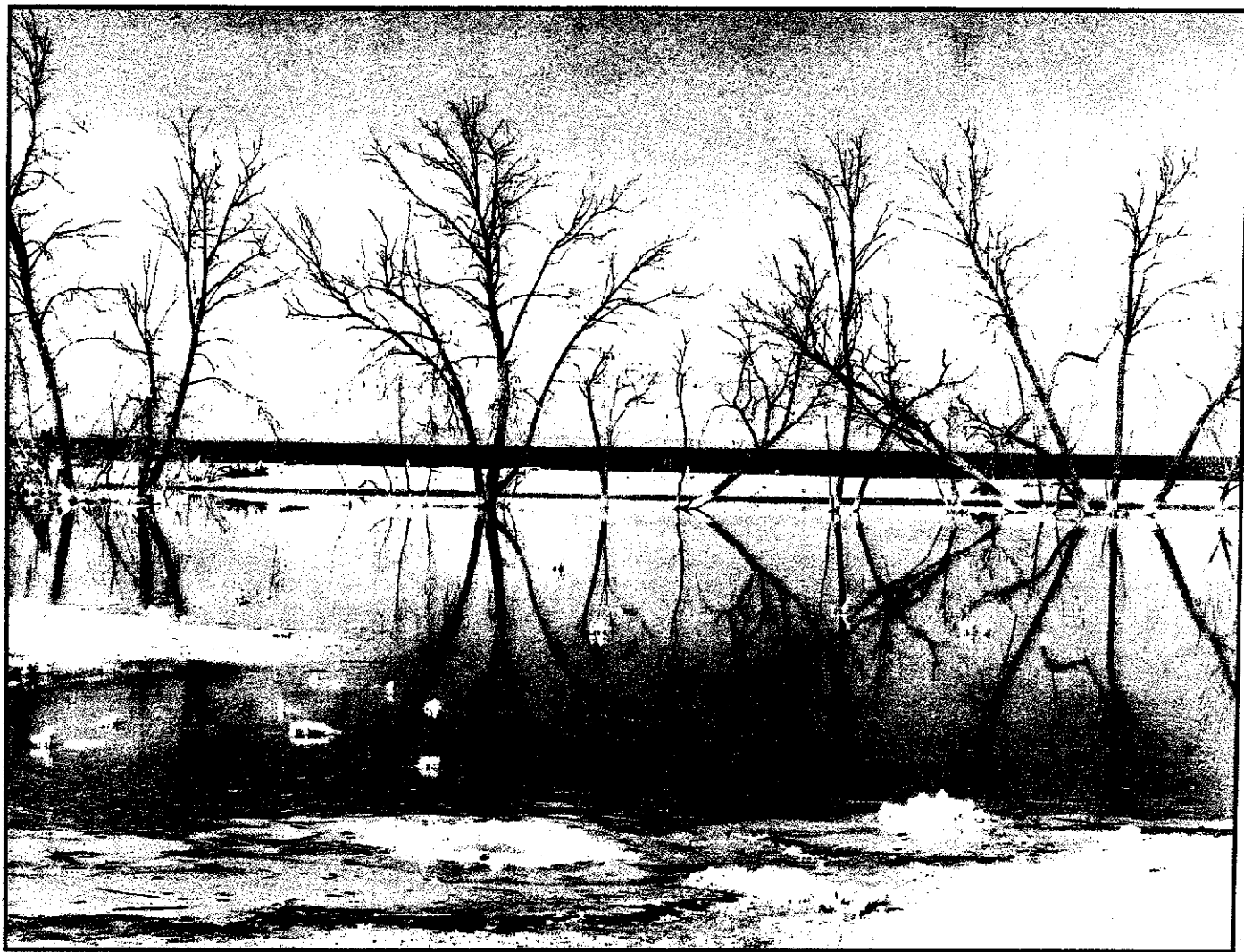


LAND & WATER IN LOW-DOWN CALIFORNIA



Salt Dreams

— WILLIAM deBUYS & JOAN MYERS —

4 | M E M O R I E S O F S E A S

Fate played roughly with Durivage and charged him a toll it waived for later emigrants. Had Durivage delayed his desert crossing by two or three weeks and attempted the *jornada* in the very maw of July heat, he might have had an easier time, not because of any mercy from the weather but because of an extraordinary gift from the Colorado River itself. The river, however, first masked its gift by presenting a more daunting challenge than ever at Yuma Crossing.

When Durivage crossed the Colorado in the third week of June, he estimated its width at Yuma Crossing to be about 150 yards. Roughly four weeks later, a Texan forty-niner, name unknown, described the same stretch of river as "five or six hundred yards wide, with a very deep and rapid current."¹ When a member of the Texan's party attempted to emulate the Quechan, who routinely swam the river even in high flood, "the task proved too great for him, and he was drowned."

Having crossed to the California side, the Texan and his fellows struck out across the desert following the same route as Durivage and having much the same experience. At their

first camp the water "was shockingly bad on account of a dead mule having been in the well; still we were compelled to use it." Next day they made the twenty-six-mile push to Alamo Mocho, where they rested, then by five in the afternoon got under way again, across country that "reminds one of descriptions given by travelers of the great Sahara desert."

Twenty-two miles farther the Texan and his party came to something entirely unexpected. Midway across the fearsome *jornada*, instead of desolation, he and his fellows encountered "a large, beautiful lake of water." The water was fresh and "excellent." They camped there, "in a pleasant grove of mesquite trees."²

The source of the unforeseen liquid lay downstream of Yuma Crossing. Along a section of channel unvisited and unobserved by forty-niners, the flooding Colorado had topped its banks, spilling water into a labyrinth of flats and sloughs. The water spread into tangles of willow and arrowweed, clumps of mesquite, and beyond, into pure desert bleakness. It flowed as though onto a teeter-totter, for stretches of the land were almost perfectly flat and tipped the flow of water now to the south, now to the north. The imperceptible divide between the two drifted across the drenched plain according to the logic of accident and chaos. A raft of snagged vegetation, an accumulation of sand or silt, a toppled cottonwood, a sudden pulse of current speeding up or slowing down, any of these changes might cause the flow on a given acre to veer along a new path. As acres added to acres, patterns of drainage might shift and rearrange. In such a way did the restless wilderness of the delta divide southbound waters destined for the Sea of Cortez from those headed northward to the still unnamed Salton Sink.

Some of the northbound waters collected in a discharge slough that ran through the present site of Mexicali and into the path of the emigrants. Where the slough widened, the waters spread out to form small lakes or lagoons.

The Quechan and their desert neighbors the Kamia were intimately familiar with this phenomenon. It occurred not every year but often enough that exploitation of overflow lands was a central strategy of Kamia survival.³ Put simply, they planted fast-growing crops in moistened soils as waters receded. But there was no predicting precisely when or where such bounty might occur. Year by year, the amount of water involved, its distribution between sloughs, and the timing of flows varied hugely.

But for Americans on the gold trail, and even for experienced Mexicans who might have made the trip several times, the sight of a significant body of open water in midsummer in the midst of the continent's most barren desert seemed as unprecedented as it was astonishing. Travelers in that busy summer of 1849 drew on no great store of insight to call this visitation the *New River*.⁴

The river no doubt saved a share of lives. When Audubon came through in October, the waters had shrunk to a string of small lagoons with no surface flow between them, but where the waters had evaporated, another boon appeared: fresh

grasses flourished in the moistened soil. The new forage was abundant enough that Rambler's party, in November, camped by the meadows for "two days and a half making hay," which they packed upon their animals to sustain them through the hard stretch ahead.

Lieutenant Cave Johnson Coutts, who commanded a patrol that summer in support of surveyors marking the international boundary, deemed the sudden materialization of a river in the desert proof of divine providence: "This particular place of the river, favored with such luxuriant grass, can only be the work of an Invisible Hand to aid the thousands of distressed emigrants."⁵ Coutts established a base near the New River, which he named Camp Salvation, and from it he and later others dispensed relief supplies to needy travelers.⁶

William Hunter, a forty-niner from Missouri, reached the New River on November 25. By then the remnants of the summer overflow were

contained in holes varying from a few yards to half a mile in length, and from a few feet to a quarter mile in breadth. The bed is at present shallow, and if the water ever runs at all, from the observation I have been able to make, I cannot say which course they take. I should, however, imagine that they must find an exit to the South East.⁷

Hunter's observations were accurate, but his conclusion was wrong. The New River flowed north. Those who later divined the source of the providential river would unlock the central mystery of the region and lay a foundation for the transformation of the Colorado Desert into the Imperial Valley. Many travelers and observers understood pieces of the puzzle, but no one yet grasped the pattern of the whole. The first to do so would be a young geologist in the employ of the army. His name was William Phipps Blake.

