

# Winged Mercury and the Golden Calf

*Two elements, one economic theory, and a cascading torrent of collateral damage*

by Rebecca Solnit

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FOR A WHILE in the middle of the twentieth century, economists liked to model their subject as hydrology. They built elaborate systems of pipes, pumps, and reservoirs through which water traveled, allegedly modeling the movements of money, wealth, capital. They were funny devices, stuck halfway between literal-mindedness and metaphor, and they begged many questions about the nature of economies and the nature of water. Since that time, water contamination and scarcity have become global issues, and water privatization an especially heated one. But even if you left aside all the strange things we do to water, water was never exactly a good model for economies, since the implication was that the flow of capital is natural, that money moves like water.

Even water doesn't move like water in our systems. Our economies produce lots of strange uphill pumping (as Los Angeles does with the Colorado River's water, as the Bush tax cuts do with the nation's wealth), as well as hoarding, flooding, squandering, false droughts, and unnecessary thirsts unto death. What model explains the hundred-foot yachts and fifth homes U.S. captains of industry accumulate while hunger, homelessness, lack of access to medical care, and general precariousness overtake more and more of the population? Or Bechtel Corporation privatizing the water supply in a Bolivian town and jacking up prices to the point that the poor were expected to do without—what kind of economic model is that? Could we model as a flood the uprising that forced Bechtel out?

But there's another problem with the attempt to represent wealth as water, which is that wealth was for millennia embodied for monetary societies not by the two-hydrogen, one-oxygen molecule that makes life on Earth possible, but by a true element, a heavy metal, and a fairly useless one: gold. The real movement of wealth and poverty through an economy, or at least our economy, might better be modeled by the movement of gold out

of the California ecosystem during the Gold Rush and by the release of deadly mercury into the same system during the same rush.

The gold was the point. The mercury was the secret. The former yielded a one-time profit and was thereafter mostly sequestered, made into coins or worn as ornaments, not even much of a speculative commodity during the century and more that the price of gold was fixed. The latter was dispersed in all the streams in which and near which gold was mined, mercury being useful in securing the gold with the old technologies of ore refinement. More than a century and a half later, the mercury continues to spread, pervading thousands of miles of stream and river, continually flowing with the rivers of the Gold Rush into the San Francisco Bay, and moving outward into the great ocean. Mercury travels from other mining operations into other water systems too, including the Salmon River in Idaho and the Amazon in Brazil. In stream, river, bay, and ocean, it enters the bodies of aquatic creatures, moves up the food chain into bigger fish, and then into other predators, including our own species, where it particularly affects the mental capacities and nervous systems of young children and unborn children, so you can say that at least indirectly gold dims the minds and drains the futures of the youngest among us. The gathering of gold then and now is the spread of mercury. The making of wealth along this extractive model is often also a far more widespread and long-lived generation of poverty.

In the popular version of the California Gold Rush, every man is free to seek his fortune, and flannel-shirted miners panning for gold in mountain streams strike it rich. This picturesque vision of the bearded prospector with his pick and pan is still re-enacted at places like Knott's Berry Farm amusement park near Disneyland in Orange County and celebrated in tourist-dependent towns up and down Route 49, which runs through the old Mother Lode, the gold-bearing belt in the Sierra Nevada. It's a vision of natural riches naturally distributed, a laissez-faire and free-market system in which all start out even, with the implication that all thereby have equal opportunity to benefit. It was almost nearly briefly true, if you ignore the racist laws and the violence that deprived Asians and Latinos of mining access and basic rights. Non-Europeans were subject to special taxes, denied the right to stake claims or work them independently, intimidated, lynched, driven off the richest sites, and barred from legal recourse, but their lot was far more pleasant than that of the native Californians. Bounties were paid for their scalps or ears, and they had no legal or treaty rights. (Though they owned the mother lode from which the gold came, most received nothing from the rush but ruin.) Disease, deracination, starvation, despair, and outright murder reduced the indigenous population by about four-fifths during those early years of the Gold Rush. So if you imagine a world in which everyone is a young white man, you

can picture the gorges, ridgelines, and canyons in which the Gold Rush unfolded as the level playing field of which free-market enthusiasts sing.

