

**A GUIDE TO THREE RIVERS:
The Stanislaus, Tuolumne, and
South Fork of the American**

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South Fork of the American**



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*To All of the Rivers,
and All of Their Friends*

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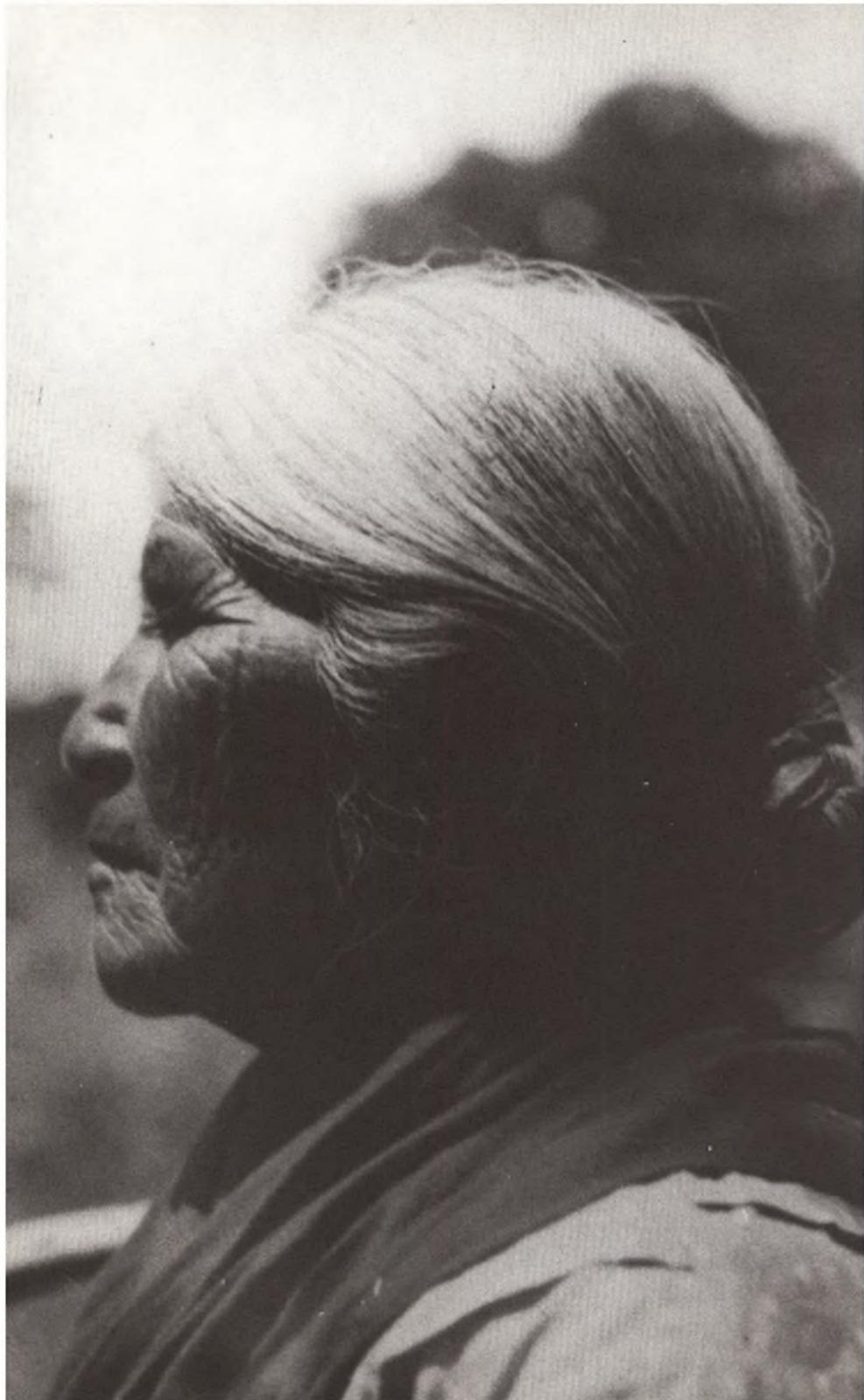
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AN INTRODUCTION
TO THE PEOPLE
AND THE PLACE



MIWOKS

The Central Sierra Foothills, the area through which the Stanislaus, the Tuolumne and the South Fork of the American all flow, has been the homeland for only two cultures in the 2000 some odd years that the region has been occupied.

The second culture — the Anglo-American — is, of course, our own. Its presence in the foothills dates from about 1848.

The first culture appears to have entered the area around 500 B.C., during the time of the Greek civilization. Never achieving great numbers, it was, nevertheless, a culture of remarkable stability — possessing a sustainable, intimate relationship with the land.

Its members were known to the first Anglos who penetrated into the foothills as “Diggers”, but in their own language they simply called themselves “the people”.

In an average year in the foothills, less than twenty inches of rain might be expected to fall, and nearly all of that between the months of November and March. During the balance of the year, water must be sought in springs or along the banks of creeks and rivers, and it was here that the natives established their villages.

Along the Stanislaus and Tuolumne Rivers, and as far north as the Cosumnes River, the inhabitants shared a common language and as a result are today known as the Miwok; in the canyon of the South Fork of the American, the people spoke a different but related tongue and have become known as the Maidu or Nishanam tribe. Both tribes developed culturally in very similar ways — both hunting and gathering their food, both adapting very closely to the demands of a common environment. In fact, except for the differences in language, the Miwok and southern Maidu might almost be thought of as a single people, with a single culture.

If one idea or belief sustained the Miwoks, it was of the value of moderation and stability. Patterns of leadership and family

life were established and maintained for generations. Hunting territories and village sites were defined by ancient usage and changed only very slowly. Indeed, archaeological evidence on the Stanislaus suggests that at least two sites — Horseshoe Bend and Clarks Flat — had been occupied continuously for 2000 years.

Drawing a realistic picture of what Miwok village life was like for these two millenia involves more than just a little guesswork. By the time there was any interest in observing the Miwok culture as it existed before the White man came, there were no examples of it left. Nevertheless, with the help of archaeological evidence, early reports, and some cautious speculation, the following picture might be drawn of Miwok village life during a typical spring day in the early part of the last century.

Waka-che was a village located in the Coloma valley on the South Fork of the American river. It was a bit larger than the villages further up the river, having a population somewhere between two and three hundred people. In addition, it was a leadership village, home of a chief who made the group decisions, not only for Waka-che, but for the smaller villages that were nearby as well. His authority, which was hereditary and would pass to his son, was mostly exercised in matters of hunting and food collection. Wars between neighboring tribes or villages were infrequent and pursued without much apparent enthusiasm — there are reports of battles being stopped while young boys collected spent arrows.

On this particular spring day the salmon run was just beginning and a group of young men were preparing to travel downstream to a small falls where the fish could be speared most easily. It was a well-known spot and they could expect to share it with other villagers. This year there would be plenty for all. They planned to be back before dark and so took little with them. The salmon they caught would be dried and preserved for later consumption.

Springtime also meant that the deer and quail would be moving to higher elevations. The snares and fences built across their migratory paths in years past would have to be repaired. The quail were funnelled with the help of brush fences into

openings laid with loop snares of tightly woven human hair. The deer were also coaxed by means of fences into narrow openings where they might be shot with an arrow or enmeshed in long nets of sedge or grapevine.

The deer hunters, all of them older men, prepared by spending the morning in the sweat-house, a conical earth-covered structure that could accommodate as many as ten men around the fire pit. Each would feed the fire from his own pile of white oak. The sweating strengthened the men as well as cleansed them of man-smell. Whoever put the wood onto the fire was considered the strongest.

After a dunking in the river the hunters loaded their burden baskets with dried provisions — venison and acorn bread — and left for the higher ranges. They would be gone for several days.

By mid-day the little village was quiet. A woman, whose hair was cut short in mourning, sat alone weaving a fish net. Her



mourning necklace, a string with small bags of medicine roots, appeared new. She would wear it until it fell off with age.

Other women, at a distance, were returning with the spoils of a mornings's foray onto the the cooler northern slopes. Their baskets were filled with a collection of greens and bulb roots. The acorn supply, collected the previous fall, was nearly exhausted. It would be many months before a new crop could be gathered; in the meantime, such substitutes as soap root, *euophus* and *mariposa* lily would have to do.

There was no rush to prepare the day's harvest. Dinner happened whenever one was hungry, and right now it was too hot. The women set their baskets down by the water and went for a swim. Later they took turns playing a dice game with an older woman who invariably won, collecting each time a pile of shell beads.