A NATION claims new lands twice. First, in military terms, it must hold them against the interests of rivals. Later, the ties of ownership deepen; the nation begins to claim its land by right of occupation and understanding, believing that it knows, better than its rivals, how to use and settle the new land, how to capture and multiply its riches. Understanding the Colorado Desert, however, was no easy matter. Before Americans could grasp the character of the newly won territory, a fresh chain of events, arising from the nation's severest tensions, had to unfold.

As mid-century approached, divisions over slavery and other matters widened between North and South, threatening to break the United States apart. But there was also a second great fracture in the frame of the nation. For all practical purposes the nation's far western holdings in Oregon and California lay as distant from eastern seats of power as had the thirteen original colonies from England. Without strong ties to bind them to the whole, ties strong enough to reach across a vast and thinly populated land, the western empire might break away.

The renowned explorer John James Abert, commander of the Army Corps of Topographical Engineers and namesake of squirrels and towhees, understood the problem better, perhaps, than anyone. In May 1849, the urgency of strengthening links to the west increased daily as reports on the magnitude of Sutter's gold strike trickled back from California. Legions of aspiring tycoons were packing their kits, kissing their wives, mothers, and sweethearts goodbye, and setting out by every conceivable path and conveyance for the land of golden opportunity. Abert wrote: "Unless some easy, cheap, and rapid means of communicating with these distant provinces be accomplished, there is danger, great danger, that they will not constitute parts of our Union. Then what will become of our great moral power, our great commerce, our infinite resources . . . ? We shall sink into two second rate governments if we are even able to maintain as good a position as that of second rate."⁸

Abert well knew that the steam locomotive should provide the answer. Steel rails could stitch the overgrown nation together, establishing bonds of economic interdependence and quick communication. Building such a railroad, however, lay beyond the capability of private capital. Leaders throughout the nation assented that government should undertake the effort, but the problem of selecting a transcontinental route posed enormous political difficulty. The eastern terminus would bring incalculable economic benefit to the surrounding region, and so northerners insisted it be in the North, southerners in the South. Compromise on this question, as on the extension of slavery into new territories, proved elusive.

At last Congress tried to place the choice outside politics. Dispassionate science, it decreed, should determine the decision. By an act of March 3, 1853, Congress instructed the War Department, and specifically its Corps of Topographical Engineers, to "ascertain the most practicable and economical route for a railroad from the Mississippi river to the Pacific ocean." The hope was to identify a single route that, on its merits, might command acquiescence, if not support, from competing sectional interests. In the end, what Congress got was far from definitive: several good routes existed, each with advantages and liabilities. Ultimately, the nation would not decide how to bind itself together until it had first come apart: civil war would rage and pass before the United States built rails to the far sea. In the meantime, the Pacific Railroad Surveys produced a flood of information about the western half of the continent and heightened immeasurably the eastern half's estimation of the value of its new empire.⁹

IN 1853 Congress was in a hurry. It gave the new secretary of war, Jefferson Davis, already a national figure and second to none in the fervency of his sectionalism, ten months to field the necessary survey parties, conduct reconnaissance of all possible railroad routes across a universe of unmapped plains, mountains, and deserts, and compile the findings.¹⁰

Davis dispatched four parties to the field, three to operate from east to west and a fourth to scour California's Sierra Nevada and Peninsular Range for mountain

passes, low and even-graded, that might allow an iron horse to reach the coast. He placed the California reconnaissance under the command of Lieutenant R. S. Williamson, with Lieutenant John G. Parke assisting. Davis empowered the officers to requisition packers and livestock; he provided them an escort of twenty-eight mounted troops—"picked men and horses only"—to protect the surveyors from Indians and outlaws; and he appointed to the expedition a small array of civilian specialists: "one mineralogist and geologist; one physician and naturalist; two civil engineers; a draughtsman: who, in addition to their stipulated compensation, will be allowed the actual cost of their transportation to and from California."¹¹

The last position to be filled in Williamson's party was that of mineralogist and geologist, which fell to William Phipps Blake, a recent graduate of Yale's new School of Applied Chemistry (soon renamed the Sheffield Scientific School) and the scion of a distinguished Yankee family. It was the chance of a lifetime for the promising young scientist, who became one of the first professional geologists in the United States.¹²

Within days of receiving his appointment, Blake embarked on the steamer *Georgia*, bound for Panama. Less than seven weeks later he landed in the Sacramento delta port of Benecia, where Williamson was equipping his party. Only twenty-seven years old, Blake cut a fine figure. He was six feet tall and possessed the strong, angular features and flowing mane that portraitists sometimes give their subjects whether they have them or not. The day after he arrived, he drew equipment for the trail and put his things in order. Next morning, July 10, amid the braying of mules and the groaning of wagon timbers, he and the rest of the survey party, complete with sabred escorts, head-tossing remounts, and canvas-topped supply train, set out for terra incognita.

For the rest of the summer and straight through to fall they crawled along the western face of the Sierra Nevada, examining every gap in its upthrust wall. Six passes in particular drew their attention, but one needed four miles of tunnel, others were too steep, and none, in Blake's words, "offered an especially favorable and easy route or inviting grades."¹³ With time running out and nothing favorable to report concerning the southern route that Secretary Davis fervently desired, Williamson in early November split his command and sent Parke and Blake south to investigate the mountains east of the Mormon settlement of San Bernardino.

After resupplying, Parke's train of men, horses, and wagons began a gradual ascent through a sparsely settled land of large cattle ranches, toward the saddle in the mountain divide separating Mount San Bernardino on the north from Mount San Gorgonio (known today as San Jacinto) on the south. The surveyors' path rose smoothly and gradually all the day of November 12 and all the day following, at the end of which they found themselves, to their intense delight, "on a broad and gently sloping plain," which proved to be the summit of the pass.¹⁴ Decades later, at the age of eighty-four, Blake described the party's discovery this way:

Imagine, then, the enthusiasm with which the unknown great break in the mountain range . . . was approached by the members of the party as we made our way eastward from the region, then practically unoccupied but now including the towns of Colton and Redlands, and found an easy grade and open country for our train of wagons to the summit, only 2,580 feet above the sea. Here, at last, was discovered the greatest break through the western cordillera, leading from the slopes of Los Angeles and the Pacific into the interior wilderness. It had no place upon the maps and had not been traversed by surveying parties or wagons. From the summit, we could look eastward and southward into a deep and apparently interminable valley stretching off in the direction of the Gulf of California.¹⁵

On November 14, the party began descending the eastern slope of the pass through country so vast and devoid of vegetation (where now the hundred golf courses of greater Palm Springs humbly abound) that Blake, upon later viewing an illustration prepared for his report, apologized for the minimal liberties the artist had taken. It seems that the eastern engraver, working from Blake's quite competent sketch, failed to grasp the true and, for the artist, unimaginable austerity of this most austere of deserts. The "brown and barren-looking mountains," Blake wrote, "are represented in the engraving, but appear too near, and the plain too narrow. Grass and vegetation among the rocks, and clouds in the sky, have also been added by mistake." He forgave as he corrected: "It is seldom that an artist is called upon to picture a scene so barren and so desolate."¹⁶

A factor in that desolation, and the first of Blake's notable discoveries, was the erosive power of wind-driven sand. San Geronio Pass today is home to electricity-producing wind farms, great orchards of windmills, row on row, topped with propellers big enough for a B-29. It was Blake who first called attention to the winds of the pass. He deduced the constancy of their direction and the magnitude of their power from the evident weathering of the landscape's naked rock. Not even resistant materials were immune: "Long parallel grooves, deep enough to receive a lead-pencil, were cut on the surface of the hard and homogenous granite." Such observations of "the cutting power of drifting sand" might seem trivial today, but in 1853 they were at the leading edge of science.