Distinguished historians once endorsed this version of the Gold Rush as a paradise of opportunity: California historian and former Nation editor Carey McWilliams wrote in 1949, a century after the rush began, “Few could conquer with Pizarro or sail with Drake, but the California gold rush was the great adventure for the common man.” McWilliams went on to say, “Since there was no ‘law of mines’ in 1848, the California miners adopted their own rules and regulations in which they were careful to safeguard the equality of opportunity which had prevailed at the outset.” But within a decade of James Marshall’s January 1848 discovery of gold on the American River, mining in the Mother Lode shifted from simple pans and sluice boxes to complex mechanical systems. The mining organizations built larger washing devices to get the gold out of the streams, introduced hydraulic mining—the use of high-powered jets of water—to hose it out of the nearby landscape, and launched hard-rock mining operations, whose tunnels and shafts still riddle the Sierra landscape, in order to get underground ore that could then be crushed and processed in a stamp mill.

The technological changes were paralleled by a shift from individual endeavor to increasingly industrialized large-scale processes requiring capitalization and eventually producing stockholders and distant profiteers, as well as bosses and employees. By that point, it took wealth to get wealth. Charles Nordhoff in his 1873 guidebook to California mentions a three-thousand-foot tunnel dug near the Yuba River at a cost of \$250,000, completed before “a cent’s worth of gold could be taken out of the claim”—not the kind of investment option available to everyone. Some of the earlier photographs are astonishing. Whole rivers were diverted so that men could pick more easily at the bed, and if the economy is imagined as flowing like water, these evicted rivers provide some interesting metaphors.

Many of the men who joined the scramble for gold spent much to get to California only to become destitute or die by malnutrition, disease, violence, suicide, accident, or other typical mining-camp misfortune. Many others became ordinary laborers working for ordinary wages, with no chance of striking it rich. It was a colorful world, with lurid newspapers published seemingly in every small town, touring singers, theaters, and even opera in San Francisco, writers like Joaquin Miller and Bret Harte, a tsunami of alcohol consumed in taverns with concomitant brawls, delirium tremens, brothels—ranging from courtesan palaces to child-rape mills—and a lot of vigilante injustice. Maybe it’s all evident in the names of their mining camps. Murderer’s Bar, Hangtown, Rough and Ready, and Sucker

Flat all existed by 1849.

Of course the division of labor and inequality were there from the beginning. Walter Colton, a Protestant minister who had settled in Monterey when it was still part of Mexico, wrote on August 12, 1848, "Four citizens of Monterey are just in from the gold mines on Feather River, where they worked in company with three others. They employed about thirty wild Indians, who are attached to the rancho owned by one of the party. They worked precisely seven weeks and three days, and have divided \$76,844—nearly \$11,000 to each." That is, if you leave out the thirty who likely worked for trade goods and food. Or leave out that the Feather River ran through the territory of the Maidu, who had not sold or surrendered their land by treaty, so that all riches extracted and lands ravaged were done so illegally. Today's equivalent, the gold rush that would make Nevada, were it an independent nation, the world's third largest gold producer, is taking place on land never quite obtained from the Western Shoshone.

Perhaps the terrain of gold rushes should be described as a level playing field riddled with mineshafts and poisoned waters.

II

JUST AS ONE OF THOSE useful commentators from another culture or galaxy might perceive the purpose of drinking heavily to be achievement of a splitting headache and furry tongue in the morning, so she might perceive mining as a way of ravaging great swaths of the land, water, and air about as thoroughly as it is possible to do. For from an ecological point of view, mining produces large-scale, long-term poverty of many kinds while producing short-term wealth for a small minority. When it comes to iron, aluminum, copper, and other metals essential for industrial society, you can argue that the mining is necessary, but about 80 percent of the world's current gold production is made into jewelry destined for India and China. The soft yellow metal has had few practical uses throughout history. The U.S. government even now has 8,134 tons hidden away and recently recommitted itself not to sell, helping to buoy up the metal's current high price (after dropping to about \$250 in the 1990s, it has recently soared to more than \$700 an ounce).

