FRACKING AND HISTORICIZING: On Deepened Time in West Texas

CAMERON HU
Wesleyan University
https://orcid.org/0000-0003-3039-8550

EXPOSURE

A traveler crossing what is now called West Texas, a desert plain sometimes loathed and sometimes beloved for its surpassing flatness, may take note of two vertical features: the mountain and the extractive zone. To the west, Guadalupe Peak juts up from the desert floor, limestone cliffs visible and stirring at a great distance. To the east, pumping units and drilling rigs and pipelines sprawl across the Permian Basin oil fields, so much extractive machinery suggesting the presence of something enormous underground. There, such height—here, such depth.

Contemporary geological thought instructs that this height and this depth are together expressions of the same ancient structure. Geoscientific consensus holds that mountain and oil field are fossilized remains of a single reef complex formed more than a quarter of a billion years ago, when the Earth's continents were joined and "West Texas" was sea. According to prevailing Earth history, tectonic forces have since exhumed the fossil reef in the west and pushed it skyward to make mountain, while in the east the same reef is still buried by time.

CULTURAL ANTHROPOLOGY, Vol. 40, Issue 2, pp. 354–382, ISSN 0886-7356, online ISSN 1548-1360. Cultural Anthropology *is the journal of the Society of Cultural Anthropology, a section of the American Anthropological Association.* Cultural Anthropology *journal content published since 2014 is freely available to download, save, reproduce, and transmit for noncommercial, scholarly, and educational purposes under the Creative Commons BY-NC 4.0 license. Reproduction and transmission of journal content for the above purposes should credit the author and original source. DOI: 10.14506/ca40.2.07*

Figure 1. Approaching the Guadalupe Mountains.
Photo by Stefan Schäfer.

Thus was it plausible that I could pass several days of a recent summer hiking the Guadalupe Mountains in the company of two dozen petroleum geologists. We believed this tour would help us understand the oil field. In the mountains, the idea went, we could see what the oil field looks like where its strata are "exposed"—where the same formations that are elsewhere underground heave above the surface, into view. We could climb what in the oil field lay beneath our feet. We could register the scale and order of strata against our bodies, smell in certain rocks the sour signature of hydrocarbons, shade in personal maps of the reef, and otherwise vibe our way into full-bodied knowledge of the oil field's geologic past—a sense of deep time in West Texas.[1]

Our hike through the mountains was professional development for experts in fracking. My companions were geoscientists advancing the growth of multinational oil firms. A richer idea of the region's "deep history" was the stuff of virtuosity in exploiting it in the present. And whenever our energies flagged in the heat, the eminent scientist leading us through the backcountry would repeat a well-worn maxim about the making of petroleum geologists. It cast the labor of geohistorical inquiry in the familiar jargon of the American imperial tradition. "First you're a slave to the data," he would say, recalling decades spent traversing the American Southwest and Arabian Peninsula, charting their prehuman pasts at the behest of a U.S.-based multinational oil corporation, which I will call the Company. "And then," he continued, "you make the rock your slave."

And then you make the rock your slave. His slogan, an incitement to mastery by way of historiography, condensed the circumstance that I will examine in this

essay. Building on recent studies of the logic and practice of fossil fuel capitalism (see Appel 2019; Bakke 2019; Bond 2022; High 2022; Jobson 2024; Rogers 2015; Smith 2021; Weszkalnys 2015) and recent critiques of the settler-imperial contours of geological thought (see Ferry 2020; Povinelli 2016; Yusoff 2018), I observe that it is via the exercise of a specifically *historical* science that the Company addresses the Earth as its slave. In West Texas, as throughout the world, multinational petroleum corporations have simultaneously spoliated the Earth and elaborated its deep history. In what follows, I explore the enterprise of petroleum extraction as a massively distributed "historiographic operation" (Trivedi 2021)—one whose violence exemplifies the modern compulsion to explicate more and more of the world as so much historical process.

The destructive progress of fossil fuel capitalism, I show, elicits from the planet the same provincial structure of processual, contingent, and indeterminate time that Euro-American imperial modernity projects into human affairs under the sign of "history." Preoccupation with the "depth" of geologic history or the relative shallowness of human history can obscure this common orientation and its moral-political undertow. Historicity has reordered human life as an open-ended process that modern powers might continuously adjust, direct, and accelerate. Today, Texas fracking elaborates a similar fantasy about the planet as it unfolds the layers of a historicized Earth. Fracking, I argue, is a nigh-inevitable project to adjust, direct, and accelerate geological process on the premise that the Earth, now burdened with historicity, is somehow too slow.

The view from West Texas may compel us to decline recent calls to emplot the political present within geological history. It ultimately suggests a maxim quite different from the geologist's: that modernity historicizes the Earth by wrecking it, and wrecks it by historicizing it.

* * *

At the end of the excursion, the geologists convoyed in SUVs back to Midland-Odessa, capital of the Permian Basin oil field and the American fracking "revolution." These men and women led an industrial avant-garde that was turning the Permian Basin into the most productive oil field on the planet—for an uncanny *second* time. Multinational petroleum corporations had largely abandoned the Permian Basin by the close of the twentieth century. Now they returned to West Texas and furiously re-engineered the moribund resource into the "center of the oil universe" (Drane 2024), in the same movement proliferating earthquakes and toxic spills and leaking more methane into the atmosphere than any

other oil field in the Americas (see Presley 2022; Pskowski and Aldhous 2023; and Zhang et al. 2020). And as our air-conditioned luxury vehicle descended from the mountain into the resurrected extractive zone, and the high-wattage lights of twenty-four-hour drilling machines broke into view against a purple dusk, some of the geologists fell to talking about the pleasures of doing petroleum geology at the height of the fracking boom. Industrial science in West Texas was "so much fun," they avowed. And everyone in the car agreed on what was most fun: It had to be the sublime moment when the Company removed a "core" in the course of drilling a well.

An oil well is engineered negative space. It is a long and narrow hole connecting a point on the surface to a point of depth, through which dead life transformed by pressure, heat, and time meets capitalist political economy. The "positive" rock withdrawn to make that "negative" space is usually ground to bits as a drill bit churns into the subsurface. But sometimes the Company would pay extra to carve out and preserve, rather than pulverize, a section of the underground. Out from claustrophobic darkness emerged the core. On a basic principle of sedimentary geology—that in a vertical sequence of rocks the oldest are usually at the bottom, such that going "down" in space is going "back" in time—the core recorded the passage of millions of years at any single point in the extractive zone. One of the geologists in the car dramatized the moment like this: when the core emerges from the Earth, "you are looking at a piece of rock that no one has ever seen in the history of humanity."

In his appreciation, two timelines crossed as the Company carved out a core. The core described the processes of Earth history. From its texture, density, color, and other qualities he might understand something about the events of the prehuman past. Yet at the same time, he grasped the moment in which the core was exposed to light and air and human vision as an event in a total "history of humanity," whose progress might be measured when the sciences learned still more about the history of the Earth—an Earth whose peculiar fate was to be known *historically* from the late nineteenth century onward, not least because the metastasis of fossil-fueled industry made geology a ubiquitous technoscientific enterprise (see Lucier 1999).

Another of the Company's geologists added, resonantly if less rhapsodically, that "the best geologist is the one who has seen the most core." Our hike through the reef-become-mountain had its value, sure, but it was core, he said, that truly honed his ability to visualize deep history in three dimensions. Envisioning the

past, he could locate more petroleum; locating more petroleum, the Company could drill new wells; when the Company drilled wells, he might see more core—and his understanding of the region's past might be enriched yet further.

Over years of fieldwork in the Permian Basin, as on trips through oil fields in South Texas and North Dakota and Saskatchewan and Sumatra, I was surrounded by cores. In conference halls and corporate offices, those cylinders of subsurface lay out in trays for geologists and engineers to mist, sniff, magnify, and stroke. In academic and corporate laboratories, I watched geologists pulverize cores for chemical analysis, scan cores in three dimensions, and crush cores in hydraulic vises. I killed empty afternoons visiting warehouses where the Bureau of Economic Geology stores millions of boxes of cores carved out across a century of extraction, on the premise that the debris of exploitation will educate future generations or future corporations about the Earth's past. The manager of an archive in Houston once offered to show me some celebrity rocks. She produced cuttings from one of the first horizontal wells drilled into South Texas's Eagle Ford Shale. I rubbed my finger across the grain of the formation whose spoliation reanimated U.S. oil extraction amid ever more extreme fossil-fueled ecological turbulence.

