiteout-grade snowstorms.[67] All of this was compounded by the fact that over the course of a normal winter short grasses lose more than half of their protein content, meaning that even if this flora is uncovered and consumed, cattle

[63] Verna Anderson, Breanne Ilse, John Dhuyvetter, Charles Stoltenow, Dale Burr, Tim Schroeder, Tyler Ingebretson, "Winter Management of the Beef Cow Herd," North Dakota State University, https://www.ag.ndsu.edu/publications/livestock/winter-management-of-the-beef-cow-herd.
[64] James DeShazer, G. Hahn, and Hongwei Xin, "Chapter 1: Basic Principles of the Thermal Environment and Livestock Energetics," *Livestock Energetics and Thermal Environment Management*, January 1, 2009, 8.
[65] Ibid., 14.
[66] This is made worse by the fact that winter is the windiest time of the year on the northern plains, with the *average* wind speed registering at just under twelve miles per hour in mid-January, eleven miles per hour for the winter as a whole "Average Weather in Miles City," https://weatherspark.com/y/3582/Average-Weather-in-Miles-City-Montana-United-States-Year-Round, *Weather Spark*.
[67] W. Turrentine Jackson, "The Wyoming Stock Growers' Association: Its Years of Temporary Decline, 1886-1890," *Agricultural History* 22, no. 4 (1948): 260.

can very easily starve on a full stomach.[68] After summers of intense drought and heat—like that of 1886—this was a very real possibility.[69]

All of these factors came into stark relief during the Hard Winter. One of the best accounts comes to us from William Peter Ricketts, later a Wyoming state legislator and the commissioner for Campbell County (home of Gillette, the focus of chapter four). At the time, however, he was a young ranch-hand working at the Half-Circle L Ranch just a few miles outside of Miles City, along the northern rim of the Powder River Basin. There he spent the winter bunking with four other workers, the group nominally in charge of the livestock but unable to venture out except for the briefest of trips, eventually spending so much time ensconced that they claimed to have memorized the newspapers which lined the walls as ad hoc wallpaper. This wearisome lifestyle continued on until the last week of February, when a warm spell swept in and turned the accumulated snow to slush. Within a week the men were able to wander out and begin the arduous attempt to account for their cattle. Men in southern Wyoming and Colorado were still cautiously optimistic that their cattle had survived the winter, but newspapermen noted that the exception would probably be northern Wyoming and eastern Montana, where the weather had been particularly severe.[70] Unfortunately, Ricketts's experience confirms such fears. As he described the scene: "water poured from every gulch into Horse Creek until its water lapped the foothills on both sides of the valley. Dead cows were moving east in bunches…we felt we were living in a new world." The men went out riding only to find

[68] Anderson et. al. "Winter Management of the Beef Cow Herd," 1-5. Sherow, "Workings of the Geodialectic," 71.
[69] At a chemical level, the membranes of the photosystems become brittle and inelastic as temperatures drop. This causes the electron transfer chain to struggle and operate more slowly, its efficiency directly correlated to temperature. And as if this is not bad enough, during winter carbon dioxide is at its lowest point of the year, thereby further slowing the chemical process of photosynthesis. Oliver Morton, *Eating the Sun: How Plants Power the Planet* (New York: Harper Perennial, 2009), 299.
[70] Larson, *History of Wyoming*, 10.

"a yearling or two or big steer dead behind most any kind of a windbreak—say a cutbank, a fallen tree, brush or rock piles," no doubt looking for relief from the brutal cold. Worse, the few surviving animals "were mere shadows. Their bodies were thin and out of proportion to their monstrous horns and the big heavy bush on their tails." Ricketts estimated his own losses to be a staggering seventy-five percent.[71]

The numbers from that spring's roundup were hardly better. Statewide, the most accurate estimates place Wyoming's deficits at fifty percent, Montana's at seventy-five.[72] But it is important to remember that the Powder River Basin suffered worse than surrounding regions—this is the key rebuttal to those scholars who argue that the winter of 1886-1887 was not as deleterious as it has been made out to be.[73] Francis Emroy Warren, the Wyoming manager for the American Cattle Trust and later Wyoming's first governor, claimed that over half of the cattle in the Powder River region were lost. The Buffalo *Echo* reported one outfit rounding up fewer than 1,000 from a herd of 12,000.[74] In the wake of such destruction, many of the larger outfits—including the Frewen Brothers, the Bar C, the Dolores Land and Cattle Company, and the Swan Land and Cattle Company, the latter two among the largest operations in the territory—either left

[71] Ricketts, "The Winter of 1886," 2-6.
[72] "The Northwestern Range," *Big Horn Sentinel*, July 28, 1888. Although Terry Jordan estimated losses from 60-100%. Jordan, *North American Cattle-Ranching Frontiers,* 238.
[73] Governor Thomas Moonlight, writing in 1887, was already confident enough to claim that "This was the turning point in this history of Wyoming…the largest cattle companies are now closing up the business and giving place to the smaller holdings." Nevertheless, some historians claim that that winter's severity—and its corollary place in the historical imaginary—has been exaggerated, that popular media, in particular the prenominate Russell painting, has propagated a myth that had little in common with the empirical reality. Among the most vehement critics has been historian T.A. Larson, who claimed that in Wyoming, "the losses were probably not far above 15 percent," or less than half of the number lost on Montana. Moonlight, "Report of the Governor of Wyoming," 1887," 1:1027-1028; Larson, *History of Wyoming,* 191.
[74] Larson, *History of Wyoming*, 12–13.

the region or declared bankruptcy.[75] In other words, although the state as a whole may not have suffered disastrously, certain microenvironments did—and unfortunately for those in Johnson County, many of those environs were located right in the heart of the Powder River Basin.

The key point here is that whatever the quantitative specifics of the Hard Winter, it unequivocally marked a turning point in the energy history of the region, serving in many ways as a hinge that tipped the balance away from the Cattle-Bison System and toward the Range-Science Ranchers (described in the next section of this chapter). Prior to the winter of 1886-1887, the C.B.S. had dominated the Powder River Basin. Based, as it was, on large, unclaimed ranges, massive herds, and little immediate oversight, it favored large corporation-type ranches and absentee owners, many of whom were either European or of Eastern-seaboard nobility. This approach was propped up by concepts such as book count and mavericks (which will be detailed later in this chapter). In the wake of that winter, however, as many outfits suffered catastrophic losses, scores of investors decided to leave the plains, selling off their remaining herds in favor of alternative business opportunities. In doing so, they were unconsciously acknowledging the failures of the Cattle-Bison System, in the process helping to pave the way for the Range-Science Ranchers and the catastrophic events of the Johnson County War.

Range-Science Ranchers

Whatever historiographic disagreements there are concerning the Hard Winter, one thing seems clear: it did not destroy cattle ranching on the northern plains. Rather,

[75] Thelma Gatchell Condit, "The Hole-in-the-Wall, Part IV," *Annals of Wyoming*, 29 (April 1957), 65; "Alexander Swan" in David J. Wishart, ed., *Encyclopedia of the Great Plains* (Lincoln, NE: University of Nebraska Press, 2004), 54.

the devastation of the Hard Winter laid bare the defects inherent to the Cattle-Bison System. Both because of the cattle losses and the number of companies that went bankrupt or abandoned the region, the continued viability of the C.B.S. was put into doubt. Partly as a result of such changes, the C.B.S. now found itself vulnerable to a steady stream of Range-Science Ranchers. During the late-1880s and early-1890s this latter group took the form of small ranchers, families, and homesteaders, individuals and groups who not only ran cattle but who also raised a number of crops as well. Much has been made of the small size of these operations when compared to that of the C.B.S. (e.g., the class argument as outlined in the introduction to this chapter); far more important, however, was the way that these newcomers approached cattle and the ever-important question of thermodynamics. Rather than looking backward and trying to replicate the seasonal movements and land-use patterns of bison, they looked overseas for guidance, to universities, institutes of science, and the newfound field of range management. Much more than the devastation of the Hard Winter, it was this cognitive shift that augured the demise of the C.B.S. and that ultimately led to the violence of the Johnson County War. The key issue was not, as has so often been believed, class; the key issue was how to understand energy production and extraction on the northern plains grasslands.

There is unfortunately a dearth of archival sources concerning these small ranchers who flocked to the region in the late-1880s and early-1890s. Part of this no doubt has to do with the C.B.S. ranchers' near-monopolistic control of the press.[76] Part of it emerges from the simple mechanics of historical archives—the C.B.S. ranchers were for the most part wealthy and well-educated, containing Ivy Leaguers and overseas

[76] See the chapter's next section. Also see Ross. F. Collins, "Cattle Barons and Ink Stingers: How Cow Country Journalists Created a Great American Myth," *American Journalism* 24, no. 3, 7-29.

aristocrats; the small ranchers were none of those. But regardless of the particular reasons for this lack, there does exist data on the larger trends that shaped Johnson County and the Powder River Basin during this time. Between 1880 and 1890 the population of the county quadrupled, swelling from a mere 637 to 2,357. During that same period 213 new land patents were filed, 205 of which came between 1888-1890, with 189 (just under ninety percent) filed in the years 1889 and 1890 alone. The bulk of these claims—seventy-two percent—were filed under the Desert Land Act, a bill whose conditions and thermodynamic underpinnings profoundly shaped Johnson County's later development.[77] Originally passed in 1877, this piece of legislation, An Act to Provide for the Sale of Desert Land in Certain States and Territories, allowed individuals to initially acquire up to 640 acres (a section) of land for twenty-five cents an acre (with a dollar per acre paid upon receiving patent to said land). Under the bill's requirements, the claimants were obligated to irrigate and cultivate the land—which was, by definition, ground otherwise unsuitable for agriculture—within three years. In Johnson County, this meant that most claims were along the handful of creeks and tributaries of the Powder River—the three branches of Clear Creek (north, middle, and south), French Creek, Rock Creek, Piney Creek, Crazy Women Creek, and the three forks of the Powder River (north, middle, and south)—that dotted the region. It also meant cultivating crops, which would go on to play such an important role in the new thermodynamic system that supplanted the C.B.S. [78]

[77] Francis Henry Tanner. "The Disposal of the Public Domain in Johnson County, Wyoming, 1869-1890," (doctoral dissertation, University of Wyoming, 1967), 19-20, 91, 119.

[78] During the late-1870s and early-1880s, the Desert Land Act was the subject of much land fraud as wealthy ranchers used it to acquire great swaths of rangeland for little cost. However this does not seem to "have been the case in Johnson County, where Ijams, Hesse, and other C.B.S. ranchers used intimidation and sparse settlement to use federal range for free (Note that there were negligible land filings prior to the late-1880s). See Tanner, "The Disposal of the Public Domain in Johnson County."

In part, these small ranchers came to Johnson County and filed their claims thanks to the openings created by the Hard Winter. But their efforts were also aided by a presidency that favored the small yeomanry of Jefferson and de Crèvecœur over the wealthy, multi-county open-range commons of the C.B.S. Hearkening back to this small-farmer worldview, President Grover Cleveland had made it a mission upon taking office to uphold the integrity of the country's land laws. In order to prevent big-business fraud, he issued an August 1885 proclamation demanding that all fences on the public domain be removed. That same year, his State of the Union address outlined a number of amendments to the Desert Land Act and other land-based bills that were designed to make them less liable to abuse by large, powerful ranchers and more amenable to small settlers looking to work the land.[79] According to the U.S. Land Office, "millions of acres are…inclosed and are now being so inclosed to the exclusion of the stock of all others than the fence owners, and to the prevention of settlements and the obstruction of public travel and intercourse."[80] In the Powder River Basin, this conflict became particularly heated. After John Tisdale, Fred Hesse, and a number of the large cattle outfits—the Peters and Alston outfit, the 76 ranch, the Bar C, the Bar X, FU, and WP, among others—refused to take down their own public range fences, Cleveland approved the deployment of a cavalry troop in Cheyenne in order "to aid the civil authorities in enforcing the proclamation of the president forbidding the fencing of the public domain

[79] Public Lands. Unlawful Inclosures or Occupancy; Obstructing Settlement or Transit, U.S.C. 1061, Title 43 (1885). 17; "Proclamation No. 271—Ordering the Immediate Removal of Any and Every Unlawful Enclosure of Public Land," August 7, 1885, The American Presidency Project, http://www.presidency.ucsb.edu/ws/?pid=71889; See Cleveland's 1886 State of the Union Address. http://www.let.rug.nl/usa/presidents/grover-cleveland/state-of-the-union-1886.php.

[80] Cited in Lyn Ellen Bennett and Scott Abbott, *The Perfect Fence: Untangling the Meanings of Barbed Wire* (College Station: Texas A&M University Press, 2017), 13.

and directing the removal of such unlawful fencing."[81] Not willing to be bullied by the federal government, the C.B.S. ranchers responded with equanimity, claiming it was their right to erect such barriers and that they "do not care a brass farthing whether one troop or one hundred troops are sent to Wyoming for that purpose."[82] Put another way, they were willing to do whatever it took to protect the continued viability of the C.B.S., even if that meant defying the whims of distant Washington.

Beyond such destructive efforts, however, Cleveland's executive mandates also proved critical for the new crop of small ranchers. For the bulk of the 1880s, the nearest land office for Johnson County settlers was nearly three hundred miles to the south, in Cheyenne, the capital of Wyoming and a town at the time essentially controlled by the C.B.S. ranchers. (It was here that their headquarters, the Cheyenne Club, was located. It was also the site from which they launched the Johnson County invasion.) On May 1, 1888, however, one year after the terror of the Hard Winter, a new land office opened its doors in Wyoming, this time in Buffalo, the informal home of the small ranchers and the later target of the Johnson County Invasion. It was here that the bulk of the small ranchers' claims would be filed with increasing frequency. And although there is no evidence that the C.B.S. ranchers physically obstructed small ranchers from filing their claims in Cheyenne or anywhere else, the subsequent evidence is unmistakable: with a land office that was both more inviting and geographically convenient, the number of claims skyrocketed.

The location of many of these patents—for the most part located in the northern part of the county, along Piney, Rock, French, and Clear Creeks—reveals a unique

[81] Oscar H. "Jack" Flagg, *A Review of the Cattle Business in Johnson County, Wyoming, Since 1882, and the Causes That Led to the Recent Invasion* (The Vic Press, 1967), 10, 12, 37.
[82] "The Fences Must Go," *Big Horn Sentinel,* May 28, 1887.

feature of the Range-Science Ranchers' approach to energy and the landscape, one distinct from that of the C.B.S. ranchers.[83] Unlike the latter, who focused on the Powder River Basin as a macroscale biome, the small ranchers identified and homed in on thermodynamically superior microclimates, seeking out those niches that were most energetically advantageous. For in a region as fragile as Johnson County—receiving fewer than ten inches of precipitation per year—these microclimates were critical, particularly for animals as seasonally vulnerable as cattle, who as we now know, were less adept than bison for the cold weather of the northern plains. A 1975 survey of the county gives an idea of just how diverse this visually monochromatic region was and remains: the report's authors listed 109 different types of soil—not counting subtypes—ranging widely in terms of fertility, moisture, and erosion.[84] Given this variety and the region's well-known aridity, even late-nineteenth century scientists claimed that "the climate [of Johnson County] is peculiar, differing greatly within a few miles."[85] It was this attention to ecological detail—both a knowledge of and familiarity with the landscape—that set the Range-Science Ranchers apart from the C.B.S. Just as the Crow had leveraged certain ecological niches to support their own horse herds, so too did the Range-Science Ranchers ferret out those same sites for cattle.

But of course the size of the herds and the mixed nature of their land tenure was not the only thing that was changing during this period. As increasing numbers of settlers filed land claims along the creeks and rivers of Johnson County during the late-1880s,

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[83] Tanner, "The Disposal of the Public Domain in Johnson County," 24.
[84] U.S. Department of Agriculture, Soil Conservation Service in Cooperation with Wyoming Agricultural Experiment Station, *Soil Survey of Johnson County, Wyoming, Southern Part* (Laramie, Wyoming, 1975).
[85] University of Wyoming Agricultural Experiment Station (1893). "Bulletin No. 13 - The Feeding and Management of Cattle." *University of Wyoming Agricultural Experiment Station Bulletin* 13, 33. Note too that it is an inattention to such microenvironments that has led to the Hard Winter being summarily dismissed.

perceptions of ranching also underwent a fundamental transformation. Coinciding precisely with this uptick was the passage of one of the more important but often overlooked pieces of legislation in the settlement of the American West: the Hatch Act. Ratified in 1887, this bill created a nationwide program of agricultural experiment stations to "aid in acquiring and diffusing among the people of the United States useful and practical information...under the direction of the college or colleges of agricultural department of colleges…[in order to] conduct original researches or verify experiments." In order to facilitate such a program, the act authorized $15,000 annually to each state to carry out research.[86] The goal was to increase the scientific understanding of crop and range management, thereby improving both efficiency and predictive knowledge, both of which had been patently lacking in the past (and whose absence defined the C.B.S.). The result was a university-educated cohort of centrally organized agricultural scientists whose job it was to improve the proficiency and gross output of the country's farming and ranching operations. On the national level, this group would usher in a new way of approaching and imagining the land; more locally, it would push out the Powder River's C.B.S., ultimately leading to the violence of the Johnson County War.

As a nation-wide program of agricultural study, the Hatch Act affected everywhere from California to Connecticut, but the local conditions in Wyoming were particularly telling.[87] Based out of the University in Laramie (the Powder River Basin was also serviced by a smaller, local experiment station in Sheridan), the Wyoming Agricultural Experiment Station published forty-five bulletins during its first decade of existence, covering everything from insecticides to potatoes to the vagaries of plant lice.

[86] Lou Ferleger, "Uplifting American Agriculture: Experiment Station Scientists and the Office of Experiment Stations in the Early Years after the Hatch Act," *Agricultural History* 64, no. 2 (1990): 6.
[87] Cheyenne *Daily Sun* announced the passage of the Hatch Act on October 20, 1887.

Most tellingly, however, the station expanded beyond the typical fare of parochial agricultural tracts to encompass the inchoate field of range science. Emerging in the late-1880s and 1890s, range science was, in the words of one historian, "an American Creation, and it was the product of the dominant movement in turn of the century America. That society placed a high value on the ability to predict, and it extended that value into all realms of life, including ranching."[88] As perhaps the premier cattle-producing state in the nation, Wyoming was at the forefront of the range science embrace: the Agricultural Experiment Station published bulletins on irrigation, stock feeding, grasses and forage plants, stock breeds, the use of alfalfa as a hay crop, hay digestion experiments, and more. And while all of these were no doubt important to the thermodynamic shifts that were beginning to affect the range, the most critical was also one of the longest, a seventy-page report released just one year after the events of the Johnson County War. Entitled "The Feeding and Management of Cattle," the Wyoming Agricultural Experiment Station's thirteenth bulletin represented a fundamental shift in how cattle were conceptualized. No longer were they seen as modern, pliable versions of bison; instead they became genetically unique compounds of cells and meat, living entities with their own biological strengths and weaknesses. In lieu of allowing the animals to forage for themselves out on the open range, there was an explicit focus on science as a tool that could "convert…coarse feed into beef and dairy product." In doing so, the report became a sort of manifesto for the Range-Science Ranchers: "there was a time when farmers thought that science, and even agricultural science, could bring little that would be helpful to them, but happily that day is past, and I approach the scientific

[88] Maarten Heyboer, "Grass-Counters, Stock-Feeders, and the Dual Orientation of Applied Science: The History of Range Science, 1895-1960," (Ph.D. dissertation, Virginia Polytechnic Institute and State University, 1992), 55.

side of the subject of feeding with no fear whatever that it will prove uninteresting to my readers, but rather that a large majority will gladly avail themselves of any opportunity which may offer for a better understanding of the great problem of stock feeding." The remainder of the text goes into great detail on the best breeds, nutrition, and seasonal protection for the region's cattle. It reprints detailed feeding tables from German agricultural scientists listing grasses by percentage composition of water, protein, fiber, carbohydrates, and ether extract (see Figure 7).[89] It expounds upon the best methods of irrigation, how to plant forage-crops and when to cut them.[90] In short, it lays out a scientific method for transforming the Powder River Basin from a region built upon hope and myth to one constructed upon the calculated production of high-quality energy.

[89] University of Wyoming Agricultural Experiment Station, "Bulletin No. 13," 41-43, 48-52.
[90] Also see Margaret W. Rossiter, *The Emergence of Agricultural Science: Justus von Liebig and the Americans, 1840–1880* (New Haven, Conn.: Yale University Press, 1975); *The legacy : a centennial history of the state agricultural experiment stations, 1887-1987*

TABLE II.—*Feeding standards.* (*According to Wolff.*)

[Per day and per 1,000 pounds, live weight.]

Animals, etc.	Total organic substance.	Nutritive (digestible) substances.			Total nutritive substances.	Nutritive ratio.
		Crude protein	Carbohydrates.	Ether extract.		
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	
1. Oxen in rest in stall	17.5	0.7	8.0	0.15	8.85	1 : 12.0
2. Wool sheep, coarser breeds	20.0	1.2	10.3	0.20	11.70	1 : 9.0
Wool sheep, finer breeds	22.5	1.5	11.4	0.25	13.15	1 : 8.0
3. Oxen moderately worked	24.0	1.6	11 3	0.30	13.20	1 : 7.5
Oxen heavily worked	26 0	2.4	13.2	0.50	16.10	1 : 6.0
4. Horses moderately worked	21.0	1.6	10.0	0.50	12.10	1 : 7.0
Horses heavily worked	23.0	2.5	12.1	0.70	15.30	1 : 5.5
5. Milch cows	24.0	2.5	12 5	0.40	15.40	1 : 5.4
6. Fattening oxen, 1st period	27.0	2.5	15.0	0.50	18 00	1 : 6.5
Fattening oxen, 2d period	26.0	3.0	14.8	0.70	18.50	1 : 5.5
Fattening oxen, 3d period	25.0	2.7	14.8	0.60	18.10	1 : 6.0
7. Fattening sheep, 1st period	26.0	3.0	15.2	0.50	18.70	1 : 5.5
Fattening sheep, 2d period	25.0	3.5	14.4	0.60	18.50	1 : 4.5
8. Fattening swine, 1st period	36.0	5.0	27.5		32.50	1 : 5.5
Fattening swine, 2d period	31.0	4.0	24.0		28.00	1 : 6.0
Fattening swine, 3d period	23.5	2.7	17.5		20.20	1 : 6.5
9. Growing cattle:						
Age, months. — *Average live weight, per head.*						
2—3 — 165 lbs.	22.0	4.0	13.8	2.0	19.8	1 : 4.7
3—6 — 330 lbs.	23.4	3.2	13.5	1.0	17.7	1 : 5.0
6—12 — 550 lbs.	24.0	2.5	13.5	0.6	16.6	1 : 6.0
12—18 — 770 lbs.	24.0	2.0	13.0	0.4	15.4	1 : 7.0
18—24 — 940 lbs.	24.0	1.6	12.0	0.3	13.9	1 : 8.0
10. Growing sheep:						
5—6 — 62 lbs.	28.0	3.2	15.6	0.8	19.6	1 : 5.5
6—8 — 73 lbs.	25.0	2.7	13.3	0.6	16.6	1 : 5.5
8—11 — 84 lbs.	23.0	2.1	11.4	0.5	14.0	1 : 6.0
11—15 — 90 lbs.	22.5	1.7	10.9	0.4	13.0	1 : 7.0
15—20 — 95 lbs.	22.0	1.4	10.4	0.3	12.1	1 : 8.0
11. Growing fat pigs:						
2—3 — 55 lbs.	42.0	7.5	30.0		37.5	1 : 4.0
3—5 — 110 lbs.	34.0	5.0	25.0		30.0	1 : 5.0
5—6 — 137 lbs.	31.5	4.3	23.7		28.0	1 : 5.0
6—8 — 187 lbs.	27.0	3.4	20.4		23.8	1 : 6.0
8—12 — 275 lbs.	21.0	2.5	16.2		18.7	1 : 6.5

Figure 7: Nutritional Table for Livestock
University of Wyoming Agricultural Experiment Station (1893). "Bulletin No. 13 - The Feeding and Management of Cattle." *University of Wyoming Agricultural Experiment Station Bulletin,* 55.

Out on the hills and riparian sections of the plains, the small ranchers did their best to translate all of this scientific information into concrete Johnson County results. Most notably, they took to harvesting hay and sheltering animals during the winter, thereby eliminating one of the main deficits of the C.B.S. By 1892—the year of the Johnson County War—the Powder River basin sported ample crops of celery, cabbage, corn, wheat, oats, barley, rye, flax, potatoes, sugar beets, turnips, rutabagas, lettuce, peas,

carrots, alfalfa, millet, buckwheat, and onions.[91] But in terms of the larger thermodynamic landscape, the most important crop was undoubtedly hay, a catchall term that in Johnson County typically meant alfalfa, one of the oldest forage crops still used. Archaeological records show its use dating back 6,000 years in what is now Iran. Pliny wrote about it, and his Roman contemporaries noted that "all emaciated cattle whatsoever grow fat with it." But as a forage crop it faded during the Middle Ages, and by the time of the Reformation there was little mention of the once ubiquitous fodder. It would later reemerge in Spanish America and the United States South, but it "was in the dry, calcareous soils of the West that alfalfa first showed its true promise in the U.S." This was due not merely to the region's aridity but to the high pH of the soil—which was typically alkaline—and the weather.[92] As one writer observed, "the long hours of daylight [in Wyoming and Montana] during the short summer are conducive to rapid growth and maturation." As a result, "on some irrigated lands as many as four alfalfa cuttings are possible from the same field."[93] Thermodynamically, this meant the potential for a great deal of energy relocation across seasons; it meant the ability to rationally produce energy instead of merely hoping for bounty.

From a historical standpoint, the precise date of alfalfa's introduction to the northern plains is unclear. Like so many other people and products, it seemed to follow the gold rush around the West, transported in the packs and carts of overland migrants, and for that reason it is not surprising that it was introduced to Montana's western landscape around 1880, following cattle drives and the strikes at Helena, Virginia City,

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[91] *Bill Barlow's Budget*, February 10, 1892.
[92] The etymology of the word even points back to the Arabic *al-fasfasa*, which literally means "horse power." Michael P. Russelle, "Alfalfa: After an 8,000-year journey, the "Queen of Forages" stands poised to enjoy renewed popularity," *American Scientist* 89, no. 3 (2001), 252-258.
[93] Bajza, "Powder River Basin," 250.

and Butte. Nevertheless, it does not appear to have made its way east to the Powder River Basin until the end of the decade, in the wake of the Hard Winter, when there were a handful of inchoate moves toward winter feed and hedging against the unpredictable seasonality of the state. In December 1885, for instance, one year before the devastation of the Hard Winter, an article on plains cattle ranching in *Harper's* openly questioned the long-term sustainability of the Cattle-Bison System. Writing about Wyoming in particular, the author opined "that the industry of feeding steers hay during the winters will rapidly increase is inevitable, and many men of small means, or who are conscientiously opposed to freezing and starving cattle to death, will engage in it, providing that the cattle-growing associations do not seize all the water rights and all the meadows."[94] Two years later, Governor Thomas Moonlight, an old Civil War colonel and an active member in the Indian Wars of the 1860s and 1870s, noted a slight shift in ranch behavior when he observed that "until lately but little effort was made even to put up hay on a large scale for winter feed."[95] Even in the midst of the Hard Winter, before all the damage was known, papers were commenting on the wastefulness of winter losses. The *Denver Tribune-Republican* opined that "the remedy for this is so plain and so easily made use of that the cattle men of western Colorado deserve very little sympathy. The soil…is exceedingly well adapted to the growth of alfalfa. Experience has taught that alfalfa is most excellent feed for cattle and yet there has been nothing like enough of it grown in the valley named to supply all the cattle off western Colorado with feed during the approaching winter…His percentage of loss would then be very small, and in spring

[94] Frank Wilkeson, "Cattle-Raising on the Plains," *Harper's New Monthly Magazine* (New York), December 1, 1885: 794.
[95] Thomas Moonlight, *Report of the Governor of Wyoming to the Secretary of the Interior 1887,* (Washington: Government Printing Office, 1887): 16.

his cattle would be in prime condition." With lucid premonition, the writer added, "this winter will probably impress this truth upon the cattlemen so forcibly that they will never forget it."[96]

Certainly those who endured in the wake of the Hard Winter began to make many of the necessary transformations. And yet, while the rate of change certainly accelerated in the wake of the Hard Winter, there is ample evidence that such transformations were already under way before that devastation. Just one month after the Denver article, Buffalo's own paper published a piece entitled, "Our Hay Industry," in which they laid out the county's developing practice of growing and curing grasses, putting a particular focus on alfalfa. In their estimation, it would only take three years to develop an adequate stand of the crop, and once established each acre could yield six tons per cutting, an observation more or less confirmed a few years later, when the *Big Horn Sentinel* estimated the per-acre yield at four-to-six tons. The article concluded by observing that "Hay is without doubt the most profitable crop that is raised in Johnson County."[97] Similarly, a spring 1887 issue of the *Northwestern Live Stock Journal* detailed a new cattle company for the region, noting that they passed through town with twelve-thousand pounds of grass seed, much of which was alfalfa.[98] Although brief and for the most part arrhythmic, such reports reveal that in the lead-up to and wake of the Hard Winter, there was already ample talk and action when it came to shifting away from the Cattle-Bison System. What was missing, however, was a scientific program for disseminating the sort of detailed, place-based information that could lead to large-scale change.

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[96] "Cattle Raising in the Future," *Big Horn Sentinel,* December 11,1886, 1.
[97] "Our Hay Industry," *Buffalo Echo,* January 7, 1887, 4; "Oak, Wheat, Barley, Rye, and Potatoes," *Big Horn Sentinel,* May 5, 1889, 1.
[98] *Northwestern Live Stock Journal,* March 18, 1887. Cited in Osgood, *Day of the Cattleman*, 227.

In the wake of the Hard Winter's devastations, such information began to arrive. The local *Big Horn Sentinel* published a series of articles on irrigation and alfalfa, claiming that "the results obtained under irrigation are almost beyond belief."[99] They described the best habits for cutting and preserving alfalfa and reported that the State Agricultural College of Colorado (keep in mind that the connections between Wyoming and Colorado at this time were substantial: the state would figure importantly in the Johnson County War) had just published a pamphlet on the growth and nutrition of alfalfa.[100] But instead of simply summarizing the information the *Sentinel* reproduced the pamphlet in its entirety, making that information available to the settlers of Johnson County and enabling them to enact the proposed changes. Among the most telling points was the contention that "no other clover, grass, or forage plant compares with it, or contains a greater per cent of protein substances."[101] In other words, alfalfa not only made energy available during the winter months, it made *higher quality* energy available. Because cattle were unable to make as efficient use of the region's grasses as bison, such a thermodynamic shift was critical for exploiting the region as a cattle empire. It would lead to the downfall of the C.B.S.

Of course ranchers could have simply harvested the plains' extant grasses—during most years there was certainly no shortage of them. But as the Hatch Act revealed, there were scientific reasons for harvesting their own crops, in particular alfalfa. As the Wyoming Agricultural Experiment Station explained, the native grasses "run out if cut

[99] "What Irrigation Does," *Big Horn Sentinel,* August 10, 1889.
[100] "Early Mowing," *Big Horn Sentinel,* August 4, 1888.
[101] "Alfalfa: The Coming Hay Crop of the Northwest," *Big Horn Sentinel,* August 10, 1889, 3.

year after year without allowing it to reseed."[102] Furthermore, as alfalfa's long and storied history indicates, there were distinctive advantages to the crop. In addition to providing simple forage, haying alfalfa and other forage crops presents animals with more energy than the "naturally cured" grasses that are dormant on the plains. This is because, as described in an earlier section, grasses contain their greatest nutrients during the spring, just prior to reaching full bloom. By haying at this point, ranchers were able to preserve the maximum energy from the land, thereby providing their cattle with that energy in winter.[103] Once again, here we can see an increase in scientific and place-based knowledge leading to a deeper understanding of the region's thermodynamic landscape and how to best exploit it. We can see the stage being set for the ultimate conflict with the C.B.S.

In doing so, the Range-Science Ranchers became more in tune with their animals and their needs, obviating many of the setbacks of the C.B.S. As one rancher described this more scientific method of winter care, "about once a day, hay [was] hauled from the stack a little distance, and scattered so the cattle [could] feed." If he found that the cattle were too thin or sick, he would give them extra feed, in particular looking out for the vulnerable, pregnant two-year old heifers.[104] During the summer that focus shifted to bulls, who were given extra food to increase virility in the lead-up to breeding season. As this was being done, ranchers would work their way through the breeding herd, "culling

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[102] University of Wyoming Agricultural Experiment Station (1893). "Bulletin No. 16 - Grasses and Forage Plants." *University of Wyoming Agricultural Experiment Station Bulletin* 16, 238.
[103] B.C. Buffum, "Alfalfa as a Hay Crop," *Bulletin No. 43* (Wyoming Experiment Station: Laramie, 1900), 59. As Wyoming's agricultural scientists put it, alfalfa "will pasture more cattle per acre than the native grasses, and stock will fatten quicker upon alfalfa hay than upon any other." University of Wyoming Agricultural Experiment Station, "Bulletin No. 16," 233-234.
[104] This same rancher estimated that in the Powder River you needed 1 1/3 tons of hay per cow, though once again he qualified this, stating that the amount varied by "the location of the ranch with reference to topographical conditions." "History of Grazing," WPA Collections, File 1386, 11-12.

out" those cows that had not produced desirable calves in the past. In July the bulls were released into the herd according to scientific theory: the established number was four percent for the bull's demographic (with the remaining animals often castrated). The goal was to use the latest range science knowledge to produce both the greatest calf yield—thereby increasing monetized energy—and the specimens most suited to the northern plains environment. By being physically present with the animals on a daily basis year-round—by breaking the bison-based seasonal round that defined the C.B.S.—and by noting the peculiarities of place and nutrition, these ranchers could alter feed according to need. Whereas under the open range system breeding had been a haphazard and natural affair, for many of the small ranchers it became systematized, closely aligned with the latest scientific findings.[105] Gone were the days of the cattle-cum-bison on the open range, fending for themselves, open to the environment, the weather, and simple chance; in its place was the well-ordered world of science-based rational management. Instead of harvesting cattle, the new settlers carefully produced them.

The Mavericks

In the spring of 1889, the Big Horn *Sentinel* detailed a number of competing energy events in the Powder River Basin: there were the oil strikes to the south in Salt Creek (early explorations that will be detailed in chapter three), voluminous lists of recent Desert Land Act filings (most of them in hometown Buffalo), and a series of reward announcements aimed at capturing cattle butchers and thieves who were said to be terrorizing the region.[106] From the viewpoint of energy history, all three of these are

[105] Buffum, 24-26.
[106] Big Horn *Sentinel,* May 4, 1889

portentous; but from the perspective of the Johnson County War, it is the latter that is the most interesting. For three straight months—extending from the spring on into the early summer—the paper ran a prominent advertisement, sponsored and signed by eleven of the region's biggest cattle outfits. In its entirety, it read:

> $1,500 reward: We the undersigned agree to pay the sum of $1,500 for the conviction of each and every person caught stealing, unlawfully killing, defacing or altering the brands of cattle or horses, belonging to any or all of us anywhere. Also for the unlawful branding of mavericks on our respective ranges.[107]

It was a terse but powerful statement, one that could not have helped but make an impression on the region's inhabitants. But by the late-1880s, such a notice was far from atypical. In the wake of the Hard Winter, and with the notion of book count now thoroughly debunked, proponents of the C.B.S. looked for a new tool to prop up their worldview. They found it in mavericks.

Like book count, the maverick system is one of those odd quirks of western history. In basic terms, it meant any animal whose brand could either not be identified or who lacked one entirely. The bulk of these unmarked animals entered the roundup alongside their mothers, to whom they were still, in a bio-parental sense, attached. In such cases—which, it should be emphasized, encompassed the vast majority of the set—the calf was branded with the same mark as the mother. But every so often a calf would wander into a roundup without a linking cow. This might happen if the cow (mother) had died or if somehow, due to heavy snow or some unknown tragedy, the calf had been separated during the winter. In these cases the animal was deemed a maverick, a cow whose owner was unknown.[108]

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[107] Big Horn *Sentinel,* July 13, 1889.
[108] Drago, *The Great Range Wars*, 248.

These circumstances tended to come about innocently, without the perpetrator realizing that he was committing any wrongdoing. But it could also be carried out with a more sinister motive. This was the heavily publicized issue of rustling, the ostensibly omnipresent but rarely witnessed crime that would come to figure so centrally in the Johnson County War. In short, *to rustle* was to knowingly purloin and brand unmarked calves—to steal them from their rightful owners. This is the (supposed) crime that Michael Kovach, in the opening vignette of this chapter from *Heaven's Gate,* was lynched for, and it was perhaps *the* defining crime of the Powder River Basin during the late-nineteenth century.[109] But it was also a crime that was notoriously difficult to prosecute. In terms of deniability, accused rustlers could—and often did—deny that they *knowingly* perpetrated any wrongdoing.[110] After all, the range was by definition open, without any concrete boundaries save for the odd extralegal fence, and it was therefore nigh impossible to prove that any such animal had been taken with the express intent of theft. Cattle often naturally drifted into other ranges and herds, and over time even the most limpid brands tended to blur, temporally smothered by hair and the animal's natural growth.[111] In the context of the ailing C.B.S., such ambiguity, especially when it came to mavericks and the free energy that they represented, was bound to cause problems.

But what was odd was that every year the number of captured mavericks remained inordinately low.[112] In 1886, for instance, in the spring before the destruction of

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[109] Mavericks emerge as the key point of conflict in nearly all of the Johnson County War histories.
[110] Davis, *Wyoming Range War,* 128.
[111] In the words of one author, "Even the killing and butchering of such a cow might have little significance if the neighbor could show a plausible reason why he believed the cow was his." Davis, *Wyoming Range War*, 28.
[112] This should also have been a sign of the C.B.S.'s pre-Hard Winter problems. As they *Wyoming Derrick* put it just a few weeks before the Johnson County War, "the raising of cattle on the open range never has been a paying business in Wyoming. Certainly it is not now and could not be made so if there was not a theft in 20 years." "The Condition of the Cattle Business," *Wyoming Derrick,* March 10, 1892.

the Hard Winter, there were just 3,446 recorded mavericks out of 171,150 cattle—roughly two percent.[113] To understand why such a minority of animals became so important we need to look at the issue through the lens of thermodynamics and the ailing C.B.S. Mavericks were by definition amorphous and slippery entities. They belonged to no one and everyone. But from a thermodynamic standpoint it was different: they represented pockets of free energy.[114] They were unaccounted for, not logged among the ledgers and receipts that tabulated beef and shipped animals. And so as the C.B.S. began to collapse in the wake of the Hard Winter and the small ranchers poured in, mavericks emerged as convenient caches of unaccounted-for energy, more or less usurping the role that book count had earlier filled. Consequently, when the spring roundup came and ranchers regularly recorded smaller numbers than they had expected, the ever-nebulous maverick became an easy elucidator, a theoretical construct that preserved the viability of the C.B.S. by shifting blame onto small ranchers, claiming that they were stealing the large ranchers' cattle (energy).