Gold was itself money and money was gold throughout most of Near Eastern, European, and American history, right until August 15, 1971, when President Richard Nixon took the wartime U.S. off the gold standard for various then-expedient reasons, and most of the world followed. Until then the bills that circulated were essentially receipts for gold held in vaults, and the gold coins still in circulation into the twentieth century were

literally worth their weight in gold. During the long era of the gold standard, the metal was the means by which all else was quantified, the measure of all other things. Its value when extracted and abstracted from the landscape was obvious. The difficulty of quantifying the true cost of extracting it is the basic environmental failure of accounting, or maybe of money.

Contemporary accounting does sometimes speak of “externalized costs,” those born by others than the profiteers, and by this measurement the Gold Rush was very expensive. Today’s environmental and social justice advocates would like to see “true cost” accounting, in which the value or cost of an item takes into account its entire impact from creation to disposal or recycling. Moves to measure costs in this way are increasing as communities begin to recognize the ways that a corporation, industry, or enterprise may bring specific benefits to their region, but may also potentially wreak pervasive or long-term damage, social and ecological. Similar analyses could be performed on many enterprises previously framed as profitable simply by asking, For whom? And who pays? For how long? You can look at an individual automobile, for example, as conveying profit to the seller and usefulness to the buyer and noxious fumes and social ills to the larger community.

The California Gold Rush clawed out of the foothills of the Sierra Nevada considerable gold—93 tons or 2.7 million troy ounces in the peak year of 1853 alone, an estimated 973 tons or 28.4 million troy ounces by 1858, more than 3,634 tons or 106 million troy ounces to date. In the course of doing so, everything in the region and much downstream was ravaged. Wildlife was decimated. Trees were cut down to burn for domestic and industrial purposes and to build the huge mining infrastructure that was firmly in place by the 1870s. That infrastructure included huge log dams to make water available on demand—the photographer Carleton Watkins took some pictures of them, looking alarmingly precarious as they stoppered deep valleys full of water. According to environmental historian Michael Black, “Within its first five years of operation, California’s hydraulic cavalry dismembered whole forests to construct five thousand miles of ditches and flumes. This figure was doubled by the close of the decade.” The earth was dug into desolation and later hosed out so that some landscapes—notably the Malakoff Digging and San Juan Ridge near Nevada City—are still erosive badlands of mostly bare earth. But most of all, the streams and rivers were devastated. The myriad waterways of the Sierra Nevada were turned into so much plumbing, to be detoured, dammed, redirected into sluices high above the landscape, filled with debris and toxins. Water as an industrial agent was paramount, and water as a source of life for fish, riparian creatures, downstream drinkers, farmers, and future generations was ignored.

By 1853, the Sacramento River's once prodigious salmon run was in steep decline, and so were those of most of the rest of the streams and rivers that flow into the San Francisco Bay. Black continues, "Three years later, an exasperated commissioner reported that owing to mining, fish runs on the Feather, the Yuba, and the American rivers were dead." Also in 1853, an Indian agent wrote of the native peoples in the region,

They formerly subsisted on game, fish, acorns, etc. but it is now impossible for them to make a living by hunting or fishing, for nearly all the game has been driven from the mining region or has been killed by the thousands of our people who now occupy the once quiet home of these children of the forest. The rivers or tributaries of the Sacramento formerly were clear as crystal and abounded with the finest salmon and other fish. . . . But the miners have turned the streams from their beds and conveyed the water to the dry diggings and after being used until it is so thick with mud that it will scarcely run it returns to its natural channel and with it the soil from a thousand hills, which has driven almost every kind of fish to seek new places of resort where they can enjoy a purer and more natural element.

There was no new place of resort; the fish mostly just died off.

At the time, the costs of the Gold Rush were perfectly apparent to its witnesses; only later was it reconfigured as a frolic. As Nordhoff said in 1873,

At Smartsville, Timbuctoo, and Rose's Bar I suppose they wash away into the sluices half a dozen acres a day, from fifty to two hundred feet deep; and in the muddy torrent which rushes down at railroad speed through the channels prepared for it, you may see large rocks helplessly rolling along.... Of course the acres washed away must go somewhere, and they are filling up the Yuba River. This was once, I am told by old residents, a swift and clear mountain torrent; it is now a turbid and not rapid stream, whose bed has been raised by the washings of the miners not less than fifty feet above its level in 1849. It once contained trout, but I now imagine a catfish would die in it.

