OZYMANDIAS

I met a traveller from an antique land
Who said: Two vast and trunkless legs of stone
Stand in the desert . . . Near them, on the sand,
Half sunk, a shattered visage lies, whose frown,
And wrinkled lip, and sneer of cold command,
Tell that its sculptor well those passions read
Which yet survive, stamped on these lifeless things,
The hand that mocked them, and the heart that fed:
And on the pedestal these words appear:
"My name is Ozymandias, king of kings:
Look on my works, ye Mighty, and despair!"
Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare
The lone and level sands stretch far away.

PERCY BYSSHE SHELLEY

MARC REISNER

CADILLAC DESERT

The American West and Its Disappearing Water

REVISED AND UPDATED

PENGUIN BOOKS

For Konrad and Else Reisner

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CHAPTER FOUR

An American Nile (I)

Ours was the first and will doubtless be the last party of whites to visit this profitless locale.

—Lieutenant Joseph Christmas Ives, on sailing up the Colorado River to a point near the present location of Las Vegas, in 1857

The Colorado is neither the biggest nor the longest river in the American West, nor, except for certain sections described in nineteenth-century journals as "awful" or "appalling," is it the most scenic. Its impressiveness and importance have to do with other things. It is one of the siltiest rivers in the world—the virgin Colorado could carry sediment loads close to those of the much larger Mississippi—and one of the wildest. Its drop of nearly thirteen thousand feet is unequaled in North America, and its constipation-relieving rapids, before dams tamed its flash floods, could have flipped a small freighter. The Colorado's modern notoriety, however, stems not from its wild rapids and plunging canyons but from the fact that it is the most legislated, most debated, and most litigated river in the entire world. It also has more people, more industry, and a more significant economy dependent on it than any comparable river in the world. If the Colorado River suddenly stopped flowing, you would have four years of carryover capacity in the reservoirs before you had to evacuate most of southern California and Arizona and a good portion of Colorado, New Mexico, Utah, and Wyoming. The river system provides over half the water of greater Los Angeles, San Diego, and Phoenix; it grows much of America's domestic production of fresh winter vegetables; it illuminates the neon city of Las Vegas, whose annual income is one-fourth the entire gross national product of Egypt—the only other

place on earth where so many people are so helplessly dependent on one river's flow. The greater portion of the Nile, however, still manages, despite many diversions, to reach its delta at the Mediterranean Sea. The Colorado is so used up on its way to the sea that only a burbling trickle reaches its dried-up delta at the head of the Gulf of California, and then only in wet years. To some conservationists, the Colorado River is the preeminent symbol of everything mankind has done wrong—a harbinger of a squalid and deserved fate. To its preeminent impounder, the U.S. Bureau of Reclamation, it is the perfection of an ideal.

The Colorado has a significance that goes beyond mere prominence. It was on this river that the first of the world's truly great dams was built—a dam which gave engineers the confidence to dam the Columbia, the Volga, the Paraná, the Niger, the Nile, the Zambezi, and most of the world's great rivers. The dam rose up at the depths of the Depression and carried America's spirits with it. Its electricity helped produce the ships and planes that won the Second World War, and its water helped grow the food. From such illustrious and hopeful beginnings, however, the tale of human intervention in the Colorado River degenerates into a chronicle of hubris and obtuseness. Today, even though the Colorado still resembles a river only in its upper reaches and its Grand Canyon stretch—even as hydrologists amuse themselves by speculating about how many times each molecule of water has passed through pairs of kidneys—it is still unable to satisfy all the demands on it, so it is referred to as a "deficit" river, as if the river were somehow at fault for its overuse. And though there are plans to relieve the "deficit"—plans to import water from as far away as Alaska—the twenty million people in the Colorado Basin will probably find themselves facing chronic shortages, if not some kind of catastrophe, before any of these grandiose schemes is built—if, indeed, one is ever built.

One could almost say, then, that the history of the Colorado River contains a metaphor for our time. One could say that the age of great expectations was inaugurated at Hoover Dam—a fifty-year flowering of hopes when all things appeared possible. And one could say that, amid the salt-encrusted sands of the river's dried-up delta, we began to founder on the Era of Limits.

In terms of annual flow, the Colorado isn't a big river—in the United States it does not even rank among the top twenty-five—but, like a forty-pound wolverine that can drive a bear off its dinner, it is unrivaled for sheer orneriness. The virgin Colorado was tempestuous, will-

ful, headstrong. Its flow varied psychotically between a few thousand cubic feet per second and a couple of hundred thousand, sometimes within a few days. Draining a vast, barren watershed whose rains usually come in deluges, its sediment volume was phenomenal. If the river, running high, were diverted through an ocean liner with a cheesecloth strainer at one end, it would have filled the ship with mud in an afternoon. The silt would begin to settle about two hundred miles above the Gulf of California, below the last of the Grand Canyon's rapids, where the river's gradient finally moderated for good. There was so much silt that it raised the entire riverbed, foot by foot, year by year, until the Colorado slipped out of its loose confinement of low sandy bluffs and tore off in some other direction, instantly digging a new course. It developed an affection for several such channels, returning to them again and again—Bee River, New River, Alamo River, big braided washes that sat dry and expectant in the desert, waiting for the river to return. The New and Alamo channels drove into Mexico, then veered back north into the United States, a hundred-mile semiloop, and ended at the foot of the Chocolate Mountains, where the delinquent river would form a huge evanescent body of water called the Salton Sea. After a while, the New and Alamo channels would themselves silt up and the Colorado would throw itself back into its old bed and return to the Gulf of California, much to the relief of the great schools of shrimp, the clouds of waterfowl, and the thousands of cougars, jaguars, and bobcats that prowled its delta. The Salton Sea would slowly evaporate and life would return to normal, for a while. The river went on such errant flings every few dozen years—a vanishing moment in geologic time, but long enough so that the first people who tried to tame it had no idea what they were in for.

The first of these tamers was an eastern developer with a grandiose imagination, a bulldog chin, a shock of steel-wool hair, and a name suggestive of his temperament. In 1892, Charles Rockwood saw the Colorado River for the first time and became obsessed. Sitting north of it, an appendage of the vast Sonoran Desert of southern California and Arizona, were hundreds of thousands of absolutely flat acres built by its ancient delta, fertile land where you could grow crops twelve months of the year. All that stood in the way of cultivation was an annual rainfall of 2.4 inches, about the lowest in the United States. Despite the imposing nature of the task, the temptation to play God with the river and turn this brutal desert green was too much for Rockwood to resist. After traveling halfway around the world for financial support, he seduced the most famous private irrigationist of his day, George Chaffey, into joining forces with him. By 1901, Rockwood and Chaffey had cut a diversion channel, and a good portion of the river was pouring over fields in what had once been called the Valley of the Dead (in grand nineteenth-century fustian tradition, Rockwood renamed it Imperial Valley). Within eight months, there were two towns, two thousand settlers, and a hundred thousand acres ready for harvesting.