For the purpose of the C.B.S., it did not matter that the number of mavericks annually sold was far below the annual losses. Inherent to their view was the belief that for every captured and known maverick thousands of others went unaccounted for, stolen by any of the number of presumed rustlers who populated the region. And the evidence suggests that the members of the Wyoming Stock Growers Association—the powerful political organization made up of the C.B.S. ranchers (hereafter referred to as the W.S.G.A.)—legitimately believed this; it was not some sort of ruse or public relations ploy. Such attitudes can best be seen in the passage of the Maverick Law of 1884 and its

[113] Larson, *History of Wyoming,* 185.
[114] Cattle were transformations of energy (sun to grass to meat). Mavericks were, in essence, free energy.

subsequent modifications, pieces of legislation that attempted to close off this thermodynamic theft, (re)capturing the mavericks' free energy and funneling it back into the proper owners' respective herds.

None of this was new. For as long as anyone could remember, mavericks had been a natural part of the cattle-driving process in Wyoming. In 1884, however, the W.S.G.A. was able to push one of its more potent pieces of legislation through the territorial government: the Maverick Bill. The law was passed thanks to the effort of Joseph Carey, the president of the W.S.G.A., owner of the vaunted C.Y. Ranch, and later one of the state's first senators, who leveraged the association's burgeoning strength to officially take control of the range. The resultant bill granted all responsibility for organizing and conducting the annual spring roundups to the W.S.G.A. During these gatherings, each maverick would, by law, become the official property of the association, who then branded the animals as such, marking them with the W.S.G.A.'s ubiquitous "M." Every ten days or so, they would hold an auction in which the mavericks were individually sold to the highest bidder. Once again, the total number was never large—the W.S.G.A. listed 1,971 mavericks for 1884, 3,446 for 1886—but the represented calories and funds were not insubstantial.[115] The accrued cash—some $30,000 in 1886, the spring before the Hard Winter—would go into the W.S.G.A.'s coffers, funding the range detectives and stock inspectors who served to protect the integrity of the C.B.S.[116]

In the wake of the Hard Winter, a number of changes were made to increase the Maverick Bill's impact. The most important alteration came in January 1888, when Wyoming officially became a state, and the body's tenth legislative assembly passed an

[115] Davis, *Wyoming Range War*, 47–48.
[116] Drago, *The Great Range Wars*, 249–50; Jackson, "The Wyoming Stock Growers' Association Political Power in Wyoming Territory, 1873-1890," 550.

amendment that vested control of the cattle industry in the state government by creating a territorial board of livestock commissioners. This was a sly maneuver by the C.B.S. ranchers: publicly, it came across as the W.S.G.A. relinquishing much of its erstwhile might. But as historian W. Turrentine Jackson has observed, far from divesting the W.S.G.A. of power, the creation of such a board was "the greatest achievement of the association in this legislative session and revealed that the stock growers continued to exert some political influence."[117] In essence, the bill put forth the notion of presumptive ownership, which stated that in any given range, the owner of the largest herd became the effective owner of *all* of the mavericks in that range.[118] Worse, the commission was virtually unchecked in its power to enforce its laws. As Governor Moonlight, over whose veto the bill was passed, complained, "the commissioners are beyond the power of removal for none is provided; are absolutely free to do as they please. They draw no salary, give no bonds, acknowledge no responsibility and are subject to no authority. They may ride roughshod over the rights of others and there is no remedy save in the courts. They can appoint an unlimited number of subordinates and pay them out of the maverick fund."[119]As such, instead of abdicating power, the creation of the livestock commission can be seen as the latest effort to bolster the ailing C.B.S.

The reaction of the small-herd owners supports this view. As Jack Flagg described it, the large-outfit owners, "many of them not owning [that is, legally] a foot of land," claimed the public domain and all the animals that were found upon it for themselves. They would tell homesteaders and small-outfit owners that "we have defined

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[117] Jackson, "The Wyoming Stock Growers' Association Political Power in Wyoming Territory, 1873-1890," 591.
[118] Davis, *Wyoming Range War,* 48-49.
[119] Cited in Helena Huntington Smith, *The War on Powder River* (Lincoln: University of Nebraska Press, 1967), 83.

our boundary lines, every maverick within the limits of those lines is ours, if you have cattle, keep them in your private field, the public domain is ours, if your animal by chance gets out of your field unbranded, we will neither allow you to buy it; when, according to our law, it is put up for sale." As such, there were public auctions in which the winner was denied the cattle that he had won, ostensibly because he was opting to pay with check instead of cash; in reality, however, the cattle were then resold to men like Fred Hesse and other prominent members of both the W.S.G.A. and, as we shall see, the Johnson County War. As Flagg contended, "it was a preconcerted plan" to sell the cattle to Hesse. In other words, after the Hard Winter, even in spite of changes to the Maverick Law, the biggest thermodynamic changes were extralegal: the "free energy" represented by ownerless cattle was pre-claimed by the W.S.G.A.'s members, thereby (temporarily) upholding the integrity of the C.B.S.[120]

At best, this was a stopgap measure. By the spring of 1890, as the W.S.G.A. was declining in power and many of its C.B.S. members came to believe that the local courts were too biased to convict rustlers, they began to take a more radical route. Bypassing the legal path, the W.S.G.A. began printing advertisements such as the one that opened this chapter's section.[121] It was a desperate maneuver, one that, in the long term, led to the eventual downfall of the C.B.S. But the more immediate effect was an uptick in violence. As 1890 heaved into view, the C.B.S. and its proponents were under increasing threat. They had tried to prop up their worldview via clever creations of energy, first through the concept of book count, then through mavericks. But when this latter too proved faulty—i.e., when the number of communally gathered mavericks turned out to be far below the

[120] Flagg, *A Review of the Cattle Business in Johnson County, Wyoming, Since 1882, and the Causes That Led to the Recent Invasion*, 25, 29.
[121] Big Horn *Sentinel,* July 13, 1889.

quantity of lost energy (cattle)—the C.B.S. ranchers were faced with two options: they could abandon their longheld worldview, accepting something more limiting and democratic, or they could continue to fight it, ramping up their efforts to bolster the ailing C.B.S. It was the decision to pursue the latter that would lead directly to the violence of 1892.

The Johnson County War

For over a hundred years historians, journalists, novelists, and filmmakers have been telling and retelling the story of the Johnson County War, presenting it as the archetypal conflict of the open range.[122] The events are well known and little disputed, having long since entered into the cannon of western lore. As such, there is little to be gained by recounting them here. Far more valuable is elucidating a handful of key events from those fateful days, ones that—even amidst the bloodshed and political strife—shed light on the Powder River Basin's shifting thermodynamic landscape. For it is only through such events that we can understand how the Johnson County War was not merely a class-based conflict, but both epitomized and served as a crisis that brought to a head the thermodynamic conflicts that had been brewing for the previous decade.

One of the most notable anomalies was the concerted effort that the invaders made to recruit out-of-state mercenaries. Not content to use their own substantial

[122] For a small sampling, see Daniel Belgrad, "'Power's Larger Meaning': The Johnson County War as Political Violence in an Environmental Context," *The Western Historical Quarterly* 33, no. 2 (2002): 159–77, https://doi.org/10.2307/4144801; Lewis L. Gould, "A. S. Mercer and the Johnson County War: A Reappraisal," *Arizona and the West* 7, no. 1 (1965): 5–20; John W. Davis, *Wyoming Range War: The Infamous Invasion of Johnson County*, Reprint edition (Norman: University of Oklahoma Press, 2012); Helena Huntington Smith, *The War on Powder River* (Lincoln: University of Nebraska Press, 1967); Harry Sinclair Drago, *The Great Range Wars : Violence on the Grasslands* (Lincoln : University of Nebraska Press, 1985), http://archive.org/details/greatrangewarsvi00drag_0; Richard White, *"It's Your Misfortune and None of My Own": A New History of the American West* (Norman; London: University of Oklahoma Press, 1991).

manpower, the C.B.S. launched a number of mustering trips during the winter of 1891-1892. The first was undertaken by one of Wyoming's earliest ranchers, Van Rensselaer Schuyler ("R.S.") Van Tassel, for whom the tiny town of Van Tassell was later named. That winter, he traveled south to Colorado, where he not only purchased horses, wagons, and other supplies for the expedition, but also attempted to recruit gunmen. At this he was notably unsuccessful, failing to bring in a single recruit.[123] The same was true for Harold Ijams, who went to Idaho with similar goals.[124] But there was one trip that was an unequivocal success: longtime W.S.G.A. detective Tom Smith (who had a salary that was paid for by the sale of mavericks) was sent all the way down to his home state of Texas, where he managed to convince twenty-one men from little Lamar County, just south of the Oklahoma border, to come north, promising them five dollars per day and all expenses paid (they were to be provided with a horse, saddle, bridle, gun, ammunition, bedding, train fare, and food), plus an extra fifty dollars for each man killed. Many of the recruits were former Texas Rangers and U.S. Marshals, men like George Tucker, who justified his vigilantism by saying that it "was just to our liking. Nobody liked a cattle or horse thief."[125] Tucker and the other Texans were all assured that the invasion was perfectly legal: the men would be provided with blank warrants upon which, after their killings were completed, they would fill-in the deceased's name, claiming he was shot

[123] "Van Tassell, Wyoming," *Niobrara County Library,* http://www.niobraracountylibrary.org/history/?id=30.
[124] Oscar H. "Jack" Flagg, *A Review of the Cattle Business in Johnson County, Wyoming, Since 1882, and the Causes That Led to the Recent Invasion* (The Vic Press, 1967), 47.
[125] Each man ultimately paid $700—$150 per month plus $50 each for the deaths of Ray and Champion. Bill O'Neal, "Johnson County War: When the Haves and Have Nots Went to War," *Ranch Record* (Fall 2017), 24-27.

while resisting arrest.[126] More practically, however, what this meant was that by the time the invaders left Cheyenne for Buffalo, nearly half of the party had neither connections nor any explicit experience in the state of Wyoming, never mind Johnson County itself.

In the bulk of the histories of the J.C.W. these recruiting efforts have been treated as an attempt by the C.B.S. to both bolster its manpower and to deny personal responsibility (the original plan was to have only the hired men go).[127] But from a thermodynamic standpoint, they fit in rather neatly with the C.B.S.'s overall approach to the Powder River Basin as an ecological entity. As mentioned earlier, ever since its beginnings the C.B.S. had been defined by absenteeism. From a thermodynamic standpoint, such a spatial removal meant unfamiliarity with the particularities of the landscape, a problem that manifested as heavy winter losses that were covered up by the ambiguities of book count. But it also actuated in the midst of the Johnson County War. Once the C.B.S. ranchers reached Casper in April 1892, they struggled to adjust to and deal with an unexpected spring snowstorm.[128] In the resulting confusion, they were delayed for nearly half a day, and by the time they finally commenced their trip on horseback, they made yet another place-based error, one that would ultimately lead to the invasion's ignominious finale, and one that could have easily been avoided given more familiarity with the intricacies of the landscape. On their way to Buffalo to eliminate the

[126] "Negus in Johnson County: A History of the Johnson County Stock War," unpublished manuscript by William Augustus Martin, undated, Collection 10597, American Heritage Center, University of Wyoming, 26.
[127] John W. Davis, *Wyoming Range War: The Infamous Invasion of Johnson County*, Reprint edition (Norman: University of Oklahoma Press, 2012), 134–35.
[128] When the train from Cheyenne pulled into Casper, they found the weather to be cold and windy, with snow blowing in hard from the west, and in the confusion of transferring the animals and goods onto the trail, a large portion of the company's horses were lost. Instead of getting off before dawn, then, the invaders spent the bulk of the morning tracking and corralling these animals, so that it was well into the afternoon before they were on the trail, heading north into Johnson County, skirting the nascent fields of Salt Creek as they did so. Davis, *Wyoming Range War*, 138-143.

presumed rustlers, the invaders received word that Nate Champion, one of *seventy* on their execution list, was holed up nearby at the K.C. Ranch. After taking a vote, the invaders decided to alter their path and dispatch Champion (and any others who might be with him) before proceeding on. This seemed logical enough. But what was meant to be a brief excursion took the invaders nearly five hours—roughly equivalent to what it would have taken them to reach their original destination, Buffalo—the journey slowed by increasingly heavy snow and a bitter Big Horns wind. It was an error that revealed both inexperience and a lack of spatial knowledge when it came to the region's multifarious microclimates. This latter would end up being one of the key differences between them and the Range-Science Ranchers.

Unfortunately for the invaders, however, this was not the only outcome of the C.B.S.'s detached view of space. In addition to their soggy blunderings across the Johnson County plains, there was also their peculiar reliance on federal-level officials. The state's first two senators—in office at the time of the invasion—were former W.S.G.A. members: Francis Warren and the aforementioned Joseph Carey. Further, Amos Barber, the governor of Wyoming, was a close friend of the invaders' doctor, Charles Penrose.[129] And so when the C.B.S. ranchers later found themselves surrounded by the Buffalo citizenry at the T.A. Ranch, they sent off a series of desperate telegrams to Barber looking for help. Barber in turn contacted none other than the president himself, Benjamin Harrison, sending a message whose nebulous language yet again reveals the C.B.S.'s disconnect from on-the-ground realities: "An insurrection exists in Johnson county, in the State of Wyoming, in the immediate vicinity of Fort McKinney, against the

[129] Ibid., 132-134.

government of said state." Barber asked for troops from Fort McKinney to be sent in order "to suppress the insurrection, restore order and protect both life and property." When he did not get a response, he sent Carey and Warren personally to the White House doors, where they reportedly woke the president from his bed. Sure enough, the next day troops from Fort McKinney were at the T.A. Ranch, ready to save the invaders.[130]

Of course the problem was that no such insurrection existed. Or rather, there was indeed an insurrection, but it was being carried out by the same individuals who were asking to be saved by the army. Once again, this was simply the latest iteration of the C.B.S. favoring the macro over the micro, and of the problems therein. Harrison was so far removed from the on-the-ground reality that he thought there was an uprising being perpetrated by the "rustlers" against the state of Wyoming. In reality of course, the state—in the guise of Buffalo Sheriff Red Angus, the man who was, in an instance of too-good-to-be-true irony, at the top of the invaders' blacklist—had already sniffed out and effectively quelled the uprising by deputizing local citizens and surrounding the invaders at the T.A. Ranch. Just as the C.B.S. ranchers had misunderstood both the Powder River landscapes and their own criminals, so too did Harrison misunderstand the signs of his midnight telegraph. In both instances, the cause was the same: a literal and figurative disconnect from the complexities of the local landscape. They did not know the Powder River Basin from the rest of the West.

Beyond these reflections of the C.B.S.'s spatial disconnect, the Johnson County War was also notable for the degree to which the invaders attempted to take control of their own narrative. In the months leading up to the attack, the C.B.S. ranchers began a

[130] Quoted in Davis, 174-175.

concerted media campaign in news outlets across the country, "telling the world how poor old Wyoming had fallen into the clutches of a gang of outlaw cattle rustlers who killed and slaughtered from dawn 'til dark."[131] When the time for the invasion came, the C.B.S. ranchers made the odd yet fateful decision to bring two journalists along with them. The first was Ed Towse, a longtime reporter for the local *Cheyenne Sun* who had ingratiated himself to the W.S.G.A. over the years thanks to his sympathetic (to the large cattlemen) reporting on the Cattle Kate incident, an 1889 lynching of Carbon County ranchers Ellen Watson and James Averell, which he described as "a question of life and death between honest men [the W.S.G.A.] and cut-throat thieves [Watson and Averell]."[132] Unfortunately for the invaders, Towse would drop out of the expedition after day one, citing his health and an inability to continue on with the hard riding (most likely hemorrhoids). That left Samuel T. Clover as the only writer on the trip. Unlike Towse, Clover was not a local. He was a correspondent for the *Chicago Herald*, a writer best known for his work on the Ghost Dance. (He claimed to have been the last white man to see Sitting Bull alive.)[133] Exactly how he managed to join the invaders is uncertain: by his own telling, he met up with an old friend, Montana cattleman Jim Pickford, in the Chicago stockyards. Pickford informed him of the conflict with the rustlers and the invasion that would soon take place.[134] Never one to miss a story, Clover boarded the

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[131] D.F. Baber, as told by Bill Walker, *The Longest Rope: The Truth About the Johnson County Cattle War* (Caldwell, Idaho: The Caxton Printers, Ltd., 1940), 44. In addition to this public relations campaign, William Irvine, one of the masterminds behind the J.C.W. owned a majority interest in the *Cheyenne Leader* for most of the 1880s, a paper that was known to be a major supporter of the large ranchers. W.E. Chaplin, "Some of the Early Newspapers of Wyoming," *Wyoming Historical Society Miscellanies, 1919* (The Laramie Republican: Laramie, 1919), 7-8.

[132] Quoted in George W. Hufsmith, *The Wyoming Lynching of Cattle Kate, 1889* (Glendo, WY: High Plains Press, 1993), 220.

[133] John William Leonard and Albert Nelson Marquis, *Who's Who in America* (A.N. Marquis, 1906), 347.

[134] This is almost certainly a made-up name for Clover's fictional account—there's no known Montana cattleman by that name,

earliest westbound train he could find, ingratiating himself to the W.S.G.A. top brass once he arrived in Cheyenne. Within a few days he had managed to convince them just how valuable it would be to have a reporter along for the trip.[135] Eager as always to control the narrative, the C.B.S. ranchers acquiesced.

At first it seemed that Clover would turn out to be a rather useful asset: as noted earlier, the C.B.S. ranchers believed they were legitimately being robbed, and there is ample evidence that Clover was more than willing to trumpet such convictions.[136] But after the invaders murdered Nate Champion—the traditional climax of the Johnson County War—something happened that would forever shift the conflict's narrative. The invaders pinned a note to Champion's body stating "CATTLE THIEVES BEWARE!" a gesture that was clearly in line with the larger goals of the W.S.G.A. and its supporters. As this was happening, however, Clover claimed he saw an object protruding from Champion's breast pocket. Before anyone else noticed, he took the item and slipped it into own pocket, saving it to read for later. According to Clover, he then "saw to his dismay that a bullet had ploughed a hole right through the center, which had admitted the heart's blood of the victim. It was a ghastly prize!"[137] It turned out that the booklet was a small diary filled with terse descriptions of Champion's last few hours, while he was in the cabin exchanging fire with the surrounding invaders. It was neither detailed nor especially eloquent, but it provided a firsthand account of the last few hours of one of the accused rustlers and a man who would eventually emerge as the epitome of bravery, both

[135] "Clover's Romantic Career," *Marin Journal,* January 13, 1898, 4.
[136] His early articles are for the most part favorable to the invaders, presenting them as archetypal Old West heroes forced by circumstance to take justice into their own hands. "Invaders Bombarded," *The Cheyenne Daily Sun,* April 19, 1892.
[137] Clover, *On Special Assignment,* 256.

to the invaders and westerners more broadly. One week later, Clover would reprint the text in full in the April 16 edition of the *Chicago Herald*.[138]

Both the chronology and the veracity of Clover's version of events has long been in doubt. Some renditions say that Frank Wolcott, the expedition's leader, read the diary aloud to the group, then gave it to Clover, deeming the document worthless.[139] Others say that Clover used the original diary as a rough model, simply making up the bulk of the printed edition.[140] What is certain is that nobody after or since has seen the diary. The only extant rendition is what Clover transcribed, purportedly verbatim, in the *Chicago Herald,* and which was then widely syndicated, appearing in most of the country's major metropolitan centers—New York, Atlanta, Chicago, etc. within the week.[141] The local northern plains rendition arrived in *The Cheyenne Daily Sun* under the headline "Invaders Bombarded: March of the Cattlemen into the Stronghold of the Rustlers." For the bulk of the article, Clover remained faithful to the invaders' point of view and interests. But when it came to Champion, Clover knew a good story when he found (or, perhaps, fabricated) one. He described the fallen rancher as "the bravest man in Johnson County," a man who died "with…a look of mingled defiance and determination on his face to the last." He then went on to reprint the Champion diary in its entirety, without any sort of extraneous commentary. The journal records the last few hours of Champion's life, as he waited inside his small cabin, at first abandoned by the two traders, then forced to care for his friend, Nick Ray, as he slowly died from a gunshot wound that he received from

[138] Drago, *The Great Range Wars*, 283.
[139] According to this account, "No one will ever know why Wolcott didn't destroy it…When he turned the notebook over to Sam Clover…he must have known that he was practically guaranteeing its publication." Ibid., 283.
[140] See, for instance, Davis, *Wyoming Range War,* 155.
[141] See *Chicago Tribune,* April 14, 1892; *New York World,* April 14, 1892; *Atlanta Constitution,* April 13, 1892. As was customary for the time, none of these pieces contain Clover's name; instead, the byline reads "Chicago Herald Correspondence."

the invaders. The prose consists of the sort of terse, periodic sentences later made so famous by Hemingway, Carver, and the Brat Pack minimalists of the 1980s. The syntax resounds with the detached toughness that would eventually turn Champion into a folk hero on the plains. He comes across not as an immoral thief but as a preternaturally brave soul who suffered his fate with stoic resignation.[142] By presenting the material in such a manner, Clover effectively gave a voice to Champion and the other proponents of the Range-Science Ranchers. The fallen hero came across as uncomplaining, heroic, and above all, decidedly innocent. He was presented to hundreds of thousands of readers as someone who suffered stoically a death he did not deserve. And as a corollary, the C.B.S. was coded as not only wrong, but as violently so; its proponents were bloodthirsty brutes who were disconnected from the on-the-ground realities of place.[143] Unfortunately for the C.B.S. ranchers, it was this narrative mold that would stick. Instead of a story of justice served and the C.B.S. being proved right, by taking Clover along the C.B.S. inadvertently gave narrative publicity to their opponents, the Range-Science Ranchers. Clover's reportage became a national sensation, the biggest news story to come out of the West since Little Bighorn.[144] Like their other mistakes, the decision to take Clover along proved to be disastrous. It helped lead to the Johnson County War as the C.B.S.'s death knell.

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[142] "Invaders Bombarded: March of the Cattlemen Into the Stronghold of the Rustlers," *The Cheyenne Daily Sun,* April 19, 1892.
[143] Nate Champion has been the subject of numerous ballads and folk songs in the century-plus since the Johnson County War. See Levette J. Davidson, "A Ballad of the Wyoming 'Rustler War,'" *Western Folklore* 6, no. 2 (1947): 115–18.
[144] Larson, *History of Wyoming,* 278.

The Aftermath: The Rise of Alfalfa

The events of the Johnson County War are traditionally presented as the climax to a much longer story. The shocking violence of the event and the aborted threat of so much more serves as an apposite climax to the romanticization of the open range era. But it is important to remember that the story did not end there. The cattle industry continued on in its wake, weathering the transition from the C.B.S. to the Range-Science Ranchers, and it continues on to this day, with the industry now generating $1.23 billion dollars worth of annual business in Wyoming alone.[145] If we want to understand the thermodynamic landscape, then, we need to incorporate the changes that took place in its path.

The omnipresent Jack Flagg provides as good a starting point as any. As he observed just a few months after the events of the Johnson County War, "the whole country is completely metamorphosed; where formerly the traveler could ride in any direction for days almost, without seeing a fence or a farm, he now finds them every few miles. Fine hay meadows and fields of waving grain have taken the place of sage brush flats and barren hill sides. The mournful howl of the coyote and wolf have been succeeded by the far sweeter sounds of the ranchman's song and the prattle of children. Small herds of horses, cattle and sheep have taken the place of the large herds of the barons, that have been forced to leave the county on account of the curtailing of the ranges by the fences and farms of the farmers."[146] From a thermodynamic standpoint, the most intriguing part of this observation is the mention of the "fine hay meadows and

[145] "History of Wyoming Cattle Ranches," https://www.wybeef.com/about-our-industry/history-of-wyoming-cattle-ranches.
[146] Flagg, *A Review of the Cattle Business in Johnson County, Wyoming, Since 1882, and the Causes That Led to the Recent Invasion*, 35.

fields of waving grain," for this floral shift reflects the central difference between the C.B.S. and the Range-Science Ranchers, one that began in the wake of the Hard Winter and reached a crescendo following the Johnson County War.

As with all things Range-Science Ranchers, these efforts were helped by the scientific push that had emerged in the wake of the Hard Winter and crested in the years after 1892. As the Wyoming Agricultural Experiment Station's scientists, writing in 1900, observed: "the palmy days of the open range are gone and the inevitable may as well be accepted, that as land becomes scarce that which can be irrigated will be cultivated. It has become necessary to support each head of stock on a small fraction of the land which was formerly available. Irrigating native meadows has greatly increased the production of wild hay. Substituting such cultivated forage crops as alfalfa will double or treble the production of hay and the prosperity of the ranchman and farmer who makes proper use of his products will correspondingly increase."[147] In the wake of the Johnson County War, land patents increased as more and more partners stepped in to fill the vacuum left by departing C.B.S. ranchers, until "nearly every farmer in this county is putting in more or less Alfalfa. Soon we will have plenty of hay and not enough stock."[148] Within a decade, Wyoming governor Bryant Butler Brooks was penning a piece for a Cornell periodical, *The Ranchman's Reminder: Devoted to the Theory and Practice of Arid Agriculture*, entitled "The Cattle Industry in Wyoming," in which he outlined the scientific shift that had taken place in the state's ranching outlook. Instead of relying upon the natural providence of the open range, he said, Wyoming's cattlemen now looked at the issue more scientifically, employing what he termed "hay, grain, and

[147] Buffum, "Alfalfa as a Hay Crop," 48–50.
[148] "Banner Briefs," *Buffalo Bulletin,* April 23, 1891, 3.

brains."[149] In terse form, this was the trinity for the Range-Science Ranchers, what the Johnson County invaders had sought without success to eliminate. In place of hope and energy excavation came the patient work of thermodynamic production.

All of these changes revolved around those well-known events of 1892. While Wyoming had a mere 24,328 acres devoted to hay cultivation in 1880, by 1890 that number had expanded to 173,010 acres. And by 1900, a full eight years after the events in Johnson County, it had further grown to 377,138. Montana tells a similar story, witnessing a rise from 56,801 acres in 1880 to 300,033 acres in 1890 and 712,048 acres in 1900.[150] The numbers were astounding, but they were mirrored by a similar shift in the region's narrative imaginary. Local advertising pamphlets now pictured hay stacks the size of houses, noting that "it is alfalfa land…the king of all forage plants."[151] As the Agricultural Experiment Station and the inchoate field of range science emphasized, it was all about efficiency, about growing and "converting coarse feed into beef and dairy products."[152] Such a shift in thermodynamic worldview is best summed up by a challenge issued by the *Buffalo Bulletin* just a year and a half after the Johnson County War. In a front-page column, the writer noted that a local, "Dutch Pete," had "thrashed out 29 ½ bushels of alfalfa seed from one and one half acres of land." The writer then showed just how different the Range-Science Ranchers' worldview was: "can anyone beat it?"[153]After the failure of the Johnson County War and the collapse of the C.B.S., this was a telling challenge indeed: how much energy could be taken from one space or time and relocated

[149] Bryant Butler Brooks, "The Cattle Industry in Wyoming," *The Ranchman's Reminder* (June 1904): 71-72.
[150] Osgood, *The Day of the Cattleman*, 228.
[151] "In the Heart of the Yellowstone: Information for Homeseekers," PAM 120, Montana Historical Society, Helena.
[152] University of Wyoming Agricultural Experiment Station, "Bulletin No. 13," 40-41.
[153] "Johnson County Alfalfa," *Buffalo Bulletin,* October 5, 1893, 3.

to another? How much energy could be created period? These were the questions that would define the worldview of not just Range-Science Ranchers but of the twentieth-century energy industry in the American West, and it all started with the Johnson County War.

The Rise of Range Science

It is not clear what happened to Samuel T. Clover in the years immediately following the Johnson County War. We know that he returned to his work with the *Chicago Herald,* and that two years later he took a new job as managing editor of the competing *Chicago Evening Post*.[154] Unfortunately, few of the papers of the day carried bylines, and so it is impossible to know exactly what he reported on. Nevertheless, it is almost certain that, like nearly thirty million others, he attended the festivities of the 1893 World's Fair. We have no idea what, if any, events he visited, or, if he was indeed there, what he made of the famous address given by Frederick Jackson Turner. Perhaps the most well-known paper in the historiography of the American West, "The Significance of the Frontier in American History" was Turner's attempt to codify the narrative of a steadily advancing frontier, one that, in his opinion, had defined American history and that now, post-1890, had ceased to exist. In his own words, "up to our own day American history has been in a large degree the history of the colonization of the Great West. The existence of an area of free land, its continuous recession, and the advance of American settlement westward, explains American development." Whereas previously, American settlers had pushed against this line—"the meeting point between savagery and

[154] John William Leonard and Albert Nelson Marquis, *Who's Who in America* (A.N. Marquis, 1906), 347.

civilization"—and labored to "transform the wilderness," now this had been accomplished. What came next was anyone's guess.[155]

It seems likely that Clover would have agreed with this take. His story—and, more broadly, the traditional narrative of the Johnson County War—fits rather neatly into Turner's historiography. We are told that the big ranchers profited for more than a decade on "free grass," empty, unclaimed lands that they could exploit without having to pay anything for it. All of this came to an end with the late-1880s invasion of homesteaders and small ranchers, individuals and groups who fenced the landscape, thereby imposing a regime of private property onto the grasslands and eradicating the large ranchers' open-range system in the process. This culminated in a fitting crisis: the full-blown vigilante conflict that would become known as the Johnson County War, an event that epitomized popular understandings of the West. Like the concrete closing of the frontier in 1890, this brief flare of brutality marked a hard end-date to the open range, safely relegating it to a bygone era.

There is a reason that this historiography has come to dominate our understanding of the Johnson County War. In both our archives and our histories, the focus is overwhelmingly on the invaders.[156] We get stories about their frustration at mounting winter and maverick losses, about the lead-up to and the blundering actions of the attack itself, and then we continue to follow the invaders as the subsequent trial drags on, editorials emerge, and the C.B.S. ranchers and their mercenaries are eventually released

[155] Frederick Jackson Turner, "The Significance of the Frontier in American History," in *The Frontier in American History* (New York: Henry Holt and Company, 1920), 1.
[156] This lack is so pronounced that Jack Gage, the former Wyoming governor, took it upon himself to write a fact-based but fictionalized firsthand account of a rustler who settled in the lee of the Bighorn Mountains and ultimately took part in the Johnson County War. Jack R. Gage, *The Johnson County War Ain't a Pack of Lies* (Cheyenne: Flintlock Publishing Company, 1967),

without charge. It all makes a nice, neat story, the sort of romanticized tale we would expect to mark the closing to the frontier. It is, in short, the stuff of movies.

But what is lost in this story is the rise of a new approach to energy use, development, and extraction in the Powder River Basin. Unfortunately, we do not have a great deal of archival material from which to understand the lives and stories of the small ranchers who would come to dominate this landscape and the cattle industry; what we do have is the cache of scientific, journalistic, and land office sources that both guided and reflected their thermodynamic approach. A careful examination of this material reveals that these small ranchers were not desperate homesteaders trying to siphon off bits of the CB.S. ranchers' range; rather, they were mixed farmers who brought a whole new understanding of ranching and thermodynamics to the land, one that leveraged the latest scientific findings in order to control, predict, and make more efficient that ever-valuable transmutation of grass and water into beef. And their arrival and eventual victory would augur changes that would soon spread throughout the region, first manifesting to the south, in the oil fields of Salt Creek, then later to the east, in the coal fields of Gillette. In other words, the Johnson County War was not really about class divisions and the end of the open range; it was about the onset of a whole new energy regime and its relation to the larger northern plains environment.

CHAPTER 3

Salt Creek and Teapot Dome:
The Rise of Oil and the Fall of Place, 1880-1930

Amongst the thousands of prospectors and thrill seekers who gathered in Spindletop, Texas in the spring of 1901, William Fitzhugh was different. Like the others, he had left his home in the wake of what would later become known as the country's first major oil gusher, joining the thousands who made the trek to East Texas in the hope of striking it big.[1] But unlike the mythic progressions of Turner and Greeley, of the forty-niners and the sodbusters before him, Fitzhugh ventured east, traveling by train from California's Bay Area down to the nascent Gulf fields. Furthermore, he had money—and lots of it. He was married to Mary E. Henshaw, a scion of one of the Bay Area's most influential families. Her grandfather, Edward Carrigan Henshaw, had been a Civil War hero, a confidant and purported favorite of Ambrose Burnsides, while two of her cousins still carried substantial political clout in the Bay Area—one was the youngest justice ever to be elected to the California Supreme Court, while the other was one of Oakland's most affluent bankers.[2] In short, Fitzhugh had the financial and familial advantages that so

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[1] The literature on Spindletop is extensive. For one of the best accounts, see Jo Stiles, Judith Walker Linsley, and Ellen Walker Rienstra, *Giant Under the Hill: A History of the Spindletop Oil Discovery at Beaumont, Texas, in 1901*, (Texas State Historical Association, 2008).

[2] Mike Mackey, *Black Gold: Patterns in the Development of Wyoming's Oil Industry* (Powell, Wyo: Western History Publications, 1997), 17–19. Sarah Edwards Henshaw, *Our Family: A Little Account of it for My Descendants* (Oakland, Cal., 1894), 41. Many secondary sources on Salt Creek misidentify Fred and William as Mary's brothers, when, in fact, they were her cousins. See Sarah Edwards Henshaw for a detailed genealogy of the Henshaw family.

many of his fellow pilgrims lacked, and he planned on using them to flourish.

But there was another more thermodynamically apposite factor that set him apart from all of those other itinerant drillers and speculators: he was an academically trained mining engineer, a rarity for the time, particularly in the United States, where the field was just then being codified in the halls of academia.[1] Like many of the men who ventured west in the wake of the Hatch Act (see chapter two), Fitzhugh had studied the inchoate science intensively during the latter part of the nineteenth century, graduating with a degree from Berkeley, and his journey to Texas was in many regards an opportunity to put that knowledge to the test in the newly erumpent industry. After arriving in Spindletop that spring, he spent the next few months surveying the land, adjusting to the climate, and sorting through the maze of competing claims that already flecked the landscape. Eventually he managed to purchase a few unproven leases in the vicinity of the original gusher, and for months he worked these claims, trying to coax up a portion of the oil that so many others had already realized. But to his disappointment he found that the region—and especially the lesser claims that fell to latecomers such as himself—was all but played out, overcrowded and underproducing, and when he heard rumors of untapped oil wealth farther north, in the recently formed state of Wyoming, he abandoned his Texas claims for the promise of colder climes.[2]

Fitzhugh's first stop on the northern plains was the twin towns of Lander and Byron, two hundred miles west of Casper. Lander had been the earliest major oil seep in what would eventually become the state of Wyoming: discovered by Captain Benjamin

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[1] See, for instance, Robert Rakes Shrock, *Geology at MIT 1865-1965: A History of the First Hundred Years of Geology at Massachusetts Institute of Technology: Department Operations and Projects* (MIT Press, 1982).
[2] Mackey, *Black Gold*, 17–19.

Bonneville in 1832, it would serve as an unofficial supply for trappers and traders in the region until the 1880s, when commercial wells were drilled in order to supply the Union Pacific. By the time Fitzhugh arrived, oil had been a known quantity in the region for close to seventy years, and it had been drilled commercially for the past twenty.[3] For a young state, then, Wyoming—and particularly Lander—had a remarkably deep mineral history. Unfortunately for Fitzhugh, however, this meant that it housed the corollary tangle of competing land claims that had plagued him down in Texas. In what was beginning to become something of a theme in his life, he found that he had arrived too late to acquire the best lands, that the boom had already taken place.[4]

All of this changed in the spring of 1909. Still without anything to show for his years of exploration, Fitzhugh got word of what was by all indications a major strike to the northeast. According to the reports that trickled down to Byron, the previous October a Dutch company had drilled and struck a gusher at the Salt Creek field, an at-the-time well-known but low-yielding stretch of alkaline flats forty miles north of Casper. According to the rumor, after drilling down to just over a thousand feet, a plume of oil had shot more than a hundred feet in the air, bathing the prairie in its black-brown mist before workers were finally able to cap it.[5]

Through his years of frustration and failure in the fields, Fitzhugh had learned an important lesson about thermodynamic punctuality; that fall, not wanting to miss out on yet another major strike, he traveled to Salt Creek himself, working the land and local government offices to ascertain how many legitimate claims had been filed and where

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[3] E.G. Woodruff, "The Lander Oil Field, Fremont County," *U.S. Geological Survey Bulletin 452* (Washington: U.S. Government Printing Office, 1911).
[4] Mackey, *Black Gold*, 18.
[5] Ed Bille, *Early Days at Salt Creek and Teapot Dome* (Casper, WY: Mountain States Lithograph Company, 1978), 12.

they were located. In the weeks that followed, he met only one other man in the field, Hugh "Daddy" Stock, a veteran oilman of the Pennsylvania and Colorado fields who was then an employee of the aforementioned Dutch company. His only other companions were thin flocks of sheep and cattle and the odd itinerant shepherd or rancher. Seeing the opportunity that had for so long eluded him now right there in front of him, Fitzhugh moved quickly. Although the field had been heavily patented over the years, the bulk of the claims had not been improved and were thus legally suspect. And so instead of tracking down all of the various claimants and trying to purchase their lands individually, Fitzhugh hired a surveying crew and spent the next month nailing survey posts and delineating sections, in essence "jumping" the prenominate holdings. He then erected a camp and brought in some forty men—the most notable being William "Missou" Hines, even at the time well-known for his role in Owen Wister's *The Virginian*—as muscle to keep out any potential trespassers, and he contracted with the only other company then in the field—the aforementioned Dutch company—purchasing all of their drilling equipment for $13,000. Because the field was so isolated and therefore plagued by only the most primitive forms of transportation, obtaining such specialized and ponderous drilling supplies was a Sisyphean task, one that took not merely a great deal of effort but also years of planning and experience with the vicissitudes of global shipping—as such, this move not only gave Fitzhugh the capacity to commence drilling, but it also halted any competing exploration.[6] In short, he was on the precipice of finally realizing his dream, of obtaining the unmatched oil wealth that had evaded him for so many years.

[6] Harold D. Roberts, *Salt Creek Wyoming: The Story of a Great Oil Field*, (Midwest Oil Corporation, 1956), 41.