Charles Lyell had published his three-volume *Principles of Geology* between 1830 and 1833, and at Yale Blake no doubt studied it minutely. In that work Lyell advanced the concept that came to be known as uniformitarianism—the idea that the earth attained its present form as a result of processes of sedimentation, erosion, and volcanism that continue to operate and to be observable today. Lands and seas formed, according to Lyell, not in a single day or week of Genesis but over vast stretches of what, thanks largely to him, we are accustomed to calling "geologic time." Analyzing the landscapes of the American West in uniformitarian terms became a chief preoccupation for Blake and his professional contemporaries,

although the spotlight of scientific discovery soon focused elsewhere. In 1859, while Blake struggled to make a living as a consulting geologist, Charles Darwin, another Lyell disciple, published a treatise in which he applied Lyell's notion of continuous change to the process for which he named his book, *The Origin of Species*.

BLAKE'S HARVEST of discovery had only begun. Onward the surveyors descended into the bleak but chromatic bowl of distance and void. Despite the harshness and sterility of the land, its topography posed no obstacles. The eastern slope of the pass was as gradual and even-graded as the western had been. They followed no road, for none existed, yet they easily drove their wagons over the wind-hardened clay. For all they knew, they were the first white men ever to penetrate these unmapped precincts, and they were not far wrong. History records only an obscure few who preceded them.¹⁷ Anza and his colonists, Kearny and the Army of the West, Cooke and the Mormon Battalion, and the legions of forty-niners had all crossed the mountains farther to the south.

Near present-day Palm Springs the surveyors stopped at a lone thicket of willow and mesquite concealing a hot spring. A band of Cahuilla Indians were encamped there—"many Indian boys and girls were bathing in the warm spring and a group of squaws were engaged in cooking a meal." Blake was pleased to find, amid the thicket, "a young palm tree spreading its broad, fan-like leaves." Like many of his future readers, Blake had formed most of his ideas about deserts from the tales of Ali Baba. He soon drafted the Cahuilla into a romantic vision of New World Bedouins: "The surrounding desert, and this palm tree, gave the scene an Oriental aspect; and the similarity was made still more striking by the groups of Arab-like Indians."¹⁸

By the standards of the day, imagining Indians as Arabs, bizarre though it may now seem, showed commendable open-mindedness. Blake's willingness to view Indians in a favorable light was hardly universal among early Anglos in California. Far commoner was the idea that desert bands deserved "to be regarded as the lowest scale of humanity."¹⁹ And thus easily dismissed and dispossessed.

Two days later, on November 17, Blake and his trailmates encountered an astonishing sight. The party rounded a projecting ridge of the mountain and beheld "an unlimited view" down the long axis of the Salton trough, south and east toward the head of the Gulf of California. Immediately Blake noticed "a discoloration of the rocks extending for a long distance in a horizontal line on the side of the mountains," which he identified as a waterline. It followed "all the angles and sinuosities of the ridges for many miles—always reserving its horizontality." Soon, as they descended below the waterline, they discovered an abundance of shells littering the desert floor, which Blake rightly identified as having belonged to freshwater snails and mussels.

This was geology at its most exciting: in the same moment that he stood on the previously submerged floor of a now vanished lake or sea, Blake also stood on the

verge of identifying and describing a vast, dramatic transformation of the surface of the earth. That night the survey party encamped near present-day Martinez, close to the largest Cahuilla village they had yet encountered. Other village clusters of Cahuilla dwellings, low domes thatched with arrowweed, lay scattered and concealed among the mesquite thickets of the valley floor. "Our coming having been duly heralded by *smokes* and excited express riders from one village to the other, the whole population had collected to gaze on us in wonder."²⁰

The wonder was mutual. In correspondence dispatched from Yuma a few weeks later, Blake wrote,

The squaws were horribly tattooed as well as painted, and manifested much interest in the advent of our wagons and such a number of "pale faces" to their hitherto almost unvisited retreat. Many of the men had often been into the settlements, and had learned some Spanish and accumulated quite a stock of second-hand clothing. . . . Old hats and odd buttons seemed to have been in especial demand, and were worn with much dignity on the occasion of our arrival.²¹

Throughout the evening's councils, Parke and Blake questioned the "principal men" about "the shore-line and water marks of the ancient lake." By way of answer,

the chief gave an account of a tradition they have of a *great water (agua grande)* which covered the whole valley and was filled with fine fish. There was also plenty of geese and ducks. Their fathers lived in the mountains and used to come down to the lake to fish and hunt. The water gradually subsided "*poco*," "*poco*," (little by little,) and their villages were moved down from the mountains, into the valley it had left. They also said that the waters once returned very suddenly and overwhelmed many of their people and drove the rest back to the mountains. . . .

The Indians had a grand feast and dance during the night, keeping us awake by their strange songs and indescribable noises.²²

By the time sleep came, Blake was far along in deducing the history of the landscape he had entered. Although the barometer the party carried was fragile and imprecise (and had not been freshly calibrated), Blake knew that they had passed below sea level somewhere close to the mark of the old waterline and that they were still descending.

Next day, the surveyors tried to recruit a Cahuilla guide to go with them as they struck southward along the ancient lake bed toward the emigrant trail linking Yuma and Carrizo Creek (which in their reports they promoted to the status of a "wagon road"). "Mucho malo," however, "was the only information that could be extracted from him regarding the section we were to go over."²³ The reluctant guide



and every other Cahuilla whom the surveyors importuned knew a bad gamble when they saw one and warned the whites that their route afforded neither water nor grass and that they would not get their wagons through. Nevertheless, Parke, Blake, and the rest of the party set forth.

Toward sundown they came to what today is known as Travertine Point, a sharp, granitic projection of the Santa Rosa Mountains. The formation fascinated Blake. All the way up to the ancient waterline, which stood out brilliantly, the crags were covered by a calcareous deposit, in places two feet thick. This calcium-based deposit, variously known as travertine, tufa, or sinter, had formed as freshwater evaporated, leaving crystallized minerals behind. In lakes it forms at waterline, where wind and wave action bathe the shore with moisture, which then evaporates. In large lakes, which Blake's inland sea certainly had been, the effect is magnified by seiches—wind-driven lake tides. A visitor today to Parker Dam, which impounds Colorado River water to form Lake Havasu, will find similar deposits on the concrete wings of the dam.

Although he was embarked on a dire *jornada*, Blake lavished much time and energy on the exploration of Travertine Point. He clambered over its white crust, collected samples, took barometric readings, and, to judge by the detail of his final report, made voluminous notes. His romantic sensibility came to the fore. Laying science momentarily to the side, Blake deepened the recesses of Travertine Point into darker grottoes and shadier caverns than actually are there; then he mused upon the forces that shaped them:

When wandering over these great masses of rock, and standing in the once sub-aqueous galleries and passages, with their walls and ceilings of the coral-like crust, the surfaces looked so new and fresh that it was not difficult to imagine that I heard the measured swell of the waves resounding in the dim caverns, and it was impossible to resist a feeling of dread that the great waters might suddenly return and claim their former sway over the deserted halls.²⁴

Blake observed much at Travertine Point, but he made no note of the petroglyphs the Cahuilla and their ancestors had chipped into the tufa. Nor did he notice the stone fish traps they had built on the basin slopes north of the point. The boulder-rimmed traps dot the hills along a narrow band of elevation. They functioned as shallow corrals into which the natives harried the mullet and humpback suckers of the prehistoric lake as its wind tides receded.²⁵

As for returning seas, Blake might better have saved his dread for the fearsome aridity of the land ahead. He and all his party soon recalled the warnings of the Cahuilla as they struggled to find passage for their wagons across the steep-banked arroyos that descended, west to east, from foothill badlands to the still unvisited bottom of the desert bowl. They clung to the belief that the spur of hills they presently faced was the last that separated them from the emigrant trail and its

guarantee of water at Carrizo Creek. Again and again the land dashed their hopes. For two days and two nights they traveled continuously, their canteens soon as empty as the landscape. They were fortunate to attempt the trek in the relative cool of November, and without winter rains turning the clay over which they traveled into glue. Nevertheless, on the second day they faltered. "The poor mules began to fail, and cried out in their peculiar, plaintive manner."

They pushed on through a hellish night, yet did not reach water. As dawn approached, they were on the point of abandoning "the wagons and all heavy articles" when they arrived at the brink of yet another daunting ravine. This time, however, a trickle of wetness snaked down the bottom: "The cry of 'Water!' arose from those who first reached it, and it was repeated with loud shouts of joy from one end of the train to the other."²⁶

The salty but life-saving waters were probably San Felipe Creek. The party rested a day in baking sun, then pressed the last twenty miles to the Carrizo and the well-used emigrant trail. From there they turned west and ascended the mountains to Warner's Ranch, where they rendezvoused with Williamson and the rest of the command. Williamson then sent Parke south to evaluate Jacumba Pass (which Parke rejected as a feasible railroad route), while he, with Blake, marched back into the valley and continued east along the wagon road to Yuma Crossing.