By late afternoon the fisherman had returned. The day's catch had been no more than average but at the falls they had met and brought with them a group of western people who had some trade goods — a collection of clam shell beads and a litter of puppies. The prospect of a bargaining session was cause for some discussion. The chief had traded for some salt from the eastern people during the summer before and had been waiting for the opportunity to bargain with it. The strangers were welcomed with food and tobacco.

Not long before sunset, the westerners were back on the trail, burdened with two "loaves" of salt from the dry lake beds of the eastern Sierra, and a rabbit skin blanket. Behind them they left their puppies and beads.

In Waka-che the fires had been started. A group of children were out in the clearing, imitating their elders by playing a game of "mula" with mountain mahogany clubs and a "ball" made of oak. The adults played with teams and goals, but the children preferred to play it every man for himself.

In his dwelling the chief undid another knot from the cord which the messenger from Loko-che had brought some days earlier, carrying word of an upcoming gathering. Only four knots remained. Soon it would be time to begin preparations, he thought. At least two deer would have to be killed and brought to the feast.

One of his new puppies was whining and struggling with his leash of milkwood fibre. The chief was momentarily reminded of the westerners who had related a story of a party of travelers seen in the summer before, somewhere to the south. The story had been passed along and was hard to understand — particularly the description of the men who sat upon animals as large as elk, but it was still a good story. He would remember it for the gathering.

Between 1845 and 1900 the Miwok population declined from an estimated 9000 to something like 700. At times deliberately, at times inadvertently, the white man virtually exterminated the race.

In the early part of the 1870's a cult known as the "Ghost Dance" swept through the remaining reservations or "rancherias" of the Miwok. It originated among the Plains Indians and

raced through the other tribes like religious wildfire. The Ghost Dance was a mystical, frenzied rite whose purpose was to arouse the long dead warriors of old to create an invincible united Indian army that would destroy the invaders. As quickly as it came, the Ghost Dance vanished before 1875.

By the turn of the century there were several significant Miwok rancherias. One near Sheep Ranch in Calaveras County; one near Tuolumne, and one near Groveland. Today the Tuolumne rancheria is the only one left, having some 65 residents. A somewhat larger group still lives in Yosemite.

The Bureau of Indian Affairs reckons there to be approximately 2,000 either full or half blooded Miwok Indians alive today. Like many others, the Miwok have recently experienced a reawakening of tribal feeling, and are taking an active part in the modern Native American movement to obtain Indian rights and to re-establish their culture and traditions.



THE WHITE MAN

In 1843, in the little Spanish settlement of Yerba Buena (later known as San Francisco), an agent for the Paty and McKinley Trading Co., a Mr. William Heath Davis, was engaged in conversation with one of the mission Padres, a Father Mercado, who confided to him something several of the wilderness missionaries already knew: there was gold, in great quantities, in the Sacramento Valley. After expressing some natural surprise at this news, Heath asked why it wasn't announced to the world.

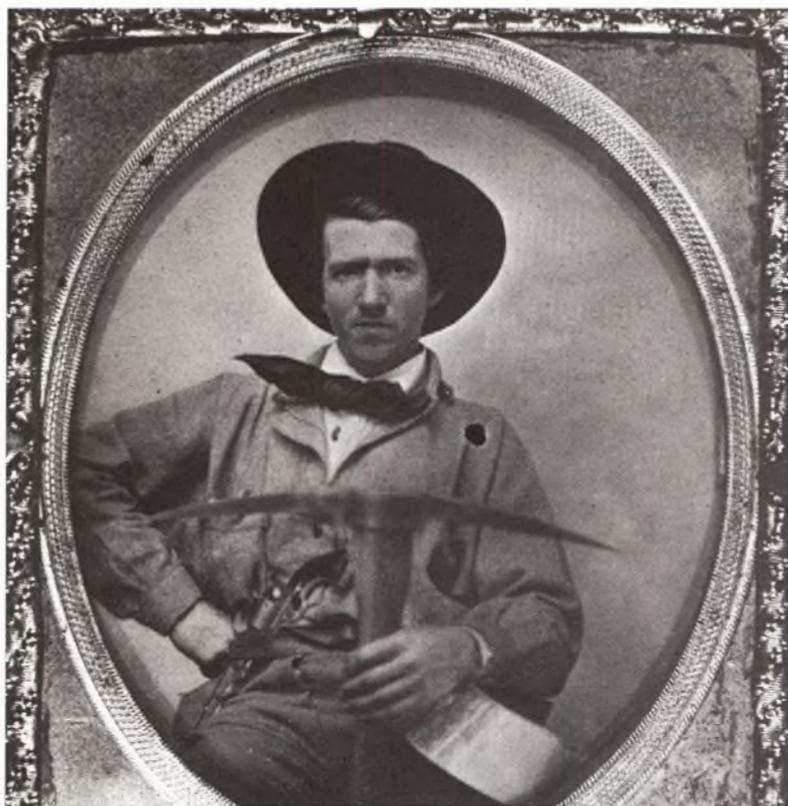
"Thousands of immigrants," the cleric responded, "would be dangerous . . . Californians have no means of defense, no army, no navy. The Americans would soon obtain supreme control."

Four years later, the War with Mexico delivered "Alta California" over to the Union, and a year after that, Marshall's discovery brought the "thousands of immigrants". As the peaceful land he once knew was being transformed overnight into a rough and ready American frontier, it seems doubtful Father Mercado took much comfort from the accuracy of his political vision.

At this distance in time, it is difficult to imagine what a scene was created in the Sierra foothills by the tidal wave of immigrants in the Gold Rush of 1849. It was an event of proportions completely unprecedented in human history and it commanded the attention of the entire world.

Indeed, for those first few heady months, it was far more an international rush than an American. Worldwide economic conditions were slumped in the mid-1800's and news of a fortune buried in the ground in the new American frontier electrified listeners around the globe.

Among the very first to arrive at the gold fields were the northern Mexicans, the Sonorans, experienced miners who had the additional incentive of being no more than a few weeks' journey away. Hard on their heels were the Europeans — the



Italians, Dutch, German, French and the English, especially the Cornishmen, Cousin Jacks as they were called, toughened coal miners experienced in the delicate art of hard rock tunnel blasting. Within a year and a half of Marshall's 1848 discovery, the river canyons of the Tuolumne, South Fork, and Stanislaus were as cosmopolitan as any boulevard in Europe.

For a time, while the easy placer deposits still held, and while no single group enjoyed a large majority, the various nationalities worked side by side with one another with remarkably little tension. By 1850, however, the "easy pickings" were starting to go, California had become the 31st state in the Union, and the Americans were beginning to look resentfully at the "foreigners". First to feel the effects of this were the

non-Europeans — the Chinese, Mexicans and Blacks. Neither the Chinese nor the Blacks were permitted to give testimony against a white man in a court of law, and in some districts they were forbidden to occupy an unworked claim; in others, laws were passed forbidding either group from working any claim at all.

At the same time, a special resentment was building against the Sonorans and South Americans whose experience in organizing large-scale mining operations enabled them to maintain high profits even while the easy gold was disappearing.

The culmination of these feelings surfaced in the Foreign Miners' Tax Law of August 3, 1850 requiring an exorbitant fee from each non-white, non-American miner. The enforcement of this Act, frequently left in the hands of the Anglo mining community, resulted in occasional violence and a wholesale foreign exodus from the fields. For the economy of the camps, the Act had an unexpectedly disastrous result; many of the merchants soon discovering how much of their business was due to the foreign population. The outcry they raised was vehement enough to force the repeal of the Act the following year. Although the Act had never generated much revenue for the state, it had served warning to the foreign miners that, although California might still be a wilderness, it was at least now an American wilderness.

As news from the gold fields gradually made its way back to the rest of the world, a popular image of California began to take shape that roughly combined the elements of a dime novel with those of a Greek myth. It was a land of balmy breezes and wild Indians, grizzly bears and Spanish maidens. The land was so rich that farmers planted their seeds and got out of the way.

And, of course, there was gold. For the most part, it was lying around in small piles, although occasionally one had to wade into a creek and retrieve it from under a rock. All in all, quite an inviting picture, and possibly the source of some disillusionment to many of the newcomers.

J.D. Borthwick, a New England artist, was one of those who travelled to the new El Dorado by way of Panama in the year

1851. His journal of the time he spent there was published in 1857 and paints an interesting — and likely more realistic — picture of life in the gold fields.



When about ten miles from the plains (en route from Sacramento to Placerville), I first saw the actual reality of gold-digging. Four or five men were working in a ravine by the roadside, digging holes like so many grave-diggers. I then considered myself fairly in “the mines”, and experienced a disagreeable consciousness that we might be passing over huge masses of gold, only concealed from us by an inch or two of earth.