By 1904, however, the artificial channel had already silted up, and a bypass had to be cut. It silted up. Another bypass was cut; it too silted up. Finally, after much negotiation, the developers persuaded the Mexican government to let them cut still another channel below the border. Because it was meant as a temporary expedient while the original channel was cleaned out in advance of the spring floods, the Mexican channel had the flimsiest of control gates. As luck would have it, the spring floods arrived two months early. In February, a great surge of snowmelt and warm rain spilled out of the Gila River, just above the Mexican channel, and made off with the control gate. For the first time in centuries, the river was back in its phantom channel, the Alamo River, heading for its old haunt, the Salton Sink. As the surge advanced across the Imperial Valley, it cut into the loamy soil at a foot-per-second rate, forming a waterfall that marched backward toward the main channel. Even as their fields were being eaten and as their homes swam away, the valley people came out by the hundreds to see this apparition, a twenty-foot falls moving backward at a slow walk. By summer, virtually all of the Colorado River was out of its main channel, and the Salton Sink had once again become the Salton Sea.

Chaffey had had some differences with Rockwood and got out of the California Development Company a short while earlier with his reputation intact, leaving his erstwhile partner ruined. But the Southern Pacific Railroad had already invested too much money in a spur line to the valley to watch it abandoned to fate, so it took Rockwood's company into receivership and set about trying to tame the river. For the next two years, Edward H. Harriman, the railroad magnate, and the Colorado River fought nose to nose. Southern Pacific trains crawled back and forth across the valley like caterpillars, carrying rock and gravel to plug the half-mile breach. But 1905, 1906, and 1907 were some of the wettest years in the Colorado Basin's history. In 1907, the river sent a record twenty-five million acre-feet—eight quadrillion gallons—to the gulf. The floods, one following another, casually ripped Harriman's brush weirs to shreds; his miles of driven piles were uprooted and washed away. Finally, in February of 1907, after laughing away the railroad's best efforts, the river decided to lull. With mad

energy, the SP crews finally secured the breach. When the next surge came down, the weirs held, and the river, dumping silt ten times faster than the trains, began rebuilding its own confinement.

Victory or no, the Colorado River was a rampant horse in a balsa corral. The only way to control it effectively, and to give the farmers some insurance against its countervailing tendency to dry up, was to build a dam—a huge dam—to lop the peaks off the floods and provide storage during droughts. The problem with such a dam, from the point of view of the basin at large, was that California was then the only state in a position to use the water. Wyoming, Arizona, Nevada, and New Mexico were still mostly uninhabited. Colorado and Utah had a few hundred thousand people each, but they had scarcely begun to tap the Colorado River and its tributaries; most of Utah's irrigation had been developed in another basin. California, on the other hand, was gaining people like no place on earth, and most of the growth was occurring in the south. The Imperial Valley could have immediately used three or four million acre-feet of the river, the consumption of all the upper-basin states and then some. The Coachella Valley, farther north, and the Palo Verde and Yuma projects could swallow another million acre-feet. Los Angeles, growing like a gourd in the night, would soon overrun its Owens Valley supply; the next logical source of water—the *only* logical source—was the Colorado River. Under simple appropriative-rights doctrine, the water would belong to California as soon as it began to use it. If California perfected its rights in court, it would, in effect, monopolize a huge portion of the river for itself. And the *real* injustice in all of this was that California contributed nothing to the river's flow. Nearly half the runoff came from Colorado and another third from Wyoming and Utah. Arizona and New Mexico contributed very little; Nevada and California, nothing at all. California's efforts to get the dam authorized by Congress were soon beaten back. Finally, it realized that if it wanted the dam and a reliable share of the river, it would have to sit down with its neighbor states and divide it up.

The negotiation of the Colorado River Compact took place in 1922 under the guidance of Commerce Secretary Herbert Hoover at Bishop's Lodge, a swank resort outside Santa Fe, New Mexico. For the time spent debating and drafting it—about eleven months—and its reputation as a western equivalent of the Constitution, the compact didn't settle much. Using the Reclamation Service's estimated average flow of 17.5 million annual acre-feet, the delegates from the seven states divided the river arbitrarily at Lee's Ferry, Arizona—a point just below the Utah border—into two artificial basins. California, Arizona, and

Nevada were the lower basin; the other four states were the upper basin; pieces of New Mexico and Arizona were in both. Each basin was allotted 7.5 million acre-feet. How they were to divide that among themselves was their problem. Of the remainder, 1.5 million acre-feet were reserved for Mexico, and the final million acre-feet were apportioned, with extreme reluctance on the part of some, as a bonus to the lower basin, whose delegates had threatened to walk out of the negotiations if they didn't get a better deal.

The compact was signed by the delegates in November of 1922; they then took it home for ratification by the voters or legislatures of their respective states, which quickly tore it to shreds. California wouldn't ratify without a conjugal authorization of Boulder Canyon Dam and a new canal running exclusively through American territory to Imperial Valley, a demand that gave the upper basin fits. Arizona wanted to divide the lower basin's apportionment before it ratified anything. Harry Chandler, probably the most influential human being in the Southwest—he talked through his vast wealth and his newspaper—was delighted by the compact and the authorization of the dam, but he was too greedy to tolerate an All-American Canal, which would divert the river right above his 860,000 acres in Mexico, so he ended up opposing everything. George Maxwell, the head of the National Reclamation Association, should have been in favor of Boulder Dam, but out of principle he opposed anything Harry Chandler liked.

In 1928, after six years of paralysis, Congress took matters into its own hands. It authorized Boulder Dam and the All-American Canal on the condition that at least six of the seven states ratify the compact, and that California limit its annual diversion to 4.4 million acre-feet per year. That implied only 2.8 million for Arizona (Nevada got 300,000 acre-feet), which was less than it wanted. Arizona, as a result, became the one state that refused to ratify, an act of defiance that would muddle things for another thirty-five years. At the time, however, its vote wasn't needed, and the other states' ratification led forthwith to the California Limitation Act and, subsequently, to passage of the Boulder Canyon Project Act. All of this appeared to settle matters: the basin could now embark on an orgy of growth the likes of which the West had never seen. And it did settle things, temporarily at least, except for one small matter: the average annual flow of the Colorado River was nowhere near 17.5 million acre-feet.

In 1930, the American West had a population of eleven million people, about the population of New York State. Half of the people were in California, by far the most populous and modern of the western states.

When Californians traveled, however, they went mainly on dirt roads. The drive from San Francisco to Lake Tahoe, which is now done in three or four hours, was a two-day adventure or ordeal, depending on one's point of view. The city's great bridges had not yet been built. San Jose was not yet a city of thirty thousand, Silicon Valley a stronghold of orchards and roaming mountain lions. In some of the other states, the usual means of locomotion was still a horse and wagon. Electricity and telephones were unknown in most rural communities, and didn't reach the more remote ones until the 1950s. In the midst of this same depopulated, untrammeled region, however, the engineering wonder of all time was about to rise.