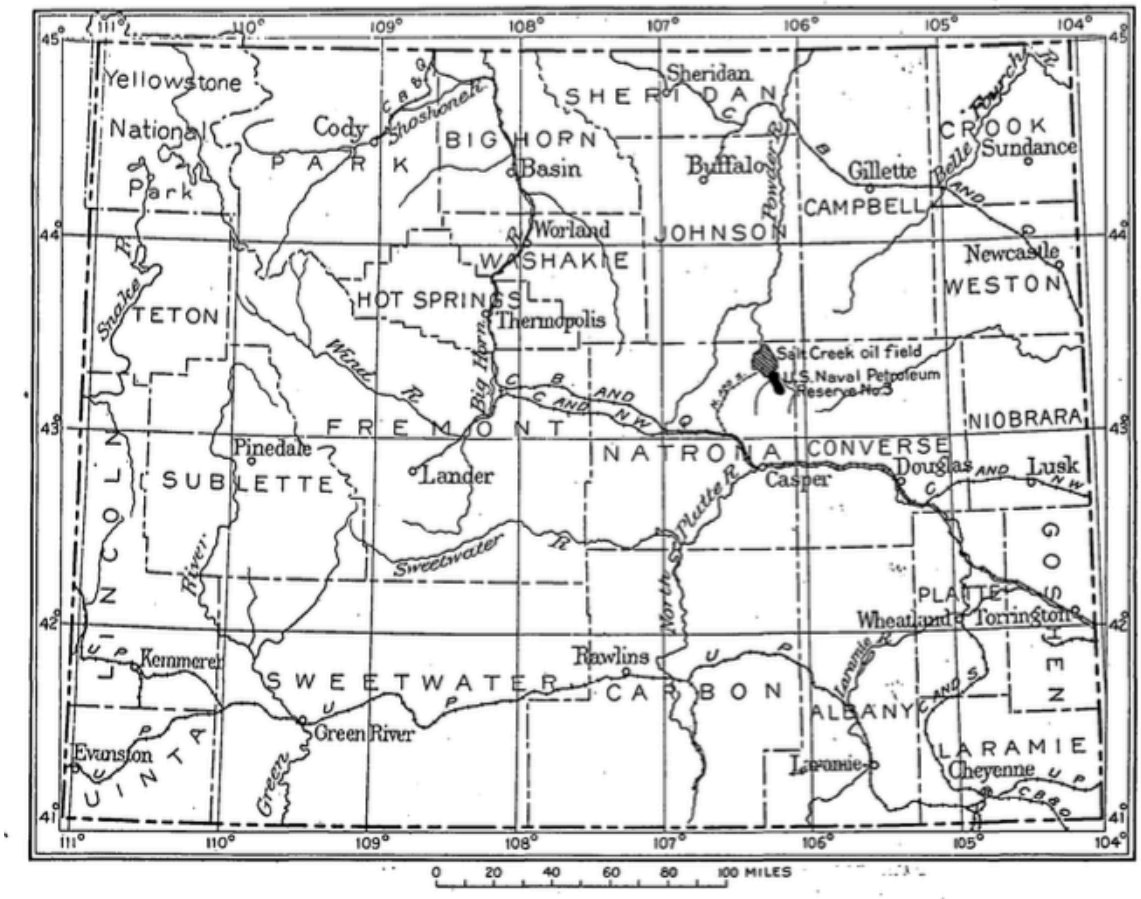

Figure 8: Map of Salt Creek, Wyoming
From W.T. Thom, Jr., and Edmund M. Spieker, *The Significance of Geologic Conditions in Naval Petroleum Reserve No. 3, Wyoming* (Washington: United States Government Printing Office, 1931), 1.

This was a pivotal time in the history of Salt Creek. By all indications, Fitzhugh had arrived at precisely the right moment—there had indeed been a major recent strike, but the field was still relatively empty, unworked and therefore ripe for a well-financed takeover. But such appearances belie a much deeper, much more complicated history than Fitzhugh could have ever imagined. Despite all indications to the contrary, Fitzhugh had arrived in Salt Creek in the wake of hundreds, if not thousands of others. For more than two decades, this remote alkaline flat had held out the promise of unimaginable wealth and bounty for the surrounding region, a capacity to transform it from a humble nineteenth-century cattle emporium to a modern twentieth-century energy factory. Time

and again local boosters had promulgated the flat's mineralogical merit, its status as one of the world's richest and most copious oil fields. And yet by the time Fitzhugh arrived—some twenty years into the field's commercial development—it had delivered next to nothing in the way of profit. As Fitzhugh found out in his early explorations, even in the wake of the unexpected gusher at Big Dutch there was very little further development—the field and greater region simply did not possess the requisite infrastructure or funds needed for such change.[7] As had been the case throughout so much of Salt Creek's history, it was yet another instance of narrative hope engulfing the limits of place.

As Fitzhugh recognized, however, despite the surface indicators, this field was on the precipice of a metamorphosis: a mere ten years after he entered Salt Creek, the sheep- and cattle-stippled flat would be home to the biggest oil field in the country, one that would pump its crude product down to Casper, where the largest oil refinery in the world would process it and ship it south to the Gulf of Mexico. From there it would go on to supply much of continental Europe, powering countries and peoples worlds away from the humble Powder River residents who produced it. It is the story of a remarkable transformation, one whose roots reach back decades to the countless boosters and wildcatters who worked to transform the field from one of mere promise and rhetoric to an empirical reality. Far more than a mere wasteland, it is a story of the stuttering rise and eventual fall of the early American energy industry.

From a historiographic standpoint, it is curious that such a location, so laden with the accouterments of cultural and environmental history, has played such a minor role in

[7] Ibid., 28–40.

the field.[8] Despite the central place that Salt Creek held in early-twentieth-century oil production, it has been almost entirely absent from these studies, which have tended to focus on the more well-known regions: Pennsylvania, Texas, and California. As such, this chapter examines the rise of the field up through its ultimate collapse alongside the Teapot Dome Scandal. In doing so, it traces the next step in the Powder River Basin's thermodynamic history. As an educated scientist, William Fitzhugh's efforts at Salt Creek were explicitly connected to the rise of the Range Science Ranchers in Johnson County. Like that former cattle conflict, the ascension of Salt Creek pitted a handful of wealthy absentee owners who had little knowledge of the local landscape against a cadre of European-educated scientists who used the latest in geological knowledge to bring the field to its early-twentieth-century apogee. Unlike Johnson County, however, Salt Creek soon found itself as part of a new development in the region's energy production and use. The Teapot Dome Scandal—long held to be an aberrant political scandal—marked the inception of this corollary stage, one that was far more concerned with narrative than it was with science and place. In other words, while the world's best geologists were using the latest scientific theories to produce detailed maps of the Powder River's subterranean landscape, a corresponding increase in nationwide energy use was leading to an antipodal

[8] The historiography of the petroleum industry has by and large centered around the economic and social aspects of the trade See, for instance, Christopher F. Jones, *Routes of Power: Energy and Modern America* (Cambridge, Massachusetts: Harvard University Press, 2014); Daniel Yergin, *The Prize: The Epic Quest for Oil, Money and Power*, 1st edition (New York: Simon & Schuster, 1991); Brian Black, *Petrolia: The Landscape of America's First Oil Boom*, First Edition, First Printing edition (Baltimore: Johns Hopkins University Press, 2000); Brian Frehner, *Finding Oil: The Nature of Petroleum Geology, 1859-1920* (Lincoln: University of Nebraska Press, 2011); Laton McCartney, *The Teapot Dome Scandal: How Big Oil Bought the Harding White House and Tried to Steal the Country* (Random House Trade Paperbacks, 2009); Burl Noggle, *Teapot Dome: Oil and Politics in the 1920's* (New York: W. W. Norton & Company, 1965); Paul Sabin, *Crude Politics: The California Oil Market, 1900-1940* (Berkeley, CA: University of California Press, 2005); Meg Jacobs, *Panic at the Pump: The Energy Crisis and the Transformation of American Politics in the 1970s* (New York: Hill and Wang, 2016); Diana Davids Hinton and Roger M. Olien, *Oil in Texas: The Gusher Age, 1895-1945*, (University of Texas Press, 2010).

movement, one that resulted in a near total abstraction from place.[9] Although such a tension was new for the West's energy producers, it would soon come to define the modern thermodynamic landscape. Its story begins in the heart of the Powder River Basin.

The Rise of Salt Creek

Nearly two decades before William Fitzhugh arrived in Wyoming, Johnson County's open-range ranchers headed north out of Casper, traveling to Buffalo, Kaycee, and a handful of other isolated towns, their path bringing them through a Wyoming landscape in the midst of drastic change.[10] With regional transportation virtually nonexistent, they were forced to ride from the train's Casper terminus, traveling northwest through the upper half of the state. As they did so, they passed through the sparse badlands of Natrona County, burnt brown sandstone and alkaline flats stippled with the odd shepherd and, if they looked really closely, one or two wooden, early-model oil rigs.[11] Of course they kept on moving: this land was not considered valuable for anything—least of all cattle grazing—and therefore was of no concern to them. It was an interstitial space, one to be moved through, not stopped in. They were on their way to the lush grasslands of Johnson County, where they would clash with the group of smaller ranchers who were using the latest range science to alter the region's thermodynamic

[9] Of course there is also an intriguing connection here with the current (since the 1970s or so) rise of the Powder River Basin coal industry. Despite housing the biggest coal mines in the world, the existence of the Powder River coal industry is virtually unknown in the United States. Similarly, in the 1920s, the Teapot Dome effectively yanked the Powder River oil industry from its concrete location.

[10] Chapter two of this dissertation will be focused on this conflict and its relation to the larger story of the Powder River Basin.

[11] By this point, the Pennsylvania Company had drilled four wells. C. A. Fisher, "History of Well Drilling in Salt Creek Field in Chronological Order from 1889 to the Present Time," 1918, Box 3, Folder 2, Collection 00664, Midwest Oil Corporation Records, American Heritage Center, University of Wyoming.

landscape.[12] Little did they know that within a few decades this barren landscape would become the most valuable piece of ground in Wyoming, home to the most profitable oil field in the world.

We tend not to think of the great cattle wars as intersecting with the rise of fossil fuels and the oil industry, but the more closely we look, the more we find that these ostensibly compartmentalized historical epochs did, in fact, collide, merging and intersecting in all sorts of baroque, unforeseen combinations.[13] Located a mere forty miles north of Casper, a ranching town (and later to become a major Wyoming city) founded in the 1880s, the Salt Creek Field was a ten-by-five-mile ellipse of timberless sandstone, some twenty-thousand acres in total. But like the Johnson County War invaders, the earliest cattle- and sheepmen saw the expanse as a passing-through place, "an intermittent source of bitter, alkali water…a bed of sand with occasional vile water holes."[14] As one writer later described it, "the Salt Creek area is a particularly barren range and the water of that Creek uninviting, so it escaped the homesteading of water holes that wove a sparse pattern over miles of the short-grass buffalo range that lies on all sides of Salt Creek."[15] Early geologists portrayed it as "barren and desolate," claiming that, "though it is traversed by numerous deep valleys the effect of relief is lost in the distance, the somber colors of the treeless hills causing one to fade into the next, forming a vast, rolling expanse, whose prevailing tones are brown and gray."[16] Even through the first few

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[12] For more on the connections between the Johnson County War and Salt Creek/Teapot Dome, see Oakley Hall, "Powder River Country," *American Heritage,* Volume 40, Issue 3, April 1989.
[13] The other one is that in moving from Casper northwest, their path roughly coincided with that of the erstwhile Bozeman Trail (which passed from Fort Fetterman, between Douglas and Casper, and Fort Phil Kearny, just north of Buffalo).
[14] Roberts, *Salt Creek Wyoming*, 1.
[15] Ibid., 10–11.
[16] Carroll H. Wegemann, "The Salt Creek Oil Field, Wyoming," *United States Geological Bulletin 452* (Washington: U.S. Government Printing Office, 1911), 40.

decades of the twentieth century, after the oil boom was well underway and realizing its first substantial profits, it would remain without any sort of permanent settlement, a place to be traveled to and extracted from, not remained in.[17]

Long before either mineral speculators or cattlemen entered the region, oil had existed as a known quantity in the West. There had been stories about the region's indigenous populations using it for medicinal purposes, and early explorers—from Captain Bonneville to the mid-century's overland travelers—noted it in muddy seeps along the foothills of the Wind River Valley.[18] The very first well in what would later become the state of Wyoming was drilled near the very spot where Fitzhugh would later stop, in Lander, in 1883, the same year that Laramie lawyer (and later president of University of Wyoming's Board of Trustees) Stephen Downey filed the first claim at Salt Creek.[19] It was patented according to the stipulations of the Placer Mining Law of 1872, a law originally intended to apply to the hard metal rushes of mid-century and that would, in the years to come, cause numerous litigious headaches for just about everyone involved (including Fitzhugh). In effect, this law enabled individuals to file on up to twenty acres of land. More commonly, though, it permitted an "association" of eight individuals to claim up to 160 acres of land (twenty acres multiplied by eight

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[17] In this respect, there are some curious overlaps with twentieth-century notion of wilderness, where, according to the 1964 Wilderness Act, is a place "where man himself is a visitor who does not remain." Quoted in Roderick Nash, *Wilderness and the American Mind* (Yale University Press, 1965), 5.

[18] See, for instance, Washington Irving and Benjamin L. E. Bonneville, *The Adventures of Captain Bonneville* (New York, G.P. Putnam and son, 1868), 236.

[19] Even in the early days of Salt Creek, there was a great deal of confusion and boasting when it came to the field's "discovery." After the *Denver Post* published a history of the field claiming that Daddy Stock was the first to drill, Harry Iba, the son of one the field's early drillers, wrote a letter to the editor of, curiously, the *Wyoming Tribune*. Iba claimed that the story had been "a falsehood," and that he had "been working in the Salt Creek fields for twenty years and many discoveries of oil were made…by my father, Cy Iba…before that time." He then goes onto say, "The writer of the article seems to follow the well-known Denver Post rule of writing about what he dreams after a round of hop." "Casper Man Corrects Denver Post Story," *Wyoming Tribune,* June 12, 1912, 4.

individuals). The individual or association was then required to drill a well or dig a shaft to at least twenty feet, and the resultant work had to amount to a minimum of $100 of improvement to that claim. If they either continued this process for five years or completed more than $500 of improvements and discovered "commercial quantities" of oil, they could then file for a patent. This required them to put up $2.50 per acre in exchange for the title to that land. Of course, terms such as "commercial quantity" were vague and subject to great manipulation, and as far as most of the historical records show, it often equated to as little as a jar of cloudy, water-logged oil.[20]

Even with this low bar, however, Downey's claim never amounted to anything, and he does not seem to have made any of the requisite improvements or conducted even minimal drilling—it was speculation in the most literal sense of the word. But in the ensuing years a number of new scientific theories began to filter into the region, leading to a deeper understanding of the field and its subterranean geography. The most important of these was the anticline theory. Developed in 1882 by Israel White, a former U.S.G.S. member and private prospector in West Virginia, it described the accumulation of oil beneath an anticline or dome, a geological formation that, through diachronic uplift, had been warped or folded into land which, when viewed via a cross-section, took on the

[20] Mary Colleen Gnagy, "Midwest, Wyoming: Living in a Company Town" (Master's Thesis, University of Wyoming, 1991), 23; Mackey, *Black Gold,* 2–5. University of Wyoming Geologist describes the law and its application to Salt Creek as follows: "The oil lands of this district belong to the general government and are located under the 'Placer Mining Act,' each person being entitled to a claim of twenty acres. Usually a company is formed and claims of one hundred and sixty acres are located by eight persons. According to law each claimant must sink a ten-foot hole on his claim the first year and do one hundred dollars worth of work each year thereafter. The work is not confined to sinking wells or prospect holes and may be put upon road construction or other improvements. When a company has completed five hundred dollars worth of work upon its claim it can, by submitting proof to the U. S. Land Office and paying two dollars and one-half per acre, obtain a patent." W.C. Knight, "The Petroleum of Salt Creek, Wyoming," *Petroleum Series—Bulletin No. 1* (Laramie, Wyoming, 1896), 10.

distinctive shape of an arch (see Figure 9).[21] When this occurred, oil was slowly forced up toward the surface, sandwiched between an upper layer of gas and a lower stratum of water. As a result, White claimed, if geologists and prospectors could identify an anticline and its apex, there was a good chance of striking oil beneath. And while anticlines are certainly not the only geological formation within which oil is found, to date approximately eighty percent of the world's oil and gas has resulted from such configurations.[22] As we will see, Salt Creek was one such field: although aesthetically unappealing, from a geological standpoint it is simply stunning, containing a near-perfect example of the anticline. Consequently, White's theory came at a propitious moment in the field's development: whereas men like Downey relied upon the same sorts of obvious surface clues that explorers had noted half a century earlier (e.g., oil seeps) and randomly sunk crude test wells, geologists working under White's model could effectively map subterranean landscapes. Like the range scientists whose work propelled the thermodynamic shift in Johnson County, White helped to pave the way for a similar metamorphosis on the fields of Salt Creek.[23]

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[21] According the Kenneth Deffeyes, even today "Active petroleum geologists spend 95 percent of their time looking for petroleum traps." Kenneth S. Deffeyes, *Hubbert's Peak: The Impending World Oil Shortage* (Princeton University Press, 2008), 44.

[22] Robert O. Anderson, *Fundamentals of the Petroleum Industry* (Norman: University of Oklahoma Press, 1984), 89.

[23] Curiously, though, the theory did not have an immediate impact upon the oil industry. Pennsylvania, at the time the center of the oil industry, was something of a geological anomaly. Unlike the majority of the world's other oil producers, almost all of its oil came in non-anticline formations. Brian Frehner, *Finding Oil: The Nature of Petroleum Geology, 1859-1920* (Lincoln: University of Nebraska Press, 2011), 71–73; Israel White, "The Geology of Natural Gas." *Science* 6 (June 26, 1885), 521-522.

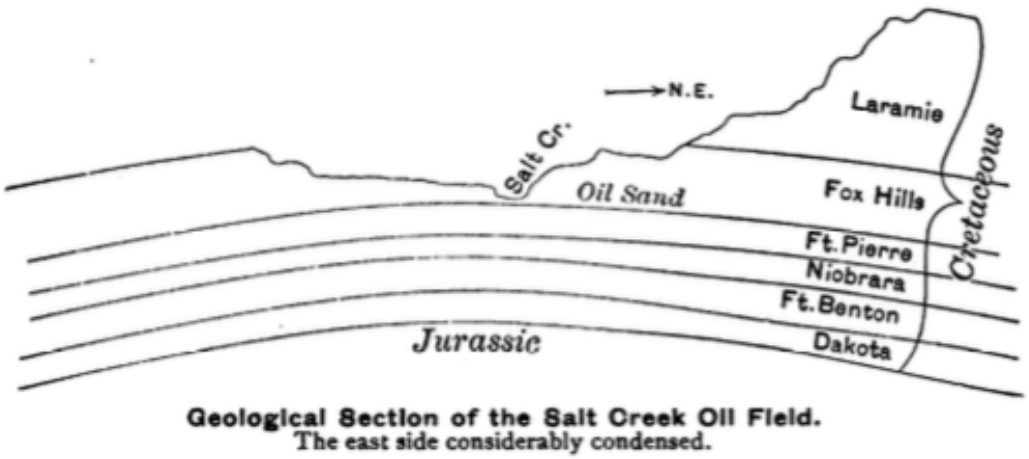

Figure 9: The Salt Creek Anticline
W.C. Knight, "The Petroleum of Salt Creek, Wyoming," *Petroleum Series—Bulletin No. 1* (Laramie, Wyoming, 1896), 17.

In order to reach the Powder River Basin, however, the anticline theory first needed publicity. Although little known as a genre today, the state-sponsored geological report—like the Agricultural Bulletins in Johnson County—was a critical part of the nineteenth- and early-twentieth century oil industry. By the time of White's anticline theory, geological surveys had existed in the United States for well over half a century. Geology was a nascent intellectual field at the time, straddling the divide between a burgeoning academia and a more practical, utilitarian interest.[24] This dialectic is most evident if viewed from a financial angle: the surveys themselves were funded by state and territorial governments, and they therefore came with certain fiscal expectations attached. Emerging out of the Northeast and then the South in the 1820s, the state-sponsored survey had originally been created for the purpose of locating and describing "mineral and soil resources so that they might be exploited as a source of wealth to the individual

[24] For a historical overview of the field of geology, see Julie Renee Newell, "American Geologists and their Geology: The Formation of the American Geological Community, 1780-1865," (Ph.D. Dissertation, University of Wisconsin, 1993).

and to the state."[25] As was the case with the Hatch Act, from the very beginning there was a delicate balance between obtaining and transmitting scientific information for the academic sake of acquiring knowledge, and a more populist, applied function of said information, a payoff to the people, one that was more often than not economic. In lobbying for employment, it was not at all unusual for scientists to portray their surveys as "investments that would improve their [the state's] financial standing." Publishers would occasionally alter geologists' reports, expurgating material that wasn't deemed economically viable.[26] The resultant tension is evident in the work of James Hall, arguably the most eminent geologist of the nineteenth century, who put the economic demands of the vocation bluntly: "it is the duty of the State Geologist…to advise other persons where they may expend their energies in search of minerals with some prospect of success, and on the other hand to advise them against expending money in geological formations barren of metalliferous ores or other economic products."[27] As such, when surveyors were able to obtain government patronage, they were not only tasked with adding epistemologically to the field, but they were forced to convey this often abstruse and esoteric information to the average citizen, to make it both accessible and valuable.

Like the Agricultural Bulletins of the period, this meant that the reports had to be made available to the public. Typically this meant that they were published in local papers, particularly those located in the vicinity of major geological activity. One example comes to us in March 1918, when Carroll Wegemann released the latest report

[25] Walter B. Hendrickson, "Nineteenth-Century State Geological Surveys: Early Government Support of Science," *Isis* 52, no. 3 (1961): 358.
[26] Newell, 236-237. Newell also provides an example of the dialectic relationship between the scientist and the state regarding economic motives, relaying a story about how the South Carolina legislature removed plates of fossils "the had been deemed nonessential" from the geologist's manuscript before printing.
[27] Quoted in E. DeGolyer, "State Geological Surveys and Economic Geology," *Economic Geology* 20, no. 4 (June 1925), 377.

on Salt Creek, *United States Geological Survey Bulletin 670*, "The Salt Creek Oil Field Wyoming." By far the most comprehensive of the surveys that had been produced over the previous three decades, the release of this document was publicized in newspapers throughout northern Wyoming. In one representative instance, *Wyoming Oil World* stated, "the report contains a full description of the field, including field and surface indications, extent, accommodations and virtually everything that is necessary to acquaint either the technically trained or the layman with the possibilities of the field." Further, it instructed readers on how they could obtain this information: "A copy of the bulletin can be obtained by writing to any of the members of the Wyoming delegation at Washington."[28] Like the Agricultural Experiment Station Bulletins before it, such geological reports were meant to be consumed by the people.

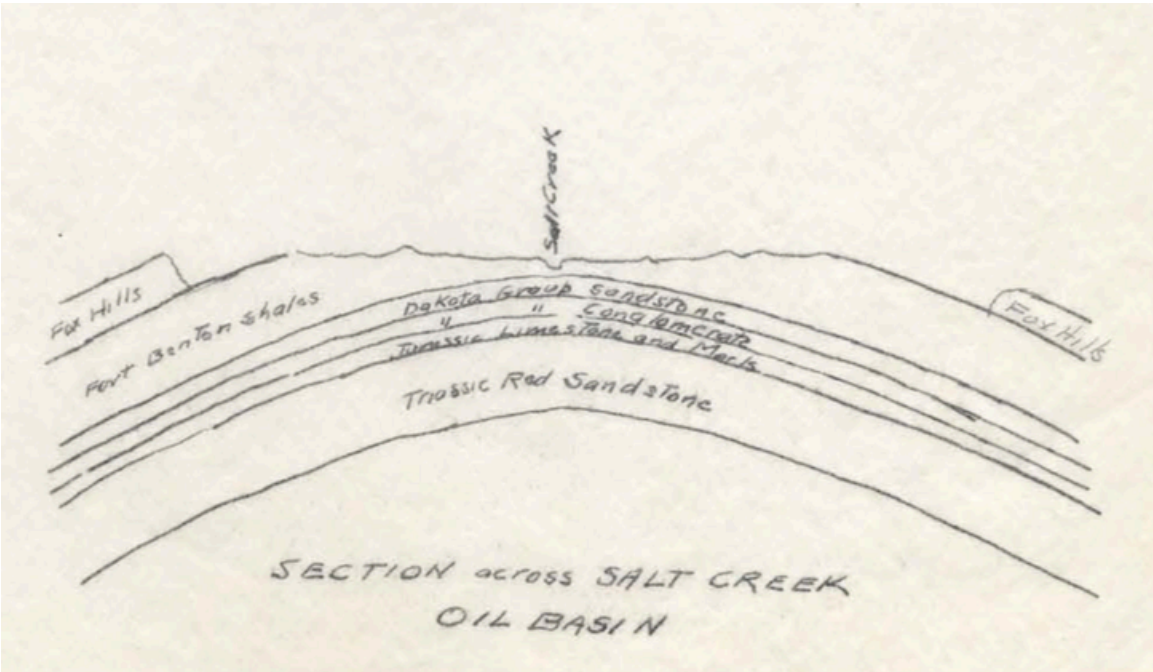

Figure 10: 1886 Depiction of the Salt Creek Anticline
Samuel Aughey, "Annual Report of the Territorial Geologist to the Governor of Wyoming," (Boomerang Printing House: Laramie, 1886), 40.

[28] "Bulletin of Salt Creek Now Out," *Wyoming Oil World,* August 3, 1918, 3.

In Salt Creek, a long string of such documents began to appear in 1886, a few years after the field's first half-hearted claims. The initial account amounted to just a few pages in geologist Samuel Aughey's larger "Annual Report of the Territorial Geologist to the Governor of Wyoming," but it nevertheless provided a template for how the field's countless other geological surveys would attempt to communicate their findings to the public. For the first time Aughey produced clear and simple diagrams of the distinctive anticlinal fold that Salt Creek would later become so well-known for, describing it as one that was "so gentle that no break has occurred, and the shales are not eroded down to the underlying group" (see Figure 10). According to Aughey, the smoothness of the rise and the lack of any accompanying fractures meant that much of the underlying petroleum trap was well-preserved and promised to be among the best oils in the world.[29] At the time oil was harvested either as a lubricant or illuminating fuel, and Aughey made no qualms about his recommendation of the Salt Creek product: "of all the fine oils of Wyoming Territory I regard this, if not the finest, at least as fine as there is anyway, not even excepting the famous Beaver Oil. It will prove itself to be one of the ideally perfect lubricating oils of the globe."[30] In much the same way that later boosters would trumpet the unique excellence of Salt Creek, Aughey promulgated the unmatched geology of the field and its mineral products. The only difference was that he did so while leveraging the latest in geological knowledge.

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[29] Aughey, "Annual Report of the Territorial Geologist to the Governor of Wyoming," 40-41. Writing in 1918, Carroll Wegemann, in a U.S.G.S. report, would write that "The Salt Creek anticline, in spite of its asymmetric cross section, is extremely regular in outline as compared with anticlines in other oil regions." Carroll Wegemann, "The Salt Creek Oil Field, Wyoming," *United States Geological Survey Bulletin 670* (Washington: Government Printing Office, 1918), 26.

[30] Aughey, "Annual Report, 40-41. Later authors would write that Salt Creek's "main features are so apparent that to any trained eye it looks almost like a diagram of an ideal dome taken from a text book on oil geology." Roberts, *Salt Creek Wyoming*, 5.

In response to this report, a handful of individuals filed claims during the late-1880s and 1890s. The most notable was Cy Iba, a former California and Black Hills gold miner who would factor into the development of Salt Creek for years to come, obstinately defending his claims in the face of men like William Fitzhugh, who periodically came in and tried to overpower existing landholders.[31] But the real change came in 1890, when the Pennsylvania Oil and Gas Company brought in the first commercially drilled well in what is now known as the Shannon Field. In spite of Aughey's early geological report and the nascent work on the anticline theory, this initial well was located *a full two-and-a-half miles north* of the field's apex. The reason for this is not clear. On the one hand, the company arrived in Salt Creek from the East Coast, and therefore their familiarity with the specifics of the field was necessarily limited. On the other hand, Aughey's report was notoriously vague; it provided a cross-section of the famous anticline (see Figure 10), but it failed to pinpoint precisely where the apex was located. In other words, like the Cattle-Bison System ranchers before, the Pennsylvania Company displayed a stunning ignorance of the local landscape, something that would come to cost them dearly over the ensuing years. Instead of looking to geology for thermodynamic guidance, they based their excavation on more conspicuous surface signs: in this case, the same sort of oil seep that had led Stephen Downey to file his initial claim seven years earlier.

Nevertheless, Mark Shannon, the head of the Pennsylvania Company, and his men still managed to strike oil far from the anticline, at approximately 1,000 feet.[32] After

[31] Harold D. Roberts, "History of the Salt Creek Oil Fields," 1919, Box 3, Folder 2, Collection 00664, Midwest Oil Corporation Records, American Heritage Center, University of Wyoming.
[32] Theories vary on why this is. The most convincing is that Shannon was coming from the Pennsylvania fields, which were something of a geological anomaly: the bulk of them fit within the twenty or so percent of world oil sumps that are not anticlines. Therefore, it is conceivable that Shannon was less likely to buy into the nascent anticline theory.

bringing a sample of the product back to Pittsburgh, he publicized the claims of eastern-trained chemists, who alleged that "nature had done more for this oil in the ground than the best and latest refining and compounding processes had done for other oils." Further promotion took place in 1893, when Shannon brought his oil to the Chicago World's Fair, taking home an award for the best natural lubricating oil. With such encomium at his command, the crude was sold *unrefined* to the Denver and Gulf Railway Company and used as a lubricant.[33] Nevertheless, Shannon took the long view on the region's profitability and eventually constructed a small refinery in Casper, one that was capable of processing up to one hundred barrels per day, though even then it was limited almost exclusively to lubricating oils.[34]

In the midst of these early efforts, Salt Creek's next geological report came out. Building upon Aughey's paper from a decade earlier, in 1896 University of Wyoming professor of geology Wilbur Knight published the first geological report that was dedicated solely to Salt Creek. In this publication, Knight noted the recent work by Shannon and the Pennsylvania Company; in doing so, however, he observed that "no pioneer company ever experienced greater difficulty than they as they attempted to convert the oil into money: It was impossible to secure freight rates to Omaha or Chicago, so that the crude oil could be sold in competition with eastern oils of the same grade. Besides the new conditions that had to be considered, this company had to haul their oil fifty miles by wagon, which in itself was a serious matter, and, had the oil not been of a very superior grade, would have defeated the enterprise had they secured reasonable freight rates." In many ways, Knight's work seems to take a step back from

[33] Nearly all oil-based products—gasoline, petroleum, kerosene, diesel, heating oil, etc.—require refinement. For Shannon to sell Salt Creek oil unrefined was both rare and not particularly profitable.
[34] Roberts, *Salt Creek Wyoming*, 20–22.

Aughey's cursory 1886 report. Instead of working to further map the intricacies of the subterranean shale, Knight seemed more concerned with drumming up local business. To begin with, despite little scientific evidence, Knight modified previous geological maps, noting a "slight anticlinal fold" where the Pennsylvania company was drilling, from which he concluded that "there are two oil horizons" instead of the previously assumed one. Further, his report was peppered with obvious unscientific features throughout. The most conspicuous is the inclusion of photographs that would seem more at home in a popular history book or travel brochure. Among these are images of pumps, refineries, and, most curiously, a lengthy sixteen-mule freight train, set and ready to haul a load of oil from the fields to Casper (see Figure 11). All of the photographs contain captions, and in this particular image Knight noted that the train contained a wagon devoted to "the freighter's home"—a "house on wheels…provided with a spring bed, a stove and all of the necessary equipage for keeping house."[35] Such details point to a larger energetic imaginary. At forty-seven pages, his report was by far the most detailed to yet be published on Salt Creek, and yet by opting to promote the local camps and domestic amenities over the latest in geological data, Knight helped to perpetuate the plodding progression of Salt Creek's thermodynamic landscape. While the anticline theory was taking hold in many of the country's competing oil fields, it had yet to break through in the Powder River Basin. Just as the C.B.S. ranchers had refused to adapt to a place-based approach to energy excavation, so too did Salt Creek's earliest drillers limit the anticline theory to paper.[36]

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[35] Wilbur C. Knight and E.E. Slosson, "The Petroleum of Salt Creek, Wyoming," *Petroleum Series—Bulletin No. 1* (Laramie: University of Wyoming, 1896), 6-12.
[36] For newspaper mentions of Knight's report, see Honorable H.W. Davis, "Our Oils," *Buffalo Voice,* December 24, 1898, 1.

SIXTEEN-MULE FREIGHT OUTFIT, PENNSYLVANIA OIL COMPANY.

This cut represents Mr. Johnson's outfit—capacity 18,000 pounds of oil—ready to start in the morning. A novel feature connected with this method of transportation is the fourth wagon, which is the freighter's home. This house on wheels is provided with a spring bed, a stove and all of the necessary equipage for keeping house. Mr. Johnson, who is the leading freighter for the Pennsylvania Company, says it saves him a great deal of time and trouble in making and breaking camp, and also provides him with comfortable quarters, even in a very severe storm.

Figure 11: Image of Cattle from Knight's 1896 Geological Report
Wilbur C. Knight and E.E. Slosson, "The Petroleum of Salt Creek, Wyoming," *Petroleum Series—Bulletin No. 1* (Laramie: University of Wyoming, 1896), 13.

In approaching geology and excavation in this manner, Knight, Aughey, and the Pennsylvania Company displayed a number of similarities with the open range ranchers who preceded them. This was most notable in the defining feature of Salt Creek's early years: the disconnect between public praise for the oil fields and the lack of extraction, which so closely corresponded with the C.B.S. habit of book count. Even when commercial drilling had hardly begun, the *Wyoming Derrick* was already situating Salt Creek in relation to the rest of the world. "The eyes of the entire world are upon us," they wrote in 1891. "The effects of a flowing oil well at this point are so manifold that it is hard to estimate them. It *will* have its effect not only in the United States but even in Europe."[37] Time and again, editors referred to Salt Creek and the greater Casper region as "The Pennsylvania of the West," taking steps to push the famous Pennsylvania fields into

[37] "Preparing to Drill," *Wyoming Derrick,* December 18, 1891, 1. Emphasis added.

the past tense, thereby opening narrative space for the future of Salt Creek.[38] "The Pennsylvania and Ohio fields have been pressed to their utmost so that new territory is anxiously looked for," one paper wrote. "This new territory is right here in Casper's backyard."[39] Even geologists such as Knight boasted that "the finest oil in the world is found in inexhaustible quantities in Natrona County."[40] In other words, much as the C.B.S. ranchers had used book count to create a specious portrait of the thermodynamic landscape, so too did Salt Creek's early drillers and boosters use selective science to portray the field as something that it was not. Like the Range-Science ranchers who replaced them, it would take a concrete application of another recently developed scientific discipline—in this case, geology—to the specificities of place in order to turn such fantasies into reality. It would require someone with far better training and a more worldly experience with oil than Aughey and Knight to bring that science to Salt Creek. A decade after Knight's report, that person would arrive.

The Second Boom

Although by 1906, a full twenty years into production, the Salt Creek field had yet to produce anything worthwhile, change was in the air. That spring one of the Powder River's more eccentric visitors, the Italian geologist Dr. Cesare Porro, traveled out onto the badlands north of Casper, doing his best to ferret out what lay beneath the surface. At just forty years old, the Milan-born scientist was already among Europe's most well-

[38] "French Oil Syndicate," *Natrona Tribune,* October 24, 1895, 5. See also "Wyoming Oil Field," *Natrona County Tribune,* April 21, 1898, 8, where George McCalmont of the Pennsylvania Oil Company is quoted as saying that "the Salt Creek belt is to the Wyoming field as the Franklin belt was to the Pennsylvania field." Notice the shift in tense here, from the past to the present.
[39] "Preparing to Drill," *Wyoming Derrick,* December 18, 1891, 1.
[40] "Salt Creek Oil," *Natrona Tribune,* March 3, 1894, 3.

respected minds in the oil business. Fluent in nine languages, he had traveled the world for nearly two decades in the service of the Royal Dutch Company, pinpointing prospective fields in regions and lands that most Europeans had never even heard of. He had written a doctoral dissertation on the geology of the Bergamo Alpine region, and since then had surveyed and mapped geological resources in France, Germany, Italy, Mesopotamia (present-day Iraq and Iran), and Sumatra, the latter of which translated into one of the world's great strikes.[41] In short, that spring Porro brought to Salt Creek the sort of geological acumen and attention to place it had been so lacking.

By 1906 the itinerant Porro was under the employ of a different company, Petroleum Maatschappij, a newly formed group of Dutch investors who were looking to expand their operations into the United States. Porro was known to be an ardent early proponent of the anticline theory, and he placed a great deal of emphasis on it as a means of "a rational program of research based on the knowledge of the geology of the subsurface," as opposed to the hunch-based drilling and prospecting that so often plagued the less scientific men (like Shannon) in the industry.[42] In what would become the field's most influential report, Porro outlined his belief that significant oil accumulations could be found in the vicinity of the anticline's peak. Unlike Knight and Aughey, however, he pinpointed specific locations: at a depth of just over one thousand feet, *nearly three miles south of Shannon's previously drilled lands*. Even then, however, he was careful to couch his projections, to foreground the cognitive impenetrability of the subterranean layers:

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[41] Thomas S. Harrison, "Memorial: Cesare Porro (1865-1940)," *Bulletin of the American Association of Petroleum Geologists,* (August 1952), Volume 36, Number 8, 1681-1686. Porro's visit drew a brief mention in one of the local papers, which reported that "Dr. Cesar Porro, a geologist from Milan, Italy," and a few men from Chicago were prospecting for oil. "Much activity in oil production in Wyoming is expected within the next few months as foreign capitalists are becoming interested extensively." *Natrona County Tribune,* June 5, 1905, 5.

[42] Harrison, "Memorial: Cesare Porro (1865-1940)," 1686.

"We cannot speak of prouved [sic] horizons in the depth, but we have sufficient reasons to admitt [sic] that such horizons in fact exists [sic]. The structure of the strata is so favorable that if these horizons are reached, they could give good, not only, but eruptive oilwells [sic]."[43] The difference from the field's previous geological reports is patent. Instead of simply noting the existence of the anticline, Porro mapped the underlying topography with precision: he marked both the location of the apex and the depth of the submerged oil. Instead of relying upon a mix of science and outdated trial-and-error, Porro brought the best education and experience Europe could offer to unlock the Salt Creek field; like the Range-Science Ranchers, he mapped the particularities of space in order to excavate the region's cache of energy.

Not surprisingly, Petroleum Maatschappij moved quickly to purchase Shannon's failed holdings. They sent their manager, Coenraad Kerbert, an engineer with experience in Siberia and the Dutch East Indies, to Casper. There he spent a year wading through the vicissitudes of competing claims and legal obstructions, until August 1908, when he was finally able to begin drilling at Porro's recommended site. By October, the crew had reached the top of the First Wall Creek sand, and on October 23, at almost the precise spot where Porro had estimated much of the oil to be located, the crude came streaming up in Salt Creek's first gusher, the same one that would bring William Fitzhugh up from Lander.[44] It erupted with such pressure that workers found themselves unable to stop the flow, and although they eventually managed to cap the hole, twenty-five to fifty barrels

[43] "Dr. Cesare Porro Report on Salt Creek," 1906, Box 3, Folder 2, Collection 00664, Midwest Oil Corporation Records, American Heritage Center, University of Wyoming.
[44] Years later, Porro's recommended site would be proven to be almost exactly atop the apex of Salt Creek's anticline. "Memorandum of Facts Connected with Early History of Salt Creek Field, Wyoming," 1924, Box 3, Folder 2, Collection 00664, Midwest Oil Corporation Records, American Heritage Center, University of Wyoming Roberts, *Salt Creek Wyoming*, 35–39.

nevertheless managed to seep through each day, much of which had to be burned off in order to prevent it from seeping into Salt Creek's nearby waters.[45] As Porro later recalled of the experience, "I was able to advise a deep drilling on Salt Creek dome, just at a point near the apex, to the north; I preferred to keep myself on that side because the oil signs I spoke of were north of the apex. The well was drilled, and in 1908 the Wall Creek sand was struck at a depth of 1,175 feet, and was penetrated to a depth of 25 feet. According to my forecast, it should have been reached at something more than 1,000 feet."[46] It was Salt Creek's first gusher, what would later become known simply as "The Dutch Well," or, more popularly, "Big Dutch," the first strike to definitively prove the existence of the voluminous oil that local boosters had been so long professing. And it was brought about thanks to the deep geological knowledge of one of Europe's primary petroleum geologists.

