

The Post-Heroic Field

Etienne Benson, *University of Pennsylvania*

Abstract: This essay argues for taking fieldwork seriously, but not too seriously. It focuses on geologists and geomorphologists in the United States in the post–World War II decades who used irony, satire, and self-conscious staging to negotiate the contradictions between the tradition of frontier fieldwork that they had inherited from the late nineteenth century and the realities of mid-twentieth-century fieldwork, which they often found hard to fit into the heroic mold. Poking fun at the fieldwork tradition, the essay argues, helped them claim that tradition as their own even while constructing new scientific personas and practices that diverged from it in a number of ways.

Recent scholarship in the history of science takes fieldwork and the field sciences seriously, as it should.¹ It may be possible, however, to take them *too* seriously—and thereby miss important historical shifts.² In the decades following World War II, some field scientists learned to laugh at what was by then the well-established tradition of fieldwork, with its stock props—the anthropologist’s notebook, the geologist’s dusty pick—and its oft-told tales of adversity overcome. They saw themselves as inheritors of a legacy that had proven its value but had also grown musty, like a treasured heirloom kept in storage too long. And so, even as they followed in the footsteps of their famous predecessors, they could be self-conscious and even self-mocking in a way that reflected the passing of the heroic age of fieldwork and the emergence of a new set of relations between lab, field, and office.

This was true even in institutional contexts where the fieldwork tradition was taken very seriously, such as the U.S. Geological Survey, whose late nineteenth-century golden age was defined by the frontier fieldwork of figures such as John Wesley Powell, Clarence King, and Gilbert

Etienne Benson is Associate Professor of History and Sociology of Science at the University of Pennsylvania. His most recent book is *Surroundings: A History of Environments and Environmentalisms* (Chicago, 2020). Department of History and Sociology of Science, University of Pennsylvania, Cohen Hall 303, 249 South 36th Street, Philadelphia, Pennsylvania 19104-6304, USA; ebenson@sas.upenn.edu.

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¹ See Henrika Kuklick and Robert E. Kohler, “Introduction,” in *Science in the Field*, ed. Kuklick and Kohler, *Osiris*, 1996, N.S., 11:1–14, esp. p. 1.

² See Rane Willerslev, “Laughing at the Spirits in North Siberia: Is Animism Being Taken Too Seriously?” *e-flux*, 2012, 36, <https://www.e-flux.com/journal/36/61261/laughing-at-the-spirits-in-north-siberia-is-animism-being-taken-too-seriously/>; and Robin Wolfe Scheffler, “Brightening Biochemistry: Humor, Identity, and Scientific Work at the Sir William Dunn Institute of Biochemistry, 1923–1931,” *Isis*, 2020, 111:493–514.

Karl Grove.³ Linked to the colonial project of surveying sites for settlement and resource extraction, such fieldwork helped give geology in the United States a distinct identity at a time when science was becoming both increasingly specialized and increasingly central to the operation of the American state.⁴ Mid-twentieth-century Geological Survey scientists continued to venerate these founding figures, looking to them as models of how fieldwork should be done.

But they also recognized that times had changed and that the fieldwork they practiced did not fit easily into the heroic narratives they had inherited. It was not only that the frontier had been officially closed in 1890—even as many of the colonial practices associated with it persisted—but also that fieldwork had changed over the intervening decades.⁵ Journeys of exploration through contested territories had been replaced by visits to well-mapped “field sites” made accessible through an expanding infrastructure of highways and airports.⁶ Once on site, Survey scientists were as likely to take precise quantitative measurements as they were to collect rocks—and when they did the latter, it was often for the purpose of chemical analysis back in the lab. Fieldwork still mattered, but it mattered differently.

Irony and humor are probably necessary for survival in any bureaucratic context, but for Survey scientists in the postwar decades they also served another function: negotiating tensions between the illustrious tradition of fieldwork as they knew it from Survey lore and the reality of fieldwork as they experienced it. If the late nineteenth century was the golden age of the Survey’s pick-and-hammer geological expeditions, the post–World War II decades were the golden age of its annual Pick and Hammer Club shows, where Survey employees sang versions of popular show tunes rewritten to roast their superiors and satirize their own work. A sense of the kind of humor at play can be gleaned from the journal-style titles that graced the covers of the shows’ printed programs: the *BULLETIN of the Amicable Dissociation of Pewtroliferous Jowlogists*, the *Interminable Proceedings of the Geosophical Society of Atlantis*, the *Jawnal of Sedentary Pedagogy*, *GeoCrimes*.⁷