The diggings here (at Placerville) had been exceedingly rich — men used to pick the chunks of gold out of the crevices of the rocks in the

ravines with no other tool than a bowie knife; but these days had passed, and now the whole surface of the surrounding country showed the amount of real, hard work which had been done. The beds of the numerous ravines which wrinkle the faces of the hills, the bed of the creek, and all the little flats alongside of it, were a confused mass of heaps of dirt and piles of stones lying around the innumerable holes, about six feet square and five or six feet deep, from which they had been thrown out. The original course of the creek was completely obliterated, its water being distributed into numberless little ditches, and from them conducted into the "long toms" of the miners through canvas hoses, looking like immensely long slimy sea-serpents.

Along the whole length of the creek, as far as one could see, on the banks of the creek, in the ravines, in the middle of the principal and only street of the town, and even inside some of the houses, were parties of miners, numbering from three or four to a dozen, all hard at work, some laying into it with picks, some shoveling the dirt into "long toms", or with long-handled shovels washing the dirt thrown in, and throwing out the stones, while others were working pumps or boiling water out of the holes with buckets. There was a continual noise and clatter, as mud, dirt, stones, and water were thrown about in all directions; and the men, dressed in ragged clothes and big boots, wielding picks and shovels, and rolling big rocks about, were all working as if for their lives, going into it with a will, and with a degree of energy not usually seen among laboring men. It was altogether a scene which conveyed the idea of hard work in the fullest sense of the words, and in comparison with which a gang of railway navvies would have seemed to be merely a party of gentlemen amateurs playing at work.

—*J.D. Borthwick, July 1851*

As the initial wave of Forty-Niners began leaving the Motherlode (and they left nearly as fast as they arrived) the history of the area entered a new, far less tumultuous era. Those who remained behind, although far fewer, were there to stay.

In the river canyons themselves, once the epicenters of the most frenzied activity, life quickly returned to its more accustomed pace. To some extent, what had once been wilderness, became wilderness again.

Farming, particularly along the South Fork of the American, took something of a hold, although the land was too hilly to be considered prime. More commonly, sheepherders and cattlemen would run their stock into the canyons on the way to their summer pasture in the Sierras.

Mining, in the meantime, had recovered from the boom and bust cycle and the miners were beginning to grimly set about the task of extracting gold deeply buried in veins or ancient gravel beds. Under the stimulus of low value ore and deeply buried gold, new technology was developed; and as each new process was perfected, a mini-boom hit the mines in the river canyons. The first was probably in the 1860's when chlorine and cyanide were found to be effective extraction agents when added to ore pulp. Concurrent with this was the improvement of the crushing, or milling machinery and the gradual electrification of many of the operations.

The cumulative effect of all this was to keep the industry alive past the first few years of this century. It was all done, though, on borrowed time; after all, gold *is* a non-renewable resource.

The Depression era, and its economic and social rigors brought a new wave of miners back into the canyons. Some banded together into companies and operated the latest in gold mining equipment — huge, floating dredges that ran an endless bucket line over the river bottom, hauling out the gravel. Others of them were called “gopher miners”, “bedrock scratchers”, individual prospectors who preferred panning a bare subsistence to getting it in a bread line.

The end to all this came abruptly in 1942 with the issuance of War Order L-202 putting a halt to many non-essential

industries — including gold mining. It turned out to be the final blow for the industry on the rivers; after the war, few of the dredges were put to use again, and even fewer of the hard rock mines re-opened. Mining activity was restricted almost entirely to the hobbyists, summer prospectors working individual light-weight dredges.

Although cattlemen from the Valley no longer summer their stock in the Sierras, grazing rights are still held — and used — along the banks of most of the foothill rivers, including the Stanislaus, Tuolumne and South Fork. And while logging is an important industry in the foothills, timbermen have generally focused their interest on the higher slopes; the digger pines and steep canyon sides combine to make logging uneconomic in the river sections described in this guide.

The most recent chapter in the history of the Stanislaus, Tuolumne and South Fork is still being opened. It began in the early 60's when a few adventurers, equipped with foldboats and war surplus rubber rafts, began floating these streams, bouncing through the rapids, and camping along their shores — many of which had seen few footprints since the Gold Rush. From these very modest beginnings, a new sport developed, and with it a consciousness of the history and natural beauty of these remarkable places.



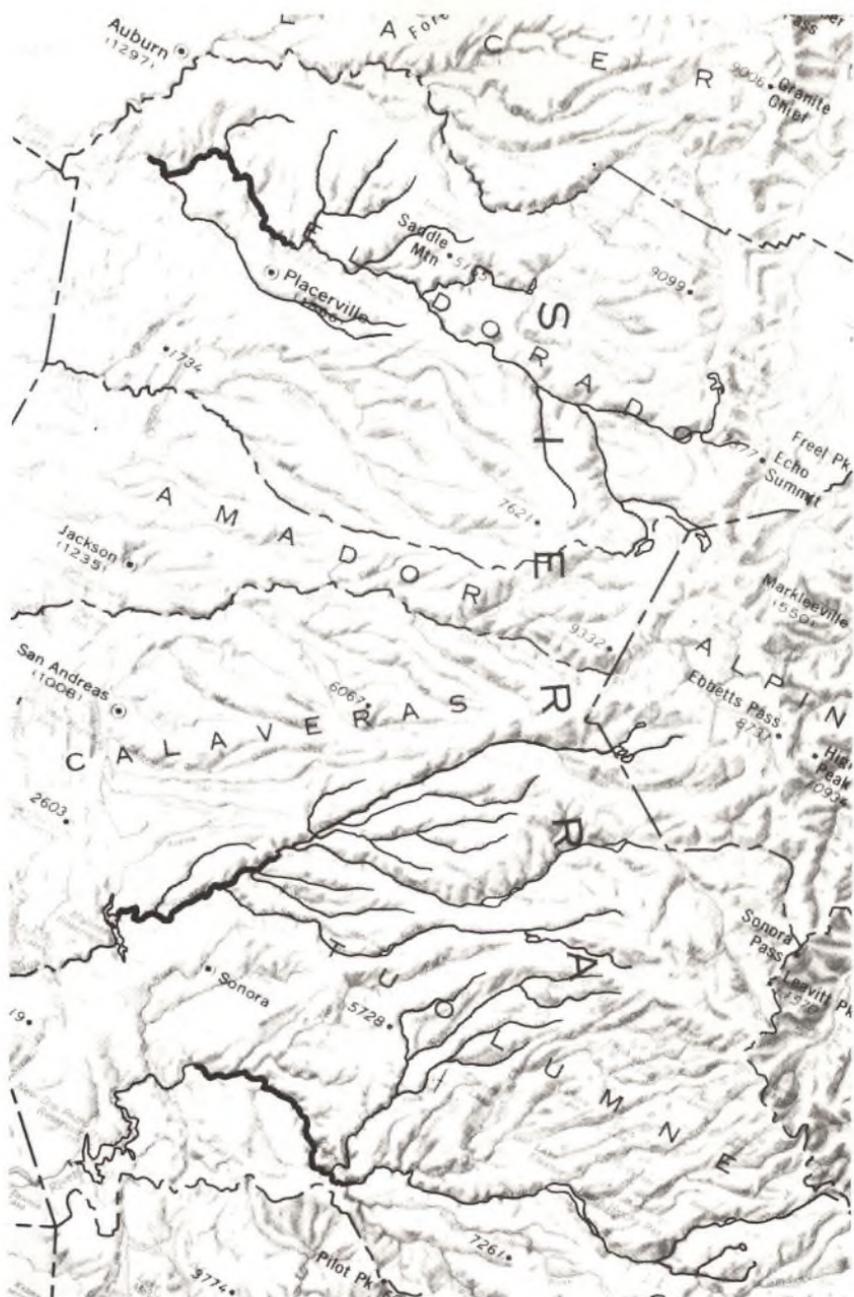
THE LAND AND THE ROCKS

By a geologist's slow-running timepiece, California's Sierra Nevada mountain range is a brash newcomer to the state's topography — a granite yearling with an improbably steep eastern flank, a jagged saw crestline, and a western slope seamed by a series of ten abrupt river canyons. The evidence of geologic inexperience is everywhere, and stands in marked contrast to such rounded, meandering ranges as the Appalachians — a group of hills clearly showing the effect of 250,000,000 years.