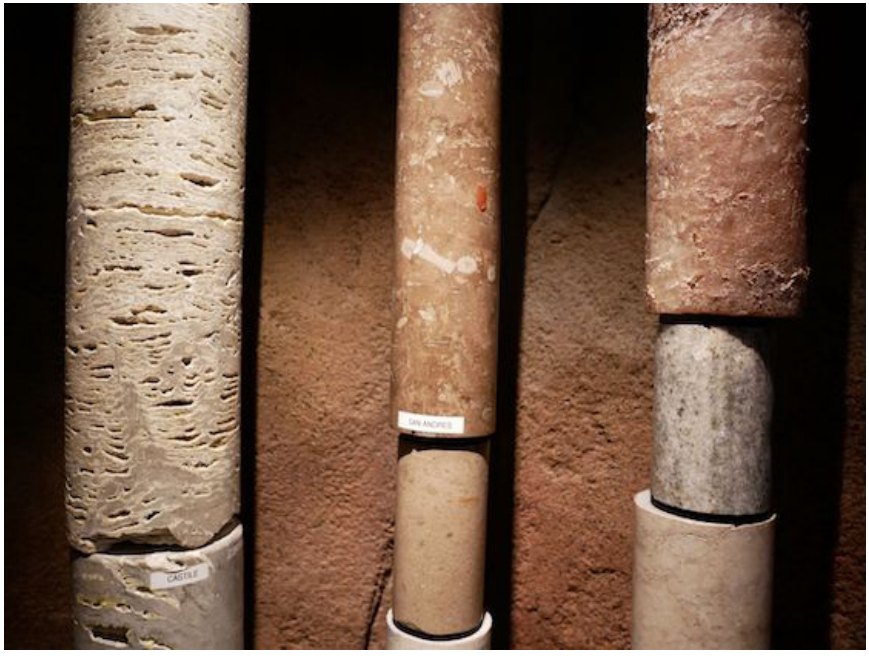

Figure 2. Core samples displayed at the Petroleum Museum in Midland, Texas. Photo by Cameron Hu.

And as I admired a bit of rock removed from a recent oil well—admired an index of Earth's deep past, or an index of petro-capitalism's present, or maybe both at the same time—I had a first, hazy glimpse of the possibility that I will try to get into clear view in this essay. It is, simply, that extraction is a historicizing operation. That the drilling of oil wells simply is the writing of the Earth's past, and that the prevailing form of life elaborated by Euro-American imperialism has given the Earth a deep past by degrading it. Or, in equal and opposite terms, that the historicization of the Earth is its destruction.

For what do so many cores, drilled out from countless wells and archived in warehouses and laboratories, actually record? Are they records of the past of the planet, those longue durée processes by which the Earth has come to be what it seems today? Or are they forensic evidence of the violation of the Earth and human communities by so many Companies, records of the world-destroying enterprise by which petroleum corporations have installed themselves in the structure of collective life and the planet? The cores, I believe, compel us to perceive not a contingent "relationship" between geohistorical inquiry and corporate destruction but their profound unity. The cores beckon us to consider the arc of a multigenerational, hyper-destructive historicizing operation. They describe a single trajectory of techno-scientific "explication" that, laminating the word's contemporary and archaic meanings, makes the Earth's history explicit through the muscular unfolding of its layers.[2]

In what follows, I trace this trajectory across two episodes of simultaneous destruction and historicization in the Permian Basin. In the 1920s, petroleum corporations expanded en masse into West Texas, turning the desert into an extractive zone *and* turning it into a former reef. Today, petroleum corporations are transforming West Texas into the world's most prolific oil field *and* fracking is—as literally as one can mean it—accelerating the geological timelines that petroleum corporations projected into the landscape a hundred years earlier. The first episode has enabled the second, and in the movement between them I observe a tendency in which the meaning of historicization drifts, as if inevitably, from chronicling deep time processes to modulating them.

In this way the modern historicization of the Earth reveals a profound resemblance to the modern historicization of human life; and it suggests the continuity of geological thought with a provincially modern orientation of the moral and political imagination that Amira Mittermaier (2021) has designated the "human horizon." For in historicizing Earth and world alike in terms of contingent, indeterminate, and indefinite temporal processes, Earth historiography and

human historiography have released unprecedented ambitions to manipulate and accelerate those processes. I will pause briefly over this likeness so that its provocations may guide a return to West Texas.

THE DEEPENED HORIZON

As scholars try to make sense of a planet degraded by capital and empire, many have called on the powers of deep time to loosen the grip of the prevailing form of life. The destructiveness of that form of life, some assert, is enabled by a shallow sense of historical time confined to human historicity—a temporal myopia seen to facilitate a catastrophic overvaluation of human agency as the story of the world. In response, scholars from across the disciplines have called to "decenter" the agency of human beings by contextualizing it within fathoms of deep time, fusing "the limited timescale over which modern humans and humanist historians contemplate history with the inhumanly vast timescales of deep history" (Chakrabarty 2021, 4).[3] In anthropology, provocative new works assert with a certain urgency that "the material conditions of human existence can only be understood as the product of processes occurring over deep time" (Irvine 2020, 173), and they invite their readers to become "more skilled deep time reckoners" (Ialenti 2020, 5). The moral and political significance scholars assign to deep time resonates with contemporary works of popular geoscience insistent that "thinking like a geologist can help save the world" (Bjornerud 2018). Amid the so-called Anthropocene, it has become broadly plausible that "saving the world" might begin with an expansion of historical sensibility beyond human recency, and into the depths of the Earth's past.

But geological time is politically complex (see Zee 2017; Oguz and Whitington 2023) and its moral force is less than self-evident; and it is, I think, possible to see something rather different in the humanities' turn to geological *history*. Might it be the special cruelty of the prevailing form of life that in striving to overcome its moral-political constraints we deepen one of its basic commitments: to apprehend the world *historically*? Could the turn to deep time actually affirm the destructive tendencies of that form of life, by deepening modernity's overwhelming compulsion to historicize?[4]

Indeed, historians of geology have indicated that deep time, far from eroding modern anthropocentrism, may actually be all too human. The paleontologist Martin Rudwick (2014, 4), for example, has argued that the source of the revolutionary "historicalness or *historicity* of nature" elaborated by geologists "lay in the contemporary understanding of *human* history, which was deliberately

and knowingly transposed into the world of nature." Deep history rendered the Earth intelligible along the same metaphysical pattern by which Euro-American modernity had come to appraise human life and action anew. In particular,

> Human history was recognized as being deeply contingent: at every point things could have turned out differently. . . . This was the new sense of historicity that was transferred from culture into nature, generating a new understanding of nature, and specifically of the Earth, as similarly historical (Rudwick 2014, 4).

Deep time may or may not be "anthropocentric," but a historicized Earth is in basic ways an anthropomorphic Earth—and it is anthropomorphic on a provincial conception of the human as a creature of history. Moderns, Rudwick indicates, project onto the planet the basic temporal blueprint along which they prefer to construct themselves: a contingent, processual, open-ended time connecting events that—to conjure a commonplace of critical social science—could always have been and may yet go otherwise. The purportedly inhuman timescales of geological inquiry are doubtless vaster than those on which moderns usually historicize human activity. Yet a fundamental conception of time's shape has remained consistent as the natural sciences expanded modernity's historicizing enterprise from the human shallows to the more-than-human depths. From a certain angle, deep history may be seen to deepen Euro-American modernity's provincial metaphysics of contingent, processual time. In the elaboration of deep history we might see not a break with the prevailing *Weltbild* but the expansion of its empire into still-further territories.

I think this shift in aspect perception is worth cultivating. For it introduces a different and difficult question about the politics of historicity amid contemporary planetary turbulence. The prevailing form of life may not distinguish itself by the shallowness of its historical thought. It may distinguish itself, rather, by the automaticity with which it progressively historicizes world and Earth. To get that destructive form of life into new critical view might not only mean inquiring, as the humanities and social sciences so often do at moments of moral-political anguish, which history or whose history or (lately) how deep a history scholars should now elaborate. It might also mean cultivating critical attention to the compulsion to historicize as it expresses itself in the flow of thinking and acting, and so learning to see moderns—including ourselves—as conscripts of a *historicizing form of life*.[5] In turn, we might explore how the modern destructiveness

that today draws our concern may be internally related to, may flow through, the operations by which modern powers cause world and Earth to radiate contingent, processual—historical—time.