One of the ways that fieldwork figured in these satirical productions was as a valued tradition at risk of being buried by an avalanche of paperwork. The program for the 1952 Pick and Hammer show, for example, includes a song to the tune of “There is Nothing Like a Dame”—a popular number from Richard Rodgers and Oscar Hammerstein’s 1949 Broadway hit *South Pacific*—rewritten to lament the declining importance of fieldwork, with rocks substituting for “dames.” “We get urges now and then / To go out into the field, / But we sublimate our yearnings / And we very seldom yield,” one stanza goes. Elsewhere in the program one can find the complaint that administrators are increasingly outnumbering scientists.⁸ The authors of such complaints were

³ See Donald Worster, *A River Running West: The Life of John Wesley Powell* (Oxford: Oxford Univ. Press, 2001); Aaron Sachs, *The Humboldt Current: Nineteenth-Century Exploration and the Roots of American Environmentalism* (New York: Viking, 2006); and Jeremy Vetter, *Field Life: Science in the American West during the Railroad Era* (Pittsburgh: Univ. Pittsburgh Press, 2016).

⁴ See Kuklick and Kohler, “Introduction” (cit. n. 1), pp. 7–10; and Brian Balogh, “Scientific Forestry and the Roots of the Modern American State: Gifford Pinchot’s Path to Progressive Reform,” *Environmental History*, 2002, 7:198–225.

⁵ See William Cronon, “Revisiting the Vanishing Frontier: The Legacy of Frederick Jackson Turner,” *Western Historical Quarterly*, 1987, 18:157–176; and Megan Black, *The Global Interior: Mineral Frontiers and American Power* (Cambridge, Mass.: Harvard Univ. Press, 2018).

⁶ See Robert E. Kohler, *All Creatures: Naturalists, Collectors, and Biodiversity, 1850–1950* (Princeton, N.J.: Princeton Univ. Press, 2006); and Vetter, *Field Life* (cit. n. 3).

⁷ These programs are from the years 1949, 1950, 1954, and 1957, respectively. For background on the changes Survey scientists negotiated see Luna B. Leopold, “Hydrology, Geomorphology, and Environmental Policy: U.S. Geological Survey, 1950–1972, and UC Berkeley, 1972–1987,” interview conducted by Ann Lage in 1990 and 1991 (Oral History Center, Bancroft Library, Univ. California, Berkeley, 1993), pp. 163–167.

⁸ “Roquiescat,” song lyrics included in printed program, U.S. Geological Survey Pick and Hammer Club Show, 2 May 1952, pp. 7–8, on p. 7; and “Across the Bored,” song lyrics included in printed program, *ibid.*, pp. 12–13, on p. 12. This program is in the author’s collection.

not looking to the lab as the field's main rival and foil but, rather, to the mid-twentieth-century office, with its proliferating memos, meetings, and managers.

While there is no doubt that the mountains of paperwork that Geological Survey researchers were expected to climb were growing, it was not the case that the era of fieldwork had come to an end. Geology as it was practiced at the Survey remained a fundamentally field-based science. What was changing was the kind of fieldwork that was being done. In the 1950s, for example, researchers in the Geological Survey's Water Resources Division began a new line of research on what they called the "hydraulic geometry" of rivers.⁹ Initially based on a quantitative analysis of the Survey's vast archive of streamgage data—the epitome of science as office work—research on hydraulic geometry soon expanded to include laboratory experiments and field observations. Rather than chaining them to their desks, the quantitative turn in the study of landscapes gave postwar scientists new reasons to go into the field.

Even as they charted new paths in the study of landscapes, the researchers who conducted such fieldwork were eager to don the mantle of the Survey's frontier geologists. Indeed, they did so almost literally, changing out of their city clothes and into "dirty old field clothes and high-top boots" as soon as they arrived at their field sites. Luna Leopold, the driving force behind hydraulic geometry and the chief of the Water Resources Division from 1957 to 1966, was particularly known for his sartorial transformations. Whereas earlier field scientists were often anxious about being perceived as low-status laborers, Leopold seems to have taken pride in his field clothes. Arriving by train in Sundance, Wyoming, in 1950 for a summer of fieldwork with a former Harvard classmate, John Miller, his first order of business was to change into blue jeans, boots, and "a great big Stetson about this high that was twenty years old," as he later recalled. Now properly attired, he ran down the steps of his hotel, tossed his hat into the air, and shouted, "Hah! the field!"—an expression of exuberant release and a self-conscious performance all at once.¹⁰ Postwar fieldwork was research, but it was also role play.