The volume of mercury-tainted soil washed into the Yuba was three times that excavated during construction of the Panama Canal, and the riverbed rose by as much as eighty feet in some places. So much of California was turned into slurry and sent downstream that major waterways filled their own beds and carved new routes in the elevated sludge again and again, rising higher and higher above the surrounding landscape and turning ordinary Central Valley farmlands and towns into something akin to

modern-day New Orleans: places below water level extremely vulnerable to flooding. Hydraulic mining washed downstream 1.5 billion cubic yards of rock and earth altogether. "Nature here reminds one of a princess fallen into the hands of robbers who cut off her fingers for the jewels she wears," said one onlooker at a hydraulic mine.

The Gold Rush was a huge giveaway of public or indigenous resources to private profiteers, a mass production of long-term poverty disguised as a carnival of riches. Which is to say that the profit the mining operations made was contingent on a very peculiar, if familiar, form of enterprise it might be a mistake to call free: one in which nature and the public domain could be squandered for private gain, in which the many were impoverished so that a few could be enriched, and no one was able to stop them in the name of the public, or almost no one.

Only one great battle was fought against the mining, by downstream farmers. They too were invaders transforming the landscape, but in that pre-pesticide era of farming with horse and plough, their impact was at least comparatively benign and they had, unlike any miners anywhere, an interest in the long-term well-being of the place, not to mention a useful product. The farmers took the hydraulic mining operations of the central Sierra to court for polluting the rivers, raising their beds, and rendering farms extremely vulnerable to flooding, and they won in 1884. Robert L. Kelley, in his 1959 history of the lawsuit, called it "one of the first successful attempts in modern American history to use the concept of general welfare to limit free capitalism."

### III

GOLD IS HEAVY, and it sinks to the bottom of a pan, a rocker, a long tom, or whatever device you might have used to get the metal out of the stream in the early days of the California Gold Rush. Some of the gold always slipped away—unless you added mercury, also known as quicksilver, to the water and silt in your pan. The mercury amalgamated with the gold, making it easier to capture, but then some of the mercury inevitably washed downstream. With hydraulic mining, the same methods were used on far larger scales. You hosed out riverbanks, hillsides, mountainsides, breaking the very landscape down into slush and slurry that you then washed for the gold. Then you poured mercury, one flask—seventy-five pounds—at a time, into the washing device. This was one of the most extravagant uses of mercury during the Gold Rush, and much of it escaped into the environment. With hard-rock mining, as the 1858 California Miner's Own Handbook describes it, you put pulverized ore into "an 'amalgamating box' containing quicksilver, and into which a dashboard is inserted that all the water, gold, and tailings may pass through the

quicksilver.” Here too the mercury helped capture the gold. You dissolved the amalgamation by heating it until the mercury vaporized, leaving the gold behind, and then tried to capture the vapor in a hood for reuse. Inevitably some of it would be atmospherically dispersed, and breathing mercury fumes was one of the more deadly risks of the process.

During the California Gold Rush, an estimated 7,600 tons or 15,200,000 pounds of mercury were thus deposited into the watersheds of the Sierra Nevada. The U.S. Geological Survey estimates that placer, or stream-based, mining alone put ten million pounds of the neurotoxin into the environment, while hard-rock mining accounted for another three million pounds. Much of it is still there—a U.S. Fish and Wildlife biologist once told me that he and his peers sometimes find globules the size of a man’s fist in pristine-looking Sierra Nevada streams—but the rest of it ended up lining the bottom of the San Francisco Bay. Some of it is still traveling: the San Jose Mercury News (named after the old mercury mines there) reports that one thousand pounds of the stuff comes out of gold-mining country and into the bay every year, and another two hundred pounds comes from a single mercury mine at the south end of the bay annually. Some of this mercury ends up in the fish, and as you move up the food chain, the mercury accumulates. According to the San Francisco Estuary Institute, “Fish at the top of the food web can harbor mercury concentrations in their tissues over one million times the mercury concentration in the water in which they swim.” All around the edges of the bay, warning signs are posted, sometimes in Spanish, Tagalog, and Cantonese, as well as English, but people fish, particularly poor and immigrant people, and some eat their catch. They are paying for the Gold Rush too.

