

## *Assembling California*

Bloody Basin Road. Moores was hearing it now, as he always had when crossing this particular stretch of country, although he had not been there in twenty years. In early slanting light, fields of prickly pears flashed like silver dollars.

We went through a one-house town. On the seat between us was an Exxon map of Arizona. "That was Cordes," I said. "Why is that place called Cordes?"

Moores said, "Because that was Bill Cordes' house."

The dust behind us thickened. We were now on the old Black Canyon Highway. When Moores was teen-aged, this unpaved and bridgeless thoroughfare lined with mesquite, cat's-claw, and paloverde was the main route from Prescott to Phoenix. We passed five buzzards eating a rabbit. While distance compiled, the mountains continued their retreat. After leaving Black Canyon Highway, we threw even more dust on saguaro cactus, agave, cholla, and ocotillo. We went through Cleator, a town that somehow managed to seem smaller than Cordes. There was a gas pump dating from the twenties which seemed to have died in the thirties. Beside it—in the open air—was a radio that had last heard the Blue Network. If you squinted hard enough into the cactus, you could see Dorothea Lange changing film. After more long miles, we began to climb, and now—in direct proportion to the gradient—the route evolved from an ordinary unpaved right-of-way into one of the oddest and certainly one of the costliest dirt roads in America. Its humble surface passed through roadcuts of exceptional engi-

[ 157 ]

**I**t was in Macedonia that I asked Moores how he felt about being in a profession that had identified the olivine that people would be ripping the mountainsides to take away, and he said, "Schizophrenic. I grew up in a mining family. . . . Now I am a member of the Sierra Club."

If you ask someone in Arizona where Crown King is, the usual answer is a shrug. Someone going home to Crown King would turn off the Flagstaff-Phoenix highway, raise a plume of dust on Bloody Basin Road, and go west-southwest toward mountains. The elevation of the basin is thirty-five hundred feet. The ridgeline ahead is seven thousand feet, and while you lurch and rattle toward it—as Moores and I did recently in a rented pickup equipped absurdly with cruise control—a good deal of time goes by but the mountains seem no closer. Moores said he remembered his father whistling a Schubert serenade on

[ 156 ]

neering. It went through narrow defiles past vertical walls of competent granite blasted by construction crews in the century before. A railroad had once climbed three thousand feet there, its purpose being to help dismantle the mountains themselves, to ease down from Crown King in gondolas inexhaustible ores of hard-rock gold. "This railroad was an incredible feat of engineering, resulting in futility," Moores said. "The ore just wasn't there. Mine promoters are a breed apart. Their mentality is 'Of course it's there.' When I was ten, I heard a promoter say, 'We have a thousand tons of ore blocked out. When we get going, we're going to process a hundred tons a day.' He didn't stop to calculate that a hundred per cent of his ore would be gone in ten days. Mine promoters will believe anything, and so will their backers. The money came from New York, principally. The promoters were always looking for people with more money than smarts."

A voice said, "They looked in the right place."

Some of the deep cuts in the granite were cul-de-sacs, and the dirt road turned sharply before them. Trains had entered them, and then backed up across a switch and on toward the higher ground. Some cuts were low-sided, like the sunken lanes of England. In the course of the climb, the chaparral of the Sonoran Desert gave way to forest of ponderosa pine. The chaparral ran highest up south-facing slopes. We bypassed a tunnel, its ends now mostly caved in. When Moores and his three sisters were children, their grandfather convinced them that the tunnel was the home of a

monster known as the Geehan. Long before they were born—after the mining scheme failed and the rails were removed—the Geehan moved in.

Crown King was at six thousand feet, in a sub-summit swale—a few dozen buildings, spread through a mile of forest. When the air was still, the people could hear vehicles far down the switchbacks, climbing. They could tell from the rattles who was approaching. In the Crown King that Moores returned to now, not a great deal had changed. The same old welcome sign stood on the outskirts:

THE FIRE DANGER TODAY IS  
EXTREME

The main street was a rocky swath of white granitic dust. Two pickups were parked by a retaining wall below the veranda of the general store. An apple tree thirty feet high grew out of the veranda. In a window, a red neon ring circled the word "Lite" under the painted words "U.S. Post Office." There was an old anonymous gas pump, still dispensing gas. It served the mountain. A white pole beside it flew the American flag.

Roads threading the declivities above Crown King led to various mines—gold mines, mainly, and silver and zinc—one of which served as the town well. The air and the forest were so dry, the community so high, that a ready source of water was beyond imagining. Yet water emerged from fissures at the Philadelphia Mine. In these exceptionally arid mountains,

monsoonal rains arrive in August. Moores remembered an August day when four and a half inches fell in a single hour.