In Oakland, California, an egomaniacal small-time construction tycoon named Henry J. Kaiser had followed the passage of the Boulder Canyon Project Act with consuming interest. Obsessed with his niche in history, Kaiser was still enough of a realist to know that he could not begin to build such a dam alone. So he called up his friend W. A. Bechtel to ask if he was interested in making a joint bid. Dad Bechtel was a horse-drawn Fresno-scraper kind of contractor; most of his business was road paving, his most noteworthy innovation a folding toothbrush which he carried on trips. Outside of northern California, and even there, the Bechtel Corporation was all but unknown. "I don't know, Henry" was Bechtel's response when Kaiser, flushed with excitement, got him on the phone. "It sounds a little ambitious to me."

A thousand miles away in Utah, two sheep-ranching Mormon brothers named W. H. and E. O. Wattis were as captivated by the Boulder Canyon Project as Kaiser, and just as unable to undertake it themselves. The Wattises' other business, the Utah Construction Company, specialized in something as mundane as Bechtel's paving contracts: laying railroad bed. Lately, however, they had taken on a new partner, a maverick Mormon banker with Keynesian leanings who talked about deficit financing while candidate Franklin Roosevelt was still promising a balanced budget. His name was Marriner Eccles, and the reward he was about to receive for his ideological flexibility was an influential position on the Federal Reserve Board. The Wattises had also been in contact with Harry Morrison and Morris Knudsen, two engineers formerly with the Bureau of Reclamation who had gone into business together in Boise, Idaho. And they had spoken with Frank Crowe, another former Bureau engineer whose enthusiasm for Boulder Dam was as obsessive as Kaiser's. Morrison had just returned from a trip east, where he had tried to influence the financial community to back a bid on the dam. He was told by the western bankers that there wasn't a company west of the Mississippi they would trust to take on

something like this. But one thing would lead to another. Before long, the Wattises were talking with Bechtel and Kaiser, and Henry and Dad were in touch with some other firms—J. F. Shea Construction of Los Angeles, McDonald and Kahn of San Francisco, General Construction of Seattle. In February of 1931, during a meeting at the Engineers Club in San Francisco, the first of the West's supercompanies was born. There were eight firms altogether, but Kaiser couldn't resist borrowing a name from the tribunal before which the tongs, the Chinese equivalent of the Mafia families, took their grievances. At his insistence, the executives agreed to call their joint venture Six Companies, Inc. Hocking everything but their shirts, they could barely scrape together the few million dollars they would need to buy enough equipment to begin the job. When the Bureau auctioned off the job, however, it was Six Companies' amazingly low bid, in the amount of $48,890,995.50, that won. Once again, sang the Los Angeles *Times*, the West had "laughed at logic and driven [its] destiny over obstacles that rational minds deemed insuperable."

The first eighteen months of work on Boulder Canyon Dam involved the construction of a new Colorado River. Four diversion tunnels were blasted through the rock of the box canyon, two on the Nevada side and two on the Arizona side, each of them three-quarters of a mile long. Their diameter was spacious enough to accommodate a jumbo jet shorn of its wings—a capacity that was needed mainly as insurance against an errant flood of 200,000 cubic feet per second, or more. The task required the excavation of three and half million tons of rock with enough dynamite to level Toledo. On November 13, 1932, four tremendous explosions blew out the entrances and exits of the two Arizona tunnels. The dust had not yet settled when a caravan of trucks lumbered onto a trestle bridge built downstream from the tunnel entrances and began dumping rocks and earth in the river's path. Finding itself blockaded, the Colorado slowly roiled and rose in frustration; sensing an escape route, it rode off into the tunnels. In a matter of hours, the river had been lured out of a bed it had occupied since the Grand Canyon was formed.

No sooner was the Colorado flowing through the canyon walls than the crews began replacing the flimsy trestle dam with a far more substantial cofferdam; then, for good measure, they built another below. Made of earth and rock and faced with concrete, the upper cofferdam measured 450 by 750 by 96 feet. Half a century earlier, it would have been the largest dam in the world, but its usefulness was to be measured in months.

When the cofferdams were finished, the engineers turned to the next task—stripping the canyon abutments to expose fresh clean solid rock. Because the dam would rise more than seven hundred feet, there was no crane big enough to do the job; it would have to be done by hand. The four hundred men whose job it was to clean the walls were known as high-scalers. Those who persevered—seven were killed on the job—spent months hanging four or five hundred feet in the air, drilling holes in the rock, inserting dynamite, and praying they would be hauled to safety before it exploded. Because the canyon was so tight, they also had to blast out space for portions of the huge powerhouse, the intake towers, and the penstock headers. Some of the rock amphitheaters they created could have held an orchestra.

Besides the hazards of the construction work (the falling rock, the explosives, electrocution, behemoth machines); besides the hazards of off-hours (fist fights, drunken binges, social diseases from the whores who camped about); besides all this, there was the heat. The low-lying parts of the Colorado and Sonora deserts are the hottest corner of North America, and we are speaking of temperatures in open, ambient air. The Colorado's box canyon held heat like an oven with the door open about an inch. Workers sometimes sacrificed eggs to see if they would actually fry on a sun-fired rock. The first death from heat prostration occurred a few days after construction began, and so many men collapsed that some of the crews finally forced a shutdown, demanded a pay raise, and ultimately staged a strike. The strike, however, did no good. Next to Boulder City was an encampment of tents and shanties known as Ragtown, where the unemployed waited by the hundreds for someone to give up, be fired, or die. "One of the myths about the Depression," Arthur Miller, the playwright, once said, "is that it brought everyone closer together. Actually, it just made everyone more voracious." "They will work under our conditions, or they will not work at all," proclaimed W. H. Wattis. And they did, at a base pay of $4 per day.

It was in 1933 when the explosive din suddenly stopped and an eerie silence descended on Boulder Canyon. The canyon walls were finally clean, the abutments sculpted, the cofferdams in place. Nearly three years after work had begun, the dam was still a figment of the imagination. Now it was time to dig down to bedrock.

The bed of the Mississippi River is hundreds, even thousands, of feet deep in silt. The Columbia and the Missouri flow over alluvial wash as thick as Arctic glaciers. On the Colorado, however, to everyone's amazement, bedrock was struck at forty feet. A milled piece of sawtimber was found resting at the bottom of the muck, obviously of

very recent origin. Since white men had begun to settle the region, perhaps eighty years before, a huge flood had evidently washed the entire channel clean. No one seemed bothered by the certainty that all of the silt constantly being relocated along the entire 1,450-mile length of the river would be forever imprisoned behind Hoover and the other dams soon to be built.