Unfortunately, there is more to oil production than place-based knowledge. Just as Salt Creek was starting to boom, as individuals were beginning to flock to the field in response to the first veritable gusher, a series of litigational changes that would permanently alter the field were taking place at the federal level. These alterations emerged out of two separate, but interrelated concerns: on the one hand, the increasing need for a modern, portable fuel for the navy; on the other, the voluble pleas for conservation of natural resources. The first had to do with American expansion and modernization. As the initial decade of the twentieth century came to a close, the federal government—and more specifically the navy—began to consider a switch over to oil as its primary fuel. Much of this had to do with the extension of the military into the far

[45] Harold D. Roberts, "History of the Salt Creek Oil Fields," 1919, Box 3, Folder 2, Collection 00664, Midwest Oil Corporation Records, American Heritage Center, University of Wyoming.
[46] Harrison, "Memorial: Cesare Porro (1865-1940)," 1683.

reaches of the Pacific, where available coal—the traditional naval fuel—was scarce. As one journalist bluntly described the dilemma: "with fuel oil regarded as the pivot upon which victory or defeat would swing in case of hostilities on the Pacific, inaction on the part of the navy department in equipping a Pacific squadron with oil-burning apparatus, can be characterized as nothing short of criminal negligence."[47] The first step was to obtain a more reliable domestic supply. Under the placer mining law, neither state nor federal government procured any portion of the mineral rights or profits. Extraction existed entirely within the private realm, leading to a rush to claim and extract crude oil as quickly as possible. According to the director of the U.S.G.S., at "the present rate at which the oil lands in California are being patented by private parties will make it impossible for the people of the United States to continue ownership of oil lands there more than a few months. After that, the Government will be obliged to repurchase the very oil that it has practically given away."[48] In response, on September 27, 1909 President Taft signed an executive order withdrawing over three million acres of public domain land in California and Wyoming, including all of the lands not currently under development in Salt Creek. Like Petroleum Maatschappij before them, the federal government relied upon teams of well-educated scientists for this move: the specific selection came under the recommendation of the U.S.G.S., who had reviewed all of the various state-sponsored geological reports and surveyed much of the implicated country, recommending certain undeveloped lands that were thought to contain large quantities of oil.[49]

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[47] *Oil Investors' Journal,* March 5, 1907, 14.
[48] California State Council of Defense Committee on Petroleum, *Report of the Committee on Petroleum: California State Council of Defense* (California State Printing Office, 1917), 38.
[49] Roberts, *Salt Creek Wyoming*, 47–54.

But there was also another factor driving the withdrawal order, one tied to the early conservation movement.[50] By 1908 and 1912, when Big Dutch came in at Salt Creek, both political parties were offering conservation-related statements as parts of their respective platforms, with the Democrats pronouncing, "we insist upon the preservation, protection and replacement of needed forests," and the Republicans similarly stating, "we endorse the movement inaugurated by the administration for the conservation of natural resources, and we approve of all measures to prevent the waste of timber."[51] Although tied to natural resources in general, part of the impetus for such proclamations was a realization that the early oil industry was—even for a time of marked inefficiency—wildly profligate. Writing in *Collier's,* the geologist (and president of University of Wisconsin) Charles Richard Van Hise bemoaned the "wanton waste" of the petroleum industry, concluding that "it is perfectly clear that the interests of the nation demand that all of our mineral lands…should be perpetually withdrawn from private entry, and be operated under the Government upon a lease system."[52] Even more desperately, the U.S.G.S.'s David Talbot Day lamented the "certainty of exhaustion," stating that all authorities in the industry "agree that the known fields are being exhausted at a rate so rapid as to mean cessation of the industry within a few decades unless the expected new fields are found."[53] Like so many conservationists and public officials of the time, Van Hise and Day blamed the Placer Mining Law under which oil land and that of most other resources was patented, which "encouraged, almost forced, overproduction

[50] Samuel Hays, in the definitive account of the movement, places its formation between 1890 and 1920, in the midst of both Salt Creek's and the wider petroleum industry's early development. Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Harvard University Press, 1959).
[51] Quoted in John Ise, *The United States Forest Policy,* (New Haven, 1920), 149.
[52] Charles Richard Van Hise, "Patriotism and Waste," *Collier's: The National Weekly,* September 18, 1901, 23, 41.
[53] David T. Day, "The Petroleum of the United States," *American Review of Reviews,* January 1909, 50.

with its attending waste." Although well-meaning in the limits that it imposed upon the amount of land any one individual could patent, when added to the fact that one had to drill and prove the existence of oil on any claimed land, the necessarily meager maximum created a competition for extraction: the amorphous geology of oil meant that one claim could drain the oil from all of the lands around it. Consequently, "it became a race to produce the oil from the tract before it was drained…He had to produce even when it resulted in overproduction that drove the price of oil so low that it was impossible to make a profit."[54] In essence, there was no motivation for an individual to employ wise use, and by withdrawing all unclaimed lands, Taft was attempting to hit the metaphorical pause button, thereby prohibiting any further expansion and waste.

From the beginning, Salt Creek's prospectors were convinced that the withdrawal was unconstitutional. Even Taft himself was not certain of his action's legality, and so the following year Congress passed the Pickett Act, explicitly granting the president the power to withdraw further lands in the public's interest.[55] But the act still failed to settle the web of ambiguous land claims that had been filed prior to its passage—June 25, 1910—and so a test case was filed. The United States Government brought suit against the Midwest Company, an at-the-time four-year-old corporation that had systematically purchased private land holdings in Salt Creek in the years prior to the withdrawal. As such, the U.S. claimed that these lands were in fact government property—that is, that the claims had been filed *after* Taft's proclamation and were therefore void. In June 1913, the

[54] J.C. Maher, R.D. Carter, R.J. Lantz, "Petroleum Geology of Naval Petroleum Reserve No. 1, Elk Hills, Kern County, California," *Geological Survey Professional Paper 912* (United States Government Printing Office, Washington, 1975), 21-22; For more on the perceived wastefulness of the early oil industry, see Roger M. Olien, Diana Davids Hinton, and Diana Davids Olien, *Oil and Ideology: The Cultural Creation of the American Petroleum Industry* (Univ of North Carolina Press, 2000), 119–30.
[55] William E. Colby, "The New Public Land Policy with Special Reference to Oil Lands," *California Law Review* 3, no. 4 (1915): 277; See David H. Getches, "Managing the Public Lands: The Authority of the Executive to Withdraw Lands," *Natural Resources Journal,* Volume 22, No. 1 (April 1982).

United States District Court for Wyoming ruled against Taft, claiming that a president's executive order could not overrule extant placer mining laws (only Congress had the authority to withdraw public lands). Midwest filed an appeal, and the case was passed on to the U.S. Supreme Court. In 1915, under the purview of Chief Justice Edward Douglas White, the country's highest court heard the case of *United States v. Midwest Oil Company*. In a five-to-three ruling, the justices upheld the executive's action—thereby reversing the state court's ruling—claiming that the president was acting within his power as an executive to uphold the public's interests.[56]

In time, the *Midwest* case would grow to become a landmark in conservation history, preserving, as it did, the president's power to unilaterally withdraw lands for conservation purposes; but in 1915 it had little direct impact on the Salt Creek field. In the years between the initial executive action (1909) and the ensuing Supreme Court case ruling (1915), William Fitzhugh had been able to claim that his visit to the Salt Creek field had clearly predated the executive withdrawal; as he surveyed and staked out land with the help of Daddy Stock, he argued, he was establishing his explicit intent to purchase the subsequent lands. Regardless of the legality of Taft's withdrawal, then, his claim remained valid.[57]

Consequently, as the case wended its way through the judicial bureaucracy, Fitzhugh continued to operate as planned, expanding his claims until, by 1910, just a year after he initially entered the field, he owned more than 18,000 acres, by far the greatest

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[56] For general facts on the Midwest Decision, in particular its pivotal role in relation to conservation, see J. Leonard Bates, "The Midwest Decision, 1915: A Landmark in Conservation History," *The Pacific Northwest Quarterly* 51, no. 1 (1960): 26–34. For local portrayals, see *Natrona County Tribune,* "Government Wants Oil Lands," February 20, 1913, 1.

[57] William Fitzhugh, "The Depositions of William M. Fitzhugh and Bearing Upon the Salt Creek Titles," 2, 14-17, Box 67, Midwest Oil Collection, American Heritage Center, Laramie, Wyoming.

total in the history of the field. It was a major coup for a man who had been struggling to break into the industry for years. Nevertheless, holdings did not necessarily equate with success: as was the case with so many before him, Fitzhugh's empire existed largely on paper. Partly thanks to the dearth of equipment and available labor, and partly thanks to his own proclivity for the business end of things, Fitzhugh had completed very little drilling on his claims. Not surprisingly, his California backers began to grow wary of such habits, and in the summer of 1910 they decided that they had had enough. They reached out to the Casper banks and cut off all of Fitzhugh's credit, making it clear that they were no longer responsible for any subsequent debts. Without his investors, Fitzhugh was forced to mortgage his home just to stay in business, bemoaning to locals that his relatives-in-law were "unscrupulous associates who wished to freeze me out after I had proven [the] value of [the] field."[58] Just when he had finally been able to obtain the untapped oil land that he had so long been searching for, he found he no longer had the funds necessary to drill them.

In spite of such losses, Fitzhugh's land holdings would prove the catalyst that finally vaulted Salt Creek from the narratological realm to the empirical. In the second decade of the twentieth century, Salt Creek's title quagmire was finally beginning to shake out, and in the wake of the *Midwest* decision, large-scale production was starting to take place. By its nature, oil drilling demands a great deal of infrastructure—pipelines, heavy equipment, refineries, shipping capacities—and so it does not tend to reward the small, individual operations that had emerged as a result of the Placer Mining Act. This

[58] The first pipeline was constructed in 1911, with another augmenting capacity the following year. "Memorandum of Facts Connected with Early History of Salt Creek Field, Wyoming," 1924, Box 3, Folder 2, Collection 00664, Midwest Oil Corporation Records, American Heritage Center, University of Wyoming; Fitzhugh's remarks about family quoted in Mackey, *Black Gold*, 26–27.

was especially evident at Salt Creek. As one potential investor, marveling over the visible surface accumulations of petroleum, logically asked, "what on earth can you do with the stuff out here?"[59] In essence, this was the latest iteration of a question that prospectors, surveyors, and local citizens had been asking for years. But during the second decade of the twentieth century, they finally received a viable answer. The Reed Investment Group, a Colorado Springs outfit (recall the connections between Colorado and Wyoming from the Johnson County War), initially entered Wyoming in search of a quick railroad fortune before turning to oil. As Oliver Shoup, the company's manager, wrote to his fellow board members following an initial survey of Salt Creek: "the possibilities of this oil field in comparison with the capital required for development, are so great that one hesitates even to make a computation." Not one to miss out on the economic application of such findings, Shoup continued, "there is hardly an oil field in the United States today that does not number from one to fifty millionaires, who have accumulated their fortunes from the production and sale of this commodity."[60] In response, Shoup and another Reed headman, Berne Hopkins, gathered all of the extant geological reports in an effort to learn about the landscape. In a move that revealed a great deal about the thermodynamic shift that was beginning to take place at Salt Creek, they then supplemented this information by hiring their own geologist, Cassius Fisher, fresh off of a coal survey in Colorado in the service of the Geological Survey. Fisher charted the field and confirmed what Shoup and the previous reports saw, adding to the seminal Porro report. Satisfied, the Reed Group moved into the acquisition phase.[61]

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[59] Quoted in Roberts, *Salt Creek Wyoming*, 64.
[60] Quoted in Ibid., 67.
[61] Ibid., 63–68.

Although experienced businessmen, the Reed Group had very little concrete experience when it came to oil extraction. Ironically, this would come to be a strength, for what they did have was an established history of building and overseeing large-scale infrastructure development. By the second decade of the twentieth century, in the wake of Porro's geologic findings, the Big Dutch strike, and Fitzhugh's comprehensive acquisitions, oil had become a well-known commodity in Casper. But as Fitzhugh's experience demonstrates, it had still yet to be translated into capital gains. Much of this had to do with the lack of industrial infrastructure in the region. As the *Natrona County Tribune* bemoaned, "were it possible to find a ready market for the product, this field would now be producing 5,000 barrels of oil daily. Until satisfactory transportation arrangements are made, there will be little more than a thousand barrels turned out."[62] But unlike the previous entrepreneurs and speculators—Fitzhugh not excepted—the Reed Investment Group possessed a network of financial relations that reached well beyond the purlieu of rural Wyoming and into the deepest pockets of continental Europe. Toward the end of 1910, Reed personally traveled to France with the goal of raising funds for a splinter company that would specialize in oil. He obtained investments from the heights of the country's royalty—Marquises, Counts, and Barons alike—and returned with an economic plan that was focused more upon infrastructural development than immediate success within any single well. Unlike many of Salt Creek's erstwhile efforts, he was dedicated to the long-term viability of the field.

His plan manifested itself in three separate but interconnected objectives that would come to drive the field's development. First, the Reed Investment Company would

[62] "5,000 Barrels Daily," *Natrona County Tribune,* October 11, 1911, pg. 1.

build a large-scale refinery in Casper. As mentioned previously, in 1894 William Shannon had indeed constructed Casper's first refinery, but it was a small, technologically limited affair—its maximum daily output was less than one hundred barrels, a painfully small total for this period, a time when technological advances were remaking the industry by the year—and by the first decade of the twentieth century, it had become an eyesore in downtown Casper, a reminder of the field's failure to live up to its early promise. Eventually the town's residents signed a petition condemning it, and the old building was demolished to great fanfare.[63] Second, Reed would construct a pipeline to connect the Salt Creek field directly to Casper, thereby obviating the longstanding problem of transportation between the field and the refineries, the issue that had proved so damaging to Shannon and his epigones. And third, they would expand their control of the field via purchases and the patient untangling of the labyrinth of competing placer claims that had retarded the field's growth for so long. For in 1910, when Reed returned from France fresh with investments, the company owned just a small corner of the field, nowhere near enough to effect the broad change that Reed and his co-investors dreamed of.[64]

At the advice of his French backers, the Reed Investment Company renamed itself the following year, taking on the appellation of The Midwest Oil Company, a title that would come to dominate the Salt Creek fields for much of the next half-century (they

[63] Alfred James Mokler, *History of Natrona County, Wyoming, 1888-1922; True Portrayal of the Yesterdays of a New County and a Typical Frontier Town of the Middle West. Fortunes and Misfortunes, Tragedies and Comedies, Struggles and Triumphs of the Pioneers* (Chicago, R.R. Donnelley & Sons Company, 1923), 250.
[64] Roberts, 21, 69–70.

would file the case against the federal government over the withdrawal act).[65] Under their watch, the Salt Creek fields leveraged the latest in scientific knowledge and technology to transform its oil into marketable products. By December, they had constructed the promised refinery in Casper: five tanks were specifically devoted to the ever-growing problem of storage—one 55,000 barrels, one 35,000 barrels, and three 5,000 barrels. More importantly, this plant was far more advanced than anything in the state, at the technological apex of oil refining for the age. Using a process called thermal cracking, it rapidly heated and agitated the sludge to separate out the crude oil's various products, resulting, on average, in an output of 57.5 % fuel oil residue, 21% gasoline, 16% kerosene, and 2.5% gas oil.[66] Furthermore, Midwest erected a thirty-five mile pipeline connecting it to the fields of Salt Creek, and with a daily capacity of 18,000 barrels, it solved the bulk of the transportation problems that had plagued the fields for the previous two decades.[67] For years similar infrastructure had been promised but not delivered. Now with Midwest's entry into Casper, they became a reality. As the local *Casper Press* triumphantly claimed, "today…the question of transportation, the greatest obstacle that has stood between the Salt Creek oil field and fame, has been solved."[68] In just a few years Casper had vaulted to the technological forefront of the erumpent industry, still isolated but now with the infrastructure of a serious economic player.

The result was not merely greater efficiency but increased marketability of the resultant products. In addition to infrastructure, this latter fact is what separated the Midwest Company from Salt Creek's earlier developers: they were committed to finding

[65] There are only two towns within the Salt Creek field today: Edgerton, with a population under 200, and Midwest, with a population of just over 400.
[66] Roberts, 73, 82.
[67] "Little Wyoming Items," *Wheatland World,* December 29, 1911, 4.
[68] "Pipe Line Seeks Entry to Casper," *The Casper Press,* February 17, 1911, 1.

new markets for products that had for so many years weighed down petroleum producers across the country. To give but one example, in the early twentieth century, refining's biggest byproduct was something called "fuel oil residue," a viscous, sludge-like product, by far the heaviest remainder from the refining process, and one that was worthless. Most refineries ended up simply storing it, maintaining vague hopes that a future market would someday open up. But Midwest opted for a different approach: they took it upon themselves to find a buyer to transform this waste into profit. Two months before their Casper refinery went online, they secured such a contract with the Chicago & North Western Railway, who, like the navy, had agreed to shift the engines on their passenger trains from coal to oil. In doing so, they committed to a contract with Midwest for their supply of fuel oil residue. Once again, this is the sort of science-backed entrepreneurial acumen that Salt Creek's earlier speculators had so clearly lacked: it effectively enabled Midwest to transform a longstanding liability into an asset, freeing the company up to aggressively market their more profitable petroleum products—gasoline and kerosene—over the greater Rocky Mountain region. By the time the refinery finally went online, they had obtained agreements with both Standard and Continental Oil to purchase all of the kerosene and gasoline that they produced.[69]

Such economic contracts were major triumphs for Midwest, but they were still inhibited by the longstanding problem of acquisition—despite his lack of funds, Fitzhugh still owned the bulk of the field, and Midwest was forced to rely upon leases and agreements by which they would purchase crude oil from patent holders—and the title

[69] "Midwest Ready to Operate Refinery," *The Casper Press,* December 8, 1911, 1' "Midwest Contracts: Northwestern Equipping All Engines West of Missouri River for Use of Casper Oil," *The Casper Press,* November 24, 1911, 1; "Railroad Tests Oil," *Natrona County Tribune,* June 5, 1912, 1; "Big Contract in Oil: Chicago & Northwestern Railway Company Makes Arrangement for Seven Years' Supply of Fuel Oil," *Natrona County Tribune*, December 5, 1912, 1.

confusion that had plagued the field for so long. From 1912 to 1913, via a series of court cases and private negotiations, Midwest was slowly able to purchase significant holdings from the major landholders in the field—Daddy Stock, William Fitzhugh and family, and Cy Iba's descendants, gaining what they thought to be the most solid of the oil land's historical claims. Even so, however, the legality of any individual claim was perpetually threatened—and would continue to be so for a decade longer—by the nexus of litigational problems that arose out of the placer mining law's inherent ambiguity, the lack of federal oversight in Wyoming, and the in-progress court hearings concerning Taft's 1909 land withdrawal and the subsequent Pickett Act (the aforementioned *Midwest* case). Consequently, like William Fitzhugh, Midwest often reverted to simple force to maintain the validity of their claims, pugnaciously preventing competing interests from working the land.[70]

Even in the midst of all of these problems, with the refinery and pipeline both completed and operating at full capacity, things were beginning to look up for Salt Creek. The initial hopes of the 1880s and 1890s finally seemed within reach, and it was at this point that the Midwest Company took a critical further step in determining the future of the field. In December of that year, in what would become known as "The Paris Agreement," Midwest merged with another local competitor, the Franco Company. The contract created a new entity—the Midwest Refining Company—who would put in all of the extractive labor on land from the three major land owning companies—Midwest, Little Company, and Wyoming Oil Fields Company—and would lease the resultant

[70] Roberts, *Salt Creek Wyoming*, 90–93.

mineral products for a period of twenty years, thereby centralizing the process and effectively reducing the waste involved with competition.

The other major development of 1913 was that Standard Oil entered the field as a serious player, thereby adding even more corporate, infrastructural, and scientific firepower to the region. The journey had begun twenty years earlier, when Clarence Richardson, a peripatetic miner and speculator, was in the employ of Iver Johnson, who, like so many of Salt Creek's advocates during this time, owned several patent claims and made annual trips out to the field in order to complete the requisite improvements. But as Richardson said, "the problem of securing money to develop the field was of course the one important thing, as it always is." Johnson therefore sent Richardson to New York with the goal of arranging a meeting with none other than John D. Rockefeller himself. As Richardson later recalled, "I had a mistaken boyish idea that I could walk right into their offices and present the proposition to them off hand without any trouble." Of course he was wrong, and it would be five years before he was able to finally gain an audience with the man himself. Although Rockefeller was not interested in investing in Salt Creek, his response to Richardson was telling: "we know there is oil in Wyoming…but it will be 20 years before it comes into the market, and when it does, our companies will be there."[71] Almost exactly two decades later, Standard Oil did indeed become involved in Salt Creek. It would be a game changer.

Their first major contribution was scientific, the construction of a state-of-the-art "cracking plant" designed to use steam and split apart what were generally waste oils into smaller molecules, thereby further refining the product and, in the process, obtaining

[71] Clarence B. Richardson, "Pioneering Over Western Trails: Address delivered before the Cheyenne Rotary Club December 18, 1929 by Clarence B. Richardson," *Annals of Wyoming,* Volume 22, Number 1, January 1950, 72-73.

more gasoline to export. It was a revolutionary process, developed in-house by Standard Oil employee William Merriam Burton, a doctorally trained chemist out of Johns Hopkins, and his partner, Robert Humphreys. Like the Midwest waste fuel contract of a few years earlier, it took what had been useless byproduct ("waste oils") and transformed them into marketable commodities; instead of extracting energy, it produced it. By good fortune, Casper was one of the first locations to obtain such a plant, beginning construction in the summer of 1913, just a few months after a patent was issued for the process, and opening the following winter.[72]

Nevertheless, challenges remained. Despite Standard Oil's involvement and a series of associated infrastructural developments, Midwest still had to deal with its disputed land claims. The problem was not limited to Salt Creek—across much of the country the ambiguous delineation of the Placer Act and the corollary lack of government oversight led to a tangle of competing claims and a general feeling of uncertainty over validity of any given title. As the U.S.G.S.'s Max Bull complained in 1916, "uncertain oil claims…made it difficult if not impossible for the operators of such claims to market their oil. Purchasing companies were afraid to take it lest, if the claims should be declared invalid, they might be made codefendants in suits to recover its value. On the other hand, fear of being drained by wells on adjoining lands and of ruining wells already producing made the operators loath to suspend production." It was a double bind that led to all sorts of consternation for the nation's petroleum industry, and in an attempt to both settle these disputes and encourage production for a country on the precipice of World War I, the federal government enacted "The Relief Act of August 25, 1914," a piece of legislation

[72] Paul H. Giddens, *Standard Oil Company* (Appleton-Century-Crofts, 1955), 167–68; Roberts, *Salt Creek Wyoming,* 85, 94.

that amended the aforementioned Withdrawal Act in order to encourage production. To do so, it permitted the Secretary of the Interior to lease oil-producing lands (in the case of Salt Creek, up to 3,200 acres per claimant) in exchange for 1/8 of the profit of that oil's sale.[73]

In Wyoming, such changes were for the most part welcomed. Midwest saw a minor dip in profits, but they benefited from a firming up of the titles that had kept Salt Creek's development so volatile. As a result, Salt Creek settled into a period of relative stability, one dominated by the Midwest Company and a hodgepodge of smaller drilling and refining companies. This would continue until 1917, when two major developments shifted the field's trajectory. The first was the United States' entry into World War I. Following the naval switch to petroleum in the years leading up to the Great War, the scale of the conflict exacerbated demand. From 1913-1920, American oil consumption increased 104%.[74] The resultant spikes in both supply and consumption drove the Allied fleets during the war and the domestic industry at home, leading British Minister of Foreign Affairs Lord Curzon to remark that the Allied forces had "floated to victory on a wave of oil."[75] All of this led to increased interest in proven fields like Salt Creek.

But the second development had a more local provenance, one that related back to the work of Porro and Fitzhugh: during this latter part of the decade, companies began to leverage the latest in science and technology in order to develop a deeper understanding of place. In August of 1917 the little-known E.T. Williams Company was drilling over a mile outside of Salt Creek's known production limits. This was out of necessity—there

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[73] Max Ball, "Petroleum Withdrawals and Restorations Affecting the Public Domain," *United States Geological Survey Bulletin 623,* Washington: Government Printing Office, 1916, 53-57.
[74] Joseph Ezekiel Pogue, *The Economics of Petroleum* (John Wiley & Sons, Incorporated, 1921), 61.
[75] Quoted in "Marine News from Every Source," *Shipping: A Weekly Journal of Marine Trades* (Shipping Publishing Company, November 30, 1918), 18.

was not much land available around the now legendary peak of the anticline. Nevertheless, at just over two thousand feet—far deeper than anything that had previously been drilled—they struck oil. Other companies quickly joined them in probing these new depths. Within a few months, Midwest had luck at approximately the same stratum. In terms of the oil produced, both of these were major strikes: the Midwest well came in at 1,700 barrels per day, a considerable total for a period when most wells topped out at just a few hundred barrels per day. But the larger impact of these findings can be seen from a scientific perspective. Occurring, as it did, so far outside the known limits of the field, the E.T. Williams strike called for a new place-based narrative with which to understand the subterranean geology of the field. Instead of a single pool of oil at the apex of the Salt Creek anticline, the Williams strike revealed a "vertical distribution of stacked, segregated pools."[76] As a result, the *Natrona County Tribune* wrote, "the conclusion is that between 3,000 and 5,000 acres may be added to the productive area of the field as a result of the Williams and Midwest discoveries."[77] Such a statement proves to be the rare underestimate in the history of the American West; in actuality, the second sands encompassed a swath of land far greater than had been previously excavated: in total, it added approximately 22,000 acres to the field. Unlike the first sand (the level that had been previously drilled, at the anticline's peak), the second sand was "essentially filled to the spill point," consisting of a strata of sandstone that was completely filled with oil.[78] As seen in the 1913 Paris Agreement and the geological surveys that had precipitated it, geologists and drilling companies previously thought that the field was

[76] D.S. Stone, "Structures of the Rocky Mountain Foreland: Salt Creek Field, A Prototypical Basement-Involved Thrust-Generated Fold," *The Mountain Geologist* 43, no. 2 (April 2006): 154.
[77] "Oil in Second Sand is Proven," *Natrona County Tribune,* April 10, 1918, 4.
[78] Stone, "Structures of the Rocky Mountain Foreland," 146-148.

heavily bounded and that it would therefore be drained within twenty years; in the wake of the E.T. Williams strike, however, a new narrative emerged, one that "definitively established that the second sand is productive on practically all the land inside the escarpment," confirming that Salt Creek was over four times larger than had previously been assumed.[79]

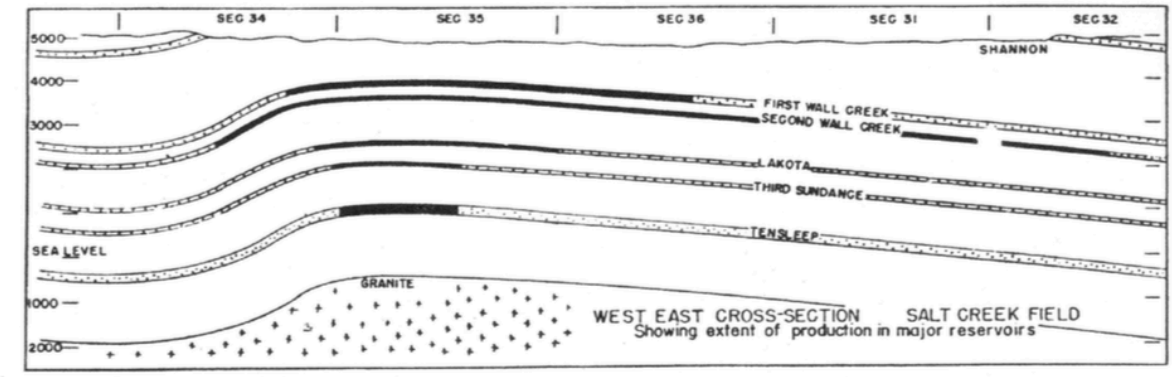

Figure 12: Cross-Section of Salt Creek Showing Second Sands
R.W. Mallory, "The Salt Creek Oil Field," in *Wyoming Geological Association Fourth Annual Field Conference in the Powder River Basin Guidebook* (Laramie: 1949), 90.

Abrupt as it may have seemed, such a thermodynamic shift fits firmly within a series of geological and narrative adjustments that had defined the field for the previous thirty years. Nearly a decade had passed since the first gusher at Big Dutch, and yet in that intervening period, although production had been higher than any of the previous decades' totals, it never matched the initial hopes of the late-nineteenth and early-twentieth centuries, when Salt Creek had been lauded as the "Pennsylvania of the West."[80] But in hindsight, many of these delays—and the corresponding frustration—can be explained by the field's geology and the diachronic changes in place-based knowledge. In the 1890s, Shannon and the Pennsylvania Company based their

[79] "Midwest Gusher is Making 2,000 Barrels Per Day," *Wyoming Oil World,* June 29, 1918, 8.
[80] "French Oil Syndicate," *Natrona Tribune,* October 24, 1895, 5.

exploration on a number of attractive but misleading surface clues. As a result, they drilled well north of Salt Creek's anticline, and their oil was understandably limited in both quality and quantity. Dr. Cesare Porro brought a cutting-edge understanding of science to the region and used it to map Salt Creek's subterranean geology. Consequently, when Big Dutch hit at the apex of the anticline in 1908, its benefits and limits could similarly be explained by this shift in thermodynamic knowledge. It was the first time that drilling had penetrated down to the first sands oil, but drilling had not progressed any deeper. And in 1917, the E.T. Williams Company became the first to infiltrate the second sands.[81] Whereas prior to this discovery, the entire field of Salt Creek was producing approximately 10,000 barrels of oil per day, after it there would be single wells that produced that much.[82] Between 1917 and 1924, production from the second sands grew to dwarf that of the first sands: 106.5 million barrels to 15.3 million barrels.[83] What we have, then, is a field that was steadily resolving into view over time, of its subterranean geology growing more and more defined as the decades passed, enabling an excavation of energy on a scale previously unknown in the region.

[81] Roberts, *Salt Creek Wyoming*, 120.
[82] Wegemann, 9; Sullins, 17.
[83] Edward L. Estabrook, Clarence M. Rader, "History of Production of Salt Creek Oil Field, Wyoming," *Mining and Metallurgy,* September 1925, 14.

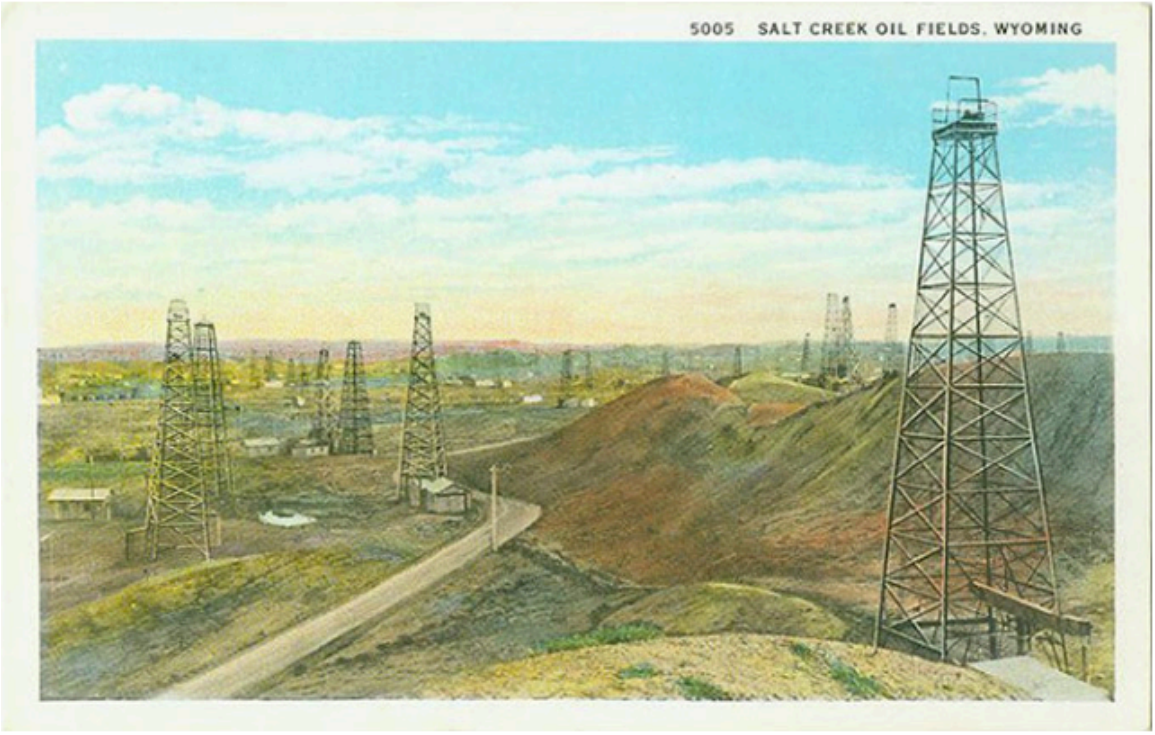

Figure 13: 1920s Postcard of the Salt Creek Fields
"Oil Camp Photos," *Wyoming Tales and Trails,* http://www.wyomingtalesandtrails.com/oilcamp.html.

As the 1920s dawned, then, Salt Creek was finally entering into a full-on boom, establishing itself as one of—if not the—premier oil producers in the country. In addition to the aforementioned discovery of the second sands—and the corollary narratological refinements—much of this improvement had to do with Standard Oil's entry into the field, and the effect that they had on finally resolving the title maze that had plagued the field for so many years. From 1919 to 1921, Rockefeller's company became more directly involved in the acquisition of Midwest, officially gaining a majority interest (and thereby gaining control of the Salt Creek field) in July of 1921. It is no coincidence that this coincided with the rise and eventual apogee of the Salt Creek field. As was evident from the past, the mere existence of oil in any given geological structure was never sufficient for a boom. Of the utmost important was an ability to locate, refine, and

transport both crude oil and its finished products—to find markets for them from the isolation and underdevelopment of northern Wyoming. Standard Oil inherited a robust refinery operation that they had contributed to since the opening of their cracking plant in 1914, but the biggest change that occurred under the Standard regime was an increase in exports. In 1921, the year they took over Midwest, Standard Oil signed a deal by which they would export gasoline from the Casper refineries, shipping it via the Burlington Railway down to Baton Rouge, whereby it would then be loaded onto ocean tankers bound for Europe. For every night for the next two years, trains would depart the northern plains, bound for the Gulf of Mexico and the shores of Europe.[84] Instead of being relegated to the role of a minor regional producer, Salt Creek was now powering the world.

Also contributing to this growth was the fact that the title controversy was finally solved with the passage of the Mineral Leasing Act of 1920. This law expanded the framework of 1914's Temporary Relief Act, permanently dismantling the old placer mining system—which had grouped oil, gas, and coal with the hard-rock mining of gold, silver, copper, and lead—and creating a new category of leasing for energy sources in its place. Under the original 1872 law, there had been no royalty or rents, and the states had received none of the extracted income. As a result, individuals and companies were able to extract mineral wealth with minimal interference from the state, a framework that not only led to the overproduction and profligate wastefulness that eventually spawned Teapot Dome—the subject of this chapter's next section—but that encouraged individuals to file claims on any and all land that held even the faintest hope of oil. In

[84] Ibid., 148-150.

contrast, by building upon the anti-monopoly sentiments of the period, the 1920 Mineral Leasing Act stated that companies could only own up to 3,200 acres, upon which they would pay a small up-front fee to lease the land. As drilling commenced they would pay a royalty consisting of 1/8 of their revenue on the sale of any extracted minerals, half of which royalties would go back to the state government. Companies would no longer be able to patent and own the land that they worked on.[85]

The result was the boom that Casperites had been predicting and waiting upon for nearly three decades. In 1922, production reached 19,000,000 barrels, a high for the field, but a number that was eclipsed the following year—Salt Creek's peak—when 35,301,608 barrels were produced. In a single day, the field yielded an astonishing 132,000 barrels. In total, this 20,000-acre ellipse grew to account for approximately five percent of the United States' production, a total rarely approached either before or since.[86] Such a shift—from geological dud to the premier oil producer in the United States—can be explained by the application of the latest in geological knowledge to further define and understand Salt Creek's mysterious subterranean topography. Unfortunately, just as Casperites were devoting such minute attention to the specifics of place, an increase in the nation's oil consumption was catalyzing a corresponding shift in the other direction, ripping energy sources from the specifics of place. In an unexpected twist, such changes would begin next door, in a little-known Powder River oil field whose name would soon grace the front pages of newspapers across the globe.

[85] For more on the Mineral Leasing Act, see David W. Miller, "The Historical Development of the Oil and Gas Laws of the United States," *California Law Review* 51, no. 3 (1963): 506–34.
[86] Roberts, *Salt Creek Wyoming*, 161.

Teapot Dome

Contiguous with, but southwest of the main Salt Creek field, there exists a geological formation that, thanks to a unique and highly visible sandstone outcropping, is popularly known under the sobriquet "Teapot Dome." Like the Salt Creek field of the late-nineteenth century, this field remained deserted through the early-twentieth century, a sandstone plain that had escaped the sporadic drilling that had defined Salt Creek. In 1911, Carroll Wegemann provided the first outline of Teapot Dome's geology within the larger Salt Creek structure. "The Salt Creek anticline," he wrote, "considered as a whole, is an arch of strata about 18 miles long by 6 or 8 miles wide, trending in general northwest-southeast." Within this anticline, however, there were "two distinct domes." The first was "the northern or principal dome," upon which the Salt Creek oil discoveries had been made. But there was also "the southern or smaller dome," to which Wegemann applied the popular cognomen "Teapot Dome." Seeing as no actual prospecting had been completed on this latter field, Wegemann's descriptions were decidedly cursory. In his examination, "no surface indications of oil were found," but he acknowledged that there had been an oil seep reported by a former employee of the Land Office, Thomas H. Harrison, who, writing to Wegemann, described a spot where "several springs of water came from the banks here, all alkaline, and the surface of the water and the ground showed oil. These springs came from the Parkman [sands], and I took it that the oil was brought from the Pierre shale below, through one of the small faults which cross the anticline." In Wegemann's interpretation, this purported discovery was geologically significant, for it pointed to "the possible existence of oil in the southern extension of the

anticline."[87] Four years later, Woodrow Wilson would use such geological insight to withdraw the field from the public domain, designating it as U.S. Naval Reserve No. 3. Although he could not have known it at the time, in doing so he unwittingly took the first step in catalyzing one of the greatest political scandals the country has ever seen.