Crown King now had four telephone lines, four parties on each line. In the nineteen-forties, when Moores was growing up, there was one line. When you turned the crank of one of the four phones in town, three other people picked up phones to hear your outgoing call. I asked him what else especially came back to him about those years. He said, "The smell of warm pine needles and the sound of the wind."

Under the ponderosas, on the dry needles, were granitic boulders. Playing hide-and-seek, he had hidden behind the boulders. When he and his friends played baseball, the bases were rocks. One year, there were six students in the Crown King school—grades 1 through 8. Usually, there were ten or fifteen. Moores climbed half a mile from home to school, sometimes in fairly deep snow. We went up there now, and found that a room was being added to the building, and thus it would become a two-room school. Academic privies had served when Moores was a child. They had been replaced by indoor plumbing. The wood stove was gone. In the ceiling, the chimney hole was covered with a board. The old classroom was otherwise the same, with its tongue-and-groove walls of horizontal boards, its long span of lead pipe supporting a curtain so that one end of the room could serve as a stage. There was a personal computer on the teacher's desk.

The Lombard piano was an upright that Moores remembered. Playing a few bars on it, he found it "more or less in tune."

When Moores was a child, there was a piano in Crown King that belonged to his grandmother Annie Moores. She was from San Francisco, where, as a girl, she had routinely gone to the opera and returned home to play the scores from memory. After her husband became a miner and they began a life of moving from one remote mine to the next, her piano went with her.

It helped that he owned trucks. From the railroad at Flagstaff to the Colorado River he had trucked the steel of the Navajo Bridge. His name was Eldridge Moores, and he was primarily a small-scale pick-and-shovel all-around hard-rock miner whose body temperature became progressively higher in the presence of lead, zinc, copper, silver, and gold. In the middle nineteen-thirties, he was mining copper in the Verde River drainage when he decided to pick up the piano and haul it to Crown King. His son, Eldridge Moores, father of Eldridge Moores, worked for his father, Eldridge Moores. His son's wife, Geneva Moores, had a piano as well, and the two families in concert, in two Ford trucks, doremfasoled up the mountain.

Eldridge III—the future tectonicist, ophiolite-ogist, structural geologist, editor of *Geology*—was born in 1938. One of his earliest memories is of his father and grandfather saying that no one seriously engaged in mining would seek or follow the advice of

a geologist. They said it often. Typically, Eldridge's father would say, "Huh—geologists. They think they can see through solid rock."

Five miles from Crown King and a thousand feet higher, Eldridge's grandfather tunneled into solid rock. The family's Gladiator Mine was just below the ridgeline of the mountains—a ten-man operation that grossed about a million dollars in ten years. Gladiator was a gold mine with enough lead and zinc to be declared a strategic industry in the Second World War, so it was not shut down, as most gold mines were. The shafts and adits (tunnels) went into the mountain several hundred feet to the stopes—chambers with five-foot ceilings, angled with the gold vein at sixty degrees. They loosened the ore with pneumatic drills, and took out fifty thousand tons, getting half an ounce of gold per ton.

The main shaft was now covered with chicken wire and surrounded by rusting debris—a contusion in the mountain a century old. "You rely on the competence of the rock to keep the chambers open," Moores said. "You play it by ear. You develop a sense of what the good ore looks like. If it had a lot of flashing sulphides, it was ore." The sulphides were galena (lead) and sphalerite (zinc). "The lead and the zinc betrayed the gold. They were only two or three per cent of the rock, but they were the clue."

Soon after the war, Eldridge's grandfather moved on to something else, and his father, having found a place below the summit where the gold vein outcropped, started a new adit there. The mine was called

War Eagle. Modestly, it would support his family, with three hundred ounces a year. He went at it first with a pick and shovel, then with a hand-driven bull prick, and finally with a pneumatic drill, as the rock, ever farther from weather, became fresher and harder. In ten minutes, he could shovel a ton of rock, enough to fill an ore cart. "It was backbreaking work," Moores said. "But my father had a tough back." When we looked into the small, cavellike mouth of War Eagle, Moores said, "There's the vein. That little fault zone—that's what it is. I was here when he started the mine. The rusty streak in the rock marks the vein he was following. These old miners had a very good sense of where things would be in rocks. They would look at an outcrop, see a streak of iron oxide, and say, 'Ah, yes, this must be the vein.' They ranked geologists with garbagemen and dogcatchers. Most of the geologists they met were starving third-rate consulting geologists who came into small-mining areas looking for money. The tectonic and chemical models weren't in place yet, so the understanding of ore deposits wasn't very good. The miners had an intuitive feel for where things would be that was probably better than what a geologist coming in cold could give them. My dad sure thought that geologists were a worthless bunch, basically—people who came into the country to write reports for mining companies telling them what they wanted to hear."