The river systems that drain this adolescent range tumble and course down its sides with appropriate energy. Beginning some 9 million years ago, these westward bearing streams have been scoring deep grooves in a bedrock block that has simultaneously been lifting itself on a "hinge" in the Central Valley. The combined effect has produced a series of precipitous river canyons that, for pure drama, are probably unmatched anywhere on the globe.

The rock history of the Western Sierra foothills can be read for a period of some 300 million years, back to a time when multi-cellular life was just beginning to evolve and a great inland sea filled a basin where the Sierras stand today. For 200 million years the floor of this sea convulsed with volcanoes and massive earthquakes. Over time, the lava, mud and eruptive material settled to the ocean bottom forming a massive sedimentary layer. Today, after millions of years of loading, compression, heating, crumpling and crushing, this sediment has been turned ("metamorphosed") into hard quartzites, slates, schists, marble and limestones now known as the "bedrock series" of the Sierra Nevada and exposed in its foothill river bottoms.

Approximately 125 million years ago, after the sedimentary ocean bottom had been lifted by movements in the earth's crust, a period of intense volcanism raised a massive chain of mountains. This proto-Sierran range eventually eroded away to



become a vast low-relief plain, crossed by a number of broad winding rivers. The deposits of these rivers, laid down over millions of years, formed a layer of rock called the "superjacent series" which overlaid the older, more complex structures of the bedrock. About 25 million years ago, a period of intense

volcanic activity filled these ancient river beds with lava. The flat topped Table Mountain near the Stanislaus Canyon is an example of an ancient lava flow of this period.

The most recent chapter opens some 9 million years ago. The "superjacent series" as well as the bedrock beneath it, began to uplift, driven by the forces of continental drift, and new river channels began forming. As the rivers cut deeper into the steepening slope, they eventually exposed the bedrock and, incidentally, cut across ancient gold bearing gravels (a minor geologic event with wildly disproportionate human consequences).

Today the river channels are cut deeply in the bedrock and the superjacent series are in evidence only near the ridge tops. Lower down on the canyon walls, and at the banks of the river itself, layers of the bedrock complex are cross-sectioned, and frequently off-set by the intense heat and pressure that characterize the earth's interior.

Largely as a result of these irregularities in the bedrock, the river cuts an uneven channel. Resistant ledges become "ribs" in the riverbed, trapping flood-swept boulders and debris. The result: rapids. In areas where the flow generally parallels the bedrock folds, the rapids are fewer and less severe; in areas where the flow cuts across them, the gradient steepens and the drops become more abrupt.

The overall effect is of a winding, staircase river cut deeply into an ancient metamorphosed bedrock gorge and overtopped by more recent layers of volcanic and sedimentary material.

The Plants and Animals

The weather pattern in the foothills is an unlikely combination of hot, dry summers and cool, wet winters. Known to meteorologists as a "Mediterranean climate", it occurs only within a narrow belt of latitudes, and in California owes its existence to the massive "weather factory" known as the Pacific Ocean, and the providential presence of the Sierras, a storm-stopping range of mountains *par excellence*.

The plant and animal communities that inhabit the foothill canyons have evolved to survive in this environment of feast

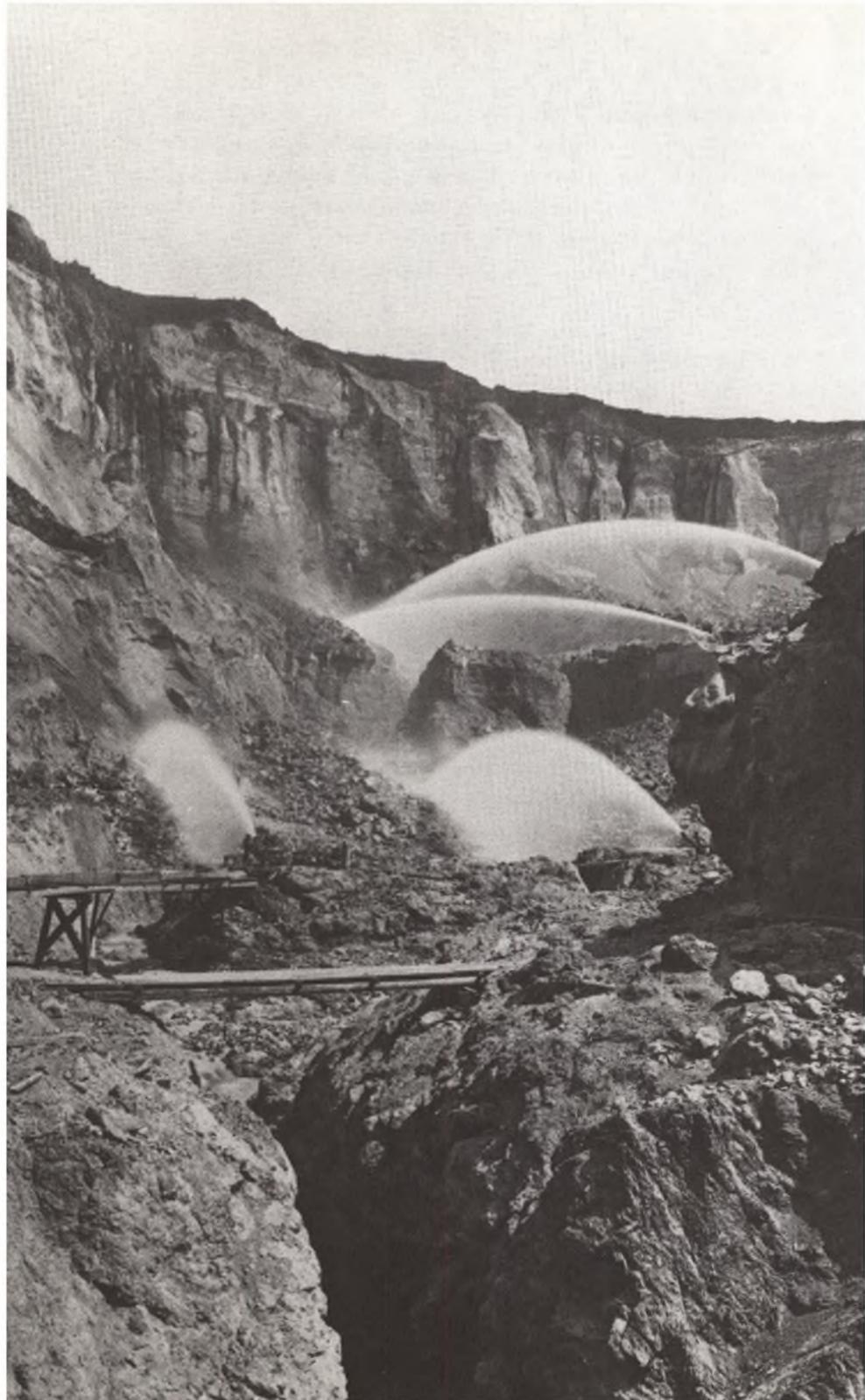
and famine. On the hot southern slopes especially, plants are favored that can both conserve water when its scarce and absorb quantities when it's not. Leaves are frequently small or waxy, pine needles sparse, root systems broad. This is the home of buck brush, digger pine, mountain mahogany, holly leaf and, above all, chamise — a shrub so tightly fitted into the "niche" of its environment that it is the dominant ground cover in the foothills, the "climax plant community".

Nearer to the water, the temperature extremes are moderated; by comparison the soil is deep and moist. Water tolerant plants are favored, and the communities are richer and more varied. Willows, alders, bayleaves, blackberries and wild grapes crowd the river bottoms in a dense profusion of riparian plant life. Even a few species of ferns and rhubarb, amphibious plants that need to keep their "feet" wet, can thrive in this special "micro-community" by the water's edge.

The animal life that has evolved in this environment reflects the soil and plant diversity. On the chapparal slopes, birds such as the wrenit and scrubjay flourish along with California quail, brush rabbits, mice, woodrats and their predators, the coyotes, gray foxes and bobcats.

In the riparian communities, such animals as raccoons, skunks, ringtails and a variety of rodents and amphibians are commonly seen, all of them fitting a niche defined by food source, climate and predator population. In the rivers themselves, of course, are the fish; brown trout, rainbows, suckers and squawfish are the commonest species.

Although this brief discussion of soil, rocks, plants and animals has been in the outline form, respecting their considerable differences, taken together they form a seamless web, a biosphere; and over the past 150 years humans have been elbowing their way rather rudely into it, although with what final success only future generations can tell. For the moment, there seems little doubt that we have chosen a path dramatically different from that of the previous race of human inhabitants whose term of residence in the foothills was an extremely long and fruitful one.