THE TRIP across the desert, past New River, Alamo Mocho, and the sand dunes, afforded Blake the opportunity to assemble in his mind still more of the region's geologic puzzle. Others had already suspected its character—Cooke in 1847, for instance, who theorized that the desert had once been submerged, and Heintzelman a few years later, who reached the same conclusion and with Quechan or Kamia guides rode almost to the bottom of the basin to inspect the mysterious mud volcanoes that boiled and bubbled there with infernal gases.²⁷ But it was Blake who finally joined the available fragments of information into one logical and explanatory picture. While many details have since been added to Blake's portrait of the region, its main elements remain unchanged. One may say today, as was said in 1909: "The work, though done in the briefest time and under great physical difficulties, has borne well the tests of all later investigations."²⁸

Blake, however, did not reach the right conclusions all at once. In his ride across the desert to Yuma he correctly reasoned that the desert basin had once been an arm of the Gulf of California and that the emigrant trail followed the crest of an earthen barrier that had formed across a narrow waist of the sea. He further theorized that with the barrier established, the Colorado might at times have flowed into the northern half of the divided basin, filling that section with a freshwater lake which then overflowed the barrier southward, possibly discharging along the upper channel of the New.

What Blake did not immediately divine was the cause of the barrier's formation. In a letter to the *San Francisco Commercial Advertiser* written from Yuma, he as-

cribed the development of the barrier to "submarine elevation"—the same set of forces, he said, that had raised the continents from the oceans. As for the ancient lake, he vastly overestimated its size: "Its extent and boundaries cannot be precisely determined until the maps of the region are completed, but it is probable that its area will not be less than 7,500 square miles"—an area the size of Connecticut.²⁹

Perhaps while at Fort Yuma Blake examined the various escarpments and terraces of the desert and refined his earlier conclusions. He realized that the eastern border of the ancient lake had stopped well short of the Colorado. He may also have found time to draw a volume of Lyell's *Principles* from his saddlebags and reread the section on river deltas: "Sir Charles Lyell gives a statement, made by Colonel Rawlinson, that the delta of [the Tigris and Euphrates] has advanced two miles in the last sixty years, and is supposed to have encroached about forty miles upon the Gulf of Persia in the course of the last twenty-five centuries."³⁰

With Lyell's help, he discovered the central dynamic of the basin's topographic evolution, which he subsequently explained in his report. The northern arm of the Gulf of California had formerly reached far up the Salton trough "to the base of the San Bernardino Mountains." The mouth of the Colorado River would then have been located near Fort Yuma, discharging both water and sediments under the shadow of Pilot Knob. The river's sediments, dropped from suspension, accumulated to form a delta, and "the encroachment of this delta, and its final extension to the opposite shore, was sufficient to shut off the waters of the upper end of the gulf, leaving them in the condition of a lake, connected with the river and Gulf by a narrow channel or slough."³¹ Blake named the postulated lake for the Indians whose tradition of a great water abounding in geese, ducks, and fish lent further evidence of its previous existence. "The Great Salt Lake of Utah is the residual lake of Lake Bonneville much as the Salton Sea is the residual lake of Lake Cahuilla."³²

DELTA S ARE the most inconstant of landforms. A river with an active delta may raise itself through deposition above the level of the surrounding land, building a perch that becomes increasingly precarious. In flood the river may deposit a new plug of sediment or vegetation, or rip through an old plug with new strength, so that it breaches its banks and spills on one occasion one way, and on the next, another. In such a way the Colorado may have repeatedly formed Lake Cahuilla over previous millennia and just as repeatedly abandoned it to evaporation. When the lake was full, it presented a bounty to the Cahuilla on its north shore and, presumably, to Yumians or others on the south. The most recent recession of the lake probably occurred between 1400 and 1500 A.D., only a few generations before Alarcón sailed into the mouth of the Colorado with the royal banner of Spain flapping from his mast.³³ The desiccation of the lake may have forced lake-dependent bands to compete for territory on the already occupied banks of the Colorado, which might partly account for the enduring hostility among river tribes that Alarcón and every European who followed him observed.

Spaniards bestowed the names of colors on both the Vermillion Sea and the Colorado River because of the heavy load of sediments that reddened them. Said one geographer in 1932, before Hoover Dam was built: "As a carrier of silt the Colorado is probably without a peer among the greater streams of the world."³⁴ Other researchers have estimated that the Colorado's burden of sediment approaches seventeen times that of the Mississippi and ten times that of the Nile.

And so when one gazes into the Grand Canyon and wonders where the content of such a mighty rent in the earth's crust might have gone, the answer, simply, is *downstream*. The soils of Imperial Valley, the clays beneath Salton Sea, the plain on which Mexicali sprawls, and all the salinizing fields southward, down to the mudflats at tidewater and the sea bottom off San Felipe—all these are the Grand anti-Canyon of North America. The miracle is not the quantity of material but the speed with which it accumulated. The formation of the modern Colorado and its canyons remains imperfectly understood, but the river probably did not commence its great work of erosion until about sixty-five million years ago, when the Rocky Mountains began to take their present shape. In the brief span of geological time since then, the river and its tributaries have abraded the intermountain West and deposited the sloughings in the Salton trough and the upper Gulf of California. Without dams like Hoover, Glen Canyon, and Imperial, it would continue to do so now. Instead, it deposits its million tons per day of sand and silt in lakes like Mead and Powell, thus guaranteeing their eventual obsolescence.³⁵

WHEN BLAKE wrote to the *Commercial Advertiser* from Fort Yuma, the agricultural potential of the desert was already on his mind, and he promised that he would include his observations on the subject in his official report. Chief among these was that wherever water was applied to the desert soils—as at the hot springs of the Cahuilla villages or among the ephemeral hay meadows of the New River bottoms—trees and grasses sprang forth luxuriantly. "From the preceding facts," wrote Blake, "it becomes evident that the alluvial soil of the Desert is capable of sustaining a vigorous vegetation. The only apparent reason for its sterility is the absence of water." He further mused that "by deepening the channel of New River, or cutting a canal so low that the water of the Colorado would enter at all seasons of the year, a constant supply could be furnished to the interior portions of the Desert."

Blake was neither a farmer nor a developer. When he looked at the desert, he did not think economically. He did not imagine the fortunes that might be made by selling land or raising crops. He was a scientist, not yet thirty. When he looked at the desert, he thought of questions, each of which possessed interest, including the question of whether the desert might again be inundated. Prophetically, he noted that bringing irrigation waters to the desert would not be without danger: "It is, indeed, a serious question whether a canal would not cause the overflow of a vast surface, and refill, to a certain extent, the dry valley of the Ancient Lake."³⁶

5 | LOOMINGS

In the twilight of the Ming Dynasty, soldiers under the order of General Gao Mingheng breached the dikes of the Yellow River where it snaked across the plains of Kaifeng. The general wished to drown a peasant revolt and so employed the great, soup-thick river as a weapon of war. For vast distances, the Yellow flowed on a bed that its own depositions had elevated above the surrounding landscape, with the result that it had acquired the character of an aqueduct. By cutting the dikes, General Gao allowed the river to pour out and submerge the plain, painting a sea of crops and untold corpses with a coat of silt. Alas for the Mings, the general's ruthlessness did not long preserve them. Two years later, their dynasty collapsed.¹

As General Gao loosed a flood from a perched river in 1642, so, too, did the California Development Company loose a flood in 1905 from a similarly perched stream—but not out of anger or tactical intent. In the case of the CDC, bungling, negligence, and greed sufficed to generate disaster. But nature assisted. The Colorado was then entering a period of natural restlessness, when its main channel, having moved to the eastern limit of its delta, should

begin new movement to the west. This predisposition, combined with monumental volumes of snow and rain far upstream, made the months leading up to the 1905 flood a particularly dangerous period for tinkering with the river. Indeed, from the present day back as far as the time of General Gao, the CDC could hardly have selected a worse time to demonstrate its ineptitude.²

The great flood of the Colorado Desert defied efforts to contain it for two years—from February and March 1905 until February 1907. The flood accomplished a number of things. It created the modern Salton Sea, which, while not the largest man-made lake in existence, surely qualifies as the most inadvertent. It reworked the topography of the Colorado Desert, carving canyons where only sloughs had formerly existed and wiping out the chain of shallow lakes that on occasion had nourished forty-niners and other weary travelers. Most significantly, the flood—or more accurately, *floods*—contributed mightily, and probably decisively, to redefining the respective roles of the United States government and private capital in the reclamation of arid lands.