Overall, approximately ten times more mercury was put into the California ecosystem than gold was taken out of it. There is something fabulous about this, or at least fablelike. Gold and mercury are brothers and opposites, positioned next to each other, elements 79 and 80, in the Periodic Table of the Elements. And they also often coexist in the same underground deposits. Gold has been prized in part because it does not rust, change, or decay, while mercury is the only metal that is liquid at ordinary temperatures, and that liquid is, for those who remember breaking old thermometers to play with the globules, something strange, congealing into a trembling mass or breaking into tiny spheres that roll in all directions, ready to change, to amalgamate with other metals, to work its way into the bodies of living organisms. The miners called it quicksilver for its color and its volatility. Half gold’s goodness is its inertness; it keeps to itself. Mercury’s problem is its protean promiscuity.

Gold was never more than a material and occasionally a curse in the old



stories, but Mercury was the deity who shared with his namesake element the elusive fluctuant qualities still called mercurial, and it is as the god of commerce and thieves that he encounters the “precious” metal gold. Perhaps in tribute to the element’s talent for engendering fetal abnormalities, Mercury is also the Roman counterpart to the Greek god Hermes, father of Hermaphrodite, though mercury-generated birth defects are never so picturesque.

At least from Roman times onward, mercury was critical for many of the processes used to isolate both gold and silver from ore. Thus mercury was a crucial commodity, not valued in itself, but necessary for obtaining the most valued metals. Sources of mercury were far rarer than those of gold, and so one of the great constraints on extracting wealth from the New World was the limited supply of mercury (in forested parts of the world, heat could be used in gold refining, but in the fuel-poor deserts, mercury was the only means). The Almaden Mine in Spain and then the Santa Barbara Mine in Huancavelica, Peru, were the two major mercury sources in the Western world from the sixteenth until the mid-nineteenth century, and when the Spanish colonies gained their independence, they (except for Peru, of course) lost easy access to this supply of mercury.

So dire was this lack that the Mexican government offered a reward—\$100,000 by one account—to whoever could discover a copious supply. In the northwesternmost corner of old Mexico, in 1845, a staggeringly rich mercury lode was discovered by one Captain Don Andres Castillero. Located near San Jose at the southern end of the San Francisco Bay, the New Almaden Mine was well within the territory seized by the United States by the time it was developed. And only days before the February 2, 1848, treaty giving Mexico \$15 million for its northern half was signed, gold was also discovered in California. Thus began the celebrated Gold Rush, which far fewer know was also a mercury rush, or that the two were deeply intertwined.

One anonymous 1857 visitor to the New Almaden Mine published his (or her?) observations in Harper’s Magazine a few years later. “One of the most curious circumstances connected with the New Almaden Mine is the effect produced by the mercurial vapors upon the surrounding vegetation,” said the report.

Despite the lofty chimneys, and the close attention that has been devoted to the secret of effectually condensing the volatile matter, its escape from the chimneys withers all green things around. Every tree on the mountain-side above the works is dead, and some of more sensitive natures farther removed exhibit the influence of the poison in their shrunken and blanched foliage.... Cattle feeding within half a mile of the

hacienda sicken, and become salivated; and the use of waters of a spring rising near the works is guarded against.... The workmen at the furnaces are particularly subjected to the poisonous fumes. These men are only able to work one week out of four, when they are changed to some other employment, and others take their place for a week. Pale, cadaverous faces and leaden eyes are the consequences of even these short spells; and any length of time continued at this labor effectually shortens life and impregnates the system with mercury.... In such an atmosphere one would seem to inhale death with every respiration.

Without the torrent of toxic mercury that poured forth from this and a few smaller mercury mines in the Coast Range, the California Gold Rush would probably have been dampened by foreign monopolies on mercury. Though the New Almaden mining operation closed more than thirty years ago, the mercury there is still leaching into the San Francisco Bay. A series of Gold Rush-era mercury mines has gravely contaminated Clear Lake a hundred and twenty miles or so to the north, where the local Pomo people have seven times as much mercury in their systems as the regional normal. In many places, mercury contamination of water forces native North Americans, who have traditionally relied on marine animals and fish as primary food sources, to choose between tradition and health.