THE GETTING OF THE GOLD

The earth's crust is built of more than 3,000 minerals, of which gold is certainly one of the less significant, making up no more than one quadrillionth of a percentage point of the planet's weight. This rarity, of course, gives gold its value, and, additionally, puts the prospector in the interesting position of looking for something difficult to find solely for the reason that it is difficult to find. Needless to say, gold mining is a uniquely human activity.

The Sierra Nevada foothills contained an extraordinary concentration of this mineral through the action of two natural "concentrators". The first was an ancient fault system through the earth's crust which enabled the gold — in vapor form — to penetrate to within a few miles of the earth's surface where it condensed in fissures, frequently bonded to another mineral, quartz.

The second "concentrator" was running surface water. Over millenia, these deep veins were exposed by the forces of erosion. The gold was eventually freed and swept downstream where it began to deposit in riverbanks.

This cycle of erosion and concentration first occurred some 50 million years ago, during the Tertiary Period. But the original Sierra rivers that cut into these veins became buried under the lava and ash of 40 million years of intermittent volcanic activity. It wasn't until some 9 million years ago that the rivers we know today began cutting canyons, eventually reaching the gold-bearing veins and beginning the same deposition and concentration process.

While the Forty-Niners may have had only dim understanding of these processes, they quickly deduced the obvious: where there was water, there was gold. Consequently, nearly all of their early efforts were known as "placer mining", working the streambed gravel.

The methods the very first miners used — the pan, cradle, sluice and long tom — were all fairly primitive, and exceedingly

wasteful. But if the values were there, it didn't matter. A single miner could stake out his claim, hammer together a cradle box or simple "tom" and in short be in business for himself.

Diverting an entire river, though, is an ambitious undertaking, demanding dams, ditches and flumes — all beyond the means of single prospectors: Enter the era of the mining company.

But even when the burden was shared, riverbed mining was risky business. Because of high water, construction of the diversion dam and fluming had to wait until July or August. And then it had to be quickly done before the winter rains came and washed the whole operation away. On top of all this, there was no way of knowing if the dirt would "pay" beforehand. Needless to add, a lot of companies were in and out of the riverbed mining business in short order.

While some groups worked these exposed river beds, others explored and prospected some of the tributaries where they discovered the ancient goldbearing gravels from the Tertiary period. Clearing off the tons of topdirt that now covered these deep gravels spurred the development of new technology.

Ground sluicing was the first technique brought to these kinds of deposits. The idea was to divert water to a holding pond above the suspected paydirt, and then release it in surges. The resulting slurry of mud and dirt was then washed in sluice-boxes. The whole process was known as "booming" a hillside.

A simple extension of this idea is credited to Edward Mattison, a Connecticut Yankee in Nevada County. Rather than allowing the water to flow over the surface, Mattison piped it down to a fixed nozzle apparatus and directed the resulting stream against the hillside. Hydraulicking, as it was called, soon became extremely popular. With more elaborate cannons (or "Monitors" as they were called) and higher source water, the process was awesomely effective. A single operator could knock down 50 tons of "overburden" in a single day. By 1867 there were over 5000 miles of ditching for these operations costing more than \$15 million. Meanwhile, however, downstream, the rivers were depositing massive silt loads in the Central Valley, filling their channels to the point where normal

runoff was creating flood conditions for the farmers. The resulting outcry precipitated what is arguably the first piece of environmental legislation in the state's history, the Sawyer Decision of 1884, which effectively shut down hydraulicking and incidentally signalled the ascendancy of agriculture over mining as the state's leading industry.

Occasionally, if it was felt that the dirt would pay well enough, and if the topdirt was too massive even for the "Monitors", tunnels (called "drifts" or "adits") were dug into the hillside, sometimes for as much as several miles. When the miners reached the ancient, compacted river gravel they carried the ore back out to a stampmill and sluicebox. Table Mountain, near the Stanislaus, is honeycombed with just these kinds of tunnels.

As the 1850's wore on, a new and for a time spectacular source of gold was uncovered: quartz vein gold - mineral still embedded in aboriginal fault lines. Carson Hill, on the Stanislaus, yielded an incredible vein gold find, generally conceded to be the largest in history.

As before, new problems gave rise to new technology. Vein gold was frequently embedded in quartz, quite a formidable material, and crushing the ore was a demanding task. Various mechanical devices were quickly developed, beginning with mule powered arrastras and culminating in steam or electrically driven ball or stamp mills. The pulverized material was then sluiced, or in later years, treated chemically to extract the valuable mineral.

Searching for vein gold combined high risks, potentially high rewards, and a steep capital investment in labor and equipment. Raising the funds for such a venture frequently involved the incorporation of a company and the selling of shares. Particularly in the late 1850's, Western mining stocks were "glamour investments" attracting a great deal of overseas capital. Many an English attic chest is today the final resting place for the stock of busted California mining ventures, their shareholders liable to wait quite a while for the next dividend.

Although the technology of hard rock mining continued to undergo a gradual refinement, particularly the extraction pro-

Pocket Mining

In that one little corner of California is found a species of mining which is seldom or never mentioned in print. It is called "pocket mining" and I am not aware that any of it is done outside of that little corner. The gold is not evenly distributed through the surface dirt, as in ordinary placer mines, but is collected in little spots, and they are very wide apart and exceedingly hard to find, but when you do find one you reap a rich and sudden harvest. There are not now more than twenty pocket miners in that entire little region. I think I know every one of them personally. I have known one of them to hunt patiently about the hillsides every day for eight months without finding gold enough to make a snuff-box — his grocery bill running up relentlessly all the time — and then find a pocket and take out of it two thousand dollars in two hours, and go and pay every cent of his indebtedness, then enter on a dazzling spree that finished the last of his treasure before the night was gone. And the next day he bought his groceries on credit as usual, and shouldered his pan and shovel and went off to the hills hunting pockets again happy and content. This is the most fascinating of all the different kinds of mining, and furnishes a very handsome percentage of victims to the lunatic asylum.



—from *Roughing It*,
Mark Twain

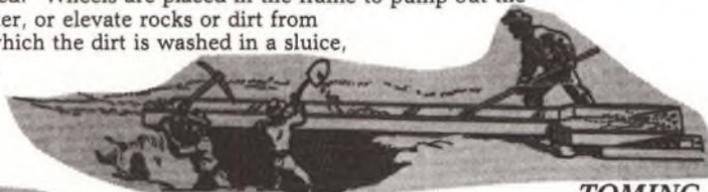
cesses, its high costs made it less and less economical. The future of gold mining at the turn of the century lay in the miners' ability to process huge amounts of dirt at an extremely low cost. It was this realization that prompted the development of the "Doodle-bug dredgers" of the 20's and 30's. There were barges equipped with draglines or endless conveyor belts of buckets. In either case, the object was to scoop out massive amounts of river gravel and wash the debris on board, dumping the slurry back into the river where it could be pulled up again. The theory may seem primitive, but these dredges were nearly as profitable as they were environmentally destructive. The same idea can be seen at work on a much smaller scale in the lightweight dredges of modern-day prospectors.

HUTCHINGS' CALIFORNIA SCENES



TURNING THE RIVER

This view represents the building of a dam across the river, to turn it into a flume. From ten to twenty men form themselves into a joint company, for the purpose of draining and working the bed of the river. Sometimes several companies will unite, and by their enterprise build a flume several miles in length, into which the whole stream is turned. Wheels are placed in the flume to pump out the remaining water, or elevate rocks or dirt from below, after which the dirt is washed in a sluice, tom or cradle.



TOMING

The above represents three men working with a Tom; two are vigorously picking down and shovelling the dirt into the upper part of the tom, — and the other is moving it about with a hoe or shovel, to wash it and throw out the larger rocks or riddlings. The gold, dirt and water passes through a sieve or tom-iron at the lower end into a riffle box underneath, where the gold is saved.



SLUICING GROUND

The above represents the many methods of ground sluicing. A trench is first dug down the hillside, into which a small stream of water is turned; miners then stand across or in the stream, and with their picks loosen the gravel and dirt, while the force of the water carries it into a sluice below. Sometimes a stream of water is made to run by the side of a bank, and by undermining or picking down the bank, it falls into the water, by which it is removed, and the pay-dirt is afterwards carefully washed.

PANNING OUT

This illustrates one of the primitive methods of mining. A pan filled with earth is set into the water, and by shaking it from side to side, the dirt is washed out, and the gold gradually sinking to the bottom of the pan, is there saved. This method is still used by every company to wash out the product of the days' labor; while the Chilian or Mexican uses the pan or bowl exclusively.