Here I am channeling Mittermaier's recent provocation. As scholars go searching for the more-than-human, Mittermaier (2021) indicates that to venture "beyond the human horizon" may demand more than the broadening of established critical-empirical strategies so that they will be inclusive of further objects (encompassing more histories, more agencies, more knowledges). It would, Mittermaier implies, also require us to hesitate over certain conventional presuppositions that organize critical-empirical inquiry: not least, the provincial assumption that history is the ground of being, and that to understand the world in any morally or politically salient way is to know the present as the outcome of so many contingent, indeterminate processes—that is, to historicize it (see, for resonant arguments, Agrama 2012; Asad 2018; Hirschkind 2020; Iqbal 2020; Trivedi 2021). My aim in this article is not to reach "beyond" what is conventional but to see another aspect in it. And from Mittermaier's provocation I would develop the following implication: if moderns are destroyers, it may not be for the incompleteness of their histories. Moderns may destroy as *historicizers*. Modern destruction may be the kind that issues from a historicizing form of life.

Indeed, as so many writers now associate planetary destruction with too-familiar fantasies of the human as a sovereign, world-constructing agent, it is worth recalling how the historicization of the world has cleared the metaphysical ground for that Promethean ideal. Hannah Arendt (1961), Constantin Fasolt (2003), Michel Foucault (2002), Reinhart Koselleck (2004), and many others have observed that a historical temporality of contingent, open-ended process constitutes the corollary of modern aspirations to world-engineering agency. When the past becomes historical, the future becomes more or less free from the determinate closures of fate, providence, and custom. History's world is a world that has been intentionally or inadvertently "made"—and which therefore remains available to being made. When we historicize the present as the temporary congelation of a contingent process—whether we are explicitly writing a past into the present, or just marking off the present from the future or past as, say, pre-Trump or post-9/11—we tacitly affirm the version of reality in relation to which human agents *could* author a future different from past and present.[6] History's fundamental seduction, as the meta-historian Fasolt (2003, xiv) sums, has been the "enhanced control it promises to human beings over the world of self and society." The modern inscription of reality as so much contingent,

open-ended process "put human beings in charge of their own affairs and gave them the liberty to differ." And although historicization arose in the later Renaissance as a radical operation for contesting specific authorities by revealing the all-too-human processes by which they *became* authorities, history's subversive gesture, Fasolt demonstrates, became ubiquitous, mandatory, and automatic in choreography with Enlightenment ideals of human freedom and self-determination. "History allowed us to create a kind of humanity"—so many potential world-shaping agents—and "now we cannot think of any other kind."

Whether the content of a particular historical narrative aligns with recognizably radical or conservative ambitions, historicization effectively carves out the operating space, the room to move, for the agent who might in some way "change the world." Historicization pries time open for the progressive and revolutionary endeavors that anthropologists often admire—just as it wrenches the future open for the creative destruction of the imperial Man (Wynter 2003) or settler futurist (Tuck and Gaztambide-Fernández 2013) whose prestige comes still further into question today, as so much imperial world-building looks even to its protagonists and beneficiaries like desultory world-breaking (see Anidjar 2019; Masco 2020; Livingston 2019). So if planetary destruction today animates redoubled critical attention to pernicious ideologies of agency, we might explore how the fantasized modern agent takes form, and draws strength and ambition, from imperial modernity's historicizing operations, social scientific and geoscientific alike.[7]

To be sure, within and beyond anthropology there exist many sophisticated and self-reflective styles of historicization. Their intellectual and political ambitions vary, as do the terms on which they render past time intelligible as so much contingent process. They differ, too, in the figurations of present and future agency they tacitly or explicitly extract from the historicized past. To chronicle the disacknowledged dynamism of those supposedly "without history" (Wolf 1982) is nonidentical to the work of characterizing how the production of silence structures historical memory (Trouillot 1995). A practice theory of history concerned with "how social beings . . . make and transform the world in which they live" (Ortner 1989, 193) responds to a different question of self-determination than the "narrative of subaltern agency . . . [whose] objective is to displace a story of submission with a story of resistance" (Scott 2004, 114). The historical materialism whose transhistorical mantra is "always historicize!" Jameson 2002, ix) approaches the etiology of prevailing conceptual equipment differently from the historical ontology emphasizing "the contingency of events

that led to the predicaments we find pressing or inescapable" (Hacking 2002, 24). Anthropologists and their fellow travelers have serious disagreements about *how* to historicize. Yet serious disagreement requires something shared about which to disagree—it reveals, as Ludwig Wittgenstein (2010, §241) wrote, "not agreement in opinions but in form of life." For their considerable divergences, the breadth of historiographic styles converge as rival stances and strategies adopted in relation to a world presumed, in the final analysis, contingent, processual, and open-ended. And they converge as stances that tacitly or explicitly deliver the future to *some* image of agency, whether they beckon the reader to modernist world-engineering or political revolution or the lower-octane Foucauldian optimism that in historicizing ourselves we may come to "understand, act out, and resolve present problems" (Hacking 2002, 25). What would truly amount to disagreement in a form of life—and what is thus genuinely scarce—is the social scientist who asserts that a present state of affairs is inevitable, or providential, or embodies some eternal principle, such that it is simply to be suffered and nothing can or should be done about it.

The point of contemplating the breadth of historicizing enterprises together, as variations on a theme, is not to bundle them for critical dismissal in favor of some equal-and-opposite determinism. It is to begin to appreciate the force with which the compulsion to historicize expresses itself in our thinking, sometimes despite ourselves, and so to nominate it as something worthy of attention. The reader will not have missed that the compulsion is expressing itself in these very paragraphs. Even as I try to get the modern compulsion to historicize into critical view I am drifting into a now familiar pattern of assumptions and assertions: that the way moderns address the past is a historical contingency, with the implication that we could become more aware, and so more free, in relation to our unexamined conceptions of time and action, such that—and now my drift reaches its fated destination—we may engage time and action "otherwise" in response to the demands of the present. This is what it means to be conscripted to a historicizing form of life. This is the compulsion to historicize at work.

If scholars desire to loosen the grip of the prevailing form of life, or unsettle its pernicious images of agency, it might prove interesting to get this compulsion into view, even if we cannot get it under control. Being "conscripts of modernity" (Scott 2004), and so of historicity, we may find more or less irresistible questions of what history demands acknowledgment, how deeply we acknowledge it, and what future endeavors it enables. But as we turn to those questions,

we might also pay attention to how our practices express this conscription, this compulsion—the myriad ways in which the prevailing form of life is "possessed by history" (Fasolt 2003, xiv).

And as the modern degradation of the planet commands anthropological attention, we might respond not only by historicizing more deeply but also by exploring the ways that historicity, having placed the world at the disposal of human agents, similarly puts the Earth at the discretion of modern powers. An anthropology of historicization today might contemplate the operations by which imperial modernity has forced the Earth to radiate deep time: the concrete procedures of geohistoricization, the drives that animate them, the hitherto unimaginable agential fantasies they release, and the deformations they induce in their object. The planetary devastations of the present may describe, however ironically, the *natural history of natural history*—or perhaps, with a different irony, the fated outcome of a modern compulsion to explicate further and further stretches of world and Earth in terms of contingent, open-ended process.

In the remainder of this essay, I follow that compulsion through the Permian Basin—where drilling historicized the Earth, and a historicized Earth in turn beckoned the industrial agent who would accelerate the processes of deep history. And maybe even change the past.

IN WHICH WEST TEXAS BECOMES A FORMER REEF

At the center of the West Texas extractive zone, the Petroleum Museum offers up "an amazing journey through over 230 million years of history" (Petroleum Museum 2021). The journey begins in a video booth advertised to "crack" putative "myths" about the American fracking boom—dispelling environmental anxiety in roughly the way refineries "crack" long-chain molecules into chemical commodities. And then a history of the present begins in earnest in front of a large diorama of an underwater reef.

It is soothing to find yourself before all this stilled marine ecology, installed like an aquarium behind floor-to-ceiling glass, artificial light falling in gently from above. You get to the Petroleum Museum by traveling through miles of industrial traffic on hot and dusty highways. The nearest sea is some 450 miles away.

But the diorama is, on closer inspection, bewildering. It takes some time to notice, but few of the creatures behind the glass are recognizable. There floats, for example, what looks like a school of fish—elegant, tapering cones in reflective silver—until your eye tracks to a wide end that opens in short tentacles.