Photographs of fieldwork from this period often present the scientist as a solitary pioneer in an uninhabited landscape, eliding histories of settler-colonial land appropriation and development and the contemporary forms of labor and infrastructure that made fieldwork possible. In one photograph taken in Montana in 1953 (see Figure 1), a well-tanned Leopold leans lightly on a shovel in front of a plane table equipped with a telescopic alidade—a precise but low-tech piece of equipment that would have been familiar to late nineteenth-century Survey geologists. Apart from the shadow of the photographer at the lower left, there are no other signs of human activity in the frame—no roads, trucks, dams, buildings, fences, or livestock, just a golden carpet of grass stretching out toward a distant, cloud-veiled mountain ridge. From Leopold's leisurely pose to his clean clothes, there are multiple signs that the photograph was carefully staged. Part of being a field scientist was looking the part.

When scientists dressed up like field-workers, it created strange optical inversions of the actual labor relations of postwar fieldwork. Given the increasing ease of transcontinental travel, survey scientists in the 1950s were less dependent on local labor than they once had been, but fieldwork remained a physical task.¹¹ Employees assigned to assist Leopold would be greeted in the field by someone dressed like a common laborer, only to discover that he was the head of the division. Robert Myrick, for example, recalled being met at the Santa Fe airport in the late 1950s by Leopold

⁹ See Luna B. Leopold and Thomas Maddock, Jr., *The Hydraulic Geometry of Stream Channels and Some Physiographic Implications*, U.S. Geological Survey, Professional Paper 252 (Washington, D.C.: Government Printing Office, 1953).

¹⁰ "Roquiescat" (cit. n. 8), p. 7 ("dirty old field clothes"); and Leopold, "Hydrology, Geomorphology, and Environmental Policy" (cit. n. 7), p. 92. See also Kohler, *All Creatures* (cit. n. 6), pp. 220–225.

¹¹ See Vetter, *Field Life* (cit. n. 3).



Figure 1. Photograph of Luna Leopold at Hasta Luego Draw near Billings, Montana, in 1953. University of Wisconsin–Madison Archives, Series 3/1, Box 85, Folder 8 (post 1948), Image S01824, <https://digital.library.wisc.edu/1711.dl/2WIVW5RYSSZMP83>. Courtesy of the Aldo Leopold Foundation and University of Wisconsin–Madison Archives.

and Miller, the latter now a professor at Harvard. Both of them were dressed in “grubby work clothes and western hats.”¹² They drove to the field site the following day after waiting for stores to open so that Myrick could buy his own field clothes. When it came time to dig the truck out of a rough spot in a sandy arroyo, it was Myrick who handled the shovel, while Leopold and Miller watched. They may all have been wearing the same clothes, but they were not all playing the same roles.

Hierarchies of labor and authority also manifested in the field in ways that made it clear that no matter how dusty and sun-scorched Geological Survey scientists might become, the clean-swept floors and fluorescent lights of the office were not far away. During one research trip to Wyoming with a team of eight or nine Survey men, the truck got stuck in a dry wash just hours before

¹² Robert M. Myrick and William W. Emmett, “Geomorphic and Sediment Processes—The Rest of the Story,” in Hugh H. Hudson, Joseph Samuel Cragwall, *et al.*, *A History of the Water Resources Division, U.S. Geological Survey: May 1, 1957 to June 30, 1966: The Years of Change* (Washington, D.C.: Government Printing Office, 1996), pp. 194–196, on p. 195.

Leopold had to catch a flight. Leopold came up with a plan: he would hitch a ride to town, send out a tow truck, and still make it to the airport in time for his flight. Some of the team gamely walked with him the two miles to the nearest highway. When they arrived, Leopold realized that no driver would stop for such a large group of rough-clad men, so he told them to hide behind the bushes while he thumbed for a ride. It was a reminder that the hierarchies of the office extended into the field, and it provided rich material for the next Pick and Hammer show—“the funniest show I’ve ever seen in my life,” Leopold later recalled.¹³

However rich in comic potential it may have been, postwar fieldwork was certainly work—and unequal work at that. But it also involved elements of leisure that established camaraderie among supervisors and subordinates and performatively wove their labor into the fieldwork tradition. For Leopold, playing guitar, singing, and drinking whiskey around the campfire with his fellow researchers—perhaps after a meal of fresh-caught fish, a bowl of chili or albondigas soup, and sourdough bread baked in a Dutch oven—was an integral part of the field experience.¹⁴ It also evoked traditions that, for Leopold, were quite personal. His father, the conservationist Aldo Leopold, had advocated preserving wilderness areas in part because they provided opportunities for “re-enacting American history,” by which he mainly meant a whitewashed history of the colonial frontier. Specific kinds of food, dress, and song transformed what Leopold *files* once called his “‘vacations’ in the field” into reenactments of both geology’s history of frontier fieldwork and his own childhood camping trips.¹⁵