The Teapot Dome Affair has long been a flashpoint of American history. Burl Noggle, author of one of the most respected accounts of the scandal, called it "garish, [and] at times weird," in effect a "tragicomedy of American politics without beginning or end."[88] Due to its exceptional nature, almost all of the scholarly accounts take a decidedly political tack in their examinations, threading the scandal into histories of Progressive Era politics, business interests, and the political lead-up to the Great Depression.[89] Rarely, however, has the scandal been situated within either a deeper, place-specific history, or a larger environmental context. This is peculiar, for at root Teapot Dome was an oil reserve, and at least initially the case was deeply concerned with the extraction and use of natural resources, traditional fodder for environmental histories, particularly given its early-twentieth century, Roosevelt-and-Pinchot roots. Further, when viewed from an environmental and narrative-centered context, the scandal illuminates critical trends and developments in the way that place and environmental-resources have been viewed in American history. For in addition to being one of the most dramatic and shocking political scandals in American history, the Teapot Dome Scandal represented a major

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[87] Wegemann, 1911, 54-55.
[88] Burl Noggle, *Teapot Dome: Oil and Politics in the 1920's* (New York: W. W. Norton & Company, 1965), 1.
[89] In addition to Noggle's work, other influential accounts include James Leonard Bates and J. Leonard Bates, *The Origins of Teapot Dome: Progressive Parties and Petroleum, 1909-1921* (Westport, Conn: Praeger, 1978); J. Leonard Bates, "The Teapot Dome Scandal and the Election of 1924," *The American Historical Review* 60, no. 2 (1955): 303–22; Gary D. Libecap, "The Political Allocation of Mineral Rights: A Re–Evaluation of Teapot Dome," *The Journal of Economic History* 44, no. 2 (June 1984): 381–91; Laton McCartney, *The Teapot Dome Scandal: How Big Oil Bought the Harding White House and Tried to Steal the Country* (Random House Trade Paperbacks, 2009).

turning point in American energy use and resource extraction: while the conversation and controversy initially surrounded questions centered upon a scientific understanding of place, as time went on and the scandal gained in notoriety, the issues became increasingly abstract; the concrete place in question—an isolated oil field in Wyoming—was pushed to the periphery as political questions of responsibility, ownership, and blame took over. In doing so, however, the Teapot Scandal can be seen as representing a larger trend in American energy history. As oil became increasingly common and central to the country's progress, the association between thermodynamic resources and their provenance—place—similarly shifted, becoming both less important and refigured into a more modern imaginary, one that was far less explicitly tied to the land from which it was produced.[90]

[90] This argument owes much to Gary Libecap, who argues that Teapot Dome wasn't so much about conservation as it was about political power. To back up his claim, he argues that Albert Fall's leases, which were cancelled in the wake of the Teapot Dome hearing, actually would have conserved more oil than the subsequent policies they were replaced with. Gary D. Libecap, "The Political Allocation of Mineral Right: A Re-Evaluation of Teapot," *The Journal of Economic History* 44, no. 2 (June 1984), 381-391.

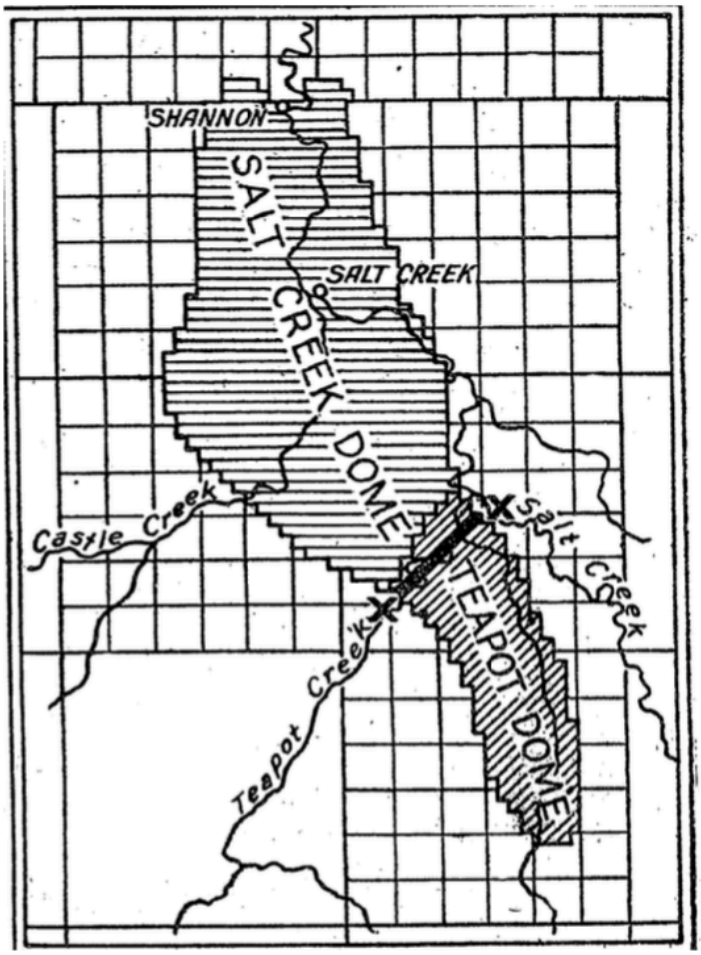

Figure 14: Location of Teapot Dome in Relation to Salt Creek
"Teapot Oil Dome Fight," *The New York Times,* May 7, 1922

Although the scandal broke in 1922, its origin reaches back to 1910 and the aforementioned concerns over conservation and energy shortages, particularly in times of war. It was a period during which the federal government feared losing all of its mineral reserves to private interests. At its core, such a phobia was most concerned with military matters. As Secretary of the Navy Joshua Daniels wrote to Woodrow Wilson in 1914, "henceforth, all the fighting ships which are added to the fleet will use oil, and the transition from coal to oil will mark an era in our naval development almost comparable

with the change from black powder to smokeless powder for our guns."[91] Although the withdrawal was originally limited to two California fields (Naval Petroleum Reserves Nos. 1 and 2), in 1915 Wyoming's Teapot Dome was added to the list, creating three Naval Petroleum Reserves and resulting in Teapot Dome's official designation, Naval Petroleum Reserve No. 3. As we shall see in the next chapter, the U.S. Navy—like so much of the country—was attempting to modernize during this period, to shift from coal, which was viewed as dirty, difficult to ship, and eminently of the nineteenth-century, to oil, which was more clean, portable, modern, and, as developments in Texas and other locales showed, was abundant in large, untapped quantities, often in the country's isolated and under-populated regions.[92]

The purpose of such reserves lay in a strategic, utilitarian sense of preservation, the idea that the federal government needed to keep resources in the ground for times of martial emergency. In practical terms, what it amounted to was a natural form of storage. But such initially virtuous interests went curiously and unsuspectingly awry on April 7, 1922. On that day Secretary of the Interior Albert Fall leased the Teapot Dome Reserve to Harry Sinclair's Mammoth Oil Company. There was no public announcement or ceremony, but rumors of the deal quickly spread throughout Wyoming and much of the West. Days later, Wyoming Senator John B. Kendrick petitioned the Department of the Interior for explicit information concerning the sale. The department denied that any transfer had been made, a refutation that became problematic when, just four days later, the *Wall Street Journal* publicly confirmed the sale, opining that the lease marked "one of

[91] "Teapot Dome Oil Fight: Grounds on Which Far-Reaching Investigation," *The New York Times,* May 7, 1922, 94.
[92] For more on this topic, see John A. DeNovo, "Petroleum and the United States Navy before World War I," *The Mississippi Valley Historical Review* 41, no. 4 (1955): 641–56.

the greatest petroleum undertakings of the age and signalizes [sic] a notable departure on the part of the government in seeking partnership with private capital for the working of government-owned natural resources." According to the article, a planned pipeline was already in the works, one that would exist at a greater scale than anything previously imagined—even within the immoderate booster literature that had defined Salt Creek's rise—and that would transfer the raw oil 1,500 miles down to Houston's refineries. From there, the Sinclair Navigation Company would deliver the finished product to the navy's international fueling stations.

Initially, there was no inkling of any deeper scandal. The story's surprise arose mainly out of the clandestine nature of the lease. Not surprisingly, however, Congress wanted more information on the deal, particularly those senators and representatives hailing from the West, who felt that the Departments of the Interior and Navy had gone behind their backs for the negotiations. The day after the *Wall Street Journal* article appeared, Senator Kendrick introduced a resolution calling for an investigation into the Department of the Interior and Navy's actions.[93] He demanded that the Secretaries of the Interior and Navy "inform the Senate, if not incompatible with the public interests, whether such negotiations are pending, and if so…whether opportunity will be given the public for competitive bidding for the operation of these lands, or whether it is proposed to award a lease or other operating contract or agreement for the entire area to one person, corporation, or association." In addressing the conflict, Kendrick outlined his two biggest concerns regarding the lease. First, "whether there is any present need for the development and operation of…Teapot Dome." Second, "if there is such need, whether

[93] Noggle, *Teapot Dome*, 1965, 37.

the interests of the Government would be best preserved by a private or a public sale." In essence, Kendrick's complaint was that, if drilling could indeed be demonstrated to be the best course of action, the people of, first, the state of Wyoming, and second, the United States, had a right to be informed "before any arrangement by contract or otherwise is made for the development of this field." The Senate agreed without debate: the initial stages of the investigation were to commence.[94]

In doing so, Kendrick effectively set the stage for what would become one of the greatest political scandals in American history. As he stated in his initial remarks, the main question driving the case's early development was decidedly simple: was there any reason to open Teapot Dome for drilling? According to the Department of the Interior, this was a matter of simple conservation: in the years leading up to the scandal, the federal government had begun to drill on the California Naval Reserves after they realized that vast mineral deposits were being lost to contiguous fields owned by private companies and individuals.[95] According to government officials, by 1921, "twenty-two million barrels of oil had been lost through failures of the Wilson administration to drill protective offset wells there. This loss was irrecoverable, and the best that the Interior could do would be to inaugurate a drilling campaign to save the oil that still remained in the ground."[96] As such, if the Teapot Dome field could be demonstrated to be similarly situated, it made sense from even the most rigidly conservationist standpoint to drill. But as Senator Kendrick outlined in his initial resolution to the Senate, "this is not the

[94] *Congressional Record,* 67th Congress, 2nd Session (April 15, 1922), 5567-5568.
[95] In addition to abutting claims, the California reserves were notable in that they contained sections of privately held land, acreage that had been filed on prior to the withdrawal and where individuals could and did drill, making the situation in this state all the more precarious—and decidedly different—than that of Wyoming. Olien, Hinton, and Olien, *Oil and Ideology*, 130.
[96] Burl Noggle, "The Origins of the Teapot Dome Investigation," *The Mississippi Valley Historical Review* 44, no. 2 (1957): 258.

condition that prevails in the Teapot Dome. There…no wells have been drilled in the vicinity through which by any possibility this reserve could be drained. It would appear, therefore, that there is no danger of the oil in the Teapot Dome being removed until the Government acts."[97] The case would depend upon how the field was understood.

Like the state-sponsored geological surveys that had played such a major role in Salt Creek's rise, the question here was both scientific and place-based: what was the subterranean geology of the Teapot Dome field? More specifically, was it a geological component of the Salt Creek field? Were the massive quantities of oil that were being extracted at Salt Creek (which was at its peak during the Teapot Dome Scandal) actually the property of the United States Navy? As noted earlier, Salt Creek Dome was geographically contiguous with Teapot Dome, located immediately to its northwest (see Figure 14). But the subterranean geology—the physical composition of these oil sinks—remained, as it did during the numerous surveys and bulletins that had been produced over the previous decades, products of conjecture. Proponents of the lease—most notably Secretaries of the Navy and Interior Denby and Fall—could and did claim that the geological structure of the field and its proximity to the thriving Salt Creek Dome made it so that Teapot Dome, like the California fields, was losing thousands of barrels of oil by the day.[98] Because Salt Creek was then producing at its peak, such a claim had a ring of

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[97] *Congressional Record,* 67th Congress, 2nd Session (April 15, 1922), 5568.

[98] Much of this argument had to do with what had been happening at the other two Naval Petroleum Reserves in California, which were, beyond anyone's doubt being drained by adjacent fields, and which, according to some estimates, resulting in losses of nearly $10,000,000 dollars. *New York Times,* May 7, 1922. One of the best visualizations of how drainage works is the final scene in Paul Thomas Anderson's *There Will Be Blood*. In this scene, oil tycoon Daniel Plainview tells an old acquaintance, Eli Sunday, how he, Plainview, had drained all of the oil out from under Sunday's field simply by having drills in the adjacent fields. As Plainview tells Sunday, "Drainage! Drainage, Eli, you boy. Drained dry. I'm so sorry. Here, if you have a milkshake, and I have a milkshake, and I have a straw. There it is, that's a straw, you see? Watch it. Now, my straw reaches acroooooooss the room and starts to drink your milkshake. I...

credibility to it. As Secretary Fall proclaimed, "the undeniable facts, in so far as human judgment can ascertain them from expert evidence and otherwise, are that at least a certain portion of the north part of the Teapot Dome is now, or will be, disastrously affected through drainage by drilling upon the lands outside the reserves which drilling is now being carried on from day to day."[99] But Fall was a politician, and much as the states had brought in professional geologists to conduct surveys and to communicate their findings to the people, he flew in his own scientific experts. In May, less than a month after the scandal broke, he was able to obtain testimony from Wyoming State Geologist G.B. Morgan, who stated definitively that "Teapot Dome and Salt Creek are separate structures with practically no possibility of draining Teapot through Salt Creek wells."[100] Not satisfied, Fall contracted a pair of eastern scientists, going to New York and flying Frederick G. Clapp and James O. Lewis to examine Teapot Dome themselves. In their report, the two men proclaimed that the reserve was "being steadily drained and now contains less than 70 per cent of its original estimated storage of 150,000,000 barrels."[101] Much as with the case with the California fields, Clapp and Lewis alleged that immediate action was needed to prevent the theft of government resources. In what would appear to be a contradiction in terms, the government needed to begin drilling in order to protect the country's natural resources.

On the other side of the debate, opponents such as Kendrick, Wisconsin Senator Robert LaFollette, and a handful of competing geologists claimed that the Salt Creek

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drink... your... milkshake!" *There Will Be Blood,* directed by Paul Thomas Anderson (2007; Los Angeles, CA: Paramount Vintage/Miramax), DVD.

[99] "Harding Approves Fall-Denby Leasing of Navy Oil Lands," *New York Times,* June 9, 1922, 1.

[100] "Teapot Dome Oil Fight: Grounds on which Far-Reaching Investigation of Naval Reserves Lease is Based—What Defenders of Administration's Action Say—Controversy Stir Capital," *New York Times,* May 7, 1922, 1.

[101] Experts Uphold Teapot Dome Lease," *New York Times,* October 23, 1923, 23.

formation was unique in that it was incapable of being drained by surrounding fields. They argued that it possessed a 2,500-foot deep water line that effectively divided it from the adjacent Salt Creek field. As such, it "was one of the few oil fields in the world which cannot be drained by wells in contiguous territory." To illustrate this point, the *New York Times* included a large map of the Salt Creek and Teapot Dome fields, illustrating their layout and the aforementioned water line that delineated the two (see Figure 14). Once again, this was a conjectural picture, a narrative representation via image that was presented as if a mimetic reality. But they also printed rebuttals to Fall's geologists, particularly the aforementioned Clapp and Lewis. One week after their report was published, the *Times* printed a letter to the editor disputing these findings. Chester W. Washburne, an established member of the United States Geological Survey but someone who was, at the time, writing as a private citizen, opined that the *Times* article "commits a serious error" by presenting Clapp and Lewis's finding as if they meant to say thirty percent of the reserve had been drained by surrounding wells. Washburne then proceeded to detail that this loss would actually result from the decreases in pressure that naturally accompany mining—that is, it would occur whether there was any drilling on the surrounding land or not. He went on to give a rather convoluted and, for the average citizen, detailed account of how the "hydrostatic pressure of the water in the oil sand" could, and most likely would, be restored over time. Crucially, however, he then pivoted to a more humanistic attack: by leasing and subsequently drilling the reserve, the government "destroyed the navy's insurance of an oil supply for the expected time of serious need." In doing so, they "had no more right to do this at a time when we have enough oil for pleasure cars and everything than a father would have to sell his life

insurance."[102] In concert with Washburne, other proponents claimed that, "by leasing the field the Government did not lose but made a bargain that will mean the saving of millions of dollars to the nation."[103] In effect, they argued that Fall, Denby, and their associates had made the initial lease without proper attention to the specifics of place: instead of looking at the particulars of Teapot Dome, they had imposed their understanding of California oil fields onto the very different geology of Wyoming.[104] It was the perils of the Cattle-Bison System of ranching all over again.

By waging such attacks, La Follette, Kendrick, and other opponents produced a potent counter-narrative, portraying the reserves as remaining full and safe, effectively enduring in the same condition as when they had been originally protected in 1910. But what is most notable about this first stage of the Teapot Dome Scandal—roughly contiguous with the calendar years of 1922 and 1923—is that both sides employed a similar tactic: focusing on the concrete location of the oil field, they debated scientific details concerning Teapot Dome's geology, the proximity of surrounding oil claims and drills, and the possibility that said claims could leach oil out of the Naval Petroleum Reserve. Their stories contained maps and references to particular locations in the state of Wyoming in order to situate a largely eastern audience. Further, much like the states that had financed the initial mineralogical surveys, they tended to lean upon testimony from professional geologists for authority and clarity. It was a conflict over the scientific understanding of place.

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[102] Chester M. Washburne, "Letters to the Editor: Teapot Dome Resources," *New York Times,* October 28, 1923, XX8.
[103] "Teapot Dome Oil Fight," *New York Times*, May 7, 1922, 1.
[104] Ibid.

This all changed in 1924, when "testimony began to creep in that had no bearing on the scientific phase of the subject. The relations between Mr. Fall, former Secretary of the Interior, and Mr. Sinclair, the lessee of Teapot Dome, came to have paramount importance."[105] In late-November and early-December of 1923, rumors had started to percolate concerning Secretary Fall and his actions. For years Fall had owned a farm—the Three River Ranch—in his home state of New Mexico. By all accounts it was a run-down, decidedly humble property, with one neighbor going so far as to describe the ranch during the late-teens and early-1920s as "completely broke."[106] But in late-1923, officials in Washington began to hear about the ranch's sudden éclat, one that coincided rather fortuitously with the Teapot Dome Lease. In January of the following year, it came out that Fall had received a loan of $100,000 to improve his ranch in exchange for signing the lease.[107] At first, it was not clear if the loan was from Sinclair or from another associate, but before this could be properly sorted out, Theodore Roosevelt's son of all people, Archie, an (at this point, former-) employee of Sinclair, testified upon his own volition before the Senate, stating that he had resigned his job over suspicions of Sinclair's wrongdoing in relation to the lease. Under oath, he claimed that Sinclair's private secretary had informed him, Roosevelt, that, he had made a payment at Sinclair's request to the foreman of Fall's Three River Ranch for $68,000. In response to this claim, the foreman was subsequently called before the Senate, asserting that the payment was for far less than what Roosevelt claimed, only "six or eight cows." Nevertheless, the rumor and Archie Roosevelt's appearance had forever altered the case's trajectory,

[105] "Teapot Dome Casts a Broad Shadow," *New York Times,* January 27, 1924, XXI.
[106] "Witness Says Fall Was 'Broke' in 1920," *New York Times,* December 1, 1923, 15.
[107] At first *Washington Post* editor Edward McLean was named as the source of the loan. In late-January, however, Edward Doheny, close friend of Fall and a man with ties to the oil industry, was revealed to be the true source. Noggle, *Teapot Dome*, 74–75.

effectively turning "what had been a somewhat tiresome investigation into a national sensation."[108] Carnage soon followed. On February 18, Secretary Denby unexpectedly resigned. The next month the Senate passed the Wheeler Resolution, calling for a full investigation of Attorney General Dougherty and his failure to prosecute Fall, Sinclair, Doheny, and the other major players of the affair. On March 28, Dougherty resigned, an event that catalyzed a tangle of subsequent court proceedings which would drag on for years, ultimately resulting in a void of the lease and Fall's conviction in October 1929, the first United States cabinet member to serve a prison sentence for crimes committed while in office.

It was an end that nobody had foreseen just a few years earlier; a scandal that had been so explicitly concerned with place and geology had somehow devolved into one concerning greed, backroom dealings, and the flagrant abuse of government power. As *The New Republic's* Bruce Blevin complained in the investigation's latter stages, "the fact that hardly anyone anywhere cared about the case as long as it concerned only the violation of our policy of conservation, and the looting of 30,000 acres of public lands containing a quarter of a billion barrels of our rapidly diminishing reserve of oil. Only when the matter developed a personal scandal, the bribery of a high government official, did the public suddenly wake up and lick its lips." And while in many ways such a shift seems to be a mere consequence of the case's larger development—of the revelation of certain bribery-related information—it is emblematic of larger shifts that were affecting the United States at the time. Throughout the first part of the twentieth century and accelerating during the 1920s, we see the rise of what has variously been dubbed

[108] "Dramatic Turn in Inquiry," *New York Times,* January 22, 1924, 1.

"sensational" or "jazz journalism," prose that more readily latched onto scandal and excitement than the more conservative pillars of objective journalism.[109] Newspapermen such as Glenn Frank, editor of *The Century,* bemoaned this shift, claiming that, "the editor [today] is frequently more concerned with capturing the reader's 'interest' than with discovering and discussing the reader's 'interests.'"[110] The effects can be seen in the Teapot Dome case itself, not merely in the shift from empirical geology to what amounted in many cases to simple gossip, but also in the specific rhetoric that journalists employed. In one of the most conspicuous examples, the *Washington Times* portrayed the case as having "all the atmosphere of a murder trial, combined with the bated breath excitement of the opening of King Tut's tomb."[111] This is also a narratological move, one that shifted the focus away from place and toward the melodramatic and the tawdry. For the thing about murder trials and politic scandals is that their appeal stems largely from their predictability, the universal formula upon which they rely.[112] Under such a structure,

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[109] Lee Brown, *The Reluctant Reformation: On Criticizing the Press in America* (New York: David McKay Company), 1974; George N. Gordon, *The Communications Revolution: A History of Mass Media in the United States* (New York: Hastings House) 1979; Hanno Hardt and Bonnie Brennen, eds. *Newsworkers: Toward a History of the Rank and File* (Minneapolis: University of Minnesota Press) 1995; John Hulteng, *Playing it Straight: A Practical Discussion of the Ethical Principles of the American Society of Newspaper Editors* (Chester, Connecticut: The Globe Pequot Press) 1981; Dan Schiller, *Objectivity and the News: The Public and the Rise of Commercial Journalism* (Philadelphia: University of Pennsylvania Press) 1981.

[110] Glenn Frank, "The Seven Deadly Sins of American Journalism," The Century 106 (July 1923): 477. For other contemporary opinions, see Charles Merz, "Bigger and Better Murders," *Harper's Monthly Magazine* 155 (August 1927): 341; Silas Bent, "Roller Coaster Journalism," *Saturday Review of Literature* 4 (May 1928): 884-886; Roy Howard, "What Do Newspapers Owe the Public?" *Collier's Weekly* 75 (January 1925): 25.

[111] Quoted in McCartney, *The Teapot Dome Scandal*, 234.

[112] Crime stories, although popular from the mid-nineteenth century through the present day, were particularly in vogue during the second quarter of the twentieth century. One of the greatest critics of this was Edmund Wilson, who, in a series of *New Yorker* articles, excoriated what he saw as the low-denominator, formulaic nature of the genre that was nevertheless among the most popular in the country. Wilson reaches the conclusion that, "the reading of detective stories is simply a kind of vice that, for silliness and minor harmfulness, ranks somewhere between smoking and crossword puzzles." He continues, "Detective-story readers feel guilty, they are habitually on the defensive, and all their talk about 'well-written' mysteries is simply an excuse for their vice, like the reasons that the alcoholic can always produce for a drink." Nevertheless, he hits on the major reason why this genre, even in its non-fiction representations, such as the Teapot Dome Scandal, was—and is—so popular: "The addict reads not to find

the specifics of place and situation naturally recede into the background, overtaken by the exigencies of scandal, the guilty what-will-happen-next sorts of questions that readers and viewers grow to love. In short, place was abstracted, erased in favor of a medley of non-thermodynamic concerns.

What resulted was not merely one of the most sensational political scandals in American history, but also a critical turning point in American energy history: a moment in which the material basis of our energy use was permanently pushed out of sight, transformed into an abstract, placeless space. As the *Wyoming Reporter* summed it up in early 1924, "much has been said in the past year, about the Teapot lease, but seemingly little is known by the world at large of the dome itself, which is situated in Natrona county."[113] As the navy shifted from coal to oil—and as Americans more broadly settled into a period of readily available electricity, heating, and gasoline-powered vehicles—the material basis of such energy use slowly receded out of mind, obviated by such source's increasing availability.[114] Oil's status as something subterranean and therefore only partly known opened it up to political maneuvering: it was able to support the weight of competing claims, many of which were vastly different but no less true. Far from being random or desultory, then, this shift in the Teapot Dome case—from a focus on place, science, and conservation to a focus on political corruption that is divorced from the land—represented a larger trend in American energy history. Although energy extraction was on the rise thanks to detailed geological understandings of place, energy production

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anything out but merely to get the mild stimulation of the succession of unexpected incidents and of the suspense itself of looking forward to learning a sensational secret." Edmund Wilson, "Who Cares Who Killed Roger Ackroyd," *The New Yorker,* January 20, 1945. See also, Wilson, "Why Do People Read Detective Stories?" *The New Yorker,* October 14, 1944.

[113] Roy Churchill Smith, "The Tale of the Teapot," *Wyoming Reporter* March 18, 1924, 4C.

[114] See, for instance, Christopher Jones, who writes that by 1930, "Mineral energy sources were not a luxury for Americans . . . they were a necessity." Jones, *Routes of Power*, 226.

worked to simultaneously erase these efforts, paving the way for an experience of use that would soon forget the western provenance of much of the country's energy.

Conclusion

It is ironic that the Teapot Dome Scandal coincided with the Salt Creek field's peak years of production. In 1923 and 1924, two new refineries were built in Casper just to handle the increased production, but even they couldn't keep up with the supply of oil that was flowing in from the fields. This forced all of the producing companies to band together and build a series of 80,000-barrel storage containers on the northern end of town to handle the excess. These tanks would eventually store more than fourteen million barrels, much of it remaining there, untouched, until the late-1930s, when the Great Depression and the corollary decline in oil production enabled the companies to process it.[115] By that point, however, the Teapot Dome lease had been cancelled and Senator Fall had already served his prison sentence for bribery, been released, and was feeling the effects of a long-term illness that would eventually kill him.

The two stories at first seem—and are often portrayed as—disparate affairs, conceptually and geographically isolated. But when viewed together, it becomes evident that not only are they intimately connected, but that they share a single story, one that reveals a great deal about the development of early-twentieth-century energy extraction and use. The stuttered rise of Salt Creek shares much in common with its close chronological and geographic neighbor, the Johnson County War. Like the Cattle-Bison ranchers, the earliest oil prospectors revealed a stunning ignorance when it came to the

[115] In 1923, the peak year of Salt Creek's output, the field accounted for just under five percent of American oil production. Roberts, *Salt Creek Wyoming,* 160-161.

local landscape. Although the work of Shannon and others drew much initial praise, it never amounted to anything concrete. In the ensuing years, a string of university-educated geologists worked to understand the local thermodynamic landscape, slowly but surely unearthing the baroque subterranean topography of the Powder River Basin. In combination with a number of technological breakthroughs, they helped propel Salt Creek to the apex of the American oil industry in the first few decades of the twentieth century. But where the Johnson County story ends, the Salt Creek narrative continues. To the southeast of the field, the abutting Teapot Dome ignited a nationwide political scandal. As fossil fuel use entered into mainstream American use, it began to be stripped of its local provenance. Instead of an augmented scientific understanding of place, narrative began to take on increased weight, ultimately emerging as the defining characteristic of the West's twentieth- and twenty-first-century energy industry. All of this begins by reconceptualizing one of the great scandals in American political history as one of the defining events in the country's environmental past.

CHAPTER FOUR

Powder River Coal:
The Cultural Construction of the Energy Capital of the World

Just over a year into his new role as president and C.E.O. of Peabody Coal Company, thirty-two-year-old Jack Peabody was still trying to make his mark on the family business. He had inherited the company from his father, Frances Stuyvesant, who had transformed it from a single wagon selling home-heating-coal door-to-door in 1880s Chicago into one of the country's preeminent energy providers.[1] But by 1920 the elder Peabody was gone, retired to an estate in upscale Oakbrook, and the coal market was similarly waning. In his brief time as president, Jack had done his best to staunch the decline and to expand the company's holdings, reaching beyond Peabody's initial Midwestern base into Kentucky, Virginia, and, most recently, northern Wyoming, where he had purchased a series of mines along the Tongue River, north of the burgeoning agricultural center of Sheridan. These properties were perhaps the most intriguing and risky in the whole of the Peabody portfolio; unlike the eastern and Midwestern mines,

[1] He had done this in part by developing close connections with Thomas Edison himself. One of Edison's employees, Samuel Insull, the head of Chicago Edison, is often credited with expanding Edison's initial electrical infrastructure into an entity capable of mass production. He did this by centralizing power output from a scattered multiplicity of small providers into core generating stations, increasing the size of steam turbines, switching Edison over from AC to DC electricity, and embracing coal as an energy source. In Chicago, the epicenter of this shift, he obtained his fuel supply by contracting with Peabody for coal. Later, he would become the chairman of Peabody's Board of Directors. See John F. Wasik, *The Merchant of Power: Sam Insull, Thomas Edison, and the Creation of the Modern Metropolis* (New York, (N.Y.): St. Martin's Griffin, 2008); Forrest McDonald, *Insull: The Rise and Fall of a Billionaire Utility Tycoon* (Washington, D.C.: Beard Books, 2004).

which harvested high-BTU bituminous coal to be sold to power companies and railroads, the Wyoming mines produced soft sub-bituminous coal for which there was not yet a ready market. Not only did this latter coal provide little heat when compared to bituminous (roughly one-third to one-fourth lower), but it was also located far from the traditional markets and population centers that claimed so much of Peabody's business. True, the Chicago, Burlington, and Quincy Railroad ran along the Tongue and through the properties, and that company had recently gone through the trouble of developing a custom-made grate "with modified fire boxes and stacks" for burning the region's boggy product, but in the grand scheme of things that market was small, limited to the northern plains and a few remote slices of the Pacific Northwest.[1] Unfortunately, so too were the region's domestic needs, emerging as they did from a small population of wood-poor northern Wyomingites who burned whatever they could simply to heat their homes and survive the brutal northern plains winters. What Jack Peabody needed was a new approach to the mines. What he needed was a new story.

In January 1922 he made an odd but in many ways prophetic proposal: he announced that the company would hold a christening contest for the newly acquired Sheridan properties. Employees at Peabody's Chicago headquarters were asked to create a new epithet for their Wyoming product, one that would transform the as-of-yet tertiary coal into something coveted and unique. The new cognomen would be copyrighted and bandied about in regional newspapers and weekly glossies, thrust into the everyday lexicon as the company expanded its Wyoming holdings and branded the name to a number of associated camps. Furthermore, the employee who generated this name was to

[1] Stanley A. Kuzara, *Black Diamonds of Sheridan: A Facet of Wyoming History*, (Pioneer, 1977), 183.

be awarded $50—roughly $650 in 2018, by no means a paltry sum. Unfortunately for us, the names of the abortive attempts have been lost to history. What we do know is the title of the winner's submission. By the second week of January, one of the company's stenographers had formulated the peculiar neologism "Kleenburn" as his entry, and Jack Peabody had loved it: the name called attention to what he saw as *the* defining characteristic of Powder River coal, what differentiated it from the more established eastern products. In contrast to the tussive smog that defined the everyday experience of modern coal, Powder River coal was a comparatively aseptic fuel, defined by its limited output of ash and smoke. And while we can only speculate as to why the winner swapped in that garish K for the more traditional C, it for some reason appealed to Peabody, giving the name a unique promotional flair, a bit of Joycean élan to usher in the opening of a new thermodynamic frontier on the northern plains.[2]

Over the next few years Peabody Coal embraced this novel approach, advertising Kleenburn as different—indeed better—than competing coals. Promotional slogans such as "Kleenburn Coal is all that the name implies," "High in Heat—Low in Ash," and "The Really Clean Coal," smothered regional newspapers.[3] Over time the company grew so besotted with the new name that they rechristened one of their mining towns—the erstwhile Carneyville—renaming it Kleenburn, a designation that remains etched in the Wyoming landscape to this day.[4] For its time, this was all revolutionary, an attempt at what we would now term rebranding, something akin to Apple's turn-of-the-century

[2] "'Kleenburn' is New Trade Name," *Sheridan Post*, January 13, 1921, 3.
[3] Advertisements in *Sheridan Post,* May 15, 1921; *Sheridan Enterprise,* December 22, 1922; *Wyoming Labor Journal,* September 2, 1927.
[4] Although no longer a town, the name Kleenburn is still a part of the Wyoming landscape as the Kleenburn Recreation Area, just north of Sheridan.

"Think Different" campaign.[5] Unfortunately for Peabody, however, it did not produce anything like the same results. Despite all of the promotional clamor, sales slumped in the ensuing years, and by 1924 the Kleenburn mine was permanently shut down. A decade later, the whole town was unceremoniously abandoned, the latest addition to the West's ever-swelling roster of ghost towns.[6] For the next few decades Peabody continued to market Kleenburn Coal from the Tongue River's abutting mines, though like so many other operations of the era, these too eventually closed, with the last Sheridan mine shuttering its doors in 1953.[7]

[5] Ronald E. Shields, "The Force of Callas' Kiss: The 1997 Apple Advertising Campaign, 'Think Different,'" *Text and Performance Quarterly* 21, no. 3 (July 1, 2001): 202–19.
[6] "Carneyville an Important Part of Area History," *Sheridan Press*, March 11, 2014
[7] This is the Monarch Mine, formerly owned by Wyoming Coal Co.

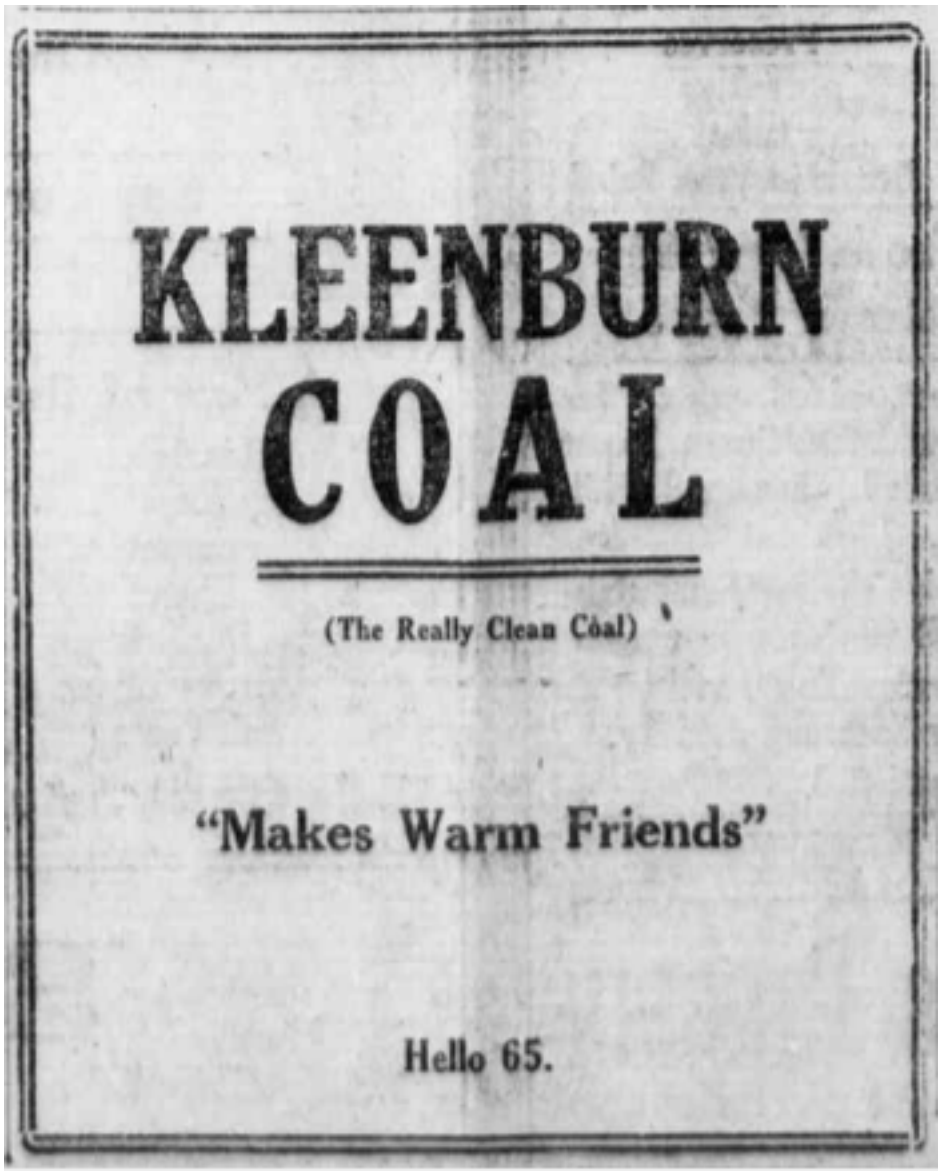

Figure 15: 1920s Kleenburn Advertisement
Sheridan Enterprise, December 22, 1922

It was a dismal end to an initially promising notion, one that had held so much hope for transforming the country's coal industry. And yet if we fast forward to today, nearly a century after Peabody's initial attempt to rebrand Wyoming coal as a paragon of clean fuel, we find that Peabody Energy is now the largest privately owned coal provider in the world. Its operational jewel, the North Antelope Rochelle Mine (N.A.R.M.), located in the heart of the Powder River Basin (just south of Gillette), is the largest coal

mine the world has ever seen. If Peabody were to hypothetically secede and form its own corporate country, it would rank as the ninth biggest provider in the world.[8] Seventy years after Jack Peabody's death, his company has managed to achieve everything that he could have hoped for and more, marketing Powder River coal as a cheap, clean, and affordable energy source for the twenty-first century.

The story of how this happened is the subject of this chapter. It is a tale of energy conflicts and competing narratives in the country's struggle to find a cheap and reliable source of domestic fuel, of the unlikely origins of the world's largest energy cache. For ultimately what is most intriguing about the late-twentieth-century rise of Powder River coal is its counterintuitive history, both deeper and far more complex than heretofore realized. Like the Teapot Dome Scandal, it begins with a battle over narrative: the aforementioned failure to rebrand Powder River coal in the 1920s. From there, however, it shifts to technology; unlike the oil strikes that preceded it, coal did not need to be discovered in the region—it quite literally covered the landscape. As such, the struggle was not for an increased understanding of place but for a method in which that overabundant coal could be efficiently excavated and sold. Beginning in the 1970s, these two approaches—narrative and technology—combined to give rise to the largest coal mines on the planet. It is a remarkable story of the transformation of a thermodynamic landscape. But despite what many modern commentators would have us believe, the monolith that is the Powder River coal industry is not a new or even a recent entity; rather, it is the product of the region's past failures at harnessing and exporting the

[8] Peabody Energy, *Peabody Energy: Celebrating Our First 125 Years, Shaping Our next 125 Years,* (St. Louis: Peabody Energy, 2008), 119.

region's energy bounty.[9] In order to understand this most recent thermodynamic surge and its future, then, we need to unearth the deep history of Powder River coal.