Figure 3. At the Petroleum Museum, a meticulously-carved diorama depicts West Texas as a former reef. Photo by Stefan Schäfer.

These are cephalopods that have not existed for eons. The diorama reconstructs a reef on the far side of 250 million years ago, the "before" of the Late Permian Extinction Event, the most severe extinction event that geologists and evolutionary biologists read off the fossil record (see Erwin 2015).

So absorbing is this waxen reef that you may forget: this is a *petroleum* museum, and you are looking at extinct cephalopods because you are yourself standing above that reef, or the "resource" it became. The diorama represents a chapter from the autobiography of fossil capitalism. The next rooms of the museum display a variety of extractive machines—drill bits, pumping units, refineries—and indeed the diorama itself depicts a phase of the historical process by which the Earth began to gather some of itself into a "hydrocarbon machine" (Meissner, Woodward, and Clayton 1984) for the generation, preservation, and transport of petroleum molecules. It went, the Petroleum Museum instructs, roughly like this: the Earth's continents were once joined in a single landmass, what is today West Texas was the location of a sea, the reef depicted in the diorama established felicitous conditions under which dead microorganisms could fall gently to the sea floor and there be buried, undisturbed by turbulence. Over millions of years heat and pressure converted those organisms to molecules of

petroleum and methane, and then caused them to migrate through the underground until they came to rest in the pores of formations whose given names—Wolfcamp, San Andras, Grayburg, Yates—grace the pages of the *Wall Street Journal* and Bloomberg when someone invests in their exploitation.

The petroleum industry invites you to marvel at the deep history through which the Earth has made itself into a fossil resource. Yet anthropologists might also marvel at the weirdness of crossing the desert plain only to be told that this plain is, most importantly, a reef-cum-hydrocarbon-machine. The diorama embodies a historicizing operation that itself invites an anthropology.

The history of West Texas has not been deep for long. West Texas has arguably not been historical for more than 150 years. I do not mean that the many peoples who crossed the plain for millennia did not have rich conceptions of the past of that place. Rather, I mean that it was from the 1870s, when U.S. military campaigns began clearing the region of every human and more-than-human obstruction on behalf of transcontinental railroad and settler ranches, that the region would be made intelligible in the specifically historical terms of a continuous temporal process connecting a receding and "closed" past to a contingent and "open" future. The progress of settler empire delivered historicizers to the plain. They caused the region to radiate a novel and specific sort of past, one continuous with the expansionist, eradicationist horizon that critics of U.S. colonialism have characterized as "settler futurity" (Tuck and Gaztambide-Fernández 2013). Some historicizers wrote books and articles about the peoples they replaced. Some chronicled, in celebratory or critical moods, the military and industrial occupation of West Texas.[8] Yet perhaps the most consequential of U.S. empire's historicizers were the corporations whose expansion forced West Texas to radiate fathoms of deep history in the early twentieth century. As Geoffrey C. Bowker (1994) observed, the oil industry writes its extractive zones not only into new rhythms of labor discipline and depletion economics but also into the frame of geohistorical time. In Texas, the drill bit was the stylus that inscribed Earth history.

A century ago, West Texas was not yet a former reef. In 1925 it had still to be deeply historicized. The American geologist P. B. King (1977, 36) recalls being dispatched by the Marland Oil Company to a "backwash of the frontier," a professional "Siberia," where minimal oil was produced and petroleum companies made only haphazard guesses as to the structure and genesis of the subsurface. King's remarkably titled *Evolution of North America* describes a year spent

surveying the surface of the Permian Basin to no meaningful end, for the one thing geologists knew was that the surface was "uncomformable" with those depths from which oil might be produced.[9]

The impasse was breached, however, in the following year—and not by a heroic act of geoscientific theorizing, but by an oil well drilled in denial of all prevailing science. In desolate Winkler County, where geologists were resolute that no petroleum could be found, "a wildcatter without geological inhibitions . . . struck oil—spectacularly—*irrevocably overturning all previous theories about the West Texas Permian basin*" (King 1977, 37; emphasis mine). It is conventional to say that the industrial degradation of the Earth is a use, or abuse, of geoscientific knowledge. But in West Texas in 1926, things worked rather in reverse. The oil well was not an application of geological thought. It cut through the haze of prevailing geohistory.

And then it gave geohistory something to do. Petroleum "gave impetus to the study of the Permian rocks, and furnished the geologist with records of hundreds of drill holes from which to deduce the nature of the strata not exposed at the surface" (King 1948, 2). As petroleum corporations plunged hundreds of wells around the first, in turn exhuming oil and cores and other evidence of West Texas stratigraphy, they extracted from the ground a question that geologists could debate, ask, and research. The ever-proliferating wells produced an anomaly that required a theory. What came out of the oil wells revealed that subsurface rocks to the east of Winkler County were differently sequenced than those to the West. If that discrepancy could be explained, oil corporations would possess a surer idea about where they should expand extractive operations. Explaining this discrepancy meant writing the deep history of contingent processes through which West Texas assumed its contemporary shape.

It is at this moment in *Evolution* that King inserts himself into the story of geohistorical knowledge. In search of a history that could explain the anomalous oil wells, industry geologists fanned out across the region's mountains, among them the Guadalupe exposures that I would hike a century later with corporate scientists aspiring to become "slave," then "master," to West Texas geology. Their expeditions established the genre of our own. And in the Glass Mountains to the south of the oil field King observed a similar stratigraphic puzzle to that posed by oil wells in the extractive zone: outcroppings on one end of the mountains displayed a series of rocks wildly different from those on the other. Whereupon King revisited a drawing he had once glimpsed in passing, of a Triassic reef-become-mountain in the Tyrolean Alps. Its resemblance to the Texas

structures spurred this speculation on deep time in West Texas: "Perhaps the odd structures were marginal to a great reef! Perhaps (but the idea seemed too outrageous) reef barriers were responsible for the unlike stratigraphic sequences" (King 1977, 40).

Other geologists were coming independently to a similar conclusion (e.g., Lloyd 1929) and however "outrageous," "reef theory became reef fact" very quickly—not least because it was effectively tested and refined with the drilling of every new oil well (King 1977, 40). A deep history of West Texas as a former reef would guide conjecture about the location of petroleum.[10] If a geologist standing on the desert plain in the late 1920s could envision themself 250 million years prior along a coral reef, they might try to point the drill bit at lagoons behind the reef, where organic matter fell to the sea floor undisturbed by turbulent ocean, or perhaps toward deep waters just in front of the reef—appropriate burials for the small lives that in death become fossil fuels. And any well drilled anywhere in the Permian Basin would further delineate the shape and story of the ancient reef. With the progress of extraction, West Texas became the former reef whose waxen imitation you may today appreciate in the chilled air of the Petroleum Museum. The dense spoliation of West Texas would historicize it in such detail that the Permian Basin became a globally celebrated model on which sedimentary geologists would understand—and search for petroleum in—fossil reefs throughout the planet.[11]

King fills his reminisces with many of those mythic tropes—lone researcher, frontier questing, sudden eureka-discovery—that the critical anthropology of technoscience arose to dispel. But the datedness of King's memoir is its interest. First published at the height of the oil industry's post–Second World War prestige, before petrochemical pollution inaugurated the reinterpretation of the Earth as so many destructible "environments" (see Bond 2022), *Evolution* was written before "oil well" was metonymic with "oil spill." Thus might King fondly reminisce about the chaos of extractive endeavor and the ineliminable ignorance with which it expands into new zones. And thus he could characterize, direct and unembarrassed, the unity of destruction and knowledge in the writing of geological history.

As a historical science, geology has often been distinguished from the so-called exact sciences on the grounds that its knowledge does *not* arise through experimental interventions. As Adrian Currie (2018, 229) observes, it is widely held that although experimental practices in physics and chemistry "bring about test cases" that disclose the unforthcoming properties of their objects, the

hypercomplex and contingent object of geohistory—the events of Earth's past—does not disclose itself to manipulative interventions. Geology, Currie reports, has long been seen to suffer an "experimental impotency" (229). It does not *make* its knowledge in the laboratory, but can "only 'happen upon' correlations" (229). Yet the process through which West Texas became a former reef belies this commonplace. It suggests that Earth history deploys an "experimental system" (Rheinberger 1997) so vast as to go unrecognized: the multinational system of petroleum corporations and drilling rigs, their holes and what comes out from them producing the question of deep time in West Texas, and supplying its answer.[12] It indicates that the contingent history of the Earth has been written via the decidedly teleological expansion of multinational corporations. That the long arc of American continental imperialism historicized the Earth in the course of wrecking it. Or maybe, that it wrecked the Earth by historicizing it.