What was almost entirely missing from such reenactments was the Indigenous presence that, more than any gaps in the map, had actually defined the frontier for Euro-American settlers and geologists in the late nineteenth century. That does not mean that Native Americans were absent from the imaginations of the almost exclusively white, male scientists of the Survey during this period. The Pick and Hammer shows were, among other things, sites for “playing Indian” in ways that both linked postwar geologists to the colonial frontier and ironically distanced them from it. The 1949 program, for example, included “topographic engineers, rodmen, Indians, cowboys, and foiled men of the Geographical Survey” in its satirical cast list, while the 1957 program included “Arab[s], Navajos, dancers and assorted supernumeraries.”¹⁶ Although the mention of Navajos was probably a reference to contemporary coal and uranium mining in the Navajo Nation, for the most part Indigenous people were represented as they were in *Guns, Smoke, Rawhide*, and other TV westerns then in vogue—as stock characters from a bygone age, rather than as real people whose lives and lands were affected by the research that Survey scientists were conducting in the 1950s and 1960s.¹⁷ Jokes about cowboys and Indians helped place the Survey’s complicity in the settler-colonial project safely in the quasi-mythical past, if it was acknowledged at all.

Postwar Geological Survey scientists were eager to signal their belonging to this mythologized American tradition of frontier geology as a form of both work and recreation, but they were also quick to distance themselves from that tradition when it served their professional purposes. One

¹³ Leopold, “Hydrology, Geomorphology, and Environmental Policy” (cit. n. 7), p. 164.

¹⁴ See Myrick and Emmett, “Geomorphic and Sediment Processes” (cit. n. 12), p. 195. On camaraderie among field scientists see Kohler, *All Creatures* (cit. n. 6), pp. 47–72.

¹⁵ Aldo Leopold, “Wildlife in American Culture,” *Journal of Wildlife Management*, 1943, 7:1–6, on p. 1; and Luna B. Leopold to Estella B. Leopold (“Luna to Estella darling”), 11 Mar. 1962 (postmark), Box 1, Folder: Leopold, Luna B., Estella B. Leopold Papers, Special Collections Division, University of Washington Libraries, Seattle.

¹⁶ Printed program, U.S. Geological Survey Pick and Hammer Club Show, 26 Apr. 1957, p. 3. The program is in the author’s collection. See also Philip J. Deloria, *Playing Indian* (New Haven, Conn.: Yale Univ. Press, 1998).

¹⁷ See Andrew Needham, *Power Lines: Phoenix and the Making of the Modern Southwest* (Princeton, N.J.: Princeton Univ. Press, 2014); and Traci Brynne Voyles, *Wastelanding: Legacies of Uranium Mining in Navajo Country* (Minneapolis: Univ. Minnesota Press, 2015).

of Leopold's close collaborators on hydraulic geometry, M. Gordon ("Reds") Wolman, defended his dissertation at Harvard in 1953 following several years of Survey-funded research on the Brandywine River. To celebrate the occasion, Leopold penned a satirical poem, "The Saga of the Brandywine," that skewered Wolman's field skills in gendered terms, noting that it was his wife who had "taught him how to run the gun / And computed all the notes, / Dried him out when he fell in / And paddled both the boats." Worse, Wolman's field measurements were a mess: "When the Survey boys came up to look, / The gages were a wreck, / The reaches were not worth a damn / The levels didn't check."¹⁸

Leopold's ribbing was good humored, and both author and subject knew that it had been exaggerated for comic effect. Wolman went on to become an influential scientist and a beloved teacher at Johns Hopkins University, where he was known for his ability to transform students into careful field observers.¹⁹ But Leopold's tongue-in-cheek "saga" nonetheless reflects a change in the status of geological fieldwork in the post–World War II decades: while it remained important, it was no longer enough. The most influential scientists in this era were not those who devoted themselves wholeheartedly to fieldwork but those who could move nimbly between field, laboratory, and office. Leopold and Wolman could laugh about the latter's misadventures in the field in part because both of them knew that much of the real work was happening elsewhere. To the extent that clumsiness in the field signaled that one spent much of one's time running experiments in a laboratory flume or sifting streamgage records for correlations, it might even be a virtue. Doing too much fieldwork could be just as bad as not doing any at all.