— METHODS OF MINING

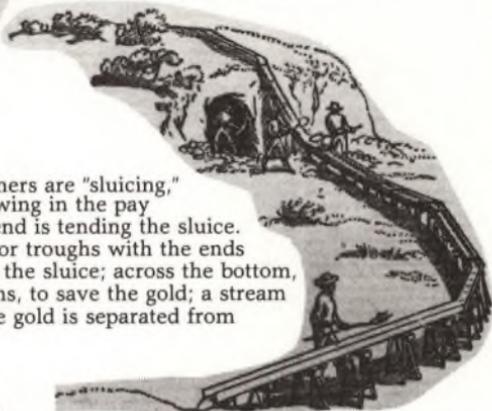


ROCKING THE CRADLE

The earth to be washed is carried in buckets to the cradle, and emptied into the sieve or hopper, when water from a dipper is poured upon it; as the cradle is rocked from side to side, the earth and water falls through the sieve upon an apron sloping towards the back of the cradle, and passing over the bottom is washed out at the end, while the gold remains on the apron, or at the end of the cradle. Chinamen are the principal operators now with this machine.

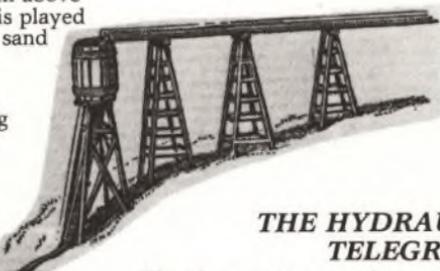
SLUICING

To the right a company of miners are "sluicing," those at the upper end are throwing in the pay dirt, and the man at the lower end is tending the sluice. Several lengths of sluice-boxes, or troughs with the ends out, supported by trestles, form the sluice; across the bottom, inside, are riffles or false bottoms, to save the gold; a stream of water being turned down, the gold is separated from the dirt, which is washed out.



HYDRAULIC WASHING

The scene below represents a company of miners washing down the hill by the hydraulic process. The water from above being confined in a strong hose, is played through a pipe upon the bank of sand and gravel, with great force and effect. By this process, great quantities of earth are washed down, and passing through a long sluice, the gold is there saved. Sometimes where the gold is very fine, the Buyaskutus is of great value to the miner, saving nearly enough to pay this weekly water bill.



THE HYDRAULIC TELEGRAPH

The above represents the manner of constructing the "Hydraulic Telegraph," as it is named. A small flume is placed upon poles or high trestles, through which the water is conveyed from the canal or ditch to a barrel or square wooden funnel at the end, to which is attached the hose. These Telegraphs are generally from 80 to 130 feet above the pipe from which the water escapes, thus creating the required force for washing down banks of earth into the sluice.

reprinted from Hutchings Magazine, 1854.



**THE SOUTH FORK OF THE
AMERICAN:
Mile by Mile**

Researched by Maureen Daley-Hutter

THE SOUTH FORK OF THE AMERICAN

One hundred and forty years ago the South Fork of the American was an untracked wilderness river; ten years later it was nothing less than an industry. Its canyon walls echoed to the thunder of stamp mills and to the black powder blasting of quartz tunnels. Its banks were lined with prospectors panning its gravel. For miles at a stretch the river's entire flow was shunted aside while gold diggers busily turned over the exposed riverbed. The towns of Coloma and Hangtown had 15,000 people between them, with dozens of tent towns scattered in the nearby hills. The South Fork was making history.

By 1880 the pace had slowed considerably. The tent camps were gone; most of the placer claims were played out and abandoned. "Hangtown" was now Placerville and had only 1500 people. By 1920 things were even quieter. The last of the quartz mines had shut down and the Coloma valley was entirely given over to vineyards and orchards.

Today, despite the crowds that come to see the relics of the old era, or boat the rapids, it is still a far cry from earlier days. More than any of the other Gold Rush rivers, the South Fork of the American is an abandoned canyon, a ghost town among rivers.

The Southern Maidu tribe lived in the South Fork canyon for 2000 years. They called the river Waka-che. Jedediah Smith, the American fur trapper and explorer traveled through the area in 1828 and called it the "Wild River". A Spanish land grant in 1833 named it "Rio Ojotska". It wasn't until 1841 that a map appeared with the words "American River" on it. John Sutter took credit for the new appellation saying: "I gave the name 'American River' to the stream that now bears it from the fact that about 3 miles above the fort was a pass (ford) where the Canadian trappers, who were called "Americans" by the Spanish speaking Indians, crossed the stream. This place was called "El Paso de los Americanos' ". It remains to this day the only stream in the North American continent with the name "American River" attached to it.



“Culloma Valley”. John Little

A visitor to the South Fork today, with only a rough idea of where to look, can see abundant evidence of the Gold Rush days: ditches cut into the hillsides, artificial islands created by new channels, rusting mill machinery. Just as evident to the informed observer are the changes in the natural appearance. The slopes are covered with non-native annual grasses, the banks lined with imported Scotch Broom, even the river itself — by mid-summer what was once a chain of warm pools is today a freshly flowing ice cold stream, the result of upstream storage reservoirs.

Achieving this bifocal awareness of the South Fork, its past as well as its present, is one of the primary purposes of this guide; and it is pursued in the belief that a concern for the future of a place frequently starts with some understanding of its past.

Slate Quarry Plant

Just upstream from the Chili Bar bridge, on the south side, is the 95 year old Slate Quarry Plant, now owned by Placerville Industries Inc. In 1979, the plant's hammer mills crushed over 20,000 tons of slate, a material now mostly used in roof shingles and walkways.

Originally known as "Buck's Quarry", it began operations in 1886 and was only one of five such quarries in a 2 mile wide slate vein that ran through the Mother Lode. At the time its machinery was powered by ditch water, and the slate it produced was not crushed, but shingle or board slate, out of which such things as counters and coffins were made.

At its peak, 100 workers labored by hand, earning \$1.25 a day, cutting and shaping the slabs with chisels and water-powered saws. The finished product was pulled by oxen over the 12 miles to the Shingle Springs railroad for shipment to San Francisco. By the beginning of World War I, however, the mine had closed, a victim of rising costs.

The shutdown turned out to be temporary. Within a decade the quarry re-opened, entering its own second era. The new owners were the Pacific Minerals Co. Ltd. who began the production of crushed slate for asphalt shingles by blasting tunnels into the canyon side. For 39 years it operated day and night, putting a total of 11 lateral shafts through the slate for more than 2 miles in total.

During the height of the Cold War, the extensive tunneling attracted the attention of the Federal Government and also, unrelatedly, the Campbell Soup Co. The one was on the lookout for a bomb shelter site; the other interested in raising mushrooms. Both organizations must have eventually settled elsewhere however, because the slate mine continued its accustomed operations until 1966 when new regulations made "drift" or tunnel mining too expensive. The owners responded by reverting to the earlier, open quarry style of operation.

In 1979, the current owners, Placerville Industries Inc., acquired the property, erected a new plant on slightly higher ground and sold as scrap the mills, classifiers, Pelton wheels

and generators that had been in use for over 60 yrs. The new plant remains in operation today, the oldest continuously running slate quarry in the state.