The closing comments of King's memoir speak to the unity of violence and historiographic inquiry—braided aspects of the historicizing operation through which the human horizon has been extended into the Earth's deep past. "Now the West Texas basin has been probed to its depths," he concludes, "and perhaps we can be content" (King 1977, 41).

IN WHICH THE COMPANY ACCELERATES THE PAST

When I first followed petroleum corporations to West Texas in 2016, in the wake of a global collapse in oil markets, I was often asking why U.S. fracking surged here after it had stalled in Appalachia, the Dakotas, and South Texas. Among the disquieting lessons of the fracking revolution is that the oil-rich formations at which fracking aims—"tight," impermeable stones whose hydrocarbons are trapped in infinitesimally small pores—are ubiquitous. Tight oil is not scarce. It is, more or less, everywhere. Something apart from the location of the resource would have to explain why so much machinery, labor, and investment now descended on West Texas. At the start of my research I had expected an answer about politics—the Standing Rock protests of that year had harried profits in North Dakota's Bakken Shale—or about some distinctive quality of the Texas economy. But most often I received an answer about the history of historiography.

Gary, a middle-aged petroleum geologist who had left Pennsylvania's gas fields to seek new prospects for the Company in West Texas, answered by introducing a metaphor that I would meet everywhere in the oil field in 2016.[13]

Figure 4. Oil well pads in Winkler County. Imagery © 2025 Airbus, CNES / Airbus, MAXAR Technologies, USDA/FPAC/GEO, Map Data © 2025 Google.

West Texas, he explained over drinks, was a "pincushion." It had been "drilled to death" over the twentieth century. The Permian Basin was perhaps the mostly densely drilled landscape on the planet. And this ultimately prepared it, he explained, for the present boom. In the 1990s, large corporations abandoned the region. They declared it depleted. Yet today they returned en masse to West Texas *precisely because it had been so densely depleted in the past*. The Permian Basin was among the most thoroughly exploited petroleum basins on Earth. It was therefore one of the most completely historicized. Being a pincushion, it was well known and understood—and so it was ready for a "second life." I nodded, but had trouble disguising that I didn't understand how this explained anything at all. How do you kill something twice?

Something in West Texas fracking seemed to contradict a basic principle of geological history. In the historiography of the Earth as in the historiography of human life, historicizing elucidates its objects from the standpoint of their finitude (see Foucault 2002). As drilling turned the desert plain into a former reef, West Texas oil became logically finite. To apprehend West Texas petroleum as the outcome of a very gradual process of deposition, diagenesis, and migration was to concede some limit as to how much petroleum could ever be extracted from the region. In the technical paper that popularized the once captivating, lately forgotten notion of "peak oil," M. K. Hubbert, a geologist then working on Shell's first fracking experiments, grounded his assertion of the global limits to fossil fuels by rehearsing precisely this principle:

> When we consider that it has taken *500 million years* of geological history to accumulate the present supplies of fossil fuels, it should be clear that, although the same geological processes are still operative, the amount of new fossil fuels that is likely to be produced during the next few thousands of years will be inconsequential . . . we can assume with complete assurance that the industrial exploitation of fossil fuels will consist in the progressive exhaustion of an initially fixed supply of which there will be no significant additions *during the period of our interest*. (Hubbert 1956, 4; emphasis mine)

500 million years. On premise of deep time thinking, oil corporations would now seem to have depleted the limited volumes that natural history had generated in West Texas. Historicized as the remains of a reef and simultaneously "drilled to death," West Texas should now be history so far as corporate expansion was concerned.

Yet this common sense comes with a footnote so absurd as to never go stated. One might say that, by the end of the twentieth century, oil corporations had depleted most of what the Permian Basin had generated *so far*. The hydrocarbon machine might still be at work on further petroleum. It was just doing so very slowly. Further petroleum in significant volumes was not ready *yet*. But on the assumption that natural law and geological process remain invariant across space and time, more oil might someday present itself for extraction in West Texas, if a corporation could wait millions of years. This would surely occur "beyond the period of our interest," as Hubbert (1956, 4) put it.

Gary detected my confusion. He proceeded to rehearse the reef theory of West Texas oil. I groaned inwardly at the prospect of hearing it told for the hundredth time. Organic matter, Gary began, was buried in the margins of a reef more than a quarter billion years ago, subterranean heat and pressure "cooked" some of it into oil and gas, and also made some of those oil and gas molecules "migrate" from the strata in which they were created into the "porous" and "permeable" strata in which they awaited the drill bit. Being porous and permeable, the molecules contained therein would flow readily to the surface—almost, Gary seemed to suggest, as if they desired it[14]—once an oil well opened a channel of unequal pressure between surface and depth. This was the familiar deep history of West Texas oil, the same history recounted at the Petroleum Museum. But now he added a further chapter.

There remained, he continued, an enormous, "practically infinite," volume of petroleum stored within the tight mudstones in which oil formed. The

molecules held there had not yet migrated into a more permeable formation, where they might respond well to the solicitations of the drill. They remained in the "source rocks." And the petroleum industry already knew the location of the source rocks where so many still-unmigrated molecules lay, because West Texas was a pincushion—its space thoroughly drilled, its history well documented in many cores. For decades petroleum companies had acknowledged those formations in passing. "We used to call it crap rock," Gary said, laughing. Now, alongside tens of thousands of geologists and engineers and laborers, he had come to West Texas to target "crap rock" in particular, and cause unmigrated molecules to move. This was fracking. The Company fractured those source formations with water and abrasive chemistry at high pressure, shattering tight rocks like safety glass, and then pressured enormous volumes of sand into the rock to "prop" those fractures open—creating microscopic channels in which petroleum molecules, now "unlocked," could flow into an oil well and to the surface.

Gary's explanation placed fracking within an ongoing and unfinished geological process whose future the Company might yet direct. The molecules that remained in tight source rocks hadn't migrated *yet*. Their deep future, like the human future, was indeterminate. The Earth-qua-hydrocarbon machine, one might say, was still working on them in its plodding, unpredictable way. Now the Company had come to the Permian Basin to make those molecules move on capitalist time. It would induce the migration of hydrocarbons *within* "the period of our interest." Fracking—this thought took shape as Gary narrated the fracking revolution within the timelines of petroleum genesis and migration—induces and accelerates geohistorical process because *the Earth has proved too slow.*[15]

Anthropologists, activists, journalists, and scientists have written at length of the destructiveness of the fracking revolution. They have documented how fracking's operations exhaust fresh water and spread endocrine-disrupting chemistry into aquifers and atmospheres (Grant 2020; Tabuchi and Migliozzi 2023; Wylie 2018; Willow and Wylie 2014); how fracking's appetite for sand turns hills into mines (Pearson 2017); how the injection of fracking's waste beneath ground induces earthquakes (Skoumal and Trugman 2021); how drilling sites and refineries release enormous volumes of uncombusted methane (Zhang et al. 2020); how the sprawling "invasive infrastructures" of fossil fuel logistics (Spice 2018) reiterate the process of settler-colonial incursion into Indigenous territories, at the same time wearing out the minimalized public infrastructures on which marginalized communities depend (Grant 2025). A full accounting of the

violations would be, like Texas oil today, practically infinite. From West Texas, one starts to see that via these and other intensities of violence the petroleum industry is trialing a distinctive relationship to deep history—a new industrial historicism.