In June of 1933, the foundation was finally ready, and the first of the wooden forms that would be used to lay concrete was being built. The concrete—sixty-six million tons of it—created one of the most vexing problems the engineers had faced, a problem peculiar to large dams. The dam's size and weight would generate superpressures and insulating mass that would both generate and retain heat. Though the dam would appear solid, it would be, in reality, a pyramid of warm pudding. Left to its own devices, Boulder Dam would require 100 years to cool down. Moreover, the cooling would be uneven, and the resultant shrinkage and warping would leave the structure fissured and cracked. After weeks of wondering what to do, the engineers finally agreed on a solution. As each form was poured, one-inch pipe would be laid through it at five-foot intervals; frigid water from a cooling plant would then be run through the pipes until convection cooling had lowered the temperature of the concrete to forty-three degrees near the base and seventy-two degrees near the crest. Since the amount of pipe required, if it had been laid out in a straight line, would have reached to Big Sur on the central California coast, this was no mean refrigeration plant. Converted to ice-making, it could have chilled a couple of million cocktails a day. Instead, it reduced a century of cooling time to something like twenty months.

When visitors were led to the canyon rim to watch Boulder Dam on the rise, there was usually a long moment of silence, a moment when the visitors groped for something appropriate to say, something that expressed proper awe and reverence for the dazzling, half-formed monstrosity they saw. The dam defied description; it defied belief. Standing on the upstream side of it, two on each flank, were the intake towers, marvelous fluted concrete columns rising 395 feet from platforms that had been blasted halfway up the canyon walls. The towers were as high as forty-story buildings, and someone who had never been to New York or Chicago or Philadelphia would never have seen a man-made stucture that high. But the crest of the dam rose nearly to the tops of the towers, and its foundation was *hundreds of feet* below their base. Its seamless curve swept across the canyon and imbedded itself in each side, a gigantic but somehow graceful intrusion. The men working on top were not even ants; they hardly qualified as fleas.

Stretching overhead, from canyon rim to canyon rim, was a thick cable on which hung suspended a sixteen-ton bucket that lowered fresh concrete into the forms. Although it was big enough to accommodate a Buick, the bucket seemed incapable of ever filling the dimensions of Hoover Dam—the name it was ultimately to acquire. But twenty-four hours per day, 220 cubic yards an hour, it did. After two years of pouring, the dam was finally topped out. On March 23, 1935, it stood 726 feet and 5 inches tall.

When the engineers surveyed what they had built, it seemed impossible to believe that anything so immense could fail to hold back the Colorado River under every conceivable circumstance. Between 1907 and 1917, however, the wettest period on record, the river had discharged nearly enough water to fill the reservoir during several years: twenty-four million acre-feet; twelve million; twenty-five and a half million; fourteen million; twenty million; nineteen million; twenty million. Hidden within the figures were big floods, periods when the river flowed at 100,000 or 200,000 cubic feet per second for weeks in a row. If such a flood happened to hit when the reservoir was full, the full force of it would have to be spilled; the penstocks leading to the power plant would never be able to handle it. But 200,000 cfs sent over the top of the dam could erode it like a seawall in a storm. The dam, therefore, required spillways on either side, and to allow for the unforeseen and the incredible they were to be built to handle 400,000 cubic feet per second—nearly twice the Columbia River's flow. The spillway troughs were excavated on the canyon sides of the intake towers and led into the vast diversion tunnels hollowed through the walls. Like everything else about the dam, they were designed curvilinear and graceful, with immense brass drum gates shaped like diamond heads. Set down in a spillway channel, the *Bismarck* would have floated clear. Some of the project engineers wistfully suggested that turbines be installed at the spillway outlets, even if they operated only during floods. With the penstocks and the outlet works both generating power, the dam, during brief periods, could have electrified the state of California.

Nothing, however, was more astonishing than the speed with which all of it was built. As the nation languished in the Depression, as plant after plant remained idle and company after company went bankrupt, Hoover Dam was being built at a breathtaking pace. The eyes of the country were fixed on it in awe. A landmark event—the completion of a spillway, the installation of the last generator—was front-page news. The initial excavations for the diversion tunnels had begun on May 16, 1931. The river was not detoured from its channel

until November, and the cofferdams were not completed until April of 1933. But two years later, all the blocks in the dam were raised to crest elevation, and a year later everything was finished: spillways, powerplant, penstocks, generators, galleries, even the commemorative plaque in the frieze alongside U.S. Highway 93, which ran across the top. The first electrical power, from what was then the largest power plant in the world, was produced in the fall of 1936. The greatest structure on earth, perhaps the most significant structure that has ever been built in the United States, had gone up in under three years.

The difference in climate between the eastern and western United States—the fact that the East generally gets enough rainfall to support agriculture, while the West generally does not—is easily the most significant distinction between those two regions. It is also obvious that there are significant distinctions within each region as well. For example, oranges grow well in central Florida; they do not in South Carolina, a few hundred miles north. The climate in Duluth, Minnesota, is quite different from that in Chicago, a mere day's drive away.

In the West, however, climatic differences far more striking than these may occur within the same state, even within the same county. In the Willamette Valley of Oregon, a farmer can raise a number of different crops without irrigation; there is usually a summer drought, but it is short, and even if he decides not to depend entirely on rainfall, a few inches of irrigation water—instead of the hundred inches used by some farmers in California and Arizona—will usually do. Two hours away, on the east side of the Cascades, rainfall drops to a third of what the Willamette Valley ordinarily receives; not only that, but the whole of eastern Oregon is much higher than the section west of the Cascades, and lacks a marine influence, so the climate is far colder as well. It can be forty above zero in Eugene and ten below zero in Bend, a two-hour drive to the east. In eastern Oregon, not only must a farmer irrigate but he is extraordinarily limited, compared to his Willamette Valley counterpart, in the types of crops he can grow.

Around Bakersfield, California, an irrigation farmer can raise the same crops that one sees growing in Libya, southern Italy, Hawaii, and Iraq: pistachios, kiwis, almonds, grapes, olives, melons, crops whose value per cultivated acre is astonishingly high. An hour's drive away, across the Tehachapi Mountains, lies the Antelope Valley, a high-desert region with a cold interior climate that can bring frost in May, and where little but alfalfa and grass can be grown. Both Bak-

ersfield and the Antelope Valley are within Kern County, whose climatic extremes are rather typical of California, and, for that matter, of many counties throughout the West. Air conditioners and furnaces in two relatively nearby towns—Phoenix and Flagstaff—may be running at the same time; one end of a county may be plagued by floods while another is plagued by drought.