Gold is the paradise of which the bankers sang; mercury is the hell hidden in the fine print. The problem is not specific to the California Gold Rush, which only realized on a particularly epic scale in a particularly lush and pristine landscape the kinds of devastation gold and mercury can trigger. The current gold rush in northeastern Nevada, which produces gold on a monstrous scale—seven million ounces in 2004 alone—is also dispersing dangerous quantities of mercury. This time it's airborne. The forty-mile-long Carlin Trend on which the gigantic open-pit gold mines are situated is a region of "microscopic gold"; dispersed in the soil and rock far underground, imperceptible to the human eye, unaffordable to mine with yesteryear's technology. To extract the gold, huge chunks of the landscape are excavated, pulverized, piled up, and plied with a cyanide solution that draws out the gold. The process, known as cyanide heap-leach mining, releases large amounts of mercury into the biosphere. Wind and water meet the materials at each stage and create windblown dust and seepage, and thus the mercury and other heavy metals begin to travel.

As the Ban Mercury Working Group reports, "Though cumulatively coal fired power plants are the predominant source of atmospheric mercury emissions, the three largest point sources for mercury emissions in the United States are the three largest gold mines there." The Great Salt Lake, when tested in 2004, turned out to have astonishingly high mercury

levels, as did wild waterways in Idaho, and Nevada's gold mines seem to be the culprit. The Reno Gazette-Journal reported that year, "The scope of mercury pollution associated with Nevada's gold mining industry wasn't discovered until the EPA changed rules in 1998 to add mercury to the list of toxic discharges required to be reported. When the first numbers were released in 2000, Nevada mines reported the release of 13,576 pounds in 1998. Those numbers have since been revised upward to an estimated 21,098 pounds, or more than 10 tons, to make Nevada the nation's No. 1 source of mercury emissions at the time." Glen Miller, a professor of natural resources and environmental science at the University of Nevada, Reno, estimates that since 1985, the eighteen major gold mines in the state released between 70 and 200 tons of mercury into the environment.

Maybe some of this is already evident in the Greek myth of King Midas. Dionysus, the god of wine and revelry, gave Midas a single wish and regretted the mortal's foolish choice: the ability to turn anything he touched into gold. The rest is familiar. The king transformed all he touched so that what he tried to drink became gold when it touched his lips, and his thirst grew intolerable. Worse yet, he touched his daughter and his greed turned her to inanimate metal, and it was with this that he begged the god to take back his gift, resigned his crown and power, and became a rural devotee of the god Pan. In this ancient tale, gold is already associated with contaminated water and damaged children.

Midas is mythological, but true tales of gold-as-horror check the history of the Americas. There is an extraordinary print from Girolamo Benzoni's 1565 *La Historia del Mondo Nuovo*, a report by an embittered witness to fifteen years of Spanish colonization. In the image, unclothed native men, tired of being savagely forced to produce gold, pour the molten metal down the throat of a captive Spaniard in pantaloons. Thus literal fulfillment of a hunger for wealth leads to death, and thus revenge for the brutality of the gold economy begins in the Americas. Another tale comes from the Death Valley Forty-Niners, seeking an easy and finding a hard route to the California gold fields. On their parched sojourn across the desert, one gold-seeker abandoned \$2,500 in gold coins to lighten his load in the hopes that thus unburdened he might make it to water and life. Another of these desperados snapped at his companion that he had no interest in what looked like gold-bearing ore along the route through the dry lands: "I want water; gold will do me no good."

Gold is a curse in Exodus too, when the Israelites, having lost faith during their pilgrimage in the desert, come to worship the golden calf made out of melted-down jewelry. Moses comes down from the mountaintop, grinds the golden idol into powder, throws it into a stream, and forces them to drink it.

For us, perhaps the golden calf is the belief that the current economic system produces wealth rather than poverty. It's the focus on the gold to the exclusion of the mercury.

FOR A WHILE in the middle of the twentieth century, economists liked to model their subject as hydrology. They built elaborate systems of pipes, pumps, and reservoirs through which water traveled, allegedly modeling the movements of money, wealth, capital. They were funny devices, stuck halfway between literal-mindedness and metaphor, and they begged many questions about the nature of economies and the nature of water. Since that time, water contamination and scarcity have become global issues, and water privatization an especially heated one. But even if you left aside all the strange things we do to water, water was never exactly a good model for economies, since the implication was that the flow of capital is natural, that money moves like water.