If prior extraction cast West Texas in terms of a gradual geological process, fracking would now speed up that process. From the standpoint of the Company, the Earth had come to seem sluggish. It needed hastening. The entire catastrophe of the U.S. fracking revolution—despoiled landscapes, ruined water tables, carcinogenic atmospheres, anthropogenic earthquakes, and volatile markets—would service this acceleration. Fracking would push the subsurface toward a geological event for which a corporation might have to wait millions of years, or which might never eventuate at all. Multinational oil corporations fantasize themselves immortal. The CEO of ExxonMobil once famously declared, "presidents come and go; ExxonMobil doesn't come and go" (cited in Coll 2012, 123). Yet even for ExxonMobil, several million years is too long to wait. A century ago, drilling projected historicity into the West Texas subsurface; and when drilling exhausted West Texas oil, petroleum corporations would move to expedite Earth history.[16]

In the plain known as a pincushion, the modern historicization of the Earth now displays a new continuity with the modern historicization of human affairs. Arendt (1961) often observed that as soon as human life was grasped in terms of an ongoing, contingent historical process that could have been otherwise and might yet go otherwise, it gave rise to a new structure of political desire: to sculpt and direct that process, whichever way one wanted it to lead; to shatter obstructions to its advancement; and to accelerate the process if a desired future was not arriving fast enough.[17] With the ascent of fracking, geohistory appears to produce a parallel aspiration. Beneath the surface differences that make deep history seem like a subversive alternative to human history, there may lie this stratum that connects them as twin expressions of an historicizing form of life.

The petroleum industry has historicized the Earth. Historicizing the Earth, the industry has expanded catastrophically throughout the world. Yet to explicate the Earth as the outcome of contingent geohistorical processes has marked out limits to continuous extractive expansion. And as those limits have neared, a deeply historicized Earth has given rise to a prospect at once novel and overfamiliar: that the industry might modulate, induce, and accelerate those processes it has so far chronicled.

AFTER HISTORY

And if the contingencies of geohistory seem increasingly insufficient to the necessities of the corporate present, perhaps the industry might even move to change the past.

In the idle moments before the start of a night class in petroleum geology at a local college, my classmates, most of them working geologists, talked excitedly of an extravagant recent experiment with "frac sand." The Chesapeake Energy Corporation had announced the experimental injection of an unprecedented 50 million pounds of sand into a tight gas play in Louisiana. At the time this was more sand than had ever been used to prop open the rocks Chesapeake fractured. The company declared it a "world record frac." At a banking conference, they nicknamed the trial "Propageddon." "What we're doing," announced Chesapeake's vice president of operations, "is unleashing hell on every gas molecule" (quoted in Carroll and Wethe 2016).

Our instructor, a soft-spoken petroleum geologist in his mid-forties, was visibly astonished. He struggled for a few seconds to explain what made Propageddon so disturbing. He seemed to find it repulsive. He settled on this: by relocating so much sand beneath ground it was almost as if Chesapeake had inserted a new sandstone stratum into the Earth, a formation not deposited over millions of years but injected all at once—*and thus the company had effectively falsified the past*. By the standards of geohistorical reason that apprehends the past from the sequence of strata, Chesapeake Energy had turned some of the Earth into an unreliable archive of its own past. In the future, he speculated, some geoscientist examining a core pulled from that field might even be misled about the events of geohistory. Chesapeake had injected dunes from the surface, maybe 2 to 3 million years old, into the remains of a Jurassic world laid down one 150 million years before. In Propageddon, Chesapeake, soon to file for bankruptcy, had made history with a disturbing literalness, inserting extra time into the sequence of deep history.

The instructor's astonishment now jogs my own speculation about some future traveler crossing the Permian Basin. The reader may recognize it as the speculation of a compulsive historicizer, straining at the limits of that modern compulsion.

The world has not been historical for long. It is plausible, even likely, that at some date in the deep future the world will cease to be historical. I do not mean that it will cease to have a past. I mean that its past will cease to be intelligible

in relation to those provincially modern notions of human and planetary reality continuously unfolding as a contingent and indeterminate historical process. Some other form of time will prevail. And perhaps on that far side of the present, someone traveling across what is today called West Texas, from the mountain to the plain, will observe a landscape punctured by hundreds of thousands of oil wells, the rusting pumping units and drilling rigs and pipelines, and observe that here were certain familiar leavings of the historicizing form of life.

ABSTRACT

This article draws on ethnographic research in the oil fields of West Texas to reflect on the imperial-modern compulsion to historicize—to explicate more and more of the world in terms of contingent, indeterminate historical process. A century ago, petroleum drilling turned West Texas into a vast extractive zone and simultaneously historicized the desert plain as a former reef. Today, I show, fracking moves to shape and accelerate the region's geological processes on the logic that the Earth, now burdened with historicity, is somehow too slow. This confluence of events highlights a common moral-political undertow shared across the "deep" historiography of the Earth and the "shallow" historiography of the human. Conceptually and concretely, both historiographic operations reorder their objects as open-ended processes that modern powers may adjust and modulate. From West Texas, the question arises: Does modernity wreck the planet by historicizing it? [oil, geology, extraction, fracking, historicity, contingency, agency, destruction]

NOTES

Acknowledgments For critical exchanges that shaped this article in ways large and small, I am grateful to: Hussein Ali Agrama, Geoffrey Rathgeb Aung, Nandita Badami, Gretchen Bakke, Emily Bock, Damien Bright, Lillian Canright, Lauren Cubellis, Matthew Furlong, Silas Grant, Anke Gruendel, Joseph Masco, Amy McLachlan, Andrea Muehlebach, Zeynep Oguz, Emma Pask, Elana Resnick, Stefan Schäfer, Lachlan Summers, Mudit Trivedi, Jerome Whitington, and Troy Vettese, along with three insightful reviewers, Julia Elyachar, Kate Herman, Petra Dreiser, and the editorial collective of Cultural Anthropology. Research for this article was supported by the Wenner-Gren Foundation, the Alexander von Humboldt-Stiftung, and the Research Institute for Sustainability, Potsdam.

1. The evocative phrase *deep time* was popularized by John McPhee, 1981.
2. For a related use of "explication," see Sloterdijk 2009.
3. From a different angle, many scholars have critiqued the undifferentiated "human" that often populates Anthropocene theory. See, for example, Davis and Todd 2017, as well as Whyte 2017.
4. Anthropologists have marked out a wide range of positions on the politics of geological time. Of special interest are *Cultural Anthropology*'s "Theorizing the Contemporary" collection on "Geological Anthropology" (Oguz 2020) and "Earth as Praxis," a special section of *Environmental Humanities* (Oguz and Whitington 2023). Beyond anthropology, efforts to "geologize the social" (Clark and Szerszynski 2021, 49) have been highly generative. The question I would like to introduce into this conversation is whether the disciplines of the "social" and the "geological" *already* presuppose a common

metaphysics—a world of contingent, indeterminate, historical process—such that each quietly confirms the other's modernist premises and prejudices.

5. To investigate imperial modernity as a condition of "conscription," as David Scott (2004) writes, discussing Talal Asad (1992), is neither to insist on modernity's homogeneity, nor to emphasize the perdurance of difference and contestation. Rather, it is to explore how "difference, such as it is, is increasingly obliged to respond to—and be managed by—the categories brought into play by European modernity" (Scott 2004, 9). The connected Wittgensteinian notion of a "form of life" (Wittgenstein 2010, §241) invites exploration of the tacitly shared assumptions and excitations that choreograph explicit, impassioned disagreement.
6. For a mind-widening discussion of stratigraphy and periodization across Earth science and critical theory, see Roosth 2022.
7. Anthropocene-proximate conversations about how to take in a broader cast of agencies have still to engage the rich critical reflections on the concept of *agency* arising in feminist and queer theory (for example, Berlant 2007; Bersani 1987; Sedgwick 1993) and secular studies (for example, Asad 2003; Mahmood 2001).
8. Important recent studies addressing what is today called West Texas include Hämäläinen 2008, Martinez 2018, Stanford-McIntyre 2017, and Pask 2024.
9. In this section, most quotes are from King's (1977) popular-audience *Evolution of North America*, but my paraphrase draws as well on King's typescript memoirs (King 2000) and studies published by the *Bulletin of the American Association of Petroleum Geologists* (1942) and the U.S. Geological Survey (1948). A resonant account of the ascent of the reef theory is found in Rigby and Millward 1988.
10. Reef theory would utterly transform the corporate search for petroleum in West Texas and elsewhere. Per King's contemporary E. Russell Lloyd (1975, 2): "If this theory could be maintained, the search for oil in the basin should be primarily a search for buried reefs."
11. J. Keith Rigby and Ann Millward (1988, 71) write: "No other reef has influenced thinking about carbonate models equal to the Guadalupe and Glass Mountains of Texas and New Mexico."
12. Although here I refer to an "experimental" apparatus, I have elsewhere argued for a wider conceptualization of the relationship between scientific representation and technological intervention, investigation of which is perhaps unduly constrained by the notion of *experiment* (see Hu 2021). For provocative suggestions of such a wider relationship beyond "experiment," see Bond 2022 and Masco 2010.
13. Gary is a pseudonym. Our conversation returned to these points over several meetings.
14. David Hughes (2017) observes a similar assignation of surface-ward desire to petroleum in the aesthetics of petroleum-resource classification systems.
15. It is not just the extractive corporation to whom a historicized nature suggests the prospect of speeding things up. Consider the following passage from Sabrina Imbler's (2022, 222) admixture of natural history and queer memoir: "In the brief splendor of my human life, I don't have millions of years to let evolution figure it out for me. I have to start morphing on my own." Across very different modern projects, from fracking to queer theory, it is noteworthy that a conception of the world as a gradual, continuous natural-historical process enables the agential prospect of accelerating natural history—bringing those deep time processes into "the period of our interest" (Hubbert 1956, 4).
16. Fracking is arguably just the most prominent in a long series of petroleum industry experiments with the acceleration of geological processes. For several decades Shell experimented with inducing a phase of petroleum genesis prior to migration, by heating sections of subterranean oil shale formations so as to force the "maturation" of kerogen that has yet to turn into oil and gas molecules (see Ryan et al. 2010).
17. This is a central tendency of modern political thought, evident throughout the *-isms* (republicanism, liberalism, etc.) that organize politics as the problem of "anticipating future historical movement and practically influencing it" (Koselleck 2004, 273). Not least among them is a U.S. settler colonialism characteristically "configured in relation to a [distinctive] political horizon: the future" (Tuck and Gaztambide-Fernández 2013, 72).