The reason for all this is mainly topographic: the mountains that block weather fronts and seal off the interior from the ocean's summer cooling and winter warmth (the prevailing westerly winds of the northern hemisphere give the ocean a much wider influence in the West than in the East, reaching as far away as Idaho); the tectonic upheavals that pushed much of the interior West, even the flat mountainless sections, to elevations higher than a mile. The significance of it, from the standpoint of water development, is that it makes infinitely greater economic sense to build dams and irrigate in warmer regions than in colder ones—even if it makes infinitely greater *political* sense to do otherwise.

When John Wesley Powell explored the American West, he duly noted these bewildering extremes of climate. Powell knew that irrigation was an expensive proposition, and that a few inches of extra rainfall or a couple of thousand feet of elevation difference would mean a project that was worth developing or, on the other hand, a project that would require heavy subsidization. A farmer raising fruit or two annual crops of tomatoes in the Imperial Valley might earn ten times more per irrigated acre than a farmer raising alfalfa at six thousand feet in Colorado; yet it might cost far more to deliver water to the Colorado farmer because his water might have to be pumped uphill, out of deep river canyons, while the Imperial Valley lay near sea level below Hoover Dam. The Imperial Valley farmer could pay enough for water to allow the government to recoup its enormous investment in dams, canals, and other irrigation works; the Colorado farmer might be able to repay, at best, a dime on every dollar.

What Powell did not foresee, however, was the Colorado River Basin arbitrarily divided, with each half given an equal amount of water. To him, such a false partitioning might have seemed absurd, for it made far better sense to irrigate in the lower basin than in the upper. But he could not imagine that the blind ambition of the Bureau and the political power of the upper basin would join forces to try to pretend that a mile of elevation difference, and the staggering climatic difference such a disparity implies, did not exist.

Simply stated, the problem with most of the upper basin was that it was too high, too dry, and too cold. Land that was well suited to

irrigation in a topographic sense—meaning that a river flowed through a wide valley with good soil which lay below a natural damsite somewhere in the mountains above—often sat at altitudes above five thousand feet. Virtually the whole state of Wyoming, for example, lies at an altitude of six thousand feet or higher. Much of Colorado is over a mile high; most of Utah is over four thousand feet. In Cheyenne, Wyoming, the frost-free season is barely four months. In such a climate, one can grow only low-value crops—alfalfa, irrigated pasture, wheat—which require much acreage to produce a meager income. Not only that, but some such crops—irrigated pasture in particular—require a lot of water, up to three times more than some high-value crops: oranges, tomatoes, nuts, even lettuce.

In 1915, it made sense to build a few economically ill-advised projects in the interior West anyway, in order to reduce its abject reliance on imported food and offer some economic stability to the region. And, in fact, dozens of marginal projects were built in the Rocky Mountain and northern plains states during the first thirty years of Reclamation's reign. But it began to make less and less sense by 1945, after tens of billions of dollars had been invested in an efficient transportation system that forever ended the isolation of places like Cheyenne and helped bring them into the nation's economic mainstream. And it made even less sense by 1955, when the nation was burying itself under mountains of surplus crops—often the same crops (wheat, barley, corn) that had to be grown in the high, cold intermountain West.

What all of this meant—to the taxpayers, anyway—was that the overwhelming share of the cost of any so-called self-financing project in the upper Colorado Basin would end up being subsidized by them. The cost of the projects would be so great, the value of the crops so low, and the irrigators' ability to pay for water so pitiful that to demand that they repay the taxpayers' investment in forty years, even allowing for the exemption from interest payments, would be to lead them into certain bankruptcy. Some of the older, *better* projects had already had some of their repayment contracts sneakily extended by several decades, and there was absolutely no evidence that they could be repaid even then. But, on the other hand, to imagine Congress booting farmers off Reclamation projects because they couldn't meet their payment obligations was unthinkable. The taxpayers would have to bail them out, even if bailing them out meant a long-term bill of billions and billions of dollars.

How well the Bureau's leadership understood this is a good question—although the secret correspondence in the Bureau's files reveals

that they knew a lot more than they let on in public. (In the 1920s, Federick Newell, the former Reclamation commissioner, was already decrying the "sentimentality" of the federal irrigation program, through which, he said, money was "deftly taken from the pockets" of the taxpayers.) What is *true*, of course, does not necessarily *matter* in a political sense, and that was particularly the case in the American West, and even more so in the upper basin. By the 1950s, California was already using its full 4.4 million acre-foot entitlement to the Colorado River and planning batteries of new pumps that would allow it to suck up 700,000 acre-feet of additional flows. The Bureau, having built Hoover Dam mainly for California's benefit, was now embarking on the Central Valley Project, a project of absolutely breathtaking scope that was exclusively for California. As far as the upper basin was concerned, it was time for some equity. And equity was only the half of it. If there was surplus water in the river—water which the upper basin owned but wasn't yet able to use—and California began "borrowing" it, would that imperial-minded state deign to give it back? The imperative for the upper basin was to develop its share of the Colorado River as fast as possible, whether the projects that could be built there made sense or not. And it was the basin's unbelievably good fortune that in the 1940s, Congress would give it a money-making machine that would allow it to do so—a machine that became known as the cash register dam.

A cash register dam was to be a dam with an overriding, if not a single, purpose: to generate electricity for commercial sales. If electricity would bring in many millions of dollars in annual revenues which could be used to subsidize irrigation projects that hadn't a prayer of paying back the taxpayers' investment. The dams were an invention spawned by something the Bureau of Reclamation called river-basin "accounting," which was itself spawned by something it called river-basin "planning."

River-basin planning, at least, made a certain amount of sense. A river like the Arkansas, which rises in the Colorado Rockies and empties into the Mississippi in an utterly different time zone and topography and climate, invites competing and potentially incompatible uses. Upstream, it is valuable for irrigation; downstream, it is valuable for inland navigation. If the Bureau diverts too much water for upstream irrigation, there won't be enough water available downstream to justify the Army Corps of Engineers' efforts to turn the lower river into a freeway for barges—an obsession it has been pursuing on virtually every large river in the country. The dilemma could also work

in reverse; if the Corps got a head start on the lower sections of a river, the Bureau could find itself unable to get any upriver projects authorized. The creation of the Tennessee Valley Authority marked the first time a major river system was "viewed whole," even if the natural river virtually disappeared as a result. The TVA was regarded as such a success by the administration of Franklin Roosevelt that it began to demand, if not more quasi-dictatorial authorities like the TVA, then at least a coordinated plan of development between the Bureau and the Corps. This was river-basin "planning," and, except for the fact that no one ever spent more than a minute or two thinking about the value of a river in its natural state, it made some degree of sense.