Helping at War Eagle, Moores as a boy shoved the hand-propelled ore carts from the working face to the ore bin, outside the mine. He emptied the carts

on the grizzly, an inclined steel grid. The smaller stuff fell through, into the bin. (Ore-vein rock, generally weaker than the rock around it, tended to break into small pieces.) The larger chunks rolled onto a steel platform. By hand, he sorted them, choosing what he thought was good ore, and heaving rejects aside. From the ore bin, the rock went down chutes into trucks. After the war, his father had acquired an International ten-wheeler with six-wheel drive, capable of hauling twelve tons. When Moores was learning to drive, his version of the family sedan with the automatic shift in the supermarket parking lot on Sunday morning was an International ten-wheeler between Crown King and the summit. The mine's driveway, five miles long, had been engineered and was maintained by his father. Not the least of its features was a railless plunge on the outboard side. As we inched along it in the cruise-control pickup, Moores said, "This was my first driving experience, this road. In that International, I was one scared little teen-ager." As he practiced, he dragged a road grader behind the truck. His father was back there, working the grader.

Sometimes he rode with his father to Phoenix in the big truck, on a dirt road flanked by desert, first encountering pavement in country that is now city, seven miles north of the state capital. The hot truck stank of transmission oil. When the truck quit, they revived it. Sometimes they would be stranded for hours by a flash flood.

The family lived for some years in the most imposing house in Crown King, which they rented for

twenty-five dollars a month. It is squarish, board-and-batten, on a rocky platform behind a retaining wall. A refrigerator reposed on the front porch. Moores called that "an emblem of rural Arizona." When he was nine, his family bought another board-and-batten house, with a yard of dry needles and granite boulders. It was light blue now, with white trim and a tin roof, and suggested, in its setting, the quarters of a forest ranger. There were two bedrooms and three daughters, so his father brought a shack from the mine and set it on a poured slab, six feet by nine, and that was his son's freestanding bedroom. The main house was heated by unvented butane. The well went dry for several months each year. Eldridge's father put a tank of water in a dump truck, and raised the body. The family had its own water tower.

At the age of ten or eleven, Eldridge noticed with some interest that two of the large rocks close to the house were different in color, yet each was called granite. He was somewhat puzzled, but his hair did not stand on end. This was the one touch of geological curiosity that he felt throughout his youth in the mining camp. In his portable bedroom, there was nothing that even vaguely resembled a mineral collection. Where a budding herpetologist might have a closet full of snakes, a chemist a set of volatile powders, a cosmologist a wheel of stars, Eldridge had musical instruments. When his father opened War Eagle, Eldridge's interest was keen: "I wanted them to find the good stuff, because it put shoes on the feet. But I wasn't curious about the vein."

Any rock that was hard and dark was blue diorite to the miners; anything platy was schist; everything else was granite. One did not have to go to Caltech to learn this geology. Endlessly, his father and other miners talked about the provender of rock. They sat on their porches in front of the refrigerators and reminiscenced about mining camps, mining failures, and yields in ounces per ton of ore. Eldridge's mind was elsewhere. Even before he entered his teens, he dreamed of places far from the ridge. He would forever remember Carl Vanlaningham, a friend of his father, remarking one day, with a glance around town, "Optimism is highest at the beginning. A mining camp has nowhere to go but down." Eldridge as a child had sensed this in a general and pervasive way. One day when he was accompanying his parents from one switchback to the next on the interminable road to Crown King, he suddenly burst out, "I've had it! If I never do another thing, I'm going to go out of here and stay out of here." His parents looked sad. He was ten years old.

He finished eighth grade and enrolled at North Phoenix High School when he was twelve. His father had built a house on the outskirts of Phoenix to accommodate his children's education. Eldridge's mother stayed with them. After she became the teacher at the Crown King school, his sister Carolyn (two years older than he) was in charge of the household in Phoenix. Moores' developing opinion of developing Phoenix was a good deal lower than his opinion of Crown King. As he would explain in later

years, "there's something wrong with a place that looks to Miami for its cultural leadership."