REFERENCES

Agrama, Hussein Ali
2012 *Questioning Secularism: Islam, Sovereignty, and the Rule of Law*. Chicago: University of Chicago Press.

Anidjar, Gil
2019 "On the Political History of Destruction." *ReOrient* 4, no. 2: 144–65. https://doi.org/10.13169/reorient.4.2.0144

Appel, Hannah
2019 *The Licit Life of Capitalism: US Oil in Equatorial Guinea*. Durham, N.C.: Duke University Press.

Arendt, Hannah
1961 *Between Past and Future: Six Exercises in Political Thought*. New York: Viking.

Asad, Talal
1992 "Conscripts of Western Civilization." In *Civilization in Crisis: Anthropological Perspectives*, vol. 1 of *Dialectical Anthropology: Essays in Honor of Stanley Diamond*, edited by Christine Ward Gailey, 334–51. Gainesville: University of Florida Press.
2003 *Formations of the Secular: Christianity, Islam, Modernity*. Stanford, Calif: Stanford University Press.
2018 *Secular Translations: Nation-State, Modern Self, and Calculative Reason*. New York: Columbia University Press.

Bakke, Gretchen
2019 "Crude Thinking." In *The Rhetoric of Oil in the Twenty-First Century: Government, Corporate, and Activist Discourses*, edited by Heather Graves and David Beard, 34–55. London: Routledge.

Berlant, Lauren
2007 "Slow Death (Sovereignty, Obesity, Lateral Agency)." *Critical Inquiry* 33, no. 4: 754–80. https://doi.org/10.1086/521568

Bersani, Leo
1987 "Is the Rectum a Grave?" *October* 43: 197–222. https://doi.org/10.2307/3397574

Bjornerud, Marcia
2018 *Timefulness: How Thinking Like a Geologist Can Help Save the World*. Princeton, N.J.: Princeton University Press.

Bond, David
2022 *Negative Ecologies: Fossil Fuels and the Discovery of the Environment*. Berkeley: University of California Press.

Bowker, Geoffrey C.
1994 *Science on the Run: Information Management and Industrial Geophysics at Schlumberger, 1920–1940*. Cambridge, Mass.: MIT Press.

Carroll, Joe, and David Wethe
2016 "Chesapeake Energy Declares 'Propageddon' with Record Frack." *Bloomberg News*, October 20.

Chakrabarty, Dipesh
2021 *The Climate of History in a Planetary Age*. Chicago: University of Chicago Press.

Clark, Nigel, and Bronislaw Szerszynski
2021 *Planetary Social Thought: The Anthropocene Challenge to the Social Sciences*. New York: Polity.

Coll, Steven
2012 *Private Empire: ExxonMobil and American Power*. New York: Penguin.

Currie, Adrian
2018 *Rock, Bone, and Ruin: An Optimist's Guide to the Historical Sciences*. Cambridge, Mass.: MIT Press.

Davis, Heather, and Zoe Todd
2017 "On the Importance of a Date; or, Decolonizing the Anthropocene." *ACME: An International Journal for Critical Geographies* 16, no. 4: 761–80. https://doi.org/10.14288/acme.v16i4.1539
Drane, Amanda
2024 "Who Is 'Big Oil'? It's Complicated—and It's Increasingly Blurred by the Fracking Revolution." *Houston Chronicle*, December 14.
Erwin, Douglas H.
2015 *Extinction: How Life on Earth Nearly Ended 250 Million Years Ago*. Princeton, N.J.: Princeton University Press.
Fasolt, Constantin
2003 *The Limits of History*. Chicago: University of Chicago Press.
Ferry, Elizabeth
2020 "The Inorganic Slot." Society for Cultural Anthropology, Theorizing the Contemporary, *Fieldsights*, September 22.
Foucault, Michel
2002 [1966] *The Order of Things: An Archaeology of the Human Sciences*. Translated by Alan Sheridan. London: Routledge.
Grant, Silas
2020 "Aggregate Airs: Atmospheres of Oil and Gas in the Greater Chaco." *Engaging Science, Technology, and Society* 6. https://doi.org/10.17351/ests2020.423
2025 "Gridlock: Infrastructure and Jurisdiction in Eastern Navajo Agency." *Antipode: A Radical Journal of Geography* 57, no. 1: 169–92. https://doi.org/10.1111/anti.13098
Hacking, Ian
2002 *Historical Ontology*. Cambridge, Mass.: Harvard University Press.
Hämäläinen, Pekka
2008 *The Comanche Empire*. New Haven, Conn.: Yale University Press.
High, Mette M.
2022 "Utopias of Oil: Private Equity and Entrepreneurial Ambition in the U.S. Oil and Gas Industry." *Cultural Anthropology* 37, no. 4: 738–63. https://doi.org/10.14506/ca37.4.06
Hirschkind, Charles
2020 *The Feeling of History: Islam, Romanticism, and Andalusia*. Chicago: University of Chicago Press.
Hu, Cameron
2021 "Knowing Destroying: The Geopolitics of Fracking and the Metaphysics of Imperialism." Doctoral dissertation, University of Chicago.
Hubbert, M. King
1956 "Nuclear Energy and the Fossil Fuels." Houston, T.X.: Shell Development Co. Exploration and Production Research Division.
Hughes, David McDermott
2017 *Energy without Conscience: Oil, Climate Change, and Complicity*. Durham, N.C.: Duke University Press.
Ialenti, Vincent
2020 *Deep Time Reckoning: How Future Thinking Can Help Earth Now*. Cambridge, Mass.: MIT Press.
Imbler, Sabrina
2022 *How Far the Light Reaches: A Life in Ten Sea Creatures*. New York: Little, Brown, and Company.
Iqbal, Basit Kareem
2020 "Asad and Benjamin: Chronopolitics of Tragedy in the Anthropology of Secularism." *Anthropological Theory* 20, no. 1: 77–96. https://doi.org/10.1177/1463499618770310