River-basin "accounting" was a horse of a different color, though the Bureau developed a propensity to use "planning" and "accounting" interchangeably. With river-basin accounting, one could take all the revenues generated by projects in any river basin—dams, irrigation projects, navigation and recreation features—and toss them into a common "fund." The hydroelectric dams might contribute ninety-five cents of every dollar accruing to the fund, while the irrigation features might contribute only a nickel (and cost three times as much to build and operate as the dams), but it wouldn't matter; as long as revenues came in at a pace that would permit the Reclamation Act's forty-year repayment schedule to be met, the whole package could be considered economically sound. It was as if a conglomerate purchased a dozen money-losing subsidiaries while operating a highly profitable silver mine—a case of horribly bad management which, nonetheless, still leaves the company barely in the black.

Michael Robinson, the Bureau's semiofficial historian, exhibits no compunction about admitting any of this in the Bureau's authorized history, *Water for the West*:

> By the late 1930s, the high cost of projects made it increasingly difficult for Reclamation engineers to meet economic feasibility requirements. In the early 1940s, the Bureau devised the plan of considering an entire river basin as an integrated project. It enabled the agency to derive income from various revenue-producing subfeatures (notably power facilities) to fund other works not economically feasible under Reclamation law.
>
> Thus, by offsetting construction and development costs against pooled revenues the Bureau was able to demonstrate the economic feasibility for the entire, pooled program. In 1942 this method was used for the first time in planning a basinwide development program for the Bighorn River in Wyoming. All

> benefits and income from producing units were lumped together to establish overall feasibility. In 1944, the Bureau's "Sloan Plan" for the development of the Missouri River followed the same formula . . . [and] encouraged the Bureau to *enthusiastically prepare basinwide plans for several western rivers*. . . . [Emphasis added]

"Enthusiastically" is a bit of an understatement. The beauty of river-basin "accounting," from the Bureau's point of view, was that it would be literally *forced* to build dams. The engineering mentality which, Robinson himself admits, came to dominate the Bureau's thinking in the 1930s and 1940s created an institutional distaste for irrigation projects. They were a necessary nuisance that provided the rationale for what Bureau men really loved to do: build majestic dams. In the past, however, the infeasibility of many projects put a damper on their ambitions, because if a project didn't make economic sense, they lost the rationale they needed to build a dam to store water. With river-basin accounting, the equation was stood on its head: a lot of bad projects—economically infeasible ones—created a rationale for building *more*, not fewer, dams. The dams—all with hydroelectric features, of course—would be required to compensate for the financial losses of the irrigation projects; the losses would miraculously vanish in the common pool of revenues.

River-basin "accounting," then, was a perversion of a sensible idea—that idea being to plan the "orderly" (a favorite Bureau word) development of a river basin from headwaters to mouth. But even if it subverted logic, economics, and simple common sense, it was essential to the Bureau's survival as an institution and to the continued expansion of irrigation in the high, arid West. On the other hand, it was something akin to a blanket death sentence for the free-flowing rivers in sixteen states.

What the upper basin of the Colorado lacked, because of its elevation, in feasible irrigation projects it more than made up—for the same reason—in sites for cash register dams. High and mountainous, geologically young, the basin had deep valleys and tight plunging gorges ideal for dams—gorges in which ran rivers that fed the main Colorado and could be included, under the bizarre new logic of river-basin accounting, in any grand basinwide scheme. The rivers, draining arid and semiarid regions, may not have held much runoff, but a very high dam on a small river can yield as much hydroelectricity as a low dam on a much larger one; that is the beauty of what dam engineers call hydrologic head: velocity of falling water does the work of volume,

of mass. There was Glen Canyon on the main-stem Colorado, Powell's favorite riverine haunt, an ideal site for a six-hundred-foot dam. There was Flaming Gorge on the Green, and Red Canyon—each a perfect site for a gigantic curved-arch, thin-wall dam approaching Hoover in size. There was the Black Canyon of the Gunnison, an almost sheer thousand-foot gorge with several sites for high dams. The Dolores, the Yampa, the White, even smaller streams like the Animas and San Miguel and Little Snake—each had at least one site for a cash register dam. Since the dams would have to be large compared to the meager river flows, they would be expensive to build. But that wouldn't matter; the Bureau had the Treasury at its disposal.

All the upper basin needed, then, was Congressional clout—that, and a Reclamation Commissioner who believed in dams for dams' sake. And it was the upper basin's further good fortune that, near the end of his third term, Franklin Roosevelt would appoint such a man as his Commissioner of Reclamation. His name was Michael Straus.

Mike Straus was the unlikeliest commissioner the Bureau ever had. For one thing, he was an easterner; for another, he was a newspaperman. On top of that, he was rich. By temperament, Straus was an exact opposite of the slide-rule engineers who had guided the Bureau during its forty-odd years. He was an anomaly down to his very genes. Straus had married into the Dodge family, and his brother-in-law was Eliot Porter; he had wealth and social connections, too. While typical Bureau of Reclamation families spent their vacations on houseboats cruising the reservoirs that Daddy built, Straus went to the family retreat at Spruce Head Island, on Maine's Penobscot Bay. It was their island—all of it. Straus could have spent his life clipping coupons, safari hunting, or writing the hyperventilating prose that was his second love. But there was nothing on earth that gave Mike Straus quite as much boyish, exuberant satisfaction as erecting dams. In eight years as Commissioner of Reclamation, he would become responsible for as many water projects as any person who ever lived.

Straus had been selected at the close of the war by Harold Ickes, himself a newspaperman, after the Roosevelt administration had endured twelve years of relatively plodding Bureau leadership under Elwood Mead, Harry Bashore, and John Page. Straus was Ickes's alter ego—a newspaperman, a liberal, a fighter, a curmudgeon. Franklin Roosevelt, who equated wealth with energy and idealism, heartily endorsed the appointment. It was a brilliant stroke. For all his man-of-the-people reputation, FDR felt paranoia about the common man. His secret fear was that the Depression would begin anew after the war, and the returning veterans would be unable to find jobs; ulti-

mately, they might revolt. In the Bureau of Reclamation, FDR had a vast job-creating engine, an agency that remade the western landscape into a place where the dispossessed could go. In Mike Straus, he had a commissioner who would stoke the engine until the rivets began to pop.

Like a lot of people who inherit or marry wealth, Straus viewed money abstractly. A million was a number, budgets were a nuisance, feasibility reports were a waste of time. And, having abandoned a career that asked for a constant objective adherence to facts, he soon acquired an easygoing way with the truth. "Facts," said one of his successors as commissioner, Floyd Dominy, "didn't mean a goddamned thing to him."

Straus was a spectacle. He was shambling, big as a bear, a terrible dresser, and a slob. "The characteristic Mike Straus pose," remembered Dominy, "was for him to plant his feet on his desk, almost in your face, and lean back in his swivel chair flipping cigarette ashes all over his shirt. At the end of the day, there was a little mound of ash behind his seat. He was an uncouth bastard! He carried one white shirt with him on trips. I remember one night when Reclamation was throwing a party, and a cub reporter came by and asked me where to find Mike Straus. I just said, 'Go upstairs and look for the guy who reminds you of an unmade bed.'"