The floods were amply foreshadowed. A summer overflow in 1849 left pools of water in the channel of the New River and saved the skin of scores of argonauts. A similar overflow in the winter of 1891 stimulated considerable curiosity about the water's source and produced, as we shall see, one of the more remarkable boating excursions in desert exploration.

In the years between these two widely noted overflows, prospectors probed the desert's slopes and canyons and scored paying strikes along the Colorado River in Mohave and Chemehuevi country, well upstream of Yuma. A regular road soon linked the mines to the coast. It descended San Gorgonio Pass and touched the northern rim of the Salton Sink before slipping north of the Chocolate Mountains and traversing the Mohave Desert to the river. Along this route traveled a steady flow of men, trade goods, and, to the everlasting misfortune of the Cahuilla, smallpox. Within a few years, stage lines began to serve the mines and forged new links southward to Yuma and the old emigrant trail, where, for a time, the coaches of the Butterfield Overland Mail Line rumbled, supported by relay stations at every waterhole.³ Stockmen, pushing their herds into every corner of the West, did not neglect the sink. In winters when grass was exhausted in the mountains, they drove their herds into the basin to graze the less and less luxuriant grasses in the sloughs of the New and the Alamo, a practice that consumed resources essential to the Kamia.⁴

In 1877 the Southern Pacific Railroad finally penetrated the low hot lands of the Colorado Desert. It pushed its tracks across the salty, sub-sea-level flats at the foot of the Chocolate Mountains. The sidings it established for watering, loading, and maintenance gave the desert a new crop of names: Glamis, Acolita, Mammoth, Flowing Well, Volcano, Frink, Durmid, and Salton, the last of which acknowledged the salt beds of remarkable purity that lay at the bottom of the sink.⁵

Industry, in the form of the New Liverpool Salt Company, soon followed the railroad to the basin. The salt that the company plowed up, sacked, and shipped out on the Southern Pacific came not from deposits of ancient oceans or residues of river floods but from saline hot springs that emptied in the basin. The evaporation of their bitter waters left behind deposits of sodium chloride more than 95 percent pure.⁶

The salt beds were less a mine than a white-fielded farm whose sterile crop renewed itself, harvest after harvest. A desert rat by the name of Arthur Burdick called it "the most remarkable harvest-field in the United States, if not the whole world."⁷ The beds lay some 265 feet below sea level, perhaps 10 feet higher than the absolute bottom of the basin. Stationary steam engines winched gang-plows back and forth across the beds to break the crust of salt. Each plow could loosen seven hundred tons of salt a day, and each was guided by one or two Cahuilla Indians. All the field hands of this salt farm were either Indian or Japanese, for, as Burdick noted, "in the summer season the temperature reaches 130 to 140 degrees at Salton, and white men are unable to endure the work." Laborers followed behind the rust-ravaged plows and raked the salt into neat cones. Their feet were likely never dry of the corrosive brine that leaked beneath the crust and, like their rough hands, must have been marvels of callus—as well as deeply cracked by sores that could not heal. The laborers loaded the salt onto wagons and then onto a tram that carried it to a drying house for grinding, sorting, and sacking. More workers ranged the sacks in boxcars for shipment to the California coast, where the salt sold for six to thirty-six dollars a ton, rated by quality. The salt beds, meanwhile, were impervious to exploitation. The mushy, caustic furrows torn by the plows soon filled again with brine and scabbed new crusts. Thus did the salty farm grow crop after crop, unbidden by its farmer and tended, as nearly all the crops of the region were destined to be, by brown hands.

IN 1891 Cahuilla laborers at the salt works spotted a sheen of water in the lowest part of the basin. The sheen grew; its edge moved closer. Without delay, the Cahuillas collected their few things and left for higher ground, "muttering statements of impending disaster."⁸ As Blake had noted, Cahuilla oral tradition included tales about the sudden and dangerous appearance of a lake in the desert. Warned by legend, the workers at the salt beds knew what to do.

From somewhere southeast of Salton that February, the passengers and crew of a Southern Pacific train beheld the same unanticipated sight. At first they believed it to be a mirage, for the refraction of light on the featureless desert often gave the impression of a flat, reflective sea. But the water they thought they saw was actual water: a lake had formed in the bottom of the basin. The train carried word of this to Yuma, where it provoked puzzlement. Floods had ravaged Yuma only days before, the result of heavy rains in Arizona that had caused collapse of the Walnut

Grove Dam, killing hundreds. The Gila River surged to a calamitously high stage and, joining with the already hefty Colorado just north of town, swamped most of Yuma. An observer, Godfrey Sykes, described the scene:

The main and only street was a muddy gully, adobe and willow-pole houses, stores and saloons were mostly heaps of ruin and the inhabitants were either grubbing about in the piles of debris in search of treasured belongings or sitting perched upon the higher heaps, considering matters. . . .

Structures of the types of which pre-diluvian Yuma consisted readily dissolve under such circumstances, and the heavy, heat-resisting earth roofs which were almost universal had merely added to the volume of the mud-heaps.⁹

Sykes had arrived in Yuma by a most roundabout route. Although he never settled in the region, in the decades ahead he proved to be a sympathetic witness to its troubles and transformation. By his own account, Sykes suffered from a rare affliction. He called it the "wanderlust bacillus," a restlessness that forced him at the age of eighteen to leave his native England in search of horizons less dreary and gray. A steamer carried him to New York in 1879, when the harbor was still a forest of sailing masts and the cables of Brooklyn Bridge had yet to be hung. By the following spring he was in the heart of Texas, living by his wits, which included extraordinary abilities as a tinker and mechanic. Years later he would supervise construction of a dome for the Lowell Observatory near Flagstaff, but in the Abilene of 1880, he was content to undertake the repair of a barrel of condemned army pistols, a labor that earned him the ownership of what he thought was indispensable equipment for the time and place—a serviceable six-gun.

Sykes's happiness grew when he was hired to replace an ailing cowpuncher in a trail crew bound with longhorns for Dodge City. The owner of the herd solemnly conferred on him the departed man's ponies and bedroll. Thus equipped, Sykes officially became a cowboy.¹⁰

Sykes rode the long trails for several years, sometimes as far north as Ogallala or Cheyenne. With irregular success he also took time for other ventures. He caught wild horses in west Kansas—or tried to. He became a mule skinner hauling freight to Fort Sill, and he prospected for gold in Indian Territory, as Oklahoma was then known. When some of the translocated tenants of that vast reservation took him prisoner, an army detachment rescued him. Somewhat later, he prematurely ended a game of pool in a Dodge City saloon by riding his horse on top of the pool table, a tactic that irritated his competitors but allowed him a rapid departure when gunfire erupted.

Sykes wandered west to San Francisco, then east to the 1884 Republican Convention in Chicago, where he hired out as a paid shouter, west again to Japan for a commission on which his autobiography does not elaborate, then to the South

China Sea, where he bummed passage on tramp steamers in the same waters where Joseph Conrad was sailing. Next he fetched up in Australia, where he found brief employment in "water development."

Eventually he returned to the small property near Flagstaff, Arizona, that had become a base for him and his brother. By dabbling in cattle and logging, they subsidized their other interests, and Sykes, still feverish with wanderlust, resolved to explore a place described to him by the master of the ship that had taken him to Japan. In earlier years the officer had served on a coastal vessel delivering freight to sternwheelers on the lower Colorado. He spoke of "uncharted dangers, strong currents, and the enormous tides that rose over the mud-flats surrounding the mouth of the Colorado," and he described "river navigation as an advanced form of lunacy well worthy of investigation by anyone as crazy as I appeared to be."¹¹

Crazy indeed. Sykes's neighbors in Flagstaff had no doubt of it as they watched him build a twenty-two-foot sailing vessel in the shadow of the San Francisco Peaks, hundreds of miles from the nearest glint of open water. Sykes completed the fitting-out of his craft and cadged free transport on an Atchison, Topeka and Santa Fe flatcar. The railroad delivered the boat to Needles, California, on the Colorado River, where it aroused such interest that the townsmen who passed for musicians broke out their instruments. To the rat-a-tat of drums and bleating of horns, the boat slid into the river.