Irvine, Richard D. G.
2020 *An Anthropology of Deep Time: Geological Temporality and Social Life*. Cambridge, U.K.: Cambridge University Press.
Jameson, Frederic
2002 [1981] *The Political Unconscious: Narrative as a Socially Symbolic Act*. London: Routledge.
Jobson, Ryan Cecil
2024 *The Petro-state Masquerade: Oil, Sovereignty, and Power in Trinidad and Tobago*. Chicago: University of Chicago Press.
King, Philip B.
1942 "Permian of West Texas and Southeastern New Mexico: PART 11." *AAPG Bulletin* 26, no. 4: 535–649.
1948 "Geology of the Southern Guadalupe Mountains." *USGS Professional Paper* 215.
1977 *The Evolution of North America*. Revised edition. Princeton, N.J.: Princeton University Press.
2000 "Autobiography of Philip B. King." U.S. Geological Survey Open-File Report 00-443.
Koselleck, Reinhart
2004 *Futures Past: On the Semantics of Historical Time*. New York: Columbia University Press.
Livingston, Julie
2019 *Self-Devouring Growth: A Planetary Parable as Told from Southern Africa*. Durham, N.C.: Duke University Press.
Lloyd, E. Russell
1929 "Capitan Limestone and Associated Formations of New Mexico and Texas." *AAPG Bulletin* 13, no. 6: 645–58.
1975 "Barrier Reefs and Saline Residues of the Permian Basin." In *Permian Exploration, Boundaries, and Stratigraphy*, 1–20. Midland, T.X.: Society of Economic Paleontologists and Mineralogists.
Lucier, Paul
1999 "A Plea for Applied Geology." *History of Science* 37, no. 3: 283–318. https://doi.org/10.1177/007327539903700302
Mahmood, Saba
2001 "Feminist Theory, Embodiment, and the Docile Agent: Some Reflections on the Egyptian Islamic Revival." *Cultural Anthropology* 16, no. 2: 202–36. https://doi.org/10.1525/can.2001.16.2.202
Martinez, Monica Muñoz
2018 *The Injustice Never Leaves You: Anti-Mexican Violence in Texas*. Cambridge, Mass.: Harvard University Press.
Masco, Joseph
2010 "Bad Weather: On Planetary Crisis." *Social Studies of Science* 40, no. 1: 7–40. https://www.jstor.org/stable/27793340
2020 *The Future of Fallout, and Other Episodes in Radioactive World-Making*. Durham, N.C.: Duke University Press.
McPhee, John
1981 *Basin and Range*. New York: Farrar, Straus and Giroux.
Meissner, Fred F., Jane Woodward, and J. L. Clayton
1984 "Stratigraphic Relationships and Distribution of Source Rocks in the Greater Rocky Mountain Region." In *Hydrocarbon Source Rocks of the Greater Rocky Mountain Region*, edited by Jane Woodward, Fred F. Meissner, and Jerry L. Clayton, 1–34. Denver, Colo.: Rocky Mountain Association of Geologists.
Mittermaier, Amira
2021 "Beyond the Human Horizon." *Religion and Society* 12, no. 1: 21–38. https://doi.org/10.3167/arrs.2021.120103

Oguz, Zeynep
2020 "Geological Anthropology." Society for Cultural Anthropology, Theorizing the Contemporary, *Fieldsights*, September 22.
Oguz, Zeynep, and Jerome Whitington
2023 "Geology, Power, and the Planetary: Earth as Praxis," *Environmental Humanities* 15, no. 3: 145–58. https://doi.org/10.1215/22011919-10746045
Ortner, Sherry
1989 *High Religion: A Cultural and Political History of Sherpa Buddhism*. Princeton, N.J.: Princeton University Press.
Pask, Emma
2024 "World-Making on the Range." Doctoral dissertation, University of Chicago.
Pearson, Douglas
2017 *When the Hills Are Gone: Frac Sand Mining and the Struggle for Community*. Minneapolis: University of Minnesota Press.
Petroleum Museum
2021 "Permian Basin Petroleum Museum." https://petroleummuseum.org.
Povinelli, Elizabeth A.
2016 *Geontologies: A Requiem to Late Liberalism*. Durham, N.C.: Duke University Press.
Presley, Jennifer
2022 "Earthquakes Continue to Rattle the Basin." *Journal of Petroleum Technology*, December 19.
Pskowski, Martha, and Peter Aldhous
2023 "Oil and Gas Companies Spill Millions of Gallons of Wastewater in Texas." *Inside Climate News* (blog), October 31.
Rheinberger, Hans-Jörg
1997 *Toward a History of Epistemic Things: Synthesizing Proteins in the Test Tube*. Stanford, Calif.: Stanford University Press.
Rigby, J. Keith, and Ann Millward
1988 "A Look Back at the Permian Reefs of West Texas and New Mexico." *Earth Sciences History* 7, no. 2: 71–89. https://www.jstor.org/stable/24144783
Rogers, Douglas
2015 *The Depths of Russia: Oil, Power, and Culture after Socialism*. Ithaca, N.Y.: Cornell University Press.
Roosth, Sophia
2022 "The Sultan and the Golden Spike; or, What Stratigraphers Can Teach Us about Temporality." *Critical Inquiry* 48, no. 2: 697–720. https://doi.org/10.1086/719837
Rudwick, Martin J. S.
2014 *Earth's Deep History: How It Was Discovered and Why It Matters*. Chicago: University of Chicago Press.
Ryan, Robert, Thomas D. Fowler, Gary L. Beer, and Vijay Nair
2010 "Shell's In Situ Conversion Process: From Laboratory to Field Pilots." In *Oil Shale: A Solution to the Liquid Fuel Dilemma*, edited by Olayinka I. Ogunsola, Arthur M. Hartstein, and Olubunmi Ogunsola, 161–83. Washington, D.C.: American Chemical Society.
Scott, David
2004 *Conscripts of Modernity: The Tragedy of Colonial Enlightenment*. Durham, N.C.: Duke University Press.
Sedgwick, Eve Kosofsky
1993 *Tendencies*. Durham, N.C.: Duke University Press.
Sloterdijk, Peter
2009 *Terror from the Air*. Los Angeles: Semiotext(e).
Smith, Jessica
2021 *Extracting Accountability: Engineers and Corporate Social Responsibility*. Cambridge, Mass.: MIT Press.

Spice, Anne
2018 "Fighting Invasive Infrastructures: Indigenous Relations against Pipelines." *Environment and Society* 9, no. 1: 40–56. https://doi.org/10.3167/ares.2018.090104
Skoumal, Robert J. and Daniel T. Trugman
2021 "The Proliferation of Induced Seismicity in the Permian Basin, Texas." *JGR Solid Earth* 126. https://doi. org/10.1029/2021JB021921
Stanford-McIntyre, Sarah
2017 "Refining the Desert: The Politics of Wealth, Industrialization, and Environmental Risk in the Twentieth-Century Texas Oil Industry." PhD dissertation, College of William and Mary.
Tabuchi, Hiroko, and Blacki Migliozzi
2023 "'Monster Fracks' Are Getting Far Bigger. And Far Thirstier." *New York Times*, September 25.
Trivedi, Mudit
2021 "Between Archaeography and Historiography: Unsettling the Medieval?" *Medieval History Journal* 24, no. 1–2: 244–80. https://doi.org/10.1177/09719458211055884
Trouillot, Michel-Rolph
1995 *Silencing the Past: Power and the Production of History*. Boston, Mass.: Beacon Press.
Tuck, Eve, and Rubén Gaztambide-Fernández
2013 "Curriculum, Replacement, and Settler Futurity." *Journal of Curriculum Theorizing* 29, no. 1: 72–89.
Weszkalnys, Gisa
2015 "Geology, Potentiality, Speculation: On the Indeterminacy of First Oil." *Cultural Anthropology* 30, no. 4: 611–39. https://doi.org/10.14506/ca30.4.08
Whyte, Kyle
2017 "Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene." *English Language Notes* 55, no. 1–2: 153–62. https://doi.org/10.1215/00138282-55.1-2.153
Willow, Anna, and Sarah Wylie
2014 "Politics, Ecology, and the New Anthropology of Energy: Exploring the Emerging Frontiers of Hydraulic Fracking." *Journal of Political Ecology* 21, no. 1: 222–236. https://doi.org/10.2458/v21i1.21134
Wittgenstein, Ludwig
2010 [1953] *Philosophical Investigations*. New York: John Wiley and Sons.
Wolf, Eric
1982 *Europe and the People without History*. Berkeley: University of California Press.
Wylie, Sarah
2018 *Fracktivism: Corporate Bodies and Chemical Bonds*. Durham, N.C.: Duke University Press.
Wynter, Sylvia
2003 "Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, after Man, Its Overrepresentation—An Argument." *CR: The New Centennial Review* 3, no. 3: 257–337. https://www.jstor.org/stable/41949874
Yusoff, Kathryn
2018 *A Billion Black Anthropocenes or None*. Minneapolis: University of Minnesota Press.
Zee, Jerry C.
2017 "Holding Patterns: Sand and Political Time at China's Desert Shores." *Cultural Anthropology* 32, no. 2: 215–41. https://doi.org/10.14506/ca32.2.06
Zhang, Yuzhong, et al.
2020 "Quantifying Methane Emissions from the Largest Oil-Producing Basin in the United States from Space." *Science Advances* 6, no. 17. https://doi.org/10.1126/sciadv.aaz5120