There was something else about Mike Straus: his arrogance. Once, in the very early 1950s, he got on a plane without reconfirming his reservation, which one was required to do in those days. The plane turned out to be overbooked, and since Straus had not reconfirmed, he was the one who was supposed to be bumped. The flight attendants invited him off the plane, but Straus refused to budge; he pretended not to hear. As a whole plane full of passengers cursed him under their breaths, Mike Straus sat there like a pig in goo. Finally, the captain had to ask for volunteers to bump themselves so that the plane could take off. There weren't a lot of flights in the early 1950s, and the passengers would have to wait a long time for another one. But Straus appeared unmoved; he wasn't even embarrassed. "It didn't faze Mike a bit," said a Reclamation man who was with him. "He thought he was performing the greatest work in the country, and he felt like the holiest bureaucrat in the land."

Cavalier, arrogant, mendacious, and whatever else he was, Mike Straus was also an idealist. A good stalwart liberal in the New Deal tradition, he believed in bringing the fruits of technology to the common man. He bore a ferocious grudge against the private utilities of the West, who denied reasonably priced power (or power at all) to

rural areas struggling against adversity on every side, and who bought space in magazines and (he was convinced) bribed reporters to rail against the Bureau's public-power dams. Straus also made some tentative efforts to crack down on the big California growers who were setting up dummy corporations and trusts in order to farm tens of thousands of acres illegally with subsidized Bureau of Reclamation water. In so doing, he infuriated the growers' and the utilities' friends in Congress, and a group of them finally decided to get rid of him. Since Straus served at the President's whim and had Harry Truman's blessing, it was useless to demand he be fired, so the politicians tried another tack. In 1949, they pinned an obscure rider onto the public-works appropriations bill that specifically withheld the salaries of Michael Straus and his regional director in California, Richard Boke. The independently wealthy Straus remained as commissioner—without pay. His enemies were upset, and that is putting it mildly. "Straus made them so mad I thought they might put out a contract on his life," says Floyd Dominy. "I have done what no good Republican has been able to do," Straus wrote to his friend Bill Warne, a former assistant commissioner then in Iran, "and that is to unite the Republican party on at least one platform and provide them with one program—to wit, who can fire Straus first."

However, as the big growers in California and the private western utilities were trying to get rid of Mike Straus, the upper basin was cultivating him just as assiduously. The population of the basin had grown substantially since the Colorado River Compact was signed, but the growth of irrigated agriculture had remained well behind. Most irrigation was by simple diversion, without benefit of reservoir storage. During droughts, the farmers were flirting with disaster; during floods, they watched millions of acre-feet escape to the lower basin unused. The farmers on the other side of the Front Range, on the perfectly flat expanse of the plains, had topography working for them; they could easily lead a diversion channel out of a river such as the Platte, fill a small offstream basin, and have a ready-made storage reservoir for a fraction of the cost of an on-stream dam. The West Slope farmers—those sitting in the Colorado River drainage—were at a terrific natural disadvantage, having no way to store their water and (in the case of some) being at a higher elevation besides. Meanwhile, California was now using up its entire entitlement and still growing by leaps and bounds. If the upper basin didn't hurry and begin using its own entitlement, California seemed certain to try to "borrow" it; if it succeeded, and millions of people then depended on that water, how would the upper basin ever get it back? But how, on the other hand,

were Colorado, Utah, and Wyoming ever to use their share of the river if they couldn't afford to build dams themselves and if high-altitude Reclamation projects could never pay themselves back?

The answer, frantically conceived by Mike Straus's Bureau during the last days of his reign—much of it was laid out in the weeks after Eisenhower, who was certain to fire Straus, was already President-elect—was the Colorado River Storage Project. Behind the innocuous name was something as big as the universe itself. In a press release that accompanied the legislation's transmittal to Congress in early 1953—days before Ike's inauguration—Straus described it rather modestly as "a series of ten dams having a storage capacity of 48.5 million acre-feet." What he failed to mention was that 48.5 million acre-feet was more than all the existing reservoirs on the main-stem Colorado and all the tributaries could hold—more than the combined capacity of Lake Havasu, Theodore Roosevelt Lake, Apache Lake, Bartlett Reservoir, San Carlos Reservoir, Painted Rock Reservoir, plus the then largest reservoir on earth, Lake Mead. The ten dams would, according to Straus, capture "several times the total annual flow of the river." In fact, with the lower basin reservoirs already holding close to forty million acre-feet, between *five* and *eight* times the long-term annual flow of the river would be captured, depending on whose estimate you believed—a storage-to-yield ratio that was not approached by any other river in the world, no matter how used. The annual evaporation from all these huge, exposed bodies of water, languishing under the desert sun, would itself exceed the storage capacity of all but a few reservoirs in the nation.

It wasn't, however, the mere magnitude of the project that set it apart. What set it apart was the way irrigation and power production were linked. The earliest projects were designed exclusively as irrigation projects; if any power was incidentally generated, it was sold to project farmers at bargain rates. With Hoover Dam, the Bureau took a big plunge into public power; nearly two-thirds of its hydroelectricity went to light Los Angeles. However, when Angelenos paid their power bills, they weren't subsidizing the farmers in the Imperial and Coachella valleys who were irrigating with Lake Mead water; they were merely paying back the cost of the dam.

The Colorado River Storage Project would be utterly and fatefully different. Anyone who bought electricity at market rates from the dams—and 1,622,000 kilowatts, an enormous amount at that time, was planned—would be subsidizing irrigation in the upper basin. *Eighty-five cents* of every dollar spent on irrigation features would be subsidized by power revenues. Every time they flicked a switch, electricity consumers in the region would be helping a farmer plant alfalfa at six thousand feet to feed a national surplus of beef.

The Bureau was strikingly candid about the dismal economics of irrigation in the upper basin. "The [upper basin] farmers can't pay a dime, not one dime," lamented the Bureau's chief of hydrology, C. B. Jacobsen, to a Congressional committee. And as if to demonstrate how far Congress had come in accepting the subsidization of an entire region, Jacobsen's words fell on sympathetic ears. Western members, even those whose districts were well outside the basin, lined up to support the bill—perhaps because they expected their own uneconomical projects to be supported in return. For the first time, a majority of eastern members seemed indifferent, neutral, or even sympathetic—perhaps because *they* had Corps of Engineers projects they wanted built which might require the western members' support. Even the Eisenhower administration decided to give the Colorado River Storage Project lukewarm support, though it violated every conservative principle Ike had ever espoused.