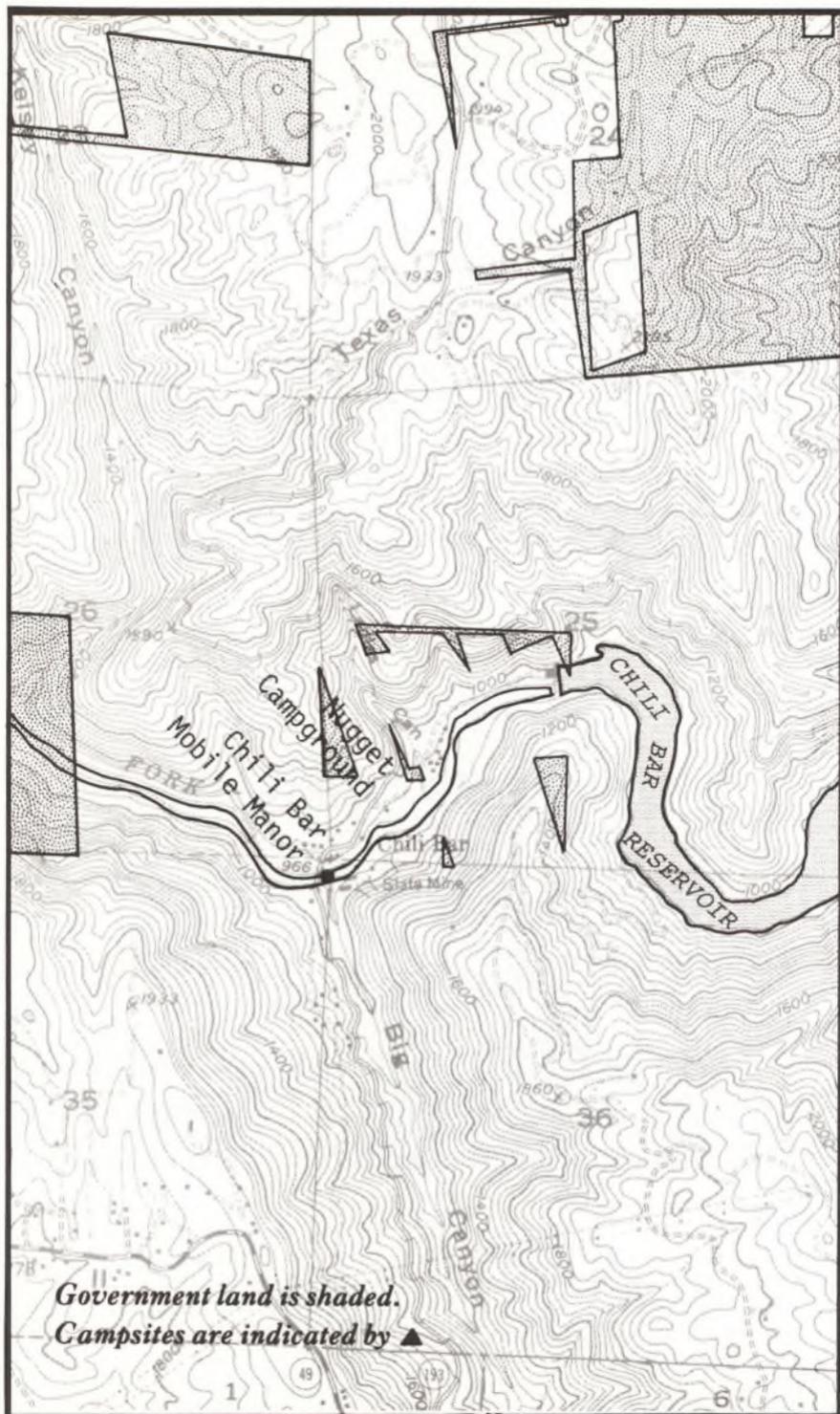
Chili Bar Bridge

About 200 feet upriver from the present bridge, a stretch of shallow water provided a fording spot to travellers between Placerville and the gold mines of the Georgetown Divide. From 1851 until 1853, a cable operated ferry connected the two shores when the water was high. In 1854, the first bridge was built. Eight years later, though, the bridge, the tollhouse, and very nearly the tollkeeper and his wife, were carried away by high water in the historic 1862 flood.

The structure that stands at the site today was built in 1928, using river rock from the gravel bar below for concrete footings.



Sacramento in the Flood on 1862. In the winter of 1862, the rains came early to California and they came to stay. Between October 12 and January 5 the sun was rarely seen. The Central Valley became a great lake putting Sacramento and Stockton under several feet of water for weeks at a time. One suggestion, put forward at the height of the flood, was to widen the Straits of Carquinez, thereby allowing the water an "easier exit".



Mile 0.0 Chili Bar

Although American history has fully adopted the California Gold Rush, in 1848 and early '49, a "Californian" was a native-Spanish speaker and the Gold Rush itself was more properly a chapter in Mexican and South American history. Certainly in those first few months, a good percentage of the Forty-Niner's spoke little, if any, English. Many of them came from as near as Northern Mexico, a few from as far away as the South Seas. Some of the best miners of all, though, came from the South American country of Chile, where mining had been a way of life since the days of the Spanish conquistadores.

A group of these Chileans arrived in the South Fork area and first mined in Garden Valley and Johntown. Trouble arose though when the foreigners were accused of panning other miners' tailing at night. Some fights followed and a vigilante group formed itself to escort the South Americans across the river, from where they were instructed "never to come back".

It turned out to be unnecessary advice. The next morning, the Chileans found their new home by the river to be excellent diggings and they stayed there for years.

A smallpox epidemic in 1886 wiped out the last of those that hadn't returned home. Evidence of their graves, marked with slate headstones, can still be found on the hillsides nearby.

Mile .4 The Greenhorn or Coloma-Lotus Ranch Ditch

On the left bank of the river, some twenty feet above the water, lies the beginning of the Greenhorn or Coloma-Lotus Ranch Ditch. Built between 1850 and 1854, the system was designed to deliver water to downstream mining operations at the same time it provided power to waterwheels along the way. The wheels frequently drove pumps used to empty the river bed of whatever flow had bypassed the wing dam.

The system took the water the length of its 13 miles with less than a 200 foot drop from its starting point at Chili Bar to its terminus just below Lotus.

Floods in 1852, 1855 and finally 1862 took a heavy toll on the timber, machinery and waterwheels of the system. By that time, it was being used primarily as an irrigation ditch, a function it continues to fill to this day, although not without frequent problems. Lotus resident Herbert Herzig recalls some of his experiences with it during the thirties.

Ditch was always a dirty word. It seemed like every holiday, and every time we had company it would break down and run dry . . . we'd hike all the way to the problem, and then pack sand on our backs up the steep ravines from the river banks, and then carry in all the cement . . . It wasn't much fun.

Today, the 600 inches of water withdrawn at Chili Bar by the original riparian water right of 1850 delivers only 100 inches at its destination in Lotus. The balance is lost to the many gaps and leaks in the 122 year old system whose owners never received any dividend on their investment.

"We just own it, that's all," says Herb Herzig.

The Coloma-Lotus Ditch A present-day view.

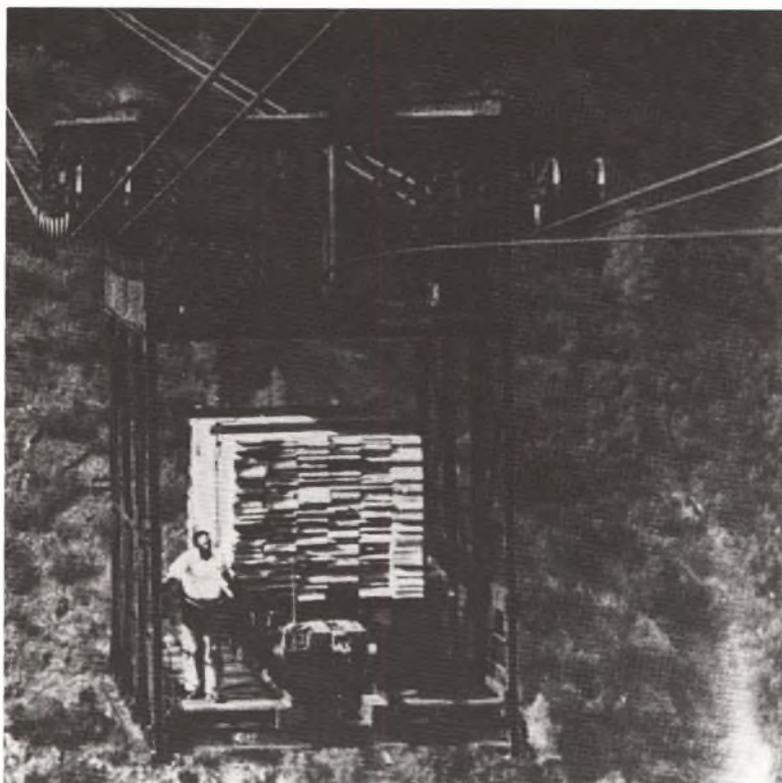


Plagued by constant repairs and money problems, the owners gave over the maintenance and accounting of the ditch to the El Dorado Irrigation District in 1960, but retained their shares in ownership.



Tower No. 15 Eureka Slate Company. One of the more ambitious engineering schemes hatched in the South Fork Canyon around the turn of the century, the tram hauled 500 lb. slabs of slate. Power to the whole operation came from a Pelton wheel in Slatington (Kelsey) more than 2 miles away.

Although the slate miners were never too successful with their scheme, the El Dorado Lumber Company ran a similar operation for 30 years, hauling more than 25 billion board feet of milled lumber from the Georgetown Divide.