Even water doesn't move like water in our systems. Our economies produce lots of strange uphill pumping (as Los Angeles does with the Colorado River's water, as the Bush tax cuts do with the nation's wealth), as well as hoarding, flooding, squandering, false droughts, and unnecessary thirsts unto death. What model explains the hundred-foot yachts and fifth homes U.S. captains of industry accumulate while hunger, homelessness, lack of access to medical care, and general precariousness overtake more and more of the population? Or Bechtel Corporation privatizing the water supply in a Bolivian town and jacking up prices to the point that the poor were expected to do without—what kind of economic model is that? Could we model as a flood the uprising that forced Bechtel out?

But there's another problem with the attempt to represent wealth as water, which is that wealth was for millennia embodied for monetary societies not by the two-hydrogen, one-oxygen molecule that makes life on Earth possible, but by a true element, a heavy metal, and a fairly useless one: gold. The real movement of wealth and poverty through an economy, or at least our economy, might better be modeled by the movement of gold out of the California ecosystem during the Gold Rush and by the release of deadly mercury into the same system during the same rush.

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Distinguished historians once endorsed this version of the Gold Rush as a paradise of opportunity: California historian and former Nation editor Carey McWilliams wrote in 1949, a century after the rush began, "Few could conquer with Pizarro or sail with Drake, but the California gold rush was the great adventure for the common man." McWilliams went on to say, "Since there was no 'law of mines' in 1848, the California miners adopted

their own rules and regulations in which they were careful to safeguard the equality of opportunity which had prevailed at the outset.” But within a decade of James Marshall’s January 1848 discovery of gold on the American River, mining in the Mother Lode shifted from simple pans and sluice boxes to complex mechanical systems. The mining organizations built larger washing devices to get the gold out of the streams, introduced hydraulic mining—the use of high-powered jets of water—to hose it out of the nearby landscape, and launched hard-rock mining operations, whose tunnels and shafts still riddle the Sierra landscape, in order to get underground ore that could then be crushed and processed in a stamp mill.

The technological changes were paralleled by a shift from individual endeavor to increasingly industrialized large-scale processes requiring capitalization and eventually producing stockholders and distant profiteers, as well as bosses and employees. By that point, it took wealth to get wealth. Charles Nordhoff in his 1873 guidebook to California mentions a three-thousand-foot tunnel dug near the Yuba River at a cost of \$250,000, completed before “a cent’s worth of gold could be taken out of the claim”—not the kind of investment option available to everyone. Some of the earlier photographs are astonishing. Whole rivers were diverted so that men could pick more easily at the bed, and if the economy is imagined as flowing like water, these evicted rivers provide some interesting metaphors.

Many of the men who joined the scramble for gold spent much to get to California only to become destitute or die by malnutrition, disease, violence, suicide, accident, or other typical mining-camp misfortune. Many others became ordinary laborers working for ordinary wages, with no chance of striking it rich. It was a colorful world, with lurid newspapers published seemingly in every small town, touring singers, theaters, and even opera in San Francisco, writers like Joaquin Miller and Bret Harte, a tsunami of alcohol consumed in taverns with concomitant brawls, delirium tremens, brothels—ranging from courtesan palaces to child-rape mills—and a lot of vigilante injustice. Maybe it’s all evident in the names of their mining camps. Murderer’s Bar, Hangtown, Rough and Ready, and Sucker Flat all existed by 1849.

Of course the division of labor and inequality were there from the beginning. Walter Colton, a Protestant minister who had settled in Monterey when it was still part of Mexico, wrote on August 12, 1848, “Four citizens of Monterey are just in from the gold mines on Feather River, where they worked in company with three others. They employed about thirty wild Indians, who are attached to the rancho owned by one of the party. They worked precisely seven weeks and three days, and have

divided \$76,844—nearly \$11,000 to each.” That is, if you leave out the thirty who likely worked for trade goods and food. Or leave out that the Feather River ran through the territory of the Maidu, who had not sold or surrendered their land by treaty, so that all riches extracted and lands ravaged were done so illegally. Today’s equivalent, the gold rush that would make Nevada, were it an independent nation, the world’s third largest gold producer, is taking place on land never quite obtained from the Western Shoshone.

Perhaps the terrain of gold rushes should be described as a level playing field riddled with mineshafts and poisoned waters.

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