Even when they were most closely retracing the steps of the geologists who had established the Geological Survey in the late nineteenth century, Survey scientists were aware that they were doing so under changed circumstances, with sometimes comical effects. That was the case for a research trip down the Colorado River that Leopold organized in 1965. As he and his boatmates well knew, they were traversing the same stretch of the Grand Canyon that John Wesley Powell, the Survey's second director, had navigated in his near-disastrous 1869 expedition. Leopold's expedition had a few white-knuckle moments of its own, but it also had the advantage of professional river guides, detailed aerial photographs, and frequent resupply via parachute drop from a light aircraft piloted by Survey staff based in Phoenix. After the parachutes came down, the team members found themselves scrambling up cliffs to recover heavy cans of fuel, chasing loaves of bread as they floated down the river, or opening a package to find that a crash landing had transformed blocks of ice and heads of lettuce into "instant chilled-lettuce salad."²⁰ Such were the tribulations of fieldwork a century after Powell's expedition.

While the lighter side of fieldwork lingered in the memory of its participants, what had sometimes verged on the parodic in the moment could also take on a more serious aspect as it receded into the past. In the 1950s and 1960s, Leopold and his colleagues styled themselves as scientific revolutionaries overthrowing the impressionistic, qualitative "physiography" of the early twentieth century with a more precise, quantitative, and genuinely scientific "geomorphology."²¹ As Miller

¹⁸ Luna B. Leopold, "The Saga of the Brandywine," unpublished poem, 26 May 1953, Box 35, Folder: Brandywine Creek, PA—Correspondence, M. Gordon Wolman Papers, Johns Hopkins University, Baltimore (hereafter cited as **Wolman Papers**). The phrase "run the gun" may refer to a surveying level, sometimes called a "level gun." Wolman's wife, not named by Leopold, was Elaine Wolman.

¹⁹ See Ruth S. Defries and Thomas Dunne, "Markley Gordon Wolman, 1924–2010" (National Academy of Sciences Biographical Memoir) (Washington, D.C.: National Academy of Sciences, 2011), p. 10.

²⁰ Myrick and Emmett, "Geomorphologic and Sediment Processes" (cit. n. 12), p. 196. For the original expedition see John Wesley Powell, *Report of the Survey of the Colorado of the West* (Washington, D.C.: Government Printing Office, 1873).

²¹ This was a tendentious misrepresentation of early twentieth-century physiography; see Dorothy Sack, "New Wine in Old Bottles: The Historiography of a Paradigm Change," *Geomorphology*, 1992, 5:251–263.

wrote to Leopold and Wolman in 1961, as they were preparing their landmark textbook *Fluvial Processes in Geomorphology*, they were already known as the “Unholy Three of geomorphology.”²² Their ironic embrace of the fieldwork tradition was in keeping with their heretical views, allowing them to claim ownership of the field tradition while also subverting it. By the mid-1990s, however, as Leopold was reaching the end of his influential career, his tune had changed: he now characterized himself as a “physiographer of the old school” and earnestly exhorted his modeling-mad younger colleagues to step away from their computers and dirty their boots in the field.²³

In the mid-twentieth century, irony, satire, humor, and self-conscious staging gave Survey scientists a way to remake the fieldwork tradition playfully rather than having to choose between the extremes of faithful reproduction and total rejection. This playful mode of engagement helped them negotiate shifts in the context and practice of fieldwork that made it difficult to see their work as a direct continuation of the heroic frontier tradition they had inherited from the late nineteenth century, with all its contradictions and elisions. That someone like Leopold would become an earnest defender of the fieldwork tradition by the 1990s was a sign not that he had recanted his earlier heresies but that the geological Earth had continued to revolve, casting some disciplinary traditions into the shadows and bringing others into the light. Even as we continue to take fieldwork seriously, we also need to attend to those moments when our historical actors seem gleefully aware that they are players on a stage—putting on their best costumes, exaggerating their gestures for comic effect, and generally making it clear to their audiences that they, too, are in on the joke.

²² John P. Miller to Luna B. Leopold and M. Gordon Wolman, 15 Mar. 1961, Box 26, Folder: 1964 Fluvial Processes in Geomorphology with Leopold and Miller, Wolman Papers.

²³ William B. Bull and Luna B. Leopold, “Geological Society of America Medals and Awards for 1994: Presentation of the Penrose Medal to Luna B. Leopold,” *GSA Today*, Mar. 1995, p. 51; and Leopold, “Hydrology, Geomorphology, and Environmental Policy” (cit. n. 7), pp. 29–30.