With a friend to help with oars and sails, Sykes drifted down to saltwater at the head of the Gulf of California and there survived the springtime's tidal bore, which in the days before the Colorado was dammed sometimes generated a wave six or seven feet high that roared up the river faster than any boat could flee.¹²

Safely under sail in open water, Sykes and his partner cruised the gulf for several weeks, exploring both shores of the narrow sea, until disaster struck. They had camped some distance north of Punta San Felipe, today a Baja California beach resort and fishing village but then a deserted stretch of sand. The wind blew hard. Sykes went back to the boat to light a lantern under the shelter of the bow decking. He used a number of matches. One must have smoldered on a oily rag, for minutes after he returned to the campfire, he and his partner were startled "by a muffled explosion and red glare showing over the shoulder of our protective dune."¹³ Their store of kerosene had burst; the boat was engulfed in flame. And the powerful tide was out: no water, only mud, as far as the eye could see.

The fire utterly destroyed the boat and most of their provisions. Nor was there another human, nor wood for a raft, nor road or trail, nor even freshwater for many a mile. Nothing but sand and mud and saltwater tides. Sykes had managed to recover his tinker's tools, however, and he fashioned a pair of large canteens from some galvanized sheet metal he salvaged from the wreckage. Then he and his understandably disconsolate shipmate set out for Punta San Felipe, where they hoped to find a spring. They dined on the gristle of a very lean coyote along the way.

Resupplied with water, they reversed their path to the north and then northeast, struggling across the soft-surfaced brush-jungles of the Colorado delta.

They swam the deep water of the Río Hardy and the main-stem Colorado and waded the bayous and backwaters in between. They slogged across mudflats and through thickets. They failed to starve, thanks to a small supply of hardtack they saved from the boat and also to a fortuitous encounter with a large mullet, which they cooked over a salt-grass fire. At last they came upon a human track. It led to a camp of hunters, whose success in pursuing the delta's feral hogs allowed Sykes and friend to feast on pork and bacon. The last fifty miles to Yuma passed quickly, and there Sykes beheld the flooded wreckage of the town. While his erstwhile co-voyager elected to retire from exploration, Sykes, typically, felt the call of a new adventure.

THE APPEARANCE of a lake in the Salton Sink, within sight of the railroad, had alarmed the businessmen of Yuma perhaps even more than the flooding of their town a few days before. They feared lest the growing lake submerge the tracks and isolate Yuma from commerce. The source of the new lake was a mystery. Some said rains in the San Jacinto Mountains must have caused it. Some hypothesized the existence of subterranean rivers or other notions equally strange.¹⁴ Sounder minds postulated a connection between the new lake and the flooding Colorado, but the path of that connection was unknown. Sykes, being freshly arrived from the delta, was consulted, and he parlayed the consultation into a commission: he would drift downstream on the Colorado and find the channel to the sink. His commissioners provided him a stack of salvaged boards with which to build a skiff, and a similarly salvaged supply of tinned provisions. The canned food promised to augment the sense of mystery attending the expedition, for the flood had washed off the labels. At any meal Sykes might open a can to discover hash or apricots, or beans, beans, beans.

Sykes quickly built his boat and recruited a new and amiable companion known as "Beer-Keg Tex." The explorers shoved off from Yuma into the muddy current and spun away downstream.

They drifted a day or two, probing the right bank of the river until they found a gap through which water flowed. They turned their craft through the gap and soon found themselves in a maze of brushy channels. Mudbanks had begun to emerge as the water level fell, but the land was still awash. Sykes had planned to draft a map of their route, but he soon abandoned the task. The amphibious plain afforded no landmarks, no view longer than a stone's throw, no means to count the twists and turns of the current that bore them onward.

Eventually their course verged northward, and the vegetation that confined them thinned, then fell away entirely. They floated north through the barren gravels that had so disheartened the forty-niners. Mile by mile the water shallowed,

then gave out. Their boat grounded in a drying mudflat. Only emptiness lay between them and the distant mountains. At length, they descried a plume of smoke inching past the foot of a purple range. A locomotive, they judged, and started walking. Sykes later calculated that they abandoned their boat "a few miles northwest of the present town of Holtville." From there they trekked to the railroad siding at Volcano, a distance of thirty-five miles.¹⁵

SYKES WAS almost certainly the first to travel by water to the arid heart of the Salton Sink, but he was not the last. The Colorado topped its banks again the following summer, and H. W. Patton, a newspaper reporter representing both the *San Francisco Examiner* and the *Banning Herald*, duplicated Sykes's feat with somewhat greater fanfare—his account of the dangers he faced in the badlands through which he floated was widely published. It bears on future events to note the pattern of the floods: high water from winter rains followed by high water again in late spring and summer. The logic of such a pattern is quickly evident. Winter weather systems that pour rain on Arizona and prompt the Gila to surge also cause heavy snowfall in the southern Rockies, especially on the western slopes that feed the Colorado. Deep snowpacks produce high runoff when warm weather arrives. Augmented by spring rains, meltwater floods can reach heroic size.

It might have been wise for the developers and early settlers of the Imperial Valley to reflect on such patterns and to ponder the substantial variability of the Colorado's flows. Instead, they elevated wishful thinking to the status of knowledge, assuring themselves that the river "rises and falls with almost clock-work regularity."¹⁶ They might also have remembered that the break in the bank of the Colorado through which Patton drifted was over a mile wide and that he floated through the delta on north-flowing sloughs that converged into rivers of considerable size. The desert floods were large and anomalous enough to attract the attention of the American Geographical Society, which summarized the factual material in Patton's account:

Turning into the main channel [of the Alamo River], which is about 200 yards wide and 18 feet deep, with a current of 4 miles per hour, [Patton's party] floated along over the old overland stage route. Marks on the trees showed that the water had been 4 feet higher.

At Alamo Mocho, an old station 52 miles southwest from Yuma, there was water all over the country as far as they could see.¹⁷

Ten miles farther west, the stream they rode converged with the New River. The combined flows, according to the geographical society, made a river "300 yards wide and 14 feet deep with a current of 6 miles per hour." When they passed the site of modern Mexicali, their channel "was 200 yards wide and 7 feet deep, and the

current was very swift. After going through this break they saw 10 large streams join their channel on the west, showing that there are other breaks in that direction."

The author of the summary advised that events "will eventually turn the whole volume of the river into the desert," a dire prediction but not a new one. A similar thought had occurred to William Phipps Blake nearly forty years before.¹⁸



Fish traps. in Cahuilla territory.

10 | THE DELTA, HUNG OUT TO DRY

Even before the Great Diversion ended, the brimming new sea attracted the notice of waterfowl. Ducks, geese, coots, and cormorants flocked by thousands to the tepid lake, although the game birds soon departed, finding little vegetation on which to subsist. But minnows and other small fish must have thrived, for three species of cormorants stayed. Baird's (known today as the Pelagic), Brandt's, and the double-crested cormorant all nested at Salton Sea in 1908. (Of the three, only the double-crested is still present.) Such unusual birds as pigeon guillemots, tufted puffins, and black oystercatchers, none of which has been sighted at the sea in recent memory, were also present in 1908, as well as phalaropes, curlews, sandpipers, and great blue herons. Gulls, of course, soon found the place, but most impressive was a colony of two thousand or more white pelicans that nested on the hot, sun-varnished volcanic cones that comprised the lake's few islands.¹

These birds only duplicated the movements of their ancestors, which by the hundreds of thousands had colonized the habitats created with every recurrence of Lake Cahuilla. If the immediate cause for creation of the Salton Sea was human blunder, the birds did not care,

and if the sea's habitats have persisted since then thanks solely to irrigation runoff, the birds care still less. The Salton Sea remains a vital breeding and resting place on the Pacific flyway, a fact recognized in 1930 with the establishment of a national wildlife refuge at the south end of the sea. Since then, the Salton Sea National Wildlife Refuge has reported the presence of 384 species—the most of any national wildlife refuge in the West—and the total number of individual birds using the Salton Sea probably exceeds two million a year. It is an oasis on the western flyway as important to them as the putrid waterholes of the Colorado Desert were to thirsty gold seekers in 1849.