The Birth of Coal and the Death of Kleenburn

Although popularly known as an unvarying landscape of sere grass and the odd meandering stream, the northern plains' ostensible uniformity shrouds a much deeper and far more complex history. More than half a billion years ago, what is now the Powder River Basin possessed a tropical climate, a damp, sultry environs akin to modern day Sumatra or Borneo. In large part, this was due to its location, just north of the equator, sandwiched between a vast western ocean (known variously as the Western Interior Seaway or the Niobrarian Sea) and an eastern landmass of similarly sticky climes.[10] Across hundreds of millions of years the ocean periodically flooded this terrain, invading and retreating until, roughly a quarter of a billion years ago, in the midst of the Permian period, when the mountain chain that would become our modern Rockies began to rise and slowly sequester the ocean, transforming the future Powder River Basin into a swampy miasma of brackish backwater and the prodigious flora of the Permian and Triassic epochs. Here the primal P.R.B. settled into a relatively staid existence, passing hundreds of thousands of years as a quiet tidal marsh, until sixty million years ago, when the Big Horns began to rise and the P.R.B. to conversely sink, ultimately settling as a dished continental floodplain fed by the nascent rivers of the Yellowstone and its tributaries. Over millions of years, huge hypertonic ferns and leggy cypresses rose and

[9] See the conclusion to this chapter for one example of such polemics, the work of a handful of modern environmentalists.
[10] Joshua S. Slattery, "Late Cretaceous faunal dynamics in the Western Interior Seaway: The record from the Red Bird Section, eastern Wyoming," Master's Thesis, University of South Florida, 2011, 3-10.

fell, forming a dense bed of ever-accruing peat across the land. Through a combination of heat, compression, and a geological steep of millions of years, this peat was slowly transformed into coal, first lignite, the low-grade, sod-looking mineral we still see used in Germany, then sub-bituminous, the low-heat, low-sulfur product for which the Powder River Basin has become so renowned. Given more time, it would have become denser still, evolving first into bituminous, the fuel of the industrial revolution and the eastern U.S., and ultimately anthracite, the lacquered, blue-burning rock still found in parts of Pennsylvania and the more mountainous regions of Virginia.[11]

Because this coal was so shallow—often literally at the surface—it was hard for later migrants to miss. Oral histories record the region's indigenous inhabitants using coal for a number of medicinal purposes, identifying it as čhaȟlí, a Lakota word still in use today.[12] And while such yarns may or may not be apocryphal, what *is* clear is that by the second half of the nineteenth century, as American military expeditions and settlements penetrated the region in increasing numbers, people began to talk more broadly of the basin's bounty. In 1859, a full thirty years before the bloodshed of the Johnson County War, Colonel William F. Reynolds led an exploratory expedition from Fort Pierre (present-day South Dakota) overland to the headwaters of the Yellowstone River.[13] The group's naturalist was a Massachusetts geologist by the name of Ferdinand Vandeveer Hayden, a Union veteran and later head of the U.S.G.S. In his published report on the

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[11] Adam Rankin and Kathy Brown, "What Lies Beneath," *Gillette News-Record,* November 18, 2001. Note that the coal of the West and the Powder River Basin is decidedly younger than that of Pennsylvania, West Virginia, and other eastern and Midwestern states, created during the Paleocene Epoch approximately 55 million years ago. It is for this reason that it is so low in sulfur and heat

[12] Richard Martin, *Coal Wars: The Future of Energy and the Fate of the Planet* (New York City: Palgrave Macmillan Trade, 2015), 97. Another translation of the word is "gunpowder." See *Lakota Dictionary Online,* www.lakotadictionary.org.

[13] Unlike Lewis and Clark and the region's later traders, the Reynolds Expedition proceeded across land, bringing it over the undulating landscape of the Powder River Basin.

expedition, Hayden noted that "the whole region from the Platte to Pumpkin Buttes is covered with the true lignite beds… more or less pure."[14] Of course he was wrong about the grade of coal—we now know it to be sub-bituminous, one level higher and far more valuable than lignite—but he was right about the quantity: Hayden may well have been the first to publicize the prodigious coal of the modern Powder River Basin.

It would be decades before any commercial use was made of the material. Settlers did not begin to infiltrate the region in significant numbers until after the Indian Wars, in the late-1870s, with immigration peaking from the late-1880s on into the following decade. During this era, coal slowly evolved into a valuable domestic resource for early ranchers and homesteaders. This was because on the Powder River Basin—as on the plains more broadly—the traditional nineteenth-century heating source, wood, was largely absent. Settlers were therefore dependent upon a number of alternative energy sources to get them through the ruthless winters.[15] Due to its ubiquity, coal became the most obvious choice on the Powder River Basin. Settlers erected scores of small family-operated drift- and slope-mines in the vicinity of nascent villages and ranching outposts.[16] Tongue River residents would later recall how at that time "everyone had a little coal mine on their place," while farther north, in Decker, Montana, one family went so far as to erect a primitive strip mine—perhaps the first in the state—that locals traveled to from "miles around."[17] And as early as 1906, the Burlington Northern was advertising

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[14] F. V. Hayden, *Geological Report of the Exploration of the Yellowstone and Missouri Rivers* (Washington: Government Printing Office, 1869), 72.
[15] Recall chapter one and the impact that steamboats had in denuding the region of its limited tree growth.
[16] Drift mines enter hills horizontally. Slope mines angle down to a level where coal can be mined, then proceed horizontally. Both of these were either manual or animal-powered. In rare instances, rails were laid down into the mines to aid in excavation. Dan Daley, "Old Mines Lie Beneath Gillette Area," *The News-Record* (Gillette), February 13, 1986.
[17] Helen Fraser Interview, OH 1856, Montana Historical Society; Lavorna Benedict Interview, OH 1858, Montana Historical Society.

homesteads on the Crow reservation, promising prospective settlers "fuel is no problem there…extensive coal mines are numerous at no great distance," while local chambers of commerce claimed that "practically all of eastern Montana is underlaid with vast deposits of coal."[18] In short, well before Peabody came into town, settlers were making use of the Powder River's ample coal supplies.

Nevertheless, early coal use was largely limited to domestic settings. It was not until the last decade of the nineteenth century that more commercial attempts were made. All across the country, coal use was on the rise, surpassing wood as the country's preferred energy source in 1885. Eight years later, Sheridan's C.H. Grinnell—local cattle baron, prolific landowner, and later town mayor—attempted to take advantage of this shift by starting the Sheridan Fuel Company. He broke ground on their first mine on the Tongue—the Dietz—four miles north of town. By November of that initial year it was producing 450 tons a day. Although this was a respectable number for western coal, the S.F.C.'s early years were nevertheless rather ad hoc and bumbling: while eastern companies were marketing their product to the nation's burgeoning rail lines, the S.F.C.'s primary market seems to have been a local furniture store.[19] In addition to the limited local population, the problem was that regional railroads—even the Chicago, Burlington, and Quincy Railroad, along whose line the Dietz mines were located—shied away from burning the local product.[20] Like all locomotives of the era, the its engines were ill-suited for burning sub-bituminous coal, which was significantly softer than eastern bituminous

[18] "Opening of the Crow Indian Reservation: Yellowstone and Big Horn Valleys, Montana," PAM 4448, Montana Historical Society, 9; MHS, "In the Heart of the Yellowstone: Information for Homeseekers," PAM 120, Montana Historical Society, 19. As late as 1890, Wyoming's territorial geologist opined that, "the coal of this district has little use other than that of supplying a local market." Rankin and Brown, "What Lies Beneath," 2.
[19] Kuzara, *Black Diamonds of Sheridan*, 55–57.
[20] This line of mines roughly parallels Goose Creek (a tributary of the Tongue) north of Sheridan, just to the east of today's 1-90.

and had a tendency to disintegrate when heated, what rail engineers termed "decripitation." This was particularly true in the limited space and strong drafts of operating trains. The resultant particles were then either blown from the stack—in essence, representing wasted energy—or dropped between the grates of the fire box, not merely symbolizing bits of lost energy but also gumming up furnaces, requiring greater maintenance and increasing the threat of fire.[21]

In time, however, the cost and convenience of Sheridan coal won out, spurring a series of technological innovations. By 1901, the Burlington had managed to manufacture a custom grate that employed a more capacious furnace and a modified fire box for the softer coal. The next year they contracted with Grinnell's S.F.C. for 400-800 tons per day, the number varying according to seasonal need and supply.[22] As Sheridan's first significant commercial market, this development attracted a number of new investors, and over the next few decades the Powder River mining industry's ecological footprint grew, spreading farther north along the Tongue River's banks. The Monarch and Carneyville mines (later to become Peabody's Kleenburn) opened in 1903 and 1904, by which point Dietz had expanded its own operations to seven veins, excavating a total of 1,200 tons per day, enough, they claimed, to last ten generations.[23] Three years later, the Kooi opened southeast of the Tongue's big bend, followed in 1911 by two of the region's most accessible and shallow mines, the Acme and the Model. Finally, in 1918, what would grow to become one of Sheridan's most important mines, the Hotchkiss, came onto the scene. Less than a decade later it would set the world-record for coal-mining

[21] Kuzara, *Black Diamonds of Sheridan*, 183.
[22] "Agreement Between the Sheridan Coal Company and the Chicago, Burlington & Quincy Railroad Company," *Sheridan Post,* December 11, 1902.
[23] "Dietz Items," *The Enterprise* (Sheridan), December 4, 1902. Here the "ten generations" claim seems to imply that, if excavated at the rate of 1,200 tons per day, the mine's coal would last for ten generations.

efficiency: 19.5 tons of coal per man per day.[24] By that point, more than a dozen mines (counting all of the various Dietz mines) splayed out north of Sheridan, spreading nearly ten miles alongside the waters of the Tongue.

Such a boom, although brief, reflected both a shift in the regional demand for Sheridan coal and industry-changing approaches to extraction. In addition to the Burlington, the Northern Pacific began to take on a chunk of the Powder River product, contracting in 1910 for more than 1,000 tons daily for its trains. As a result, many of the aforementioned operations constructed small power plants at their mines, not for the purpose of generating marketable power but rather for electrifying their own operations, thereby increasing output: subterranean tunnels were lighted and lined with rails, upon which motorized cars were employed to haul out the harvested coal. Not surprisingly, production soared: by 1914, Sheridan's mines were producing close to two million tons annually, with three mines individually generating more than a quarter million each.[25] The jump in output mirrored coal's growing reputation in the region: as Wyoming's Secretary of State bragged, "Wyoming has enough [coal] to run the forges of Vulcan, weld every tie that binds, drive every wheel, change the north pole into a tropical region, or smelt all hell!"[26] No longer a bit domestic player peddling coal in local furniture stores, by 1920, the Powder River coal industry was morphing into a major player in the newly formed western market. Like the Salt Creek oil fields that preceded it, it was on the brink of becoming nationally known.

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[24] "Hotchkiss Coal Company Makes World's Record," *Wyoming Post Enterprise,* December 5, 1925. By 1901, as one visitor put it, "A visit to the mines will reveal the fact that from 40 to 50 cars of coal are loaded and set to point on the Burlington to give warmth at the fireside of thousands of residents who till the soil of the level plains."

[25] Kuzara, *Black Diamonds of Sheridan*, 184–87.

[26] Quoted in John Thilenius and Gary Glass, "Surface Coal Mining in Wyoming: Needs for Research and Management," *Journal of Range Management* (September 1974), 337.

It was into such an ostensibly fecund climate that Jack Peabody brought his Midwestern firm. By that point, Peabody Coal had blossomed into one of the largest coal providers in the country, operating a total of thirty-six mines across the U.S. and Canada. Their Sheridan acquisition represented an attempt to diversify their holdings and break into the promising but unproven western territory. In many ways this approach was prescient—instead of limiting themselves to local rail markets, Peabody attempted to increase its thermodynamic footprint by leveraging what William Cronon has called the "new capitalist logic [that the railroad introduced] to the geography of the West," and expanding into eastern-dominated markets.[27] By highlighting the material differences of sub-bituminous coal not as a deficiency but as a boon, Peabody was paving the way for the future titans of the industry.

This shift began with narrative. During the early twenties, Kleenburn's half-page advertisements dominated many of the region's newspapers—the *Sheridan Post, Wyoming Labor Journal,* and *Sheridan Enterprise,* with the *Post* alone printing nearly two hundred of their promotions over a year-and-a-half span. These ads inevitably built upon the original Kleenburn conception, attempting to portray Peabody's Wyoming product as the original clean coal: "No soot, three percent ash, very little smoke and lots of heat," "Kleenburn Coal is all the name implies," and the most prevalent, the straight-to-the-point "The Really Clean Coal."[28] Not willing to be left behind, Sheridan's regional competitors began to ape Peabody's tactics, similarly highlighting the area's unique blend of soft, young coal. The aforementioned Hotchkiss mine, a half mile north of Dietz, promoted what they described as "Nature's Finest Coal. More Heat, Less Ash, No Dust,"

[27] William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton, 1992), 81.
[28] *Wyoming Labor Journal* September 2, 1927; *Sheridan Enterprise*, November 8, 1922.

even taking a syntactical move out of the Peabody playbook, briefly (re)branding the company as "Hot-Kiss."[29] Wyoming's other mines soon took notice: in the Powder River Basin, Buffalo's Gray Coal advertised their product as "Good Clean Coal," while farther afield, on the eastern edge of Yellowstone National Park, Cody's aptly named Buffalo Bill Mine informed readers of "Orders Taken for good clean coal."[30] By the mid-1920s, it seemed that the push for clean western coal was in full swing.

What is important to realize is that despite the diversity of these approaches, this clean coal narrative was essentially the same argument that the federal government would make half a century later. Unfortunately for Peabody and the other Sheridan purveyors, however, such rhetoric had a negligible impact on Jazz Age consumers. While pollution and smoke were certainly legitimate worries in the first half of the twentieth century, they were not to such a degree that consumers were willing to forego the patent thermodynamic superiority, cheapness, and overwhelming availability of eastern bituminous coal. Part of this had to do with perceptions of air quality, health, and pollution. In many of Colorado's turn-of-the-century coal towns, for instance, residents rhetorically equated the presence of smoke and pollution with prosperity.[31] Similar claims emanated out of Butte, where the notorious copper baron and mining-city bigwig William Clarke heralded the city's infamously hazy air, asserting that the arsenic transformed Butte women into the most beautiful in the world.[32] With such a blissful—and, we would now say, naïve—outlook, it should not be surprising that Peabody and the other Sheridan

[29] *Wyoming Post Enterprise,* October 26, 1923.
[30] *Buffalo Bulletin*, January 19, 1922; *Cody Enterprise*, January 9, 1924.
[31] Thomas G. Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge, Mass: Harvard University Press, 2008), 65–66.
[32] Timothy J. LeCain, *Mass Destruction: The Men and Giant Mines That Wired America and Scarred the Planet* (New Brunswick, N.J: Rutgers University Press, 2009), 68.

producers were bound to fail. When the inevitable crash finally did come, it was remarkably swift. Dietz saw its output fall from 115,000 tons in 1921 to 45,000 the following year. Two years later, Kleenburn laid off 300 workers and closed its principal mine, the former Carneyville, citing a lack of orders. The bulk of the region's competing operations were similarly shuttered within the decade. A few—Acme and Monarch—hobbled on through the depths of the Great Depression, managing to carve out niche supplies of domestic and limited railroad coal, lasting until 1940 and 1953 respectively.[33] Put simply, the initial promise of the Tongue River mines failed to manifest. The clean coal narrative simply never gained a foothold amongst Jazz Age consumers unconcerned with urban and domestic pollution. As Kleenburn and the rest of the Sheridan producers were finding out, it would take more than a name change to put Powder River coal on the map. It would take a fundamental shift in the country's relation with both air and coal.

New Technologies: Colstrip and the Shift to Open-Pit Mining

Part of the issue was efficiency. While the Sheridan mines had introduced electricity into their operations for the very purpose of improving production, their output per man was nevertheless materially circumscribed. These were cramped underground mines after all, spatially restricted and thereby limited in the amount of coal that was available for any person to mine at any given time. Even post-electricity, horses and mules were routinely employed to haul loads to the central rail artery, where a motorized cart would bring them to the surface. In other words, despite the availability of electrically powered machinery, and despite the fact that Powder River coal had the

[33] Kuzara, *Black Diamonds of Sheridan*, 111, 149.

thickest seams that anyone had ever seen, the technology was still that of eastern small-seam mining. Peabody and the rest of the Powder River companies were stuck trying to replicate the long-established eastern methods on less valuable coal.[34] Not surprisingly, they failed.

The Northern Pacific Railroad (N.P.) was the first to realize the absurdity of this approach. Completed in 1883, the N.P. was the northernmost of the (American) continental railroads, stitching Lake Superior to the Puget Sound. Its Montana path traced the banks of the Yellowstone, passing through Glendive, Miles City, and Billings (at the northern reaches of the Powder River Basin before continuing west). Since the late 1890s, the railway had relied upon their mines at Red Lodge, Montana, just northeast of Yellowstone National Park, for most of its northern plains fuel supply. Run by the Northwestern Improvement Company (N.I.C.), a subsidiary of the Northern Pacific, the mines at Red Lodge produced a steady and reliable supply of coal through the early-twentieth century. During and after World War I, however, they began to experience a number of labor conflicts: both 1919 and 1922 saw extended strikes that put the N.P.'s northern plains operations in question. Consequently, the Red Lodge mines, for so long a reliable producer, began to grow increasingly expensive, proving themselves unable to keep up with growing railroad demands.[35]

In an effort to alleviate themselves of such financial woes, the N.I.C. looked to the grasslands of southeastern Montana, thirty miles south of the Forsyth, in the sagebrush plains surrounding the Yellowstone and its southern branches. The land there was

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[34] Ibid., 117.

[35] For coal and land grants, see Ross Ralph Cotroneo, "The History of the Northern Pacific Land Grant, 1900-1952," (Ph.D. dissertation, University of Idaho, 1967). For Red Lodge, see Rita McDonald and Merrill G. Burlingame, "Montana's First Commercial Coal Mine," *Pacific Northwest Quarterly*, Vol. 47 (1956).

sparsely settled and, thanks to a long drought that presaged the ensuing Dust Bowl, becoming more so every day. According to one estimate, 70,000-80,000 people moved into eastern and central Montana between 1909 and 1918, but by 1922, when the N.I.C. was looking to enter the region, 60,000 of those had already departed.[36] In the wake of the Red Lodge troubles, the N.P.'s Chief Engineer, H.E. Stevens, and Lochren Donnelly, son of the N.P.'s chairman, surveyed what would later become known as the "Rosebud Seam." It was by all appearances the answer to the company's northern plains difficulties, one of the richest and shallowest coal lodes they had ever seen. To harvest it, they recommended that the N.P. build a thirty-mile branch line down to the field at a cost of just over one million dollars. And while the younger Donnelly claimed that "the Rosebud bed covers such a large area that the work required to get an accurate estimate of the amount of coal is impractical," a series of experimental shafts and core samples led to an average estimated seam thickness of twenty-eight feet and 240 millions tons of mineable coal on Northern Pacific lands. Although it was of lower quality (as measured in energy output, BTUs) than that found in Red Lodge, the coal's proximity to the surface meant that it could be mined for one-fifth the cost. The only problem was its isolation. The coal was transportationally remote, in land inhabited by just a few ranchers at the upper edge of the Northern Cheyenne Reservation. As a result, the Northern Pacific decided to adapt Stevens' and Donnely's proposals, building a new rail branch to the location and, in the proper Montana tradition, erecting a company town that they dubbed Colstrip.[37]

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[36] K. Ross Toole, *Twentieth-Century Montana: A State of Extremes* (Norman: University of Oklahoma Press, 1972), 26.

[37] The Montana tradition here is that of Anaconda, who created a similar company town, the eponymous Anaconda, west of Butte in the 1880s. Also similar to Colstrip, the original proposed name for Anaconda

The name was a nice play on words, a corporate neologism in the style of the erstwhile Kleenburn. But what brought Colstrip its eventual success was not wordplay but brute technology, in particular the heretofore little-used method of open-pit or strip mining, in which electrified shovels dug coal from above and loaded it onto rail cars, thereby both reducing labor costs and increasing production.[38] In the United States, this method had been employed in hard-rock extraction for close to two decades, but such use had been limited to other industries, the most notable being the cavernous copper mine at Bingham Canyon, Utah, and the iron operations of Minnesota's Messaba range. Historian Timothy LeCain has coined the term "Mass Destruction" to describe the socio-technological revolution that this switch from subterranean mining unleashed, explaining it as powered by "the relentless drive for efficiency" that characterized twentieth-century America.[39] Under its domain, the days of skilled workers drew upon years of experience to identify and extract underground veins were obviated; in their place came great cranes that dug up as much earth as possible, leaving science and technology to handle the resultant sorting.

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was "Copperopolis," one that was abandoned only because it was already taken. William B. Evans and Robert L. Peterson, "Decision at Colstrip: The Northern Pacific Railway's Open-Pit Mining Operation," *The Pacific Northwest Quarterly* 61, no. 3 (1970): 129–33; Louis Tuck Renz, *The History of the Northern Pacific Railroad* (Fairfield, WA: Ye Galleon Press, 1980), 240-241.

[38] There was initially debate over whether to employ open-pit methods at Colstrip. Interestingly, one of the primary motivators for making the shift was the fact that it involved fewer employees and therefore had less chance of suffering from the labor issues that plagued Red Lodge. Evans and Peterson, "Decision at Colstrip," 134–35.

[39] LeCain, *Mass Destruction*, 111.

Figure 16: Open Pit Mining at Colstrip
Hough, "Mining Coal with Mammoth Shovels" *Scientific American*, April 1930, 298.

In essence, open pit mining took factory Taylorism and transported it to the open world of large-scale metal extraction. In doing so, it effectively created the template for the region's later coal empire, working out the complex, technologically infused world of getting coal from the ground to the furnace. Everything about this new mode revolved around the notion of efficiency. As it did with copper mining, the process began with

brute destruction: black powder—used in so much of the great railroad building boom of the late-nineteenth century—was piped into a series of narrow holes that had been drilled at precise, pre-calculated distances in order to effect the desired damage. It would then be ignited, the resulting explosion loosening the overburden and cracking the subterranean coal into more manageable chunks. Next came the loading stage, during which huge electric-powered shovels (the original plan was to use steam) picked up and loaded the shattered slabs onto trains.[40] According to one observer, "from an esthetic point of view, the appearance of the landscape is not enhanced by stripping operations, but the working present an interesting picture, particularly from an airplane," where it "assume[d] the appearance of a series of miniature mountain chains placed side by side."[41] From there, the trains brought the coal chunks to the company's central processing plants, where sorters and hoppers further crushed the coal to the desired consistency while filtering out impurities. Finally, the finished product was loaded onto transcontinental trains for its final destination.[42]

For the northern plains and the coal industry more broadly, this was a new way of operating, one that inspired—and continues to inspire—an odd mix of awe and near-dystopian fear. As the first mine in the country to be completely electrified, Colstrip was a minor media sensation. National media outlets sent reporters west to describe the technological innovations for distant coastal readers. The *Scientific American* attempted to convince its audience how, "man's domination of the earth is appreciated when one

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[40] The problem with using steam was two-fold. First, eastern Montana is a notoriously arid climate. Second, the water that is available is extremely alkaline, which would have caused major corrosion and mechanical headaches for the upkeep of the machinery. *Foley Brothers Inc., an Eighty Year Story*. (Saint Paul, Minn.: The Corporation, 1957), 8;
[41] Hough, "Mining Coal with Mammoth Shovels" *Scientific American*, April 1930, 297.
[42] LeCain, *Mass Destruction,* 111, 136–37.

witnesses the gargantuan work of a new electrically-driven machine, operated by one man, which bites a hole in the ground large enough to serve as the cellar for a house, and deposits the 15 tons of excavated earth a full city block away, perhaps at a height equivalent to that of a 10-story building. Within one minute the operation is complete, and the shovel is back for another 15-ton bite."[43] The equipment referred to here, a Marion 350 stripper, had the "longest operating range of any shovel in the world." Over the course of a day, it and its partner, the nearly as large Bucyrus-Erie 175-B, could load 20,000 tons. As one Montana newspaper opined, "Goliath would have stood aghast at the Northern Pacific Railway Company's mine at Colstrip, Montana."[44] When stitched into the Taylorist model that was open-pit mining, these machines operated at scales and paces that made Sheridan look like a pick-and-shovel pastime.[45]

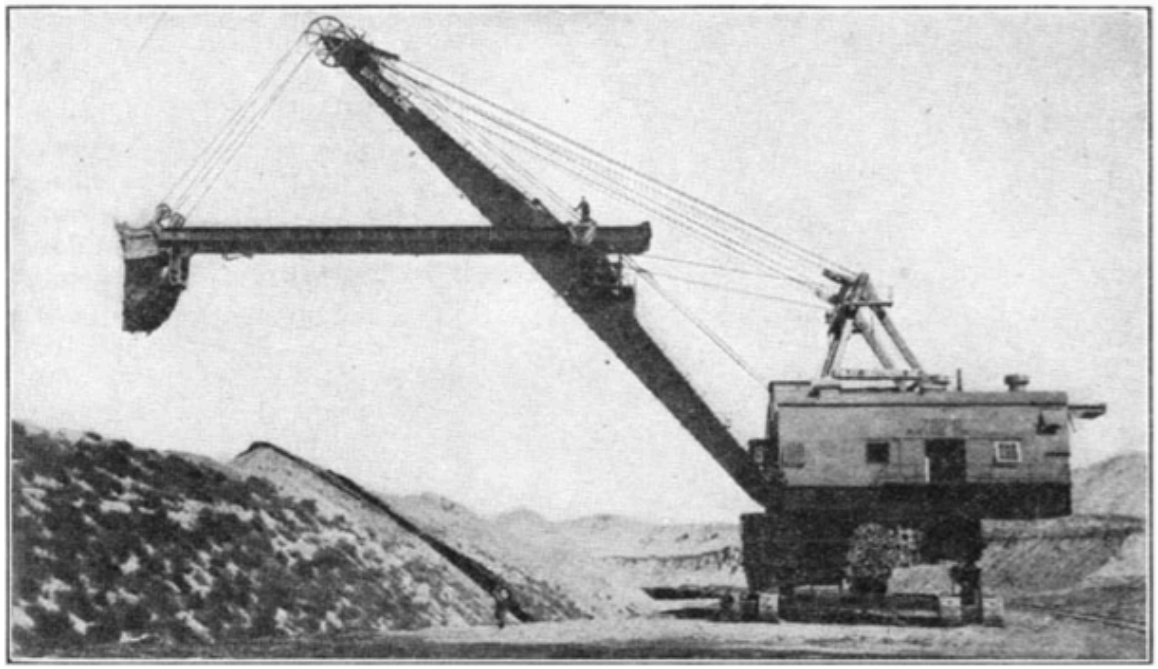

Figure 17: Colstrip's Marion 350 Stripper
Hough, "Mining Coal with Mammoth Shovels" *Scientific American*, April 1930, 298.

[43] Hough, "Mining Coal with Mammoth Shovels", 296-297.
[44] "Huge New Shovel Scoops Up Coal From Open Pit of N.P. Mine at Colstrip," January 24, 1930, Colstrip Vertical File, Montana Historical Society.
[45] Hough, "Mining Coal with Mammoth Shovels", 296-297.

The results were remarkable. By the start of World War II, Colstrip was producing 2.5 millions tons of coal per year, roughly double that of all the Sheridan mines combined at their peak. (Sheridan's greatest single-mine, single-year output was approximately 350,000 tons).[46] This was possible thanks to round-the-clock operation and a new addition to the mine's infrastructure, a three-million pound shovel capable of lifting thirty tons at a time.[47] For years on end this steel bit down into a seam of coal closer to the surface and thicker than any previously known, each gouge adding to the company's profits. Over its first three decades of operation, the mine excavated some forty-four million tons from the grounds, supplying two-thirds of the Northern Pacific's coal and saving the railway more than $50 million.[48] In doing so, it became the first unequivocal success story in the Powder River Basin's coal history, paving the way for the Gillette-area empire in the process.

It all sounds eerily similar to the technologically transformation that had rocked the copper industry a few decades earlier. But what is important to realize is that Colstrip was not simply parroting the methods of other non-coal open-pit operations. There was a key difference between the "Mass Destruction" described by LeCain and that practiced in the Powder River Basin. The driving belief at Bingham Canyon (and later Butte's Berkeley Pit) was that modern copper mines were "more often made than discovered." Open-pit mining came to the copper fields precisely because the metal was of such low-grade: the high-density copper of Michigan and Butte was by this point diminished, and

[46] "Montana Coal Forum Proceedings: September 20-22, 1984," Butte, Montana. S 622 M662S No. 93, Montana Historical Society, 24.
[47] "Montana Power Leases Colstrip Property for future Power Source," *Industrial Horizons,* 4, no. 5, (May-June 1959): 2.
[48] "Colstrip History," Colstrip Vertical File, Montana Historical Society.

the quantity of extant copper per acre or ton of land (less than two-percent) was so low that the only way to make a profit was to go through it with speed and power. The sheer scale of strip mining meant that copper could, in essence, be coaxed from ever-diminishing percentages, the whole operation ultimately progressing to the point where concrete copper presence was infinitesimal and yet, paradoxically, had little effect on the ultimate outcome. "It was obviously a cultural construction," LeCain writes, "a product of engineering and technology rather than a national treasure that had been discovered."[49] It was abstract and intangible; you could neither see nor touch the copper veins. The determining factor was not so much the quantity of copper in the ground as it was the ability to strip away huge chunks of land (i.e., that there were not people living there).[50] You could technically do it anywhere.

This was decidedly not the case in the Powder River Basin. Not only could you patently see the coal that lay there, slicing up through the surface in thick seams and cutbanks, but as early settlers were quick to point out, in many spots you could quite literally harvest it with your bare hands. (An old joke in Gillette is that the only thing you need to mine coal there is a three-iron.)[51] Further, this coal existed in quantities and concentrations never before seen: seams two- and three-hundred-feet-thick stretched like black waves across hundreds miles of prairie, drawing the sort of histrionic descriptions that nineteenth-century explorers usually reserved for the region's earliest buffalo herds.

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[49] LeCain, *Mass Destruction,* 119, 124.
[50] This, of course, was the key issue in Butte during the second half of the twentieth century: how can you strip mine when people inhabit the land? The result was the Berkeley Pit and the erasure of the communities of Meaderville, McQueen, East Butte, and parts of Dublin Gulch. Brian James Leech, *The City That Ate Itself: Butte, Montana and Its Expanding Berkeley Pit* (Reno: University of Nevada Press, 2018), 62–72.
[51] Robert Godby, Roger Coupal, David Taylor, Tim Considine, "The Impact of the Coal Economy on Wyoming" University of Wyoming Center for Energy Economics and Public Policy, Report prepared for the Wyoming Infrastructure Authority, February 2015, 15.

Instead of an abstract, cultural creation, place and efficiency were the heart of Colstrip's thermodynamic revolution.[52] Strip mining may have come to the P.R.B. through Utah, but it had a different cause: it was precisely *because* the coal was so pure and potent, so concretely prevalent, that strip mining took—and continues to take—hold there.[53]

In effect, then, Colstrip represented an important alternative to Sheridan's Kleenburn narrative. It was not in opposition to the latter, but neither was it identical; it was rather a separate branch from the same narrative stream. Through the use of the strange, solecistic neologisms, both Kleenburn and Colstrip attempted to craft new narratives that presented western sub-bituminous coal not as defective and second-rate but as superlative, not equal to but in many ways superior to the eastern and Midwestern bituminous coal that had for so long dominated the American market. Whereas Sheridan (via Peabody) had attempted to market the coal as cleaner than any other product, Colstrip took a more business-oriented approach: they promoted Powder River coal as superior because it was the easiest (and cheapest) to extract. They brought eastern and Midwestern factory methods to the plains, in the process transforming the industry into one built upon efficiency and output.

And for a while, the proficiency narrative seemed poised to succeed where Kleenburn's had failed. Throughout its life, Colstrip mined far more coal than Sheridan ever did.[54] But it too never made the jump to the industry's acme, remaining for the most

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[52] Workers averaged ten times that of those at Sheridan and in other traditional tunnel mines. In the words of *Scientific American*, "it is required that fewer men working under more favorable conditions shall produce more goods at less cost.". In other words, "daybreak at Colstrip meant twilight at the deep mines." Hough, "Mining Coal with Mammoth Shovels," 298.

[53] LeCain, *Mass Destruction,* 181.

[54] The difference is 44 million tons in comparison to approximately 20 million Note, however, that these are estimates: no totals exist for Sheridan. The latter number was calculated by tallying annual totals and estimating the missing data. This is probably an overestimate. Data from Kuzara, *Black Diamonds of Sheridan*.

part relegated to the tertiary western market. Nevertheless, the differences in their failures are telling. Ultimately Colstrip suffered not so much from the perceived problems with Powder River coal as with coal generally. As we saw in the previous chapter, by the 1920s coal was well on its way to becoming domestically obsolete. The industry's primary market—transportation—was in the midst of a much-needed shift to more affordable and efficient diesel oil (recall chapter three and the lead-up to the Teapot Dome Scandal). The requisite technology—the diesel engine—had been around since the late-nineteenth century, but it had been hampered by a series of developmental snags: it was too heavy, too expensive, and prone to frequent and untimely breakdowns. In the wake of World War I, however, General Motors developed diesel-electric motors for the Burlington and the Union Pacific's passenger trains, both of which set records for distance without stopping and time, and by the late-1930s, many freight operations—the bulk of the industry, in fact—had begun to experiment with these engines. Like open-pit mining, its greatest virtue was its efficiency. With a single tank of oil, it was able to conduct the same amount of work that a steam engine would need eight carloads of coal to complete. This ability to efficiently convert fuel into energy also meant less time lost to maintenance: by the 1940s, diesel engines operated on average 50% more hours than a comparable steam engine. And like open-pit mining, it required far less labor: the big rail companies estimated that for every five men needed for steam engine maintenance, a diesel engine required just one.[55] In short, they were the epitome of "the modernist drive for efficiency."

[55] N. C. Dezendorf, "The Maximum Economies of Diesel Motive Power," *The Analysts Journal* 7, no. 3 (1951): 43.

The problem was that diesel engines did not depend upon places like Colstrip. A few coal companies held out through the 1930s, but the onset of World War II permanently shifted the thermodynamic debate, "usher[ing] in a diesel revolution." From 1942 to 1955, the percentage of locomotives running diesel increased from a mere 3.7% all the way to 79.6%.[56] During that period, rail's annual coal consumption fell from 135,000 to 15,000 tons.[57] Not surprisingly, the Northern Pacific held out longer than many of the other big operators, resisting calls from the company's mechanical department, who argued that a switch to diesel engines would provide far more efficiency for the line.[58] Management's counterargument was that efficiencies aside, it simply did not make economic sense: thanks to economies of scale, Colstrip's coal was so cheap that it obfuscated the technological eminence of the diesel engine. And of course there was the added factor that, in addition to providing it with energy, Colstrip also produced cargo in the form of coal to be shipped.[59] As a result, Colstrip continued to mine railroad coal for decades after the rest of the country had moved on to oil.

But by the 1950s, even these comparative benefits were beginning to collapse. Long-range trucking and a host of more efficient, diesel-powered railroad companies cut into the northern plains' business. And so in 1959, the Northern Pacific finally joined the rest of the nation's rails. It closed its Colstrip mines, selling the town to the Montana

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[56] Thomas G. Marx, "Technological Change and the Theory of the Firm: The American Locomotive Industry, 1920-1955," *The Business History Review* 50, no. 1 (1976): 1–7.
[57] Sam H. Schurr et al., *Energy in the American Economy, 1850 - 1975* (Johns Hopkins, 1960), 76.
[58] Evans and Peterson, "Decision at Colstrip," 135–36.
[59] This was a common refrain for many of the rail companies that delayed the switch to diesel. As Thomas Marx writes, "Coal was also the railroads' most important freight commodity, providing 15 to 20 per cent of total rail freight revenue. Some eastern railroads obtained as much as 70 per cent of their freight revenue from coal. These lines, being close to the deposits, also obtained their own coal requirements on favorable terms. As might be expected, these lines were the last to convert to diesel." Marx, "Technological Change and the Theory of the Firm," 4-5.

Power Company, who planned to construct a series of coal-fired power plants there.[60] Over more than three decades, the operation at Colstrip had proved that coal was both abundant in the region and that it could be extracted more cheaply and efficiently than anywhere else in the country. As the former Secretary of State had observed half a century earlier, the Powder River Basin was full of energy, but the problem was that by the middle of the century nobody wanted it.

A Land on Fire: The Mid-Century Fall of Powder River Coal

As these technological changes were working their way through the coal industry, so too was a narrative shift. By the 1930s, the mere presence of coal in the region was beginning to be viewed not merely as a problem but as a legitimate threat, one that posed economic and health hazards. According to legend, the region's indigenous inhabitants had informed the first Campbell County settlers that coal fires had been burning in the Powder River for as long as anybody could remember. This put the timeline of these smolderings at a century plus, though they may well have been burning for millennia. Their origin lay in lightning strikes, grass fires, or even spontaneous combustion, the latter of which was (and is) the most common igniter in the Basin. The reason these fires were so prevalent in the Powder River Basin is the same reason that the Northern Pacific strip-mined there: because it lay so close—often directly on—the surface, the coal was constantly exposed to fire's most important nutrient, oxygen. Once started, the resultant burns could smolder and spread across decades, often lurking unbeknownst underground. Over time, they baked and melted the rocks above them in a process not unlike to that

[60] The plant opened in 1973. "Northwestern Energy: A 104-Year Timeline," *Montana Standard,* May 20, 2016.

used to fire bricks, turning the stone into the distinctive rust-colored rocks we know as clinker. Across geologic epochs, billions of tons of coal have burned in this fashion, enough to cover 4,100 square kilometers of the present Powder River Basin with the stuff. Of this, approximately four hundred square kilometers is in the area immediately east of present-day Gillette and Wright, in the heart of the world's coal industry, where modern open-pit mines often experience spontaneous combustion.[61]

Such coal fires were a regular presence in the early history of the Powder River Basin, many of them so well-known as to garner long-standing nicknames. The most famous was Devil's Kitchen, a coal-fueled fire thirty-five miles south of Gillette, near today's Cordero Rojo mine. There the heat was so intense that "the flames shoot up and at night can be seen for miles." Not surprisingly, the other-worldly existence of this burn brought a combination of fear and childlike fascination to the region's residents, many of whom steered well clear, citing, among other things, the smell.[62] But others took to the fires more blithely, packing picnic lunches in which they would boil coffee, fry steaks, and roast "wienies" in the ambient heat. One particularly droll remark comes to us from a professor visiting from Colorado, who wrote, "I have always heard of the lower regions which burn with fire and brimstone and little thought I would ever live to see the reality,

[61] Edward L. Heffern, Peter W. Reiners, Charles W. Naeser, and Donald A. Coates, "Geochronology of Clinker and Implications for Evolution of the Powder River Basin Landscape, Wyoming and Montana," in *Geology of Coal Fires: Case Studies from Around the World,* Glenn B. Stracher, ed., 155-158.
[62]According to one fire chief, "Once you smell it [a coal fire], you never forget it. Even if you're out here fighting a fire, you can distinguish the coal smell from the other smells of burning grass and burning trees." Perrin Stein, "Hunters Find Burning Coal Seams North of Gillette," *Gillette News Record,* October 10, 2017. According to one origin story, the Powder River was so named precisely for this reason: originally dubbed the Redstone River by William Clark due to the prevalent clinker, it was renamed "because the smell of the ever-burning coal fires evoked the smell of burning gunpowder." Heffern, 156.

but here it is at my feet and I am able to go back home and tell about it."[63] Although no doubt offered in jest, the remarks would in any ways prove to be prescient.[64]

As was the case with Colstrip, the reputation of these coal fires witnessed a marked decline during the 1920s and 1930s. While the country's population increased and people filtered into the West, the former enjoyment and use of the fires devolved into a latent fear, one that received unexpected attention. Like so many other communities during the Great Depression, Gillette was assigned a number of camps from the Civilian Conservation Corps. The brainchild of Franklin Roosevelt, the C.C.C. employed more than three million young men (largely eighteen to twenty-one, largely rural) from 1933 to 1942, assigning them to a sweep of public works projects ranging from planting trees to building roads to laying early telephone lines. The goal was not only to ease the financial difficulties of young men in the midst of the Depression but also to educate them, to improve their post-camp employability and thereby aid the country's mid-century progress. But there was also an underlying environmental ambition, a program specifically tasked "to provide for the country's depleted natural resources and the advancement of an orderly program of useful public works."[65] Gillette's C.C.C. camps

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[63] Mrs. Johnson, "Burning Coal Mines," in Rockpile Museum (Gillette, Wyoming), Coal Vertical File; Margerite Drake, "Burning Coal Mines," Rockpile Museum (Gillette, Wyoming), Coal Vertical File.