In high school, his principal interests were music and history. Teachers urged the cello on him, because his hands were large. He has nearly perfect pitch. "If you ask me to sing a note, I can get within a few cycles per second. If I'm listening to a piece on the radio, I can tell you what key it's being played in." In Crown King, while his father struck notes on the family piano Eldridge with his back turned could identify the notes. Eldridge has said of his father, "Music meant a lot to him, too. But, as he saw things, men didn't go into music. They had to go into something that was practical." To fulfill the high school's requirements, Eldridge also studied science and math. He was not inwardly driven toward a scientific or technological career, but he was already being nudged in that direction by what he has described as "a regional force." He explains, "In that part of the United States, it was assumed that any bright high-school student would go into science or engineering." His grade-point average was almost unimprovable. North Phoenix High School took particular pride in steering its best students toward the California Institute of Technology. Caltech offered him a larger scholarship than any other school to which he applied. Tractably, compliantly—sixteen years old—he went to Caltech.

Academically, he was at home there. For him, Caltech proved to be no more formidable than the one-room school in Crown King. Eventually, however, the day arrived when he had to choose a

major—to decide, in effect, what he wanted to do with his life—and he experienced a sort of intellectual ambush. To his considerable surprise, he came to realize that there was only one discipline at Caltech that appealed to him strongly enough for such a commitment, and the discipline was geology. Under all his early indifferent attitudes, not to mention his avowals to escape from Crown King, there had obviously lain ambivalence. Evidently, what he thought he hated he did not altogether hate. He wondered still about those colors in granite. He may not have cared how the gold got out of the mountains, but he did want to know how the mountains came there to receive the gold. He remembers looking out through classroom windows, seeing the San Gabriel Mountains, and wishing he were up there. In the years ahead of him, he decided, he would like to combine history with science, and to travel the world out-of-doors. Those prerequisites could be combined, and restated as a single word. So he majored in geology. Today, if you look at him closely through your hand lens and ask him why he did that, he will give a little shrug and say, "I grew up in the mountains."

He will also say, "I had a hard time coming to grips with going into geology. While I was in graduate school, I still wondered if I could make a career in music."

At the mouth of the Gladiator Mine, we set up a bench with a discarded plank, resting it on discarded ores. Not many feet away were irises planted by his grandmother Annie Moores, whose house had once

stood beside them. Just below the ridgeline, looking east, we ate sandwiches and spread on the ground before us the geologic map of Arizona. Six million acres of the original were also spread before us. We could see the Superstition Mountains, east of Phoenix. We could see the Four Peaks of Mazatzal Land. We could see a hundred miles. I remembered him once shaking his head with amazement at the joy experienced by a paleontologist who, in ten hours bent over in a blistering Wyoming gully, might find a couple of sharks' teeth. "I'm a ridge man, not a ravine man," Moores remarked at the time. "I like to get up and look out." Now in the foreground three thousand feet below us was the valley we had crossed in coming to Crown King. The axis of the valley, he said, running his finger along a black line on the map, was the Shylock Fault—"a major zone of tectonism that is reminiscent of major mélange zones that characterize consuming plates." Like the rock of the mine, the rock of the valley was Precambrian. He had found there—in sequence—serpentines, gabbros, and basalts. Pillow basalts. All this had suggested to him "plate activity eighteen hundred million to two thousand million years ago"—a collision, a docking, an addition to the continent arriving. He had published an abstract on the subject. Precambrian tectonics are, in their great antiquity, extremely difficult to read, but the rock of the valley suggested to him that he grew up in exotic terrane.

The granite of Crown King, he said, was technically quartz monzonite—a granite sibling, almost a

twin. Where it contained a little iron, it would be pink. It had come into the earth molten, as a pluton, about seventeen hundred and fifty million years ago, and the country rock it had intruded was the rock here at the mine. (We had crossed the contact driving up from Crown King.) The rock at the mine was a rusty-looking, darkish, metavolcanic metasediment, two thousand million years old. Kicking at it, Moores said, "I would rank these rocks as not particularly easy to work with."

I thought he was referring to the picks, the shovels, the pneumatic drills—the backbreaking labors of his father and his grandfather. But he meant the geology.

"It's taken me a long time to get this stuff out of my system," he continued. "Metal deposits are telling you something interesting about tectonic systems." Thus, by the front door, his interests returned to the place where he developed. The livelihood of his family had depended on the yield of this rock. The relationship of an Arizona pluton to the rock in which it had ballooned as magma was now heating his imagination, as, before, it had heated his grandfather's and his father's.

They died in 1949 and 1979. "I don't have gold fever," Eldridge said. "When I get it, I stamp it out. I avoid the study of ore deposits, except as they are a scientific subject. Small mining is dirty, dangerous, boring, and dismal. After a while, watching people do it gets to you. The prospect of doing that made me want to get out, get away. I developed a hankering

for places that were dust-free. I promised myself I was going to live in a place that was green and cool. Basically, this kind of mining is a futile operation. No one ever gets rich. It's got to be something in your blood."

I said, "Wouldn't you say it's in *your* blood?" He said, "Sort of like an antibody."