Unfortunately, the comparison between the Salton Sea and those contaminated wells is altogether too apt. In order to survive, Durivage risked debilitating illness to gulp down the waterholes' "tincture of bluelick, iodides of sulphur, Epsom salts, and a strong decoction of decomposed mule flesh." The avifauna of the Pacific flyway struggle with equally superlative pollution. The Salton Sea brims with high concentrations of salt and organic compounds, and in certain areas it bears levels of selenium, pesticide metabolites, and other possible toxics that warrant grave concern. In ways only partly understood, the cumulative foulness of the sea has triggered spectacular die-offs among the birds that depend on it. In 1992 and 1994, epidemics of mysterious origin claimed over 170,000 eared grebes. In 1996, avian botulism killed 20,000 birds, nearly half of them pelicans. In 1997, an outbreak of Newcastle's disease swept through a colony of nesting cormorants. All of these afflictions remain present in the Salton ecosystem and contribute to a steady toll of death even without epidemic breakouts. By the end of 1997, low levels of botulism, avian cholera, and the mysterious grebe ailment helped push the year's count of feathered bodies to 10,000. In the next year the death count had already matched that figure by the end of March.

The chronic problems of the Salton Sea derive from its closed-in, aging character, and they give every indication of growing more formidable year by year. The freshness and purity of an evaporative sump do not improve with time.

A later chapter details the sea's environmental problems. For the present, let us count the lake a blessing because it provides a place of relative rest and safety along the arduous Pacific flyway. From the moment of its creation, the importance of the sea has increased as the vitality of other such places has declined.

Our story now turns to one of those beleaguered "other" places, the one most closely linked to the Salton Sea. Of all the oases along the Pacific flyway, none was more an avian paradise, none was larger or more productive, and none harbored a greater diversity of finned, furred, and feathered creatures than the shifting, amphibious landscape of the Colorado delta. Although the obliteration of other wildlife oases may have been more complete, none in its demise has presented a greater loss. One can measure the magnitude of that loss through any number of means. Aerial photography can show the loss of wetlands. Bird censuses can attach numbers

the Glanton gang, Samuel E. Chamberlain, gives his version of events in *My Confession*. No account of this troop of psychopaths, however, can be more vivid than Cormac McCarthy's fictionalized treatment, *Blood Meridian*, certainly one of most powerfully imagined novels of the American West.

CHAPTER 4. MEMORIES OF SEAS

1. Bieber, *Southern Trails*, 272.
2. *Ibid.*
3. Gifford, *The Kamia of Imperial Valley*.
4. Job Dye, a mountain man who first crossed the Colorado Desert with Ewing Young early in 1832, claimed credit in his memoirs for naming New River (*Recollections of a Pioneer*, 67–68). In February 1849 he sailed from California, where mules were in great demand, to Mazatlán. He gathered a herd of three hundred and drove them north across Sonora to Yuma Crossing. From there he followed the emigrant trail to Monterey, arriving on August 12, but he gives no other dates and so we may only suppose that he encountered the New River some time in early or mid-July. His comments about crossing the Colorado and the Gila, however, warrant reflection. He says, "I lost 80 odd head in crossing the Jila [sic] and the Colorado," and then later adds, "On our arrival at the Colorado river we found the stream very high and difficult to cross the mules and baggage. . . . The mules . . . had to swim half a mile or more, and in crossing fourteen head were carried down the stream and lost." Dye's account seems to suggest that he crossed both the Gila and the Colorado (losing mules in each instance) and that both rivers were in flood. Indeed, since Dye came from the south, it would have made no sense for him to pass up the usual fords and cross the Gila at all unless by so doing he avoided the even more dangerous, combined waters of both rivers, downstream of their confluence. If floods on the Gila in 1849 caused the appearance of the New River, it is not surprising. A flooding Gila River also triggered the Great Diversion of 1905. As to the New, the desert stream that Dye encountered was no trickle: "That evening we traveled up the New River about ten miles, but could not find a crossing to ford the stream, so we were compelled to camp for the night. The next day I made a raft and crossed the river" (69).
5. As quoted by Robrock, *Missouri Forty-Niner*, 267.
6. Coutts also went into the ferry business at Yuma Crossing and collected customs duties from Sonorans returning from the gold fields (Forbes, *Warriors of the Colorado*, 308–309; Audubon, *Audubon's Western Journal*, 167). Audubon reported obtaining biscuits and rice at Camp Salvation from a "Col. Collins." This was probably Colonel James Collier, a newly appointed customs collector on his way to San Diego with thirty dragoons (Robrock, *Missouri Forty-Niner*, 187, 192–193, 269–270. Goetzmann, *Army Exploration*, 160–163).
7. Robrock, *Missouri Forty-Niner*, 190.
8. Abert to Francis Markoe, May 18, 1849, as quoted in William Goetzmann, *Army Exploration in the American West 1803–1963*, 209–210.
9. Goetzmann, *Army Exploration*, chapter 7, especially 262–266, 295.
10. Goetzmann theorizes that had Davis and high-ranking officers of the Topographical Engineers been less biased in favor of a route along the thirty-second parallel, its competitor

along the thirty-fifth might have marshaled support enough to win selection, thereby serving better the interests of the nation and the South. *Ibid.*, 303-304.

11. *Pacific Railroad Survey Reports*, 2A.
12. David B. Dill, Jr., "William Phipps Blake."
13. William Phipps Blake, "The Cahuilla Basin and Desert of the Colorado," 1.
14. Blake, "Geological Report," 90.
15. Blake "Cahuilla Basin," 1.
16. Blake, "Geological Report," 93.
17. Philip J. Wilke and Harry W. Lawton, "Early Observations on the Cultural Geography of the Coachella Valley," 21-24. See also Lowell John Bean and William Marvin Mason, *Diaries and Accounts of the Romero Expedition in Arizona and California, 1823-1826*.
18. Blake, "Geological Report," 95.
19. Finis C. Farr, *The History of Imperial County, California*, p. 27. Farr's history treats the settlement of Imperial Valley as a heroic conquest by estimable men and women under the most trying natural circumstances. Its section titled "Indian Occupation" (25-28), however, is a litany of deprecation. Farr's thesis, belief in which we may assume was shared among much of the white community, was that the native dwellers of the desert so lacked skill and energy that they had failed in the Darwinian struggle for survival.
20. William Phipps Blake, "Ancient Lake in the Colorado Desert," 436.
21. *Ibid.* The Mohave also had a great fondness for tattooing, especially among women. According to Kenneth M. Stewart ("Mohave," 67), the Mohave believed that tattoos helped assure an appropriate afterlife: "Regardless of a person's behavior while alive, the soul went to [the land of the dead], with only a few exceptions, such as the victims of witchcraft, and those who died without having been tattooed, who were believed to pass down a rat hole at death." Perhaps, then, it was out of kindness to Olive Oatman, a white woman held by Mohaves from 1852 until 1856, that her captors adorned her chin and lower cheeks with an array of dark ciphers. Miss Oatman's photograph after her return to white society (Stewart, "Mohave," 63), shows a dark-eyed, handsome woman in a pinched-waist gown, and the incongruous, indelible staining of her face renders it one of the most forlorn images in the history of the American West.
22. Blake, "Geological Report," 98.
23. Blake, "Ancient Lake," 436.
24. Blake, "Geological Report," 100.
25. Lowell John Bean, Sylvia Brakke Vane, and Jackson Young, *The Cahuilla Landscape*, 24, 26, 50; *Imperial Valley Press*, June 7, 1998, "Ancient fish traps, villages line shore of former Lake Cahuilla; protection sought." For more on the ancient lake and those who dwelled upon its shores, see David L. Weide, "Regional Environmental History of the Yuha Desert."
26. Blake, "Geological Report," 103.
27. Bieber, *Exploring Southwestern Trails*, 213. Early speculations about a prehistoric lake by Heintzelman and others are discussed in Wilke and Lawton, "Early Observations," 1013.
28. W. G. Mendenhall, "The Colorado Desert," 687.
29. Blake's letter to the *Commercial Advertiser* was soon reprinted in the *American Journal of Science*, 2d series, vol. 17 (1854): 435-438.
30. Blake, "The Colorado Desert," in *Pacific Railroad Survey Reports*, 237.

31. *Ibid.*, 236.
32. Blake, "Cahuilla Basin," 4.
33. Wilke and Lawton, "Early Observations," 11.
34. Fred B. Kniffen, *The Natural Landscape of the Colorado Delta*, 165; Norris Hundley, "The Politics of Reclamation: California, the Federal Government, and the Origins of the Boulder Canyon Act—A Second Look."
35. Donald L. Baars, *The Colorado Plateau*, 32-33.
36. Blake, "Colorado Desert," *Pacific Railroad Survey Reports*, 249-250.