[64] Another interesting connection here is with the nascent cattle industry. As a result of the subterranean heat, the ground above the coal fires stayed relatively warm and snow-less throughout the winter. One thinks of the area surrounding geysers in modern-day Yellowstone. In Campbell County, however, the coal fires became heat oases during the brutal winters. (Today, firemen use this same feature to find and track subterranean coal fires: they use airplanes and note the spots of bare ground.) According to one resident, "in winter…cattle find a comfortable resting place when the days and nights are very cold." In essence, then, cattle drew upon the coal's ancient energy, using it to preserve their own stores against the winter losses that were outlined in Chapter Two. Perrin Stein, "Hunters Find Burning Coal Seams North of Gillette," *Gillette News Record,* October 10, 2017; Mrs. Johnson, "Burning Coal Mines" Rockpile Museum.

[65] Neil M. Maher, "A New Deal Body Politic: Landscape, Labor, and the Civilian Conservation Corps," *Environmental History* 7, no. 3 (2002): 435–61; Eric Gorham, "The Ambiguous Practices of the Civilian Conservation Corps," *Social History* 17, no. 2 (1992): 229–49; Robert Fechner, "The Civilian Conservation Corps Program," *The Annals of the American Academy of Political and Social Science* 194 (1937): 129–40.

were in many ways built upon these initial goals and therefore similar to other camps across the country. But there was one important distinction, a regional quirk that differentiated Gillette's camps from these others and provides insight into the shifting cultural conceptions of coal: they were the only C.C.C. division in the country whose sole purpose it was to extinguish coal fires.[66]

Originally working out of Fort Sill, Oklahoma, Company 886 (also known as Camp GLO-1-W) made its way to northern Wyoming in the mid-1930s. Not surprisingly, the bulk of its members were from these two states, with a smattering of young Coloradans and Texans thrown in as well. Many of the men were out-of-work miners—the superintendent and twelve of the camp's foremen were former Wyoming coalmen—with experience in the industry. For the first few years the camp operated seasonally, limiting its work to the summer months. Beginning in 1937, however, Company 886 established year-round residency, erecting permanent barracks, offices, and a mess hall in place of the tents that had previously dotted the hills. It was a shift in mindset that reflected not merely the demand for their services, but, more importantly, the scope of the problem at hand.[67] During their eight years there, the company completed over a million man-hours of work.[68] And yet the fires continued to smolder.

Company 886's approach to each burn depended upon a number of variables. The smallest fires were combatted directly. Burning material was removed from the area and mixed with dirt until extinguished. Then the combustible area was covered with layers of sod to prohibit future ignition. Such a hands-on method was only feasible on the smallest,

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[66] Rankin and Brown, "What Lies Beneath."
[67] *History of the Civilian Conservation Corps in Colorado and Wyoming*, 56-57.
[68] "Gillette History," Campbell County, Wyoming Government, https://www.ccgov.net/DocumentCenter/View/509/Gillette-History.

most easily accessible fires. For ones that burned deeper underground, a more indirect method was employed. In such cases, it was not unusual for ground to be sunken and cracked.[69] As one modern rancher has described such scenarios, "it sounds like you're riding on a pumpkin. The ground is hollow underneath and then it caves in and sloughs because it burns the coal away and there is nothing left to fill the void."[70] In order to eliminate these fires, the C.C.C. worked to fill in all of the cracks and chasms that allowed oxygen to seep down below and feed the fire. The scale of such work was often immense, requiring "dump trucks, draglines, power shovels, bull dozers, tractors, and fresnos" to help lessen the burden and increase efficiency.[71]

The final method is perhaps the most interesting. In instances where the fire was shallow but could not be easily removed, the C.C.C. employed something called "trenching." This approach required the corps to dig a deep channel around the fire, attempting to halt its spread by isolating it. The theory behind the method was similar to that which has been employed against forest fires for close to a century: fuelbreaks, three-hundred-foot-wide strips of land where trees, brush, and other flammable flora were removed, thereby (in theory, if not always in practice) halting a fire's expansion.[72] Unlike wildfires, however, smoldering coal spread at a much slower pace. As such, the idea was to cut the burning coal off from the non-burning coal, thereby prohibiting the flame's

[69] *History of the Civilian Conservation Corps: Colorado and Wyoming District*, 56–57.
[70]Stevee McManamen, "A Fire Down Below," *Gillette News-Record,* April 11, 2010.
[71] *History of the Civilian Conservation Corps in Colorado and Wyoming,* 56-57.
[72] Notably, the most famous fuelbreak, California's 650-mile Ponderosa Way, was built by the C.C.C. Stephen J. Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire* (Princeton, N.J: Princeton University Press, 1982), 120.

extension. This accomplished, the trenches would be backfilled with dirt and the fire would be allowed to burn itself out.[73]

Although Camp 886 left town in 1942, there would be a brief reprisal of the C.C.C.'s efforts during the 1950s, when the federal Bureau of Mines took bids to extinguish a number of remaining coal fires in Campbell County (where Gillette is located). The most notable of these were the Padlock Fire, thirty miles northwest of Gillette, and the Little Thunder Fire, sixty miles southeast of Gillette. Congress authorized funding to suppress these fires, along with a handful of others in New Mexico and Colorado. Contracts were eventually awarded to the Nugget Coal Company out of Denver, the Barker Brothers out of Sheridan, and J.D. White out of Weston. The resultant work took nearly a year and cost the government just under $100,000. Nevertheless, the Bureau of Mines declared the operation a success, claiming that the fires would have continued undeterred, consuming twenty million tons of coal and extending across whole decades if not for the government's efforts.[74]

Like the C.C.C.'s efforts before it, what is most interesting about these bids is the shift that they represent in the region's coal imaginary. Whereas Colstrip and Kleenburn had attempted to capitalize on Powder River coal, transmogrifying popular opinions of western energy resources via narrative and technology, the actions of the C.C.C. and the Bureau of Mines reflect a competing narrative, one that would win out until the legislative changes of the 1970s. From the Great Depression on through the end of World War I, coal was viewed mostly as a problem for the basin, a hindrance to further

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[73] *History of the Civilian Conservation Corps in Colorado and Wyoming,* 57.
[74] "Denver Firm is Low Bidder on Coal Fire," *Gillette News-Record,* May 25, 1951; "Two Contracts Let For Extinguishing Coal Mine Fires," *Gillette News-Record,* April 19, 1951; "Complete Coal Fire Projects: Little Thunder Blaze is Near Gillette," *The Billings Gazette,* September 22, 1951, 12; "State's Burning Coal Mines are Attacked By U.S.," *Las Cruces Sun News,* July 19, 1951, 4.

development. Ranchers and settlers alike complained and worried about the uneasy ground beneath their feet, the toxic fumes, and the threat of potentially devastating wildfires. According to this narrative, the coal was not simply less valuable then eastern bituminous coal, it was outright dangerous. And the only way to effectively neutralize that threat was to get rid of it, to snuff it out both literally and figuratively. The C.C.C. and the Bureau of Mines attempted to do this, throwing heavy equipment, millions of man hours, and the latest in fire-fighting theory at the conflagrations. But their impact was necessarily limited. The problem was not resources or approach; the real issue was that the Powder River had too much coal to ever be legitimately contained. In proper hydric fashion, for every fire they extinguished, two more seemed to emerge. There was simply too much energy underfoot to remain inert. Sooner or later, it would release itself back into the atmosphere; the only question was what fashion it would take.

"Making Coal Lovable": The Rise of Powder River Coal

Like most of the Monongahela's mid-century towns, Donora, Pennsylvania was a steel city both by product and by character. The bulk of the town's 14,000 residents were employed at American Steel and Wire's blast furnaces and zinc works, a huge industrial plant stretching nearly 4,000 feet along the river's snaking front. Like most company towns of the time, it was far from pollution-free, but on October 27, 1948, things were worse than usual. Overnight a cold front had drifted in, and over the course of the morning the normal a.m.-haze never burned off; instead it just kept building up in density, until by mid-afternoon all of the street lights were on and residents reported being unable to see the curb at their feet. Nevertheless, American Steel and Wire

continued to run as it did every day, pumping out exhaust around the clock. For three days the smog continued to thicken, taking on an almost viscous, jaundiced quality. Residents brandished handkerchiefs in ad hoc attempts to protect their lungs; senior citizens collapsed as emergency services trucked in oxygen tanks and other potentially lifesaving supplies; and even young, healthy students complained of headaches, vomiting, and difficulty breathing. On Sunday, American Steel and Wire was finally forced to give in, announcing that they would shut the factory down for the day, giving the workers a rare day off. As if on cue, a rainstorm washed in, dissipating the smog and finally releasing the town from its bondage.[75]

By Monday, seventy had been declared dead (including Stan Musial's father) while thousands more were filling the area's hospitals with all manner of respiratory ailments. And although it was thought to be an atmospheric anomaly, four years later 4,000 perished in a similar but far more virulent outbreak in London.[76] The culprit, it turned out, was sulfur dioxide, a colorless gas that, in sufficient concentration, can prove fatal to both humans and ecosystems more broadly. Although occurring in nature—most notably in volcanic eruptions—it is more often human-produced by burning sulfur-containing fossil fuels such as coal, fuel oil, and gasoline. Not surprisingly, the highest

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[75] Liam Baranauskas, "The Historically Hazy Story of Donora's Deadly Smog," Atlas Obscura, November 29, 2017, https://www.atlasobscura.com/articles/donora-smog-1948; Edwin Kiester, Jr., "A Darkness in Donora," *Smithsonian,* November 1999, https://www.smithsonianmag.com/history/a-darkness-in-donora-174128118/. For a number of reasons, there is no accepted, unproblematic death count for the Donora event, though most estimates place the number between twenty and a hundred.

[76] Clarence A. Mills, "The Donora Episode," *Science,* January 20, 1950, 67. The focus on these two events also highlights the important narrative foundations of this shift toward sulfur dioxide discourse. As Bruce Ackerman describes it, "Rather than the product of comprehensive study, the traditional emphasis on SO2 was a product of the famous 'killer fogs' of London and Donora." Bruce Ackerman and William T. Hassler, "Beyond the New Deal: Coal and the Clean Air Act," *Yale Law Journal, (*Volume 89, 1980), 1516. For a recent take on the London Fog, see Kate Winkler Dawson, *Death in the Air: The True Story of a Serial Killer, the Great London Smog, and the Strangling of a City* (New York, NY: Hachette Books, 2017).

concentrations tend to arise in the vicinity of large-scale industrial facilities. At American Steel and Wire—and at other steel producers around the world—the gas was produced during metal smelting, particularly through the process of extracting sulfide ore. At small concentrations, it causes irritation to the nose, throat, and lungs; heavier exposures can have adverse effects on respiration, particularly for the very young, very old, and asthmatic; in particularly dense or entrapped environments—such as those found in Donora and London—it can cause death.[77]

Figure 18: Donora, Pennsylvania in the Midst of the Killer Smog
https://www.pennlive.com/news/2017/04/deadly_smog_in_pa_town_paves_w.html

As a result of such high-profile tragedies, sulfur dioxide took on increased narrative weight during the 1950s and 1960s, transforming itself from a recondite

[77] "Sulfur Dioxide," National Aeronautics and Space Administration, https://eospso.gsfc.nasa.gov/sites /default/files/publications/SO2poster_508.pdf. ALSO "Sulfur Dioxide," Agency for Toxic Substances and Disease Registry, https://www.atsdr.cdc.gov/toxfaqs/tfacts116.pdf

chemical compound to a concrete atmospheric presence that posed a tangible threat to everyday Americans. In the words of one environmental expert, "before Donora, people thought of smog as a nuisance. It made your shirts dirty. The Donora tragedy was a wake-up call. People realized smog could kill."[78] Such a cultural transformation was aided by the work of the 1960s environmentalists—Rachel Carson, Stuart Udall, Paul Ehrlich and countless others—who further emphasized the danger of unseen pollutants, helping to solidify a narrative of veiled ecological threat in the eyes of the American public by "cultivat[ing] powerful new metaphors for chemical threats to public health."[79] Spurred on by such fears, in 1968 President Nixon commissioned an advisory group to examine the country's most pressing environmental issues. Chaired by former vice president of the World Wildlife Fund and later head of the E.P.A. Russell Train, the task force presented their report to Nixon in December of that year. The president used its findings and recommendations as the foundation for a special message to Congress in which he outlined a comprehensive plan for overhauling the country's approach to environmental protection. "Our current environmental situation calls for fundamentally new philosophies of land, air, and water use," the president said, "for stricter regulation, for expanded government action, for greater citizen involvement, and for new programs." Two months later, twenty million Americans participated in the country's first Earth Day, planting and protesting in the name of environmental reform.[80]

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[78] Quoted in Kiester, "A Darkness in Donora."
[79] Emily Alice Swanson, "Natural Arguments: Popular Discourse and Environmental Legislation, 1945-2007," (Ph.D. dissertation, University of Minnesota, 2007), 59.
[80] Erwin Mauricio Escobar, "Nixon and the Environment: Clean Air, Automobiles, and Reelection," 7-12. Another critical response to the environmental movement was 1970 creation of the Environmental Protection Agency (from by the National Environmental Policy Act (N.E.P.A.), signed into law in 1970), the seminal—if now often maligned—division tasked with maintaining and enforcing environmental legislation.

One of the results of these efforts was the 1970 amendments to the Clean Air Act (C.A.A.), a bill designed to improve air quality by centralizing regulation and limiting a handful of particularly noxious emissions, among them sulfur dioxide, lead, carbon monoxide, ozone, nitrogen dioxide, and a catch-all group known as particulate matter. The legislation contained a maze of sections and sub-sections, but from the perspective of the coal industry, the regulations on sulfur dioxide were the most momentous.[81] In addition to the specter of "killer fogs," by the late-1960s scientists had hypothesized sulfur dioxide as a key contributor to a host of environmental maladies: smog, acid rain, and global warming more broadly, among others.[82] In the blunt estimation of one researcher, "global warming during the 20th century was primarily initiated by a rapid increase in the rate of anthropogenic emission of sulfur by man…the SO2 reduced the oxidizing capacity of the atmosphere, leading to an increase in methane, water, and other greenhouse gases."[83] As such, lowering sulfur dioxide output became a central goal of both the Nixon administration and the inchoate E.P.A., not merely to cut back anthropogenic impact, but also from the perspective of energy autonomy, so that what became known as "clean coal" could be used as a more productive energy resource,

[81] It is crucial to note here that the legislation applied almost entirely to coal-burning plants that were built after the act's passage. I.e., those already extant were "grandfathered in" against many of the requirements. This has had a major effect on coal use in the U.S., effectively disincentivizing the construction of new plants. As one author puts it, "if you require new power plants to spend upwards of $100 million on scrubbers, but you don't impose any comparable cost on existing plants, suddenly it becomes much more attractive to continue operating existing plants. Even now, 45 years into the Clean Air Act, we have in operation plants that were deemed to be close to the end of their useful life back in 1970 when the statute was enacted." Richard Revesz, ed. "Grandfathering Coal: Power Plant Regulation Under the Clean Air Act," *Environmental Law Reporter,* July 2016, 10542.
[82] Michael Greenstone, "Did the Clean Air Act Cause the Remarkable Decline in Sulfur Dioxide Concentrations?," *Journal of Environmental Economics and Management*, Including Special Symposium Section from the National Bureau of Economic Research Conference on Advances in Empirical Environmental Policy Research, 47, no. 3 (May 1, 2004): 588; Christopher J. Bailey, *Congress and Air Pollution: Environmental Policies in the USA* (Manchester University Press, 1998), 137.
[83] Peter L. Ward, "Sulfur Dioxide Initiates Global Climate Change in Four Ways," *Thin Solid Films* 517, no. 11 (April 2, 2009): 3198.

enabling the country to "take advantage of our enormous coal resources."[84] For all new coal-burning power plants, the 1970 amendments set a maximum output of 1.2 pounds of sulfur dioxide for every million BTU's. To comply, offending plants were left with just two options: they could install sulfur scrubbers (also known as flue gas desulfurization equipment) to their smokestacks, technology that was prohibitively expensive, representing as much as ¼ the cost of producing electricity; or they could shift their coal supply: instead of continuing to burn the high-sulfur eastern coal that had served as the lifeblood of American coal consumption for nearly a century, they could switch to low-sulfur western coal, which, thanks to geological processes, was both younger and possessed far less sulfur (though also fewer BTUs).[85]

From a cultural perspective, Nixon's public declarations and the passage of the Clean Air Act served as the public announcement of a belief that had been percolating amongst the American public ever since Donora: sulfur was something to be feared—a chemical threat to humans—and the federal government needed to take steps to protect its citizens from its wrath. From an energy perspective, this meant that almost overnight coal took on a nefarious reputation—getting tagged as an ecological threat akin to Carson's D.D.T.—for it was not only abnormally high in sulfur, but burning it for fuel or electricity released that sulfur directly into the air, potentially spawning apocalyptic tragedies of the Donora- and London-variety. By putting the emphasis on sulfur and denoting it as deleterious, then, the Clean Air Act effectively flipped the erstwhile coal narrative: up until that point, coal's value had essentially been correlated (positively) with

[84] United States Government Printing Office, *Public Papers of the Presidents of the United States, Richard Nixon, 1971: Containing the Public Messages, Speeches, and Statements of the President* (Government Printing Office, 1999), 703-705.
[85] Robert Henry Nelson, *The Making of Federal Coal Policy* (Duke University Press, 1983), 28–29.

its sulfur content. This was not a direct relation but rather the result of the fact that having more sulfur meant having more heat (i.e., energy). In contradistinction, the Clean Air Act transformed low-sulfur product into the most desirable of all coal genera.[86] Along with Nixon's political addresses, it helped to create a newer, more powerful iteration of Kleenburn: the counterintuitive concept of "Clean Coal." Although the term was not used by Nixon in any of his energy addresses, it began to enter the public's consciousness during the 1970s, appearing sporadically in the *New York Times* and other major publications. In doing so, these outlets—and the Clean Air Act more broadly—were reproducing something that Jack Peabody and the West's countless geologists and railroad executives had known for more than a century: the largest and cleanest coal reserves in the country lay in Montana and Wyoming's Powder River Basin. By crafting a neo-clean-coal-narrative, the federal government was hoping to succeed where Kleenburn had failed.

The Powder River Basin was the logical destination for such a narrative to become reality. Not only did the region have a long history of marketing their coal as a clean, healthy alternative to the nation's more popular bituminous coal (e.g., Kleenburn), but it also had extensive experience mining that coal more efficiently and cheaply than anyone else (e.g., Colstrip). When the boom finally did come, however, it was not in Sheridan or Colstrip or any of the other sites of early mining success; rather it emerged in the Powder River home of the Civilian Conservation Corps' fire brigades, a narrow eighty-mile strip stretching south from the tiny cattle town of Gillette, Wyoming. Founded in 1890 as "Donkey Town," a tent city on the leading edge of the Burlington

[86] As the *New York Times* put it, "because of increasing resistance to lowering air pollution standards this very low-sulfur coal has now become an extraordinary prize." Ben A. Franklin, "Coal: It's Cheap, but Dirty and Hard to Dig," *New York Times,* June 16, 1974.

and Missouri Railroad, it was later renamed after B&M surveyor Edward Gillette.[87] The first cattle shipment was sent out of town in August of the following year, just two days after the tracks reached town.[88] And although still a ranching settlement at heart, one that continues to run cattle and domestic bison today, mining has long existed in Gillette. Some of the earliest iterations of coal strip mining—first using horse-drawn scrapers, then hydraulic mining of the type seen in late-gold-rush-era California—stretched back to 1923, when the Kirby Coal Company and Homestake Coal Company both opened mines east of Gillette.[89] But what was so appealing about Gillette was not the history but the vast scope of the supply. It possessed the Wyodak bed, the biggest expanse of recoverable coal in the country, an unbroken 120-by-10 mile strip of the stuff. And unlike the thin, fissured coal of the eastern United States, these seams averaged 70-120 feet thick, with some reaching as much as 200, an unheard of breadth.[90]

Such limited overburden had helped to fuel the fires that the C.C.C. had worked to extinguish during the thirties and forties. But it also meant that the Gillette-area belt was a prime location for modern, large-scale strip mining, that extractionary method pioneered by the Northern Pacific and its subsidiaries at Colstrip half a century earlier. Like that former coal town, Gillette too required an initial injection of infrastructure before it was able to overcome its isolation and produce. In 1972, the Burlington Northern (B.N.) built a nineteen-mile spur line from Donkey Creek south to the Belle

[87] According to local legend, the city was named for Gillette after his engineering efforts saved the company millions by saving miles and bridges built in comparison to the line's original survey. "Edward Gillette, Engineer, Politician, and Namesake of Gillette," in "Gillette—History (General)" Vertical File, Rockpile Museum.
[88] "Steve Gardiner Oral Histories About Gillette, Wyoming," Collection Number 12570, American Heritage Center (Laramie), 2.
[89] "Time Exposure: Homestake Power Plant," *Gillette News-Record,* November 27, 1989; "Campbell County's Mining History," *Gillette News-Record,* September 17, 1992; "Horses and Half-Yard Scrapers First Used to Uncover Coal Beds at Old Wyodak Mine," *Gillette News-Record,* June, 1975, 4.
[90] "Steve Gardiner Oral Histories About Gillette, Wyoming," 6.

Ayr, the first Gillette-area mine to take advantage of the Clean Air Act's. Four years later, the B.N. began construction on the largest new stretch of rail in America since 1931, a 126-mile line stretching south from the Belle Ayr all the way to the B.N.'s main line at Shawnee Junction, stitching the proposed Powder River fields to vital eastern and Midwestern markets. By the time they were finished, the Gillette area mines had individual connections to the bulk of the country's power plants: a central route that traced through Lincoln, Nebraska on its way to Kansas City, Iowa, and Illinois; and a southern line that pushed down to Denver before continuing onto Texas (see Figure 19).[91] With such an infrastructure in place, they were ready to take the next technological step: the implementation of large-scale coal strip mining on a scale never before seen.

[91] Fred W. Frailey, "Powder River Country," *Trains: The Magazine of Railroading,* November 1989, 57.

Figure 19: Map of Powder River Rail Lines
Note the addition appears in the lower right-hand corner of the map, connecting Gillette and Shawnee Jct.
http://www.bnsf.com/ship-with-bnsf/maps-and-shipping-locations/pdf/Mine-Guide-2018.pdf

The mining methods that took root were modern intensifications of the open-pit approach that had been pioneered half a century earlier. Overburden—anywhere from fifteen to fifty feet in Gillette—was first blasted to expose the coal beneath. Electric-powered 25- to 35-cubic-yard shovels would then come in to load the unwanted sod into 170-ton haul trucks (today 400-plus-ton), which would then deposit it along the pit's perimeter for later reclamation. In the largest Powder River mines—North Antelope,

Black Thunder, and Cordero—such shovels were relinquished in favor of draglines: huge, hypertrophic cranes with excavating buckets of 160 cubic yards—six times greater than the average electric shovel—and price tags of $50-100 million. Some of the largest mobile machines ever built, draglines were the latest attempt to increase the speed and efficiency of operations. In their wake, shovels would then load the coal into the same haul trucks, which would transport and dump the product into a crusher. The crusher broke the coal into the desired size, after which the finished product would be transported via large conveyor belts to hoppers: 200-foot-tall concrete storage silos erected over company-specific railroad spurs that were capable of holding 13,000 tons of material. At this point, unit trains—industry argot for the one-hundred-car, mile-long coal trains—would set up under the ever-full hoppers. There they would be loaded via an automated system, the train moving at approximately one m.p.h. below the tipple, each car getting weighed to minimize variation.[92] Then the train would be off, heading for a distant power plant along either the Burlington Northern or the Chicago and Northwestern's tracks for a distant power plant, and a new train would take its place under the hopper. This process continued around the clock, every day of the year, embodying a level of efficiency and cumulative output far beyond anything early Kleenburn and Sheridan-area producers could have imagined: mines in the Powder River Basin averaged more than forty tons of coal per employee per hour as compared to a mere 4.4 for competing mines.[93] By taking the coal-mining method pioneered at Colstrip and adapting it to the modern age, the P.R.B. mines leveraged technology to achieve rates and quantities of extraction not seen

[92] "Coal Trains Familiar Sight," *The News-Record,* May 2, 1977, 9.
[93] Kenneth R. Miller and James L. Long, "Evolution of Mining Equipment in the Powder River Basin," *Mining Engineering,* 50, no. 7 (July 1998): 49–53. Rail routes from Frailey, "Powder River Country," 40-63; Timothy J. Considine, "Powder River Basin Coal: Powering America," *Natural Resources,* December 2013, 519.

in the industry before or since. It was LeCain's culture of mass destruction with a potent coal-specific twist.

Figure 20: Powder River Coal Train Leaving the Belle Ayr Mine
Photo by the author

As Gillette's first mines worked through the early stages of this technological escalation, Nixon and his predecessors continued to trumpet a neo-Kleenburn narrative to the American public. In the words of the *New York Times*, the challenge was "Making

Coal Lovable."[94] In this they were unexpectedly helped by the Organization of Arab Petroleum Exporting Countries' (O.P.E.C.) famous 1973 oil embargo, a pronouncement that not only sent oil prices skyrocketing in the U.S. but also increased demand for alternative resources. One month after O.P.E.C.'s edict, Nixon launched "Project Independence," a plan to wean the country off of foreign oil by cultivating domestic energy resources. Not surprisingly, coal was at the top of this list. In the wake of the oil crisis and this announcement, western coal prices spiked, rising from $10.67 to $31.95 a ton over the course of a year.[95] Following Nixon's resignation, Gerald Ford intensified the plan for domestic energy independence. In his 1975 State of the Union address, he told the country, "I have a very deep belief in America's capabilities," before outlining a comprehensive energy program for the next decade that included not only the construction of nuclear plants and oil refineries, but also 250 "major" coal mines and 150 "major" coal-fired power plants. In doing so, he referenced the pioneering beneficence of F.D.R., comparing the program to the ambitious but for the most part successful federal program to build 60,000 new military aircraft in the midst of the Great Depression. "They did it then," Ford said, "we can do it now."[96] Such executive action not only further solidified the clean coal narrative, but it gave narratological weight to the aforementioned technological advances of large-scale strip mining. A few months later, Ford vetoed a proposed strip-mining bill that would have curbed coal production in the West, particularly in the Powder River. In taking such unprecedented action, Ford described the critical role that coal played in the dream of American energy independence: "as the one

[94] Ben A. Franklin, "The Technological Fix: Making Coal Lovable," *New York Times,* July 31, 1977.
[95] Steven Rattner, "The Battle for Western Coal," February 27, 1977.
[96] Gerald R. Ford, "1975 State of the Union Address," January 15, 1975, The American Presidency Project, http://www.presidency.ucsb.edu/ws/index.php?pid=4938

abundant energy source over which the United States has total control, coal is critical to the achievement of American energy independence. In the face of our deteriorating energy situation, we must not arbitrarily place restrictions on the development of this energy resource."[97] Two years later, Jimmy Carter took such rhetoric even further. Although he didn't tour Wyoming coal mines specifically, he did visit smaller low-sulfur mines in Kentucky, opining "I would rather burn a ton of Kentucky coal, than to see our nation become dependent by buying another barrel of O.P.E.C. oil."[98] Not only was the extraction and use of low-sulfur coal an ecological statement, it was now a patriotic one, becoming "a moral responsibility" not unlike war.[99]

With such a burgeoning narrative foundation, the Powder River mines continued to grow into the 1980s.[100] During that decade Gillette became home to seven of the ten biggest coal mines in the country: Black Thunder, Jacobs Ranch, Belle Ayr, Rawhide, Eagle Butte, Cordero, and Caballo.[101] With the exception of the latter, all produced more than ten million tons of coal annually, and Black Thunder, a Peabody-owned operation

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[97] Gerald R. Ford, "Veto of a Surface Mining Control and Reclamation Bill," May 20, 1975, The American Presidency Project, http://www.presidency.ucsb.edu/ws/?pid=4928

[98] *Public Papers of the Presidents of the United States, Jimmy Carter, 1979, Book 2: June 23 to December 31, 1979* (Government Printing Office, 1980), 1341.

[99] "Steve Gardiner Oral Histories About Gillette, Wyoming," 94.

[100] Prior to 1980, the Interstate Commerce Commission established maximum rates for the nation's railroads. The 1980 passage of the Staggers Act removed this federal oversight, allowing railroads to set their own prices. In effect, this increased competition. In the Powder River Basin, the Burlington Northern lost its decade-plus monopoly on coal shipments, allowing the Union Pacific to join the region in 1983. And although the impact of the Staggers Act was felt throughout the 1980s, it wasn't until the 1990 C.A.A. amendments that its full impact was realized. With lower shipment rates and increased transportational options, power plants now had more flexibility in purchasing coal. As a result, more and more were able to shift to Powder River coal as prices lowered. See Theodore Keeler, *Railroads, Freight, and Public Policy*. (The Brookings Institution: Washington, 1983), 97-114.

[101] In part, this counterintuitive rise was due to shifts in the country's other sources of alternative power. Throughout the 1970s, many Americans viewed nuclear energy as a potential savior from the country's energy woe. This changed in 1979 with the Three-Mile Island disaster and the (temporary) shift from nuclear- to coal-generated power in many regions, For instance, the TVA closed down its Sequoyah and Browns Ferry reactors in the mid-1980s, shifting electric-generation to coal plants. Edson Servernini, "Impacts of Nuclear Plant Shutdown on Coal-Fired Power Generation and Infant Health in the Tennessee Valley in the 1980s," *Nature Energy,* April 3, 2017.

and the largest mine in the country by nearly twofold, produced just under twenty-five million tons (more than all Sheridan mines combined did in their lifetime).[102] Even the Cordero Rojo—a middle-of-the-pack Gillette operation—produced at a rate of 212 tons of coal per man per day shift, more than ten times Hotchkiss's world record of half a century before.[103] In 1988, for the first time in its history, the state of Wyoming reached the apex of American coal, becoming the number one coal-producing state in the country, passing Kentucky, which had held the position since 1971. But whereas Kentucky's totals came from 2,086 different mines, Wyoming's came from just thirty. Fourteen of these mines—contributing close to ninety percent of Wyoming's total—were located in the Gillette area, which also saw its highest ever excavation total, at 135.7 million tons.[104]

These jumps in production were enabled not only by increasing developments in and sophistication of technology, but by a more powerful narrative foundation—a clarification of the clean coal approach—as well. Throughout the 1970s, the low-sulfur coal story had lacked the pithy metaphorical node that most great narratives possess. During the 1980s, this changed. Although the term "clean coal" had been used sparingly by the media the decade previously, during the 1980s it was adapted by Congress to describe the new low-sulfur narrative.[105] In 1987, the Department of Energy (D.O.E.) took the next big step by officially codifying this phrase when it released "America's Clean Coal Commitment." In this paper, the D.O.E. outlined three separate delineations of clean coal. The first two involved removing sulfur before it was released into the

[102] "Campbell has 7 of 10 biggest U.S. coal mines," in Rockpile Museum, Coal—1980 Vertical File.
[103] Vic Kolenc, "Coal: Campbell County Coal Mines Dig 61 Million Tons in '80," *News-Record* in Rockpile Museum, Coal—1980 Vertical Files.
[104] Kevin Doll and Jay Dedrick, "Wyoming No. 1 in U.S. Coal," *The News-Record,* May 7, 1989.
[105] In the early part of that decade, lobbying groups with names like the Clean Coal Coalition formed in Washington to support the cause. See Leon Green Jr., "Clean Coal Solution," *The New York Times,* November 16, 1983.

atmosphere—flue gas scrubbing and pre-combustion coal cleaning. The third, however, was "coal switching," which entailed "the substitution of a typically higher priced, lower sulfur coal in a power plant that previously burned high sulfur coal."[106] This was the narrative that the Powder River Basin was working to solidify, the one that led to the rise of the region's leviathan mines.

On the ground, both local residents and coal companies joined in the effort to market clean coal as the smart, responsible alternative, one that had a deep history in the Powder River landscape. Casper College historian Bill Bragg gave a notable speech to this effect entitled "A Little Pollution is Good for Tourism." Bringing to mind William Clark's comments on early Butte, Bragg defended the criticism that many of the mines were facing—for, among other things, disfiguring the grasslands landscape—by placing the industry in a long historical line of polluters in Wyoming history, a list that included the region's indigenous inhabitants, overland migrants, and ranchers. Like many coal town residents, Bragg reserved his harshest criticism for environmentalists. In a perhaps misguided attempt to appeal to history, he even noted that the Johnson County War was carried on by environmentalists not unlike those trying to regulate the northern plains, "leading an invasion of environmentalists into Johnson Country [sic] with a hit list of 70 friendly polluters led by Sheriff Red Angus."[107] Other residents took to the patriotic

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[106] *America's Clean Coal Commitment* (Washington, D.C.: U.S. Department of Energy, 1987), 3-5. Also see Matthew L. Wald, "U.S. Approves New Subsidies for Clean Coal Projects," *The New York Times,* September 29, 1988; Doug McInnis, "Wyoming's Bonanza: Plentiful 'Clean' Coal," *The New York Times,* December 28, 1990.

[107] "A Little Pollution is Good for Tourism," William Frederick Bragg Papers, American Heritage Center. Interestingly, Bragg also traces his line of argument, what he terms "the anti-environmentalists" to Wyoming's indigenous peoples, who he claims to be the first anti-environmentalists. "That's why they found it a hell of a lot easier to drive thousands and thousands of buffalo off steep inclines or cliffs, where the buffalo fell like a tan waterfall, a virtual river of brown bodies cascading upon each other, hurtling to their own death and destruction." There was also a well-known bumper sticker that tended to appear around Gillette during this time: "If you're hungry and out of work, eat an environmentalist." A. Dudley Gardner,

energy arguments of Nixon and Ford. Local rancher Doris Wagensen testified to the "moral responsibility" of harvesting Powder River Coal. "We need energy," she said, "our whole civilization is dependent on energy. Is it morally right for any part of the county to say, 'I don't care if you need what we've got, we're not going to let you have it? We're not going to let you in here. We're not going to sell you any property. We're not going to meet any of your demands.' I think there is a moral responsibility to provide for the well-being of the nation, and perhaps that is to deliver coal so that OPEC nations are not as important and as powerful in our national politics."[108] By grounding the clean coal narrative in the past and a larger moral imperative, locals like Bragg and Wagensen were adding a regional flair to the large-scale industry narrative, further solidifying coal's cultural transition in the process.

We can see similar developments taking place among the Gillette-area coal companies of the time. Since their inception in the seventies, many of these operations had been plainly visible from the road, great seams of black bordered by buffalo grass and blue grama, with mile-long conveyor chutes angling up to silos the size of space shuttles. For years Amax and Carter Mining had given tours to the most pestering of visitors, but there were neither advertisements nor public encouragement for such actions. The mines remained private property, blocked by lurid signage and cyclone fencing, and engagement with the public was purposefully restricted. This approach began to shift as the clean coal narrative gained credence during the late-eighties. Two local producers—Cam-plex and Wyodak Resources—teamed up to construct a small tourist point east of the town, a tread-plate overlook perched up above Wyodak's northeastern mine. The

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Verla R. Flores, and A. Dudley Gardner, *Forgotten Frontier: A History Of Wyoming Coal Mining* (Boulder: Westview Press, 1989), 193.

[108] "Steve Gardiner Oral Histories About Gillette, Wyoming," 93-94.

viewing stand still exists today—or rather the latest version of it does. Thanks to the ever-expanding footprint of surface mining, the original platform has been relocated a number of times, moved back as the mine chews up more and more land. Today, the Chamber of Commerce has joined with another coal company, Alpha Natural Resources, to offer two-hour, twice-daily tours of Eagle Butte. Headed by a retired employee, these bus tours take visitors not only to the aforementioned viewing stand but onto mining premises itself, where they are able to get an up-close look at Gillette's mammoth machinery and watch a Burlington Northern unit train load at the Eagle Butte tipple.[109] Not surprisingly, the trip seeks to wed the technological and the narratological into a comprehensible whole: the one big photo-op takes place in front of a thirteen-foot tire off of one of the company's trucks, where the tour guide offers to take pictures of families and groups, explaining that each individual tire costs upwards of $100,000.[110]

In doing so, companies like Alpha and Cam-plex effectively wedded the approaches of Kleenburn and Colstrip: they would perform large-scale strip mining, but they would also consciously shape how that mining was perceived. LeCain describes similar public relations shifts that took place in mid-century Butte, where "Anaconda and other producers of raw materials attempted to link what had previously been rather straightforward places of industrial extraction with the burgeoning culture of consumption" by building an overlook above the (at the time operating) Berkeley Pit.[111] During the 1980s, however, Powder River coal companies took this approach a step further. In addition to showcasing the scale and importance of their operations, they also

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[109] "Overlook Affords a Glimpse of Wyodak's Coal Mine," *The News-Standard,* November 17, 1989; "Tourists, Get Your Lump of Coal Here," *The News-Record,* July 12, 1994.
[110] Information from Eagle Butte tour.
[111] Timothy J. LeCain, "'See America the Bountiful': Butte's Berkeley Pit and the American Culture of Consumption," *Montana: The Magazine of Western History* 56, no. 4 (2006): 7.

began to draw upon myths and popular conceptions of the American West. This can be seen most patently in campaigns' images around reclamation. A prime example is a now well-known photograph taken by a Black Thunder employee.[112] The image shows two elks locking antlers in foot-high prairie grasses, Black Thunder's monolithic crushing and loading facilities framing the background. It is the sort of image that represents everything the coal companies could hope for: the virile stubbornness of the West's rugged individualism, the harmonic co-mingling of nature and industry, and the purported success of mining reclamation efforts. Not surprisingly, the photograph has been circulated widely, used as a popular regional postcard and, more recently, has even served as the inspiration for the eponymous Two Elk Power Plant, a proposed—and often maligned—"clean coal plant" near Wright.[113] In choosing that name, they were attempting to connect coal to the region's fauna and thereby to the natural Powder River landscape, in the process fighting back against the older cultural associations birthed by Donora and London. Like Kleenburn and Colstrip before it, Two Elks has realized the power that a name has to tell a story.