The most effective opposition, by far, came from Paul Douglas, the urbane Senator from Illinois, who, ironically, had played a pivotal role in the creation of the New Deal. When World War II broke out, Douglas was fifty years old, a former economics professor at the University of Chicago who had become a reform-minded Chicago alderman. He promptly enlisted in the Marines, talked himself out of a desk job, and got to the front lines of the Pacific theater. He was gravely wounded at Peleliu and again at Okinawa, and was lucky to return alive. Elected to the Senate after the war, Douglas brought all of his determination and iconoclastic, brilliant thinking to Washington with him. He was—perhaps because of his economics background—the first architect of the New Deal who seemed to sense that something had gone drastically wrong. And the worst perversion of the New Deal ideas that *he*, at least, had in mind was the Reclamation program, subsidizing high-altitude desert farmers so they could grow the same crops some of Douglas's farmer constituents were being paid *not* to grow—so serious had America's crop-surplus problem become now that Europe was back in production again.

In a series of memorable debates on the Senate floor, Douglas, tall, athletic, and white-haired, went after the Colorado River Storage Project hammer and tongs. At Glen Canyon Dam, he told his colleagues, the cost of hydroelectricity per kilowatt would be $463; at Echo Park Dam, it was over $600; at Central Utah, it was $765; at Flaming Gorge, it was more than $700. "Let us compare that cost with the average cost in the Tennessee Valley of $166 per kilowatt of capacity. At Bonne-

ville, the average cost was only $115. At Hoover, the cost was only $112. At Grand Coulee, the cost was only $90. . . . [I]t is extraordinary that an administration which has declared public power to be creeping socialism, which has put the lid on additional dams on the Columbia, should go up into the mountains of Colorado and there locate public power projects where the cost will be three, four, or five times what they would be at these other locations. . . . I am not saying that the administration wishes to have this project fail. But I will say that if the administration had wished to discredit the public power system, it could not have proceeded in any better fashion than it has done in this instance." And he couldn't help noticing, said Douglas sarcastically, that certain Senators who opposed public power in the Tennessee Valley and the Columbia Basin had suddenly emerged as great champions of public power when it was to come from cash register dams in the mountains of Colorado.

The power features, however, were, as Douglas knew, not the worst aspect of the storage project, but the best. The worst, by far, was the irrigation. "The original projects," he lectured his colleagues, "tended to be at low altitudes and in fertile soil, and to involve low costs. . . . Now we are being asked to irrigate land in the uplands, at altitudes between five thousand and seven thousand feet, where the growing season is short and the chief products will be hay, corn, livestock, and alfalfa. . . . There exists an interesting tendency for Senators in those States to congregate on the Committee on Interior and Insular Affairs and the Committee on Appropriations, which consider irrigation and reclamation bills. There is a sort of affinity, just as sugar draws flies." For the benefit of his colleagues and the Bureau, whose economists had labored mightily to put the CRSP in the best possible light, Douglas had sat down and figured out the per-acre costs of the various projects himself. The Silt River Project in Colorado, for example, would cost $674 per acre; the Paonia project, $873 per acre; the Central Utah Project, the most expensive of the lot, $1,757. If one calculated interest, Paonia would go up to $2,135 per acre, Central Utah to $3,953 per acre. These were the mid-1950s, when land prices in the West were still dirt-cheap. Most of the land whose conversion to irrigation would cost thousands of dollars an acre was not worth more than $50 per acre, and that, in many cases, was being generous. "In my state of Illinois," Douglas pointed out, "the price of the most fertile natural land in the world is now between $600 and $700 per acre. In the largest project of all, the Central Utah Project, the cost would be nearly $4,000 an acre—six times the cost of the most fertile land in the world."

If an investment of $2,000 an acre could create reclaimed land worth $2,000 an acre, that would be one thing. But even after being supplied with irrigation water, the upper-basin lands would be worth nowhere near that. "What is to be grown on the land?" asked Douglas. "Of the sixteen projects reported, eight of them were stated as being suitable for livestock only, through the raising of alfalfa and pasture. Seven were stated as being primarily for livestock, but with some fruit and vegetable production . . . 95 percent of the projects contemplate the production of alfalfa or grain or are directly or indirectly for the feeding of cattle. As a consequence, this land, *after irrigation*, will not be worth very much, probably not more than from $100 to $150 per acre—$150 per acre at the outside. Yet we are being asked to make an average expenditure of $2,000 an acre on land which, when the projects are finished, will sell for only $150 per acre."

Douglas's western colleagues, of course, had no answer to this; his math was correct, his reasoning impeccable. All they could do was stand the rhetoric of their nineteenth-century predecessors on its head; instead of praising the fertile soil and glorious climate of the West, they talked about how miserable and uninhabitable their home states were. "The Senator from Illinois has correctly stated that we have little rain," said Joseph O'Mahoney of Wyoming. "I say to him, 'Pity us. Let us store the rainwater which for thousands of years has been rolling down the Colorado River without use. Please have some pity on the area, which is the arid land area of the country. It wants to conserve the great natural supply of water which the Almighty placed there, for man to use, if he has the intelligence and the courage to use it.' "

All of Paul Douglas's eloquence and logic, as it turned out, were a poor match for appeals such as O'Mahoney's and the growing Congressional power of the arid West. O'Mahoney and Clinton Anderson of New Mexico, representing Colorado Basin states, were powerhouses on the Senate Interior Committee; Carl Hayden of Arizona ruled Appropriations; Wayne Aspinall of western Colorado was the ascendant power at the House Interior Committee. The Colorado River Storage Project also enjoyed overwhelming public support, not just among the western farmers, but among their city brethren, too; conservatives, liberals, Democrats, Republicans—ideology meant nothing where water was concerned. The only serious public opposition came from southern California (which was expected) and from conservationists, who were horrified at the prospect of watching three of the most magnificent river canyons in the West filled by giant, drawn-down reservoirs: Glen Canyon on the main Colorado and Flaming Gorge and Echo

Park on the Green. Each of these reservoirs would be as long as smaller eastern states; Glen Canyon would stretch back for nearly two hundred miles behind the dam, not even counting tentacles of water that would reach up side canyons and tributary streams. But in those days conservationists didn't count for much. The Sierra Club had just one full-time person, whose name was David Brower, on its paid staff.

The outcome was foreordained. California had gotten Hoover Dam, Parker Dam, Davis Dam, the Imperial and Coachella projects, and water and power for Los Angeles. Now the upper basin would get its share. After minimal debate on the floor, the CRSP bill passed both Houses and was signed into law by Eisenhower in April of 1956. The estimated cost of everything was around $1.6 billion, but it would, of course, be substantially more. Never in U.S. history had so little economic development been proposed at such an exorbitant public cost, for all the billions were buying, besides extremely expensive public power, were a few patches of new irrigated lands whose composite size was smaller than Rhode Island. The subsidies, it turned out later, would be worth as much as $2 million per farm, perhaps five times as much as the farms themselves were worth. But even if the Colorado River Storage Project seemed like utter folly, the Bureau of Reclamation and its sometime collaborator and arch-rival, the Army Corps of Engineers, were on a tear.