CHAPTER 5. LOOMINGS

1. Daniel Hillel, "Lash of the Dragon." The Yellow River again served as a weapon of war in 1938, when Chiang Kai-shek breached the dikes to flood the path of an advancing Japanese army. The ensuing inundation, thought to be the worst in China's history, slowed the invaders for only three months. Its greater legacy was the death of an estimated 890,000 of Chiang's countrymen. See also Patrick E. Tyler, "China's Endless Task to Stem Centuries of Floods," *New York Times*, September 15, 1996, A-1, 6.
2. On the readiness of the Colorado to begin moving westward, see Godfrey Sykes, *The Colorado Delta*, 169ff. On the magnitude of the flood of 1905, see David Meko and Donald A. Graybill, "Tree-Ring Reconstruction of Upper Gila River Discharge."
3. Mahlon Dickerson Fairchild, "A Trip to the Colorado Mines in 1862"; Francis J. Johnston, "Stagecoach Travel through the San Gorgonio Pass"; Hubert Howe Bancroft, "Guide to the Colorado Mines."
4. Lester Reed, *Old Time Cattlemen and Other Pioneers of the Anza-Borrego Area*.
5. Passenger Department, Southern Pacific Company, "Imperial Valley, California" (1908 pamphlet).
6. Sykes, *Colorado Delta*, 110. Additional accounts of the salt works may be found in Charles F. Holder, "A Remarkable Salt Deposit," 224; Arthur J. Burdick, *The Mystic Mid-Region*, 162-171; and George Wharton James, *The Wonders of the Colorado Desert*, 324-329.
7. Burdick, *Mystic Mid-Region*, 162.
8. Wilke and Lawton, "Early Observations," 12.
9. Godfrey Sykes, *A Westerly Trend*, 224.
10. Not until the herd reached the Arkansas River did Sykes learn that the previous owner of his blankets had come down with smallpox. As Sykes later explained, neither the owner nor the foreman "thought it necessary to enquire whether I had ever had small-pox—which I had not!—but relied on the prophylactic air of the plains, and the bean-pot and corn-bread of our cook, to ward off infection. These measures had proved to be so effective, and the treatment so pleasant in this early experience of mine, that I forthwith adopted them as remedial agents and have placed great reliance upon them ever since." *A Westerly Trend*, 73.
11. *Ibid.*, 208-209.
12. Sykes, *Colorado Delta*, 49 and map, flyleaf.
13. Sykes, *Westerly Trend*, 220.
14. Cf. Cecil-Stephens, "The Colorado Desert and Its Recent Flooding," 376.
15. Sykes, *Colorado Delta*, 40. Volcano was near the location shown as Wister on some contemporary maps. Sykes gives the trip no further mention in either *The Colorado Delta*, a

superb physiographic monograph, or *A Westerly Trend*, his arch and fascinating autobiography, an overlooked western classic.

16. Farr, *History of Imperial County*, 157.
17. Cecil-Stephens, "The Colorado Desert and Its Recent Flooding," 374.
18. Blake, "Geological Report," 250.

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CHAPTER 6. NATURE REDREAMT AND REDRAWN

1. Harold Bell Wright, *The Winning of Barbara Worth*, 79.
2. Franklin Walker, *A Literary History of Southern California*, 214-217.
3. Vilma Banky played Barbara and Ronald Colman took the role of Willard Holmes, the young engineer patterned after Henry Cory, who ultimately wins Barbara's hand. Henry King directed (Donald Worster, *Rivers of Empire*, 197-198.)
4. Wright, *Barbara Worth*, 85. Near the bottom of Wright's social hierarchy are dark-skinned primitives including Mexicans, whom Wright usually presents as compliant laborers who speak childlike English and smile obsequiously—such as "dark Pablo, softly touching his guitar, representing a people still far down on the ladder of the world's upward climb" (290).
5. Farr, *History of Imperial County*, 311-313.
6. Rockwood, "The Early History of Imperial County," 103.
7. *Ibid.*, 98.
8. *Ibid.*, 98.
9. *Ibid.*, 99. Sykes, *Colorado Delta*, 110.
10. Rockwood, "Early History of Imperial County," 100.
11. *Ibid.*, 102.
12. Like Rockwood, Wozencraft drew encouragement from William Blake's researches. All he needed to launch the project, he boldly explained to the California legislature in 1859, was a grant of some sixteen hundred square miles of desert. The sale of land to settlers would generate capital for building the irrigation infrastructure, as well as compensate him for his labors.

Previously Wozencraft had served as one of the state's three Indian commissioners and negotiated a range of treaties and advocated a system of reservations encompassing almost seven and a half million acres. California's white citizens, however, begrudged assigning so much territory to the land's first inhabitants, and neither the treaties nor the reservations were ever approved. Wozencraft turned to other dispositions of land. He lobbied the legislature on behalf of the Atlantic-Pacific railroad, a task that further versed him in the rhetoric and legalities of giant land grants. Then he turned to his own proposal.

In the early days of statehood, Californians were not averse to making vast grants of land, so long as the right people benefited. In 1859 the legislature approved Wozencraft's plan for colonizing the desert and ceded him all the state's rights in the domain he sought. Wozencraft's victory, however, was not as grand as it sounds, for the state's rights were few. Nearly all the land lay in the public domain of the United States. Only Congress might give it away.

And so Oliver Wozencraft went to Washington, where timing undid him. The Civil War soon outweighed all other public business. Nevertheless, Wozencraft doggedly pressed his case with the Public Lands Committee of the House of Representatives. In May 1862, Con-

Salton Basin with unexpected and largely unwanted rain. More to the point, the weather of those wet years deposited unusually deep snowpacks in the intermountain West, and the Colorado flowed with abundance: reservoirs filled, and spillways and floodgates were obliged to open. Flows that exceeded the treaty-bound minimum surged across the international border, and Mexican farmers happily put the additional water to use in the Mexicali valley, much of which drains northward via the Alamo and New rivers. The IID and its member farmers in Imperial Valley seem also to have treated themselves to greater than usual profligacy in their use of water. As irrigation on both sides of the border increased, the level of the sea dutifully rose, leading to the damage actions and settlements.

The successful damage suits arose in response to unusual weather years. The Cahuilla's grievances, which arise entirely from normal operations, remain uncompensated. Viewed in the simplest terms, the situation suggests that the two districts may safely ignore injuries caused by their day-to-day operations, but they become liable for acts of God and El Niño.

13. Keep Decision, 1066. The total of damages given in the published decision is \$69,563,213—a few dollars less than the sum of the alleged constituent damages.

14. *Ibid.*, 1069.

15. Mary Belardo, personal communication, January 14, 1994.

16. Thomas Luebben, personal communication, March 15, 1997.

SIDE TRIP. PORT ISABEL

1. Godfrey Sykes, *A Westerly Trend*, 216-217. See also Glenton G. Sykes, "Five Walked Out! The Search for Port Isabel."

CHAPTER 10. THE DELTA, HUNG OUT TO DRY

1. Joseph Grinnell, "Birds of a Voyage on Salton Sea"; James, *Wonders*, 518.

2. Sykes, *Colorado Delta*, 87; Pattie, *Personal Narrative*, 241-242.

3. Aldo Leopold, "The Green Lagoons," in *A Sand County Almanac*; Luna B. Leopold, *Round River*, 10ff.; Curt Meine, *Aldo Leopold*, 207-209.

4. Leopold, "Green Lagoons," 142.

5. See Meine, *Aldo Leopold*, 453, on the writing of "The Green Lagoons."

6. A few outsiders, such as Godfrey Sykes, who were better acquainted than Leopold with the place and its people, knew that the mazelike twists and turns of delta waterways were hardly a mystery to the Cocopa. On one occasion, Sykes traveled an inundated delta in the company of a Cocopa guide who knew its waters even to the point of recognizing old channels by the merest show of treetops above the floodwaters (*Colorado Delta*, 55-56).

7. Kelly, *Cocopa Ethnography*; Nabhan, *Gathering the Desert*, 158.

8. U.S. Geological Survey data at <http://waterdata.usgs.gov/nwis>. See also Sykes, *Colorado Delta*, 80.

9. David Harris, "Recent Plant Invasions in the Arid and Semi-Arid Southwest of the United States," gives a figure of 723,000 acres lost to tamarisk by 1961. Tamarisk has hardly halted its spread since then, and continued dam construction has increased the availability of suitable habitat. See also Nabhan, *Gathering the Desert*. Among possible points of entry to