[112] Mary Kelley and the Campbell County Rockpile Museum, *Coal in Campbell County* (Charleston, South Carolina: Arcadia Publishing, 2013), 84.
[113] The plant has been delayed multiple times over the past decade. Nevertheless, it could be constructed and online within the new few years. Jonathan Gallardo, "Two Elk could be home to $100 million coal plant," *Gillette News Record*, November 9, 2017.

Figure 21: Two Elks Photograph Outside Black Thunder Mine
https://www.wyofile.com/wp-content/uploads/2014/04/two-elk.jpg

Over the last few decades, these narrative efforts have been bolstered by the latest version of the Clear Air Act, which established a new system for regulating sulfur emissions.[114] The C.A.A.'s previous amendments (1977) had provided little choice when it came to reducing sulfur dioxide. Under that system (known in economics as a "command and control" approach), power plants were required to install scrubbers to reduce their emissions. Beyond that there was no incentive to burn low-sulfur coal. You either met the limit or you did not; there were not any savings for decreasing past the

[114] The shifting approaches of the three sets of amendments can be confusing. To simplify, the 1970 amendments required all plants built between 1971 and 1977 to emit fewer than 1.2 pounds of sulfur dioxide per million BTUs. Plants built prior to 1971 were not federally regulated, though states had the option of doing so. The 1977 amendments required all plants built after September 18, 1978 to install scrubbers. The 1990 act established a permit system for all plants, regardless of year constructed. By 1995, the rate was 2.5 pounds of sulfur dioxide per million BTUs. By 2000, that rate was lowered to 1.2 pounds per million BTUs.

minimum.[115] In contrast, the 1990 rendition removed this technological mandate, imposing a quantitative limit on sulfur expulsion (2.5 pounds of sulfur dioxide per million BTUs by 1995; 1.2 pounds per million by 2000) and leaving it up to the plants themselves to decide how they would meet it. In doing so, they generated a new market for tradable emissions: as one economist has described it, this "created an implicit marginal willingness to pay for reductions in sulfur content as this would translate into fewer SO2 emissions, freeing permits to be sold." In other words, the federal government was essentially putting a price on sulfur, encouraging plants not merely to reach the bare minimum in sulfur reduction, but to limit emissions as much as possible (thereby freeing up permits to be sold and increasing cash flow). In place of the command and control approach, the latest rendition of the Clean Air Act applied this "market-based" method to the power industry.[116]

The result was another boom in Powder River coal production, this one far greater and longer lasting than most could have imagined. In the decade following the 1990 amendments, Wyoming coal production nearly doubled.[117] In 1996, the U.S. Department of Energy predicted that power plants would look increasingly to low-sulfur coal suppliers (i.e., the Powder River Basin) to comply with its stricter stage II (2000) requirements, and that increasing amounts of that coal would come from west of the

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[115] Note that this was why there was such a focus on "clean coal technology" during the 1980s.
[116] As one group of authors put it: "The value of low-sulfur coal to a power plant depends on how its emissions are regulated. Under an emissions standard, a power plant is willing to pay a premium for low-sulfur coal, but only up to the amount necessary to comply with the regulatory limit. In contrast, an allowance market rewards marginal reductions in emissions: every ton of pollution abated saves the price of an allowance. Meghan R. Busse and Nathaniel O. Keohane, "Market Effects of Environmental Regulation: Coal, Railroads, and the 1990 Clean Air Act," *The RAND Journal of Economics* 38, no. 4 (2007): 1161. Lange, "Investigating the Effects of the 1990 Clean Air Act Amendments," esp. 32-35.
[117] Shelby Gerking and Stephen F. Hamilton, "What Explains the Increased Utilization of Powder River Basin Coal in Electric Power Generation?," *American Journal of Agricultural Economics* 90, no. 4 (2008): 161.

Mississippi, in particular from the climes of the Powder River Basin. The limited eastern supply of sub-bituminous coal—most notably from southern West Virginia—was becoming increasingly scarce, and Gillette was in a powerful position to take on the growing demand: not only was the nation's largest mine, the Black Thunder, set to expand for the second time in as many years, but Triton Coal was in the process of constructing the North Rochelle mine, a thousand-plus acre behemoth that would come to dominate the global coal industry and recalibrate expectations of size and extraction.[118] Per-capita production peaked in 2004, with each worker in the basin averaging 81,000 tons. Four years later, overall production hit its own crest as Wyoming produced just short of half a billion tons.

From those halcyon years, however, production has since fallen into the long-predicted decline. Between that 2008 and 2016, the state's coal production dropped 17%, a downturn that has been attributed to falling natural gas prices, a country-wide recession, growth in the use and popularity of renewable energy, and rail congestion brought on by the abutting Bakken oil fields.[119] It remains to be seen whether the new Republican administration will be able to return the industry to its previous growth pattern of ever-increasing peaks.

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[118] "Report Sees Coal Growth in Campbell," *The News-Record,* August 16, 1996. Notable here is also a Salt-Creek-like growth in reserves: The Department of Energy report estimated 496 billion short tons of mineable coal remained available in the country, 22 billion short tons more than their earlier estimate "due to better coal mapping information and updated assessment criteria." Other analysts concurred. Resource Data International, a Boulder company specializing in coal forecasting, predicted a steady growth in Powder River Basin exports: 348 million tons in 2000, 382 million in 2005, 442 million in 2010, over half a billion in 2015. Deb Holbert, "Growth Predicted, but How Much?" *The News-Record,* July 27, 1997.

[119] 97% of Wyoming coal is from the Powder River Basin. Additionally, it is important to note that, despite, the post-millennia declines, the percentage of U.S. coal supplied by Wyoming increased from 32% in 1990 to 54.5% in 2009. Robert Godby, Roger Coupal, David Taylor, Tim Considine, "The Impact of the Coal Economy on Wyoming" University of Wyoming Center for Energy Economics and Public Policy, Report prepared for the Wyoming Infrastructure Authority, February 2015, 2.

Figure 22: Peabody Coal "Coal Can Do That" Advertisement
https://coalcandothat.wordpress.com/

Even in the wake of this wane, however, narrative efforts have intensified. While the federal government has, for the most part, continued to push a clean coal narrative, the coal companies themselves have increasingly come to embrace the tools of modern advertising to shape the thermodynamic narrative.[120] In 2008, during the initial stages of coal's decline, Peabody Energy—the same company of Kleeburn fame—launched the award-winning "Coal Can Do That" advertising campaign. The platform's chief goal—and one that has been increasingly embraced—was to make Americans aware of just how dependent they were on the coal industry. Full-page spreads appeared in magazines and

[120] The main exception to this was the Obama administration, who began to push back against the coal industry.

newspapers, picturing huge pieces of anthropomorphized coal wearing sunglasses, images of electric appliances and guitars plugged into pieces of coal, and adolescents using laptops atop chair-sized chunks of coal with captions such as, "Promising research shows 9 in 10 dentists use Coal", "Coal: Help you quit smoking," and "Play a tune. Flip a switch. Send an e-mail. The technologies that surround you are fueled by clean coal." The gist of the campaign was the punchy refrain "Yeah…coal can do that." In essence, it attempted to marry basic thermodynamic education with a casual, ironic syntax aimed at reaching younger generations. It was an approach that was reiterated throughout the decade, gradually intensifying in volume. According to Peabody C.E.O. Gregory Boyce, one of the more vociferous proponents of both coal and a heavy public-relations approach, "black is the new green…coal is the fuel of the future…clean coal is essential to solving the world's energy security concerns and advancing climate solutions."[121] Instead of being something out of sight and out of mind, the Powder River Coal industry was becoming more culturally proactive, working to bring its past narrative efforts into the twenty-first century by reminding Americans how much coal still factored into their everyday lives. Unlike Kleenburn and Colstrip, they were not satisfied with a regional market. In the words of the Gillette visitor's center, they were "Proud to Provide America's Energy."[122]

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[121] See archived examples of ads as coalcandothat.wordpress.com. More recently, in 2014, Peabody put out a new advertising campaign, what they called the "Advanced Energy for Life," campaign, which portrayed coal as a key driver of global equality. As Boyce described it, "Energy inequality is the blight of energy poverty, limiting access to basic needs like food, water and medicine; stunting education; and cutting lives short. Every one of the U.N. Millennium Development goals depends on adequate energy, yet today one out of every two citizens lacks adequate energy and over 4 million lives are lost yearly due to the impacts of this scourge." Not surprisingly, environmentalist reaction was strong. The Sierra Club compared the campaign to the tobacco industry denying scientific evidence that connected cigarette use to cancer. Daniel Cusick, "Peabody Energy Pitches Coal as the Cure for Third World Poverty," *E&E News,* April 11, 2014.

[122] Sign at the entrance to the Gillette Visitor Information Center, just off of I-90.

Conclusion

The journey from Jack Peabody's failed Kleenburn brand to the largest coal-mining region in the world has not been without its snags. This has been particularly true of Peabody's namesake company. In Edward Abbey's classic environmental caper, *The Monkey Wrench Gang,* we read of Hayduke, Seldom Seen, and crew driving by the "ever-growing strip mines of the Peabody Coal Company," conveying "fifty thousand tons. Every day. For thirty-forty-fifty years. All to feed the power plant."[123] The eponymous Monkey Wrench Gang blows up a nearby railroad bridge, destroying a Peabody Coal train in the process. More recently, William Vollmann has provided another fictional account of the company: his as-of-yet unfinished book, *The Cloud-Shirt,* one of two remaining pieces to his monumental *Seven Dreams: A Book of North American Landscapes* series, details the historical and modern-day conflicts between the Navajo nation and Peabody Coal, a strife that the author sums up with a quote from Hobbes: "This question, *Why Evill* [sic] *men often Prosper, and Good men suffer Adversity,*…hath shaken the faith, not onely of the Vulgar, but of Philosophers, and which is more, of the Saints."[124] From Frances Stuyvesant Peabody's door-to-door business to the biggest private coal corporation in the world, it is safe to say that no modern coal company has figured more prominently in the field of American fiction. And almost without exception, this has been as a target, an evil empire looming large against the beneficence of the common man.

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[123] Edward Abbey, *The Monkey Wrench Gang* (Lippincott, Williams, and Wilkins: Philadelphia, 1975), 148-149.
[124] William T. Vollmann, "The Cloud-Shirt," *Grand Street*, no. 46 (1993): 212. Italics in original.

Much the same can be said for the genre of the essay. Over the past forty years, Abbey, Alvin Josephy, Rick Bass, and countless others have offered their pens in service of an ecological counter-narrative to offset the more dominant clean coal storyline.[125] Of these, perhaps the most notable has been the late K. Ross Toole, the popular partisan professor at the University of Montana. During the 1970s and continuing on until his untimely death in the early 1980s, Toole was a tireless defender of the northern plains. In this vein, his most forceful book was *The Rape of the Great Plains* (1976), in which he detailed the Powder River Basin's early post-Clean Air Act coal efforts. Drawing upon his extensive work in both the archives and the legislature, Toole argued that if nothing were done to stop the big coal companies from taking over the region, the northern plains would soon become "A National Sacrifice Area."[126] He rued the country's descent into a nation of gluttons, equating the notion of reclamation with "lipstick on a corpse" and proclaiming that Montana "*is* a national heritage. And the heritage is not spelled C-O-A-L." Drawing upon the textual structure of an earlier generation of environmental writers, Toole went on to juxtapose what he saw as the true unsullied West and the corrupted version of modern coal companies. "For six years I ran a thousand head of yearlings in the remote foothills of the Beartooth Mountains of southwestern Montana," he wrote. "It is on those great, rolling foothills that the Great Plains begin…If I look southward…I can see my eleven-year-old son on a fractious Appaloosa horse, headed fast for the

[125] See, for instance, Alvin M. Josephy Jr., "Agony of the Northern Plains," *Audubon,* July 1973; Rick Bass and David Hanson, *David T. Hanson: Colstrip, Montana*, (Fairfield, Iowa: Taverner Press, 2010); Edward Abbey, *The Journey Home: Some Words in the Defense of the American West* (New York, N.Y., U.S.A: Plume, 1991), 159-160. Original article was printed under the same title in *Playboy,* December 1975.
[126] Since this time, the rape rhetoric associated with coal mining in the West has continued unabated. See, for example, Timothy Egan's *Lasso the Wind: Away to the New West,* in which the first chapter is entitled "The Rape of the West," or artist and activist Alaina Buffalo Spirit who, in worrying about coal companies coming onto the Northern Cheyenne reservation, observed "They will rape the land, the water, the air, and then they will leave in 20 years." Marc Gunther, "Warren Buffett's Coal Problem," *Sierra Magazine,* May/June 2013, http://vault.sierraclub.org/sierra/201305/warren-buffett-coal-3.aspx.

neighboring ranch." In contrast to this Edenic locale, Toole describes "the great coal and energy companies now descending upon the land…It is infuriating to hear them cry…while their monstrous machines are eating at our vitals." Like so many before him, Toole elevated this rhetoric with an appeal to a romanticized past: "give me this small bow and this small arrow and let me fire just once in the name of the eternity they are about to steal from us."[127] Under such worldview, there is no room for the energy extraction that we have seen time and again in the region's history. It is on the wrong side of an idealistic dichotomy.

In short, there has been no dearth of powerful and well-supported counter-narratives to that embodied by Peabody and the Powder River coal industry more broadly. And yet, in spite of all of the controversies and criticisms raised by Abbey, Toole, and others, the P.R.B. continues to lead the world in coal production, housing not only the largest coal mines, but also harboring the greatest untapped supply of energy in the world.[128] For more than a hundred years now, locals and scientists alike have been aware of this unique thermodynamic bounty, but it is only in the last half-century that the

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[127] K. Ross Toole, *The Rape of the Great Plains: Northwestern America, Cattle, and Coal* (Boston: Little, Brown, and Co, 1976), 9-10, 244. Toole was far from the politically correct professors we think of today, commencing lectures with confessions such as, "I am biased, I am prejudiced, I am bigoted, I am one-sided, I am subjective." Partly as a result of this, and partly due to the ostensibly un-academic nature of his work, Toole was much maligned by many of the academics of the day, both at University of Montana and elsewhere, decried as a "silver-tongued charlatan" who wrote literature, not history. "K. Ross Toole's Montana," Lecture Two: The Price of Space and Natural Resources," VID 978.6 T618K PT. 1; Jael Marchi Prezeau, "An Interpretive Biography of K. Ross Toole: A Legacy of Leadership in Montana," (Ph.D. Dissertation, University of Montana, 303). Note that we see the same sort of romanticized rhetoric in more recent works decrying Powder River Coal. Rick Bass writes, "I stopped at the Little Bighorn on my way home from Colstrip, I went in and looked at the markers, walking between the gravestones over the warriors and soldiers sleeping forever just below. Maybe, I thought, the coal—only a little farther down—could stay buried and sleeping too. Maybe it could sleep forever, like the soldiers who once, and not so long ago, in their arrogance and impatience, made a fatal mistake…I lingered longest at the marker for a warrior who died, the simple inscription says, 'defending the Cheyenne way of life.' What will we give to change ours?" Bass and Hanson, *Colstrip, Montana*, 91.

[128] Estimates place the P.R.B.'s reserves at 3,616 Quadrillion BTUs. In order to equal that total, you need to *combine* the next ten largest energy reserves in the world. Considine, "Powder River Basin Coal: Powering America," 517.

region has emerged as an energy capital. As this chapter has shown, this boom has come about not as a result of any new discovery or technology; it has emerged thanks to a propitious combination of chance and the reintegration of the region's past failures.

During the 1920s, a young Jack Peabody made the first attempt to market the region's coal based upon its difference from the country's most popular eastern bituminous product. He singled out its relative lack of pollution, its ability to burn clean and give off less particulate matter than that used by the majority of the country. In this effort he was an unequivocal failure. Nevertheless, a decade later the Northern Pacific Railroad entered the region not with a new advertising plan but with a technological model lifted whole cloth from the copper industry. Through the first large-scale application of strip mining to American coal, the N.P. managed to extract the product at rates and costs previously unknown. For a few decades, they managed to supply their fleet for far cheaper than had previously been possible. But they too ultimately failed, a casualty of shifting public opinion and a mid-century narrative that portrayed coal as dirty and antiquated, a fuel of the past. It was not until the 1970s that these two foundered methodologies—narrative and technology—merged into something far more powerful and lasting than either had been individually. The erstwhile Kleenburn was resurrected via the Clean Air Act as the new "Clean Coal" approach to American energy, while Colstrip's technological innovation was brought to life in a steroidal, modernized version that saw trucks and draglines the size of skyscrapers brought into one of the more isolated regions of the country. The result is Peabody Coal's crown jewel, the North Antelope Rochelle Mine (N.A.R.M.), which has become the largest coal mine in the world, extracting close to three tons of the stuff per second—a pace that continues, unceasing,

twenty-four hours a day, seven days a week, 365 days a year.[129] In 2016, it shipped its two billionth ton of coal, the equivalent of seventeen million train cars—five thousand times more than what Kleenburn shipped in its entire lifetime.[130] The scale is quite literally awesome.[131]

There are without question both positives and negatives to such large-scale ecological extraction and destruction. On the one hand, the industry contributes untold jobs and infrastructural development to the region, bringing a billion dollars a year to the state in taxes, royalties, and fees.[132] On the other, despite all of the promises that the coal industry has made to return the land to its original state, only 2.4% of the disturbed land has been reclaimed to this point.[133] None of this is beyond consideration. Nevertheless, the important historical point is that coal mining has long been—and continues to be—a critical part of the Powder River landscape. The region's earliest ranchers were operating hill mines out of Buffalo and Casper in the nineteenth century; Hemingway was writing about Sheridan's great Tongue River mines in *Scribner's* in the 1930s; and since the 1980s, the region as a whole has been the world's leading coal provider.[134] As Richard White has written about the Columbia River, "we have neither killed the river nor raped it. Nature still exists on the Columbia. It is not dead, only altered by our labor."[135] The

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[129] Suzanne Goldenberg, "The Real Story of US Coal: Inside the World's Biggest Coalmine," *The Guardian,* November 10, 2014.
[130] Benjamin Storrow, "North Antelope Rochelle Ships its 2 Billionth Ton of Coal," *Casper Star-Tribune,* January 23, 2016.
[131] Peabody Energy is now the largest private-sector coal company in the world.
[132] Wyoming Mining Association, *Wyoming Coal: The 2017-2018 Concise Guide,* 2018, http://www.wyomingmining.org/wp-content/uploads/2013/10/2017-18-Concise-Guide-to-Wyoming-Coal.pdf, 5.
[133] Michael Illiano, "PRBRC Report Shows Slow Rate of Mine Reclamation," *Gillette News Record,* July 20, 2018.
[134] The Hemingway story is "Wine of Wyoming," a piece about the outdoors and prohibition in the Sheridan area, in which one of the main characters works at the Tongue River mines. Ernest Hemingway, "Wine of Wyoming," *Scribner's* 88, no. 2 (1930).
[135] Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1996), 59.

same can be said for the Powder River Basin. The region is and has long been a center of world energy production; to either forget or deny that is to misrepresent the West, falling back upon the fantasy of horses and bison instead of accepting and attempting to understand the far more complex reality of coal, oil, uranium, grass, and the scores of other thermodynamic manifestations that have defined it as a region. Today, Gillette calls itself the Energy Capital of the Nation. There is nothing false about such a claim. But then, too, there is nothing new about it either.

CONCLUSION

Five years after the events of Sarpy Creek, the Crow nation received a very different type of visitor to their Absaloka Mine: newly elected Vice President Mike Pence. The former Indiana governor was on a western swing of the country, passing through Montana to stump for the upcoming special election, but according to his staff he also wanted to visit one of the region's innumerable mines. As noted in the previous chapter, since 2008 the coal trade had been in a rather steep and steady decline. Some blamed this downturn on the climate change policies of the Obama administration; others saw it as a result of the aggressive promotion and growth of natural gas and oil exploration. Regardless of who held the fault, one thing was certain: businesses and communities across the country suffered from the slump, and the Crow were right up there among the hardest hit. Just one year after Westmoreland had threatened to close the Absaloka, the Crow's number one employer and primary source of income, the tribe had reluctantly agreed to reduce their own profit percentage. As such, Pence's visit was one that augured change—the records are incomplete, but all signs point to him being the first vice president to visit a Powder River mine.[1] And although nothing concrete had changed by the time of his tour, the tribe had seen a few promising signs under the new administration: in March, the Department of the Interior had lifted a mining

[1] As far as I can tell, no president has either.

moratorium on federal lands, and by the time Pence came to Crow Agency, the Tribal Chairman, A.J. Not Afraid, had already been to the White House twice to provide input on future energy policies. Now the Crow Nation was hoping for more overt action from the vice president: a promise to make permanent the Indian Coal Production Tax Credit—a tax break on reservation-produced coal—and a federal push to open West Coast export terminals, thereby opening paths overseas, where demand for the product was still high.[1]

The resulting visit turned out to be yet another thread in the Powder River Basin's long line of oddly imbricated energy resources. When Pence arrived, he joined U.S. Interior Secretary Ryan Zinke, Vice Chairman of the Crown Nation Carlson Goes Ahead, and a handful of associated political and Crow Nation staff for a horseback tour of Westmoreland's mining facilities. The scene was like something out of a Costner film: eight middle-aged men hunched up on horses, cowboy hats in abundance, without exception every one of them wearing jeans and button-down shirts, Pence's own rolled up with two or three crisp cuff-turns. The resulting media photos frame the crew in rolling fields of knee-high wheatgrass, a prodigious plains horizon at their backs. But of course this was not just another leisurely stroll across the prairie; it was a tour of one of the largest coal mining facilities in the country. And like all of the Powder River Basin's mines, the Absaloka features some of the most advanced technology in the industry: a dragline the size of an office complex, 150-ton wheel loaders, and trains that run 24/7/365, carrying millions of tons of coal across the country in the process. But instead of taking four-wheel-drive trucks, of showing off the transportational technology and

[1] Jackie Yamanak, "Pence Told Crow Tribe 'War on Coal Is Over' During Absaloka Mine Visit," *Yellowstone Public Radio,* May 15, 2017. Article available at http://www.ypradio.org/post/pence-told-crow-tribe-war-coal-over-during-absaloka-mine-visit#stream/0.

resources that today's miners actually use, the vice president dipped into the mythology of an earlier era. He told those assembled about the joy of being "able to sit on a horse and see that glorious panoramic view that has been the legacy of the Crow Nation for more generations than we can count," citing Reagan's observation that "there's nothing better for the inside of a man than the outside of a horse." As they rode alongside Westmoreland's past and future mining sites, Goes Ahead explained to the vice president the Crow's recent troubles with Westmoreland and the coal industry in general, declaring that coal was "the lifeblood of the Crow." In response, Pence did his best to ease Goes Ahead's fears, informing the vice chairman, "I am here to announce the war on coal is over."[2] With a new administration and a personal assurance from none other than the vice president himself, the Crow were hoping to move on from the discord of Sarpy Creek and the plummeting returns of the past eight years. They were hoping for a return to the thermodynamic riches of the past.

[2] David Caplan, "Mike Pence in Montana: Tours Coal Mine on Horseback, Stumps for GOP Candidate," *ABC News,* May 13, 2017, https://abcnews.go.com/Politics/mike-pence-montana-tours-coal-mine-horseback-stumps/story?id=47386520; http://westmoreland.com/location/absaloka-mine-montana/.

Figure 23: Mike Pence Visiting the Absaloka Mine, May 2017
https://billingsgazette.com/news/vp-mike-pence-says-war-on-coal-is-over-during/article_42469654-6f28-54fc-aed7-0e13898d9726.html

It should not be surprising that nobody mentioned the Sarpy Creek incident. On top of all the discord and strife, by 2017 it had been legally resolved, and the focus was on the future of the industry and the "great work" Westmoreland and the Crow Tribe were doing.[3] Four years earlier, a case concerning the bison bones had reached the Billings District Court. It was brought against members of the Crow Tribal Historic Preservation Office (C.T.H.P.O.), the branch of the tribal government that was (and is) in charge of monitoring any work on the reservation that "may disturb tribal lands," activities such as "utilities, construction, energy exploration, development." To facilitate this oversight, the tribe received funds from the U.S. Department of the Interior, the National Park Service, and the company that was doing the work (in this case,

[3] Despite Pence's promises, Westmoreland's stock continued to plummet in the wake of his visit, dropping from $45 a share in mid-2014 to its all-time low, seven cents, by the beginning of 2018.

Westmoreland). The job of the C.T.H.P.O. was "to monitor the project to insure [sic] that lands of cultural of historic importance are not destroyed."[4] In other words, they were tasked with preventing precisely the sort of tragedy that occurred at Sarpy Creek.

All of the payments for these services first had to go to the Crow Tribal government, who would then pay the individual monitors for their work. During and after the Sarpy Creek incident, however, Dale Old Horn, the (at the time) Tribal Historic Preservation Officer, worked with Westmoreland and other associated companies in order to have the businesses pay the monitors directly, without the funds first passing into the Crow Nation's coffers. According to the 2013 court case, from July 2008 to November 2011, more than half a million dollars were diverted in this way for "the personal use and benefit of the employees of the CTHPO." Three men in particular—Mark James Denny, Larkin Troy Chandler, and Frederick Paul Deputee Jr.—were the monitors for the Sarpy Creek expansion. In that position, they took what amounted to bribes in exchange for not showing up to work, receiving pay for labor that they did not do and—more importantly—allowing Westmoreland to expand without any tribal oversight.[5] In May 2013, U.S. District Judge Richard Cebull sentenced all three men to five years of probation, with Denny owing $73,046 in restitution, Chandler $44,546, and Deputee $6,130.[6]

Unlike the bison bones and the atlatl darts, the sentencing did not make the national news. Coverage was limited to a handful of local papers; most carried no

[4] "Mark James Denny Sentenced in U.S. District Court," *The United States Attorney's Office, District of Montana,* May 1, 2013, https://www.justice.gov/usao-mt/pr/mark-james-denny-sentenced-us-district-court.
[5] Ibid.
[6] Lorna Thackeray, "3 Sentenced in Crow Fraud Investigation," *Billings Gazette,* May 1, 2013. Article available at https://billingsgazette.com/news/state-and-regional/montana/sentenced-in-crow-fraud-investigation/article_2d78dd47-e24f-5278-9df1-4966539c83c1.html.

mention of the case. In many ways, however, such quietude fits the region's past rather well. For hundreds of years, the Powder River Basin's thermodynamic resources have played a critical role in the development of the West, the country, and the continent as a whole. And yet for the most part this has been done quietly, beyond the purview of the bulk of the country. This trend began with behind-the-scenes transformations of the Teapot Dome scandal and has only become more pronounced through time, even as the Powder River coal industry has grown and asserted itself as the chief coal producer in the world. For instance, just this past summer, the ever-prolific writer and National Book Award winner William Vollmann produced the latest and perhaps the most comprehensive tome on the country's energy history. Coming in at a meaty 1,265 pages, his two-volume *Carbon Ideologies* is a look back at the industries and worldviews that have driven American energy production and consumption over the past century. Narrated from the perspective of a global future in which such resources are far more scarce, it is meant to be a dense but accessible book that represents our conceptions of the country's energy past and present. Vollmann covers everything one could expect of such a text: coal, oil, fracking, natural gas, nuclear energy, and solar power as he travels the globe to interview experts, excavators, and average citizens from West Virginia to Bangladesh, California to the United Arab Emirates. *The Washington Post* described it as "an elegant indictment of the mundane behaviors that require immense amounts of carbon-emitting fuel, and the ways we've structured our world around fulfilling and continually augmenting energy demand…a feverish, sprawling archive of who we are, and what we've wrought."[7] What is surprising, then, is that in these thousand-plus pages,

[7] Meara Sharma, "Why Have We Done So Little to Tackle Climate Change?" *The Washington Post,* April 6, 2018. Article available at https://www.washingtonpost.com/outlook/why-have-we-done-so-little-to-

neither Wyoming nor the Powder River Basin is mentioned even once.[8] The world's largest provider of coal for more than three decades now is not even a footnote to American's energy history; it is outright invisible.

From a material standpoint, it is impossible to debate the Powder River's modern impact. It is—and has long been—the greatest cache of energy on the planet.[9] And yet in spite of the patent evidence, the coal portion of Vollmann's study (2013-2015) focuses on West Virginia and Kentucky. During that time, Wyoming produced *four times* as much coal as West Virginia and nearly *seven times* as much as Kentucky. In fact, Wyoming excavated as much coal as the closest six states *combined*. And yet, as this dissertation has argued, one of the underlying reasons for omissions like Vollmann's (and Pence's) has to do with narrative. Despite all of the thermodynamic advances and technological fixes that have emerged over the years, our stories about coal remain stubbornly mired in nineteenth-century notions of manual labor and individualism. Almost without exception, these narratives focus on underground mines, highlighting murderous labor disputes and the plight of the exploited worker. West Virginia, Pennsylvania, and Kentucky are the inevitable settings of such stories, though even when the narrative does occasionally venture West, it does so through the guise of the underground mine.[10] One only needs to

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tackle-climate-change/2018/04/06/d62710dc-2baf-11e8-8688e053ba58f1e4_story.html?noredirect=on&utm_term=.11e4309a6333

[8] It is mentioned twice in tables. Once listing caloric efficiency of Wyoming sub-bituminous coal (211), once in a description of what sub-bituminous coal is (555). William T. Vollmann, *No Immediate Danger: Volume One of Carbon Ideologies*, 1st Edition edition (New York, NY: Viking, 2018).

[9] As noted in chapter four, current estimates place the P.R.B.'s reserves at 3,616 Quadrillion BTUs. In order to equal that total, you need to *combine* the next ten largest energy reserves in the world. Considine, "Powder River Basin Coal: Powering America," 517.

[10] This seems to be due to our popular understandings of the West, its past, and its landscape. For instance, see K. Ross Toole (discussed in chapter four), whose arguments against Powder River coal mining is based on a regional history that is largely horseback. This, it seems to me, is the main reason Pence and his crew took to horseback to tour the Absaloka Mine: he needed to draw upon this romanticized view of the West—men riding horseback across the grasslands—in order to interact with or justify this alternative narrative—coal mining—that is supposedly modern and antithetical to the American West as an ecological space. One

look at perhaps the most well-known fictional description of the industry in the United States, Upton Sinclair's *King Coal* and its sequel, *The Coal War,* which focus on Colorado's Ludlow Massacre, the subject of Thomas Andrews's much later academic history, *Killing for Coal*.[11] In concentrating on such a narrow and in many ways dated approach to energy excavation—tunnel mining—Vollmann's work both draws upon and perpetuates a discourse for viewing the country's relationship to coal, one that subtly shrouds the more prominent and far more impactful endeavor of strip mining.

Something similar can be said about our histories of the American West. Despite the New Western History and all of the revisions that it has brought about, the field is still weighted down by the paradigm of boom and bust.[12] Patricia Limerick and others have pushed back against this, encouraging scholars to view the West as a place of continuity, what she refers to as an "unbroken past." And yet in that same work she asserts that the West "provid[es] the prime example of the boom/bust instability of capitalism."[13] Of course the very notion of boom and bust is, by definition, predicated upon discontinuity—something happens, massive numbers of people flow into a place,

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only needs to look at the bounty of traditional and modern songs on coal mining in the U.S.—Darrell Scott's "You'll Never Leave Harlan Alive, Merle Travis's "Dark as a Dungeon," Woody Guthrie's "The Dying Miner," to name a few—to see that, without exception, they are about underground mining in places like Kentucky and West Virginia. There are no romantic songs about open-pit mining in the West. What there are is a bevy of music on cowboys. Even the Johnson County War has been the subject or inspiration of a number of songs—Patterson Hood's "The Range War," Chris Ledoux's "The Johnson County War," the traditional "The Ballad of Nate Champion," not mention movies like *Shane*. Ariel Arden Downing even wrote an entire dissertation on music in the "cowboy culture" of the Powder River Basin. This sort of dichotomized popular perception is what this dissertation has been trying to illuminate as historically specious. Ariel Arden Downing, "Let'er Buck!: Music in Cowboy Culture of the Powder River Basin, Wyoming, (PhD diss., University of Colorado, 1997).

[11] Upton Sinclair, *King Coal: A Novel* (Macmillan, 1917); Upton Sinclair, *The Coal War: A Sequel to "King Coal"* (Boulder: University Press of Colorado, 1976). Note that *Killing for Coal* and the original edition of *The Coal War* use the same image from the Ludlow Massacre for their cover.

[12] Limerick's call for the West as a place of continuity rather than as a region defined by starkly delineated progressions is most in debt to Earl Pomeroy, "Toward a Reorientation of Western History: Continuity and Environment," *The Mississippi Valley Historical Review* 41, no. 4 (March 1, 1955): 579–600.

[13] Patricia Nelson Limerick, *The Legacy of Conquest: Unbroken Past of the American West* (New York: WW Norton & Co, 1987), 27, 29, 142–143.

something else happens, nearly all of those people leave. Similar contradictions can be seen throughout the field of western history. Even the bulk of "New Indian" histories tend to unintentionally perpetuate them. For decades now, scholars have rhetorically assaulted the 1890 end of the frontier, going back, as so much does in western history, to Turner's infamous frontier thesis. And yet that 1890 divisor nevertheless persists—if implicitly—in the majority of our histories. Almost without exception, every one of the major award-winning texts from the New Indian History concludes prior to the reservation era.[14] And so despite their theoretical flaws, the boom-and-bust paradigm and the frontier binary persist precisely because they fit our popular understandings of the West: they neatly delineate bison, horses, coal, and oil, putting each into its own sterile temporal compartment, ensuring that they never overlap or conflict in any sort of problematic way.

It is these sorts of histories that enabled the vice president and his supporting cast to don Wranglers and cowboy hats as they toured the Crow reservation's cutting edge, twenty-first-century mines on horseback. In doing so, they were reasserting popular

[14] Brian DeLay, *War of a Thousand Deserts: Indian Raids and the U.S.-Mexican War* (New Haven; Dallas, TX: Yale University Press, 2009); Pekka Hämäläinen, *The Comanche Empire* (New Haven: Yale University Press, 2008); Ned Blackhawk, *Violence over the Land: Indians and Empires in the Early American West* (Cambridge, Mass.: Harvard University Press, 2006); Jeffrey Ostler, *The Plains Sioux and U.S. Colonialism from Lewis and Clark to Wounded Knee* (Cambridge: Cambridge Univ. Press, 2004); Elliott West, *The Contested Plains: Indians, Goldseekers, & the Rush to Colorado* (Lawrence, Kan.: University Press of Kansas, 1998); Daniel K Richter, *The Ordeal of the Longhouse: The Peoples of the Iroquois League in the Era of European Colonization* (Chapel Hill: University of North Carolina Press, 1992); Richard White, *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650-1815* (Milwaukee, WI: Cambridge University Press, 1991); Kathleen DuVal, *The Native Ground: Indians and Colonists in the Heart of the Continent* (Philadelphia: University of Pennsylvania Press, 2006); Juliana Barr, *Peace Came in the Form of a Woman: Indians and Spaniards in the Texas Borderlands* (Chapel Hill: University of North Carolina Press, 2007); James Brooks, *Captives & Cousins: Slavery, Kinship, and Community in the Southwest Borderlands* (Chapel Hill, NC: Published for the Omohundro Institute of Early American History and Culture, Williamsburg, Virginia, University of North Carolina Press, 2002); Alan Gallay, *The Indian Slave Trade: The Rise of the English Empire in the American South, 1670-1717* (New Haven: Yale University Press, 2002); Brett Rushforth and Omohundro Institute of Early American History & Culture, *Bonds of Alliance: Indigenous and Atlantic Slaveries in New France* (Chapel Hill; Williamsburg, Va.: University of North Carolina Press ; Published for the Omohundro Institute of Early American History and Culture, 2012).

understandings of the American West as the land of horses and cattle, not the land of strip-mined coal. At the same time, however, they were (unknowingly) bringing forth the region's submerged energetic imbrications, thermodynamic ragouts that every so often bubble up through the surface, demanding explanation. This dissertation began with the Sarpy Creek incident, an ostensibly atypical instance of ancient coal and ancient bison bones intertwining across space and time. It ends by arguing that this sort of historical plaiting is not merely normal, but is perhaps the quintessence of the region. From the quiet rise of Crow thermodynamic dominance to the complex energy histories of Johnson County, Salt Creek, and Gillette, what these places and moments reveal is the often messy, contradictory nature of the past. Even when we try to cordon such histories off, to focus singularly on a particular energy source or method of extraction, a closer look reveals overlapping sources. In other words, no matter what we do, any serious archival examination unearths a multitude of thermodynamic sources: time and again, energy in all of its manifestations rises through the cracks of our historical models, splintering and challenging our traditional understandings of the American West.

To bind all of these ostensibly disparate events and epochs together we need to focus on the presence and extraction of energy through time. Although we tend to think of the history of the American West as that of aridity and "independence, self-reliance, and individualism," this dissertation has revealed that it is just as much—if not more—the story of energy in all of its manifestations.[15] In doing so, it has demonstrated the power that a thermodynamic history has to recast even the most important events in the history of the American West. It has shown that the Crow were not the weak victims of a

[15] White, *"It's Your Misfortune,"* 57.

Lakota advance but instead the first to transform the thermodynamic bounty of the Powder River Basin into an energy empire; it has proclaimed the archetypal open range conflict in our continent's history to be far more about science and ideas surrounding energy production than anything class-based; it has revealed the greatest political scandal in American history to be a turning point in the country's long energy narrative; and it has uncovered the century-plus buildup to the largest coal mines that the planet has ever seen. In disinterring the submerged thermodynamic roots of these paradigmatic western moments, this dissertation has recast the history of the region as a whole. For the American West has been many things for many different people over time: the land of cattle and cowboys; of indigenous peoples and bison herds that numbered in the millions; of pioneers and austere sod abodes. One thing it has never been, however, is the land of energy.

This dissertation has laid bare the problematic nature of such a claim. The West is and has long been a haven of American energy production. Even today, if you drive through the Powder River Basin, taking Route 59 north from Wright to connect onto the main I-90 corridor, you will pass by a small sign welcoming you to the town of Gillette. It is hard to miss. You need to look just past the bowling alley, directly across from Wyoming Machinery, the one with the big Caterpillar sign and all of the excavators lined up along the road, booms bent up in salute. It is a six-by-four stone rectangle with the words "Welcome to Gillette." But look closer. Up above it sits an epithet. Stamped on an arched white cutout, it reads "Energy Capital of the Nation." It is the sort of histrionic rhetoric you would expect from the nineteenth century. Booster fare. But this is different somehow. More fitting. Although few people would recognize such a claim today, the

numbers tell us that there is really no other way of interpreting the modern thermodynamic landscape. Over the past two hundred years, you could even argue, this whole region has been the energy capital of the world.

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