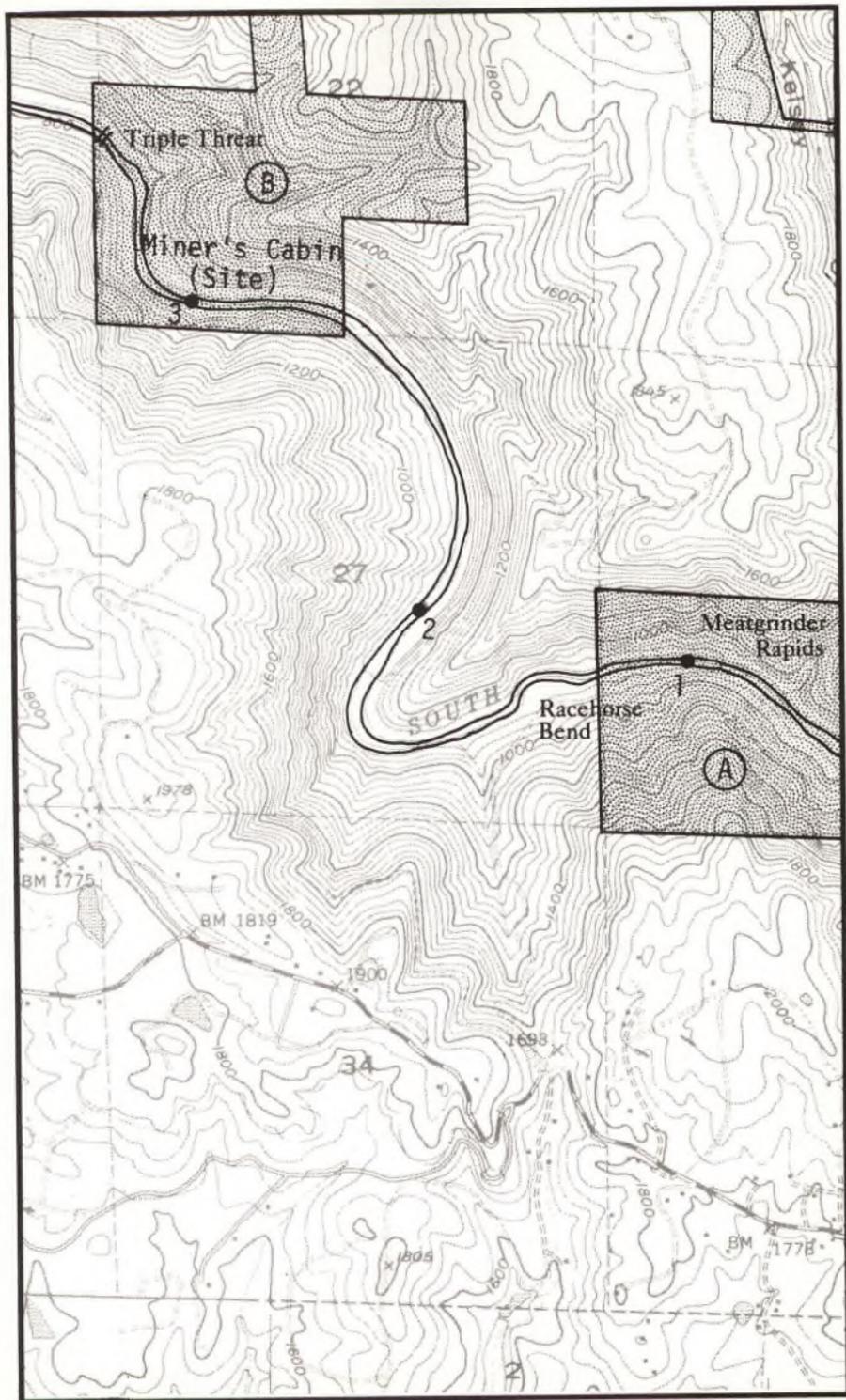
The El Dorado Lumber Company Tram.
Abandoned in 1942, this tram was the second constructed at this site about 6 miles upstream of Chili Bar.

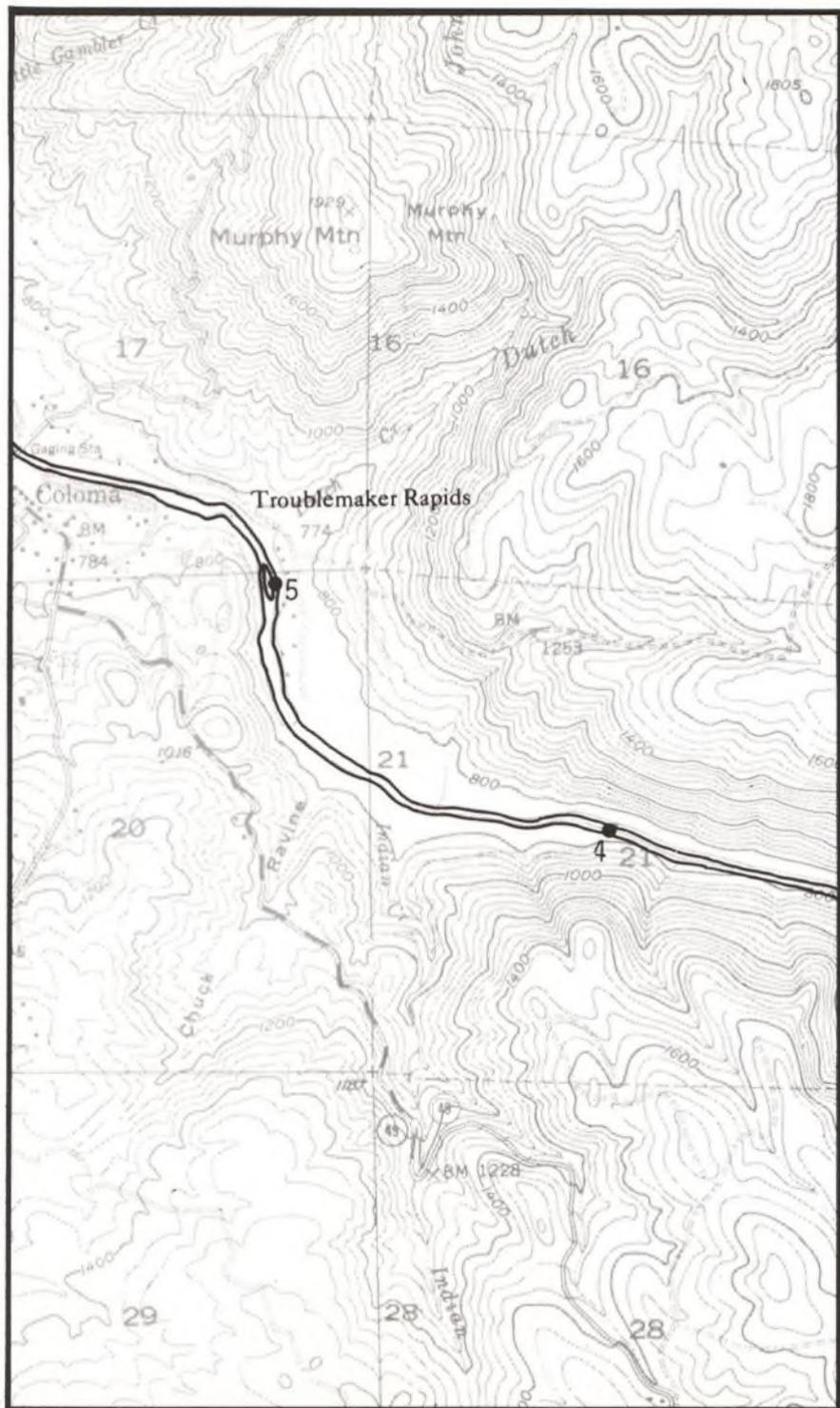
Mile .8

Visible at the top of the left ridge are the remains of the overhead tramway that was run by the Eureka Slate Quarry shortly after the turn of the century. The Quarry used the system of towers and cables to support 500 lb. slabs of slate as they were pulleyed high over the South Fork gorge.

The power for the tram was provided by water taken out of the Loon Lake reservoir and ditched to the town of Kelsey, then known as Slatington, some 40 miles away.

The system was abandoned in 1919, and shortly thereafter most of the towers were destroyed by fire. The steel cables, though, or at least parts of them, can still be found on the southern hillside.





Mile 0.9

Can Opener Rock. Like most of the boulders stranded mid-stream Canopener Rock is granite. The slates are too soft to withstand the grinding of the river during transport.

Mile 1.0 Quartzmines

The Chapparel, the Champion and the Excelsior were quartz mines that were located a short distance below Chili Bar. They were worked quite extensively, employing a ten-stamp mill run by waterpower.

Mile 1.3 Racehorse Rapids

Mile 1.3 Suckerslide Gulch

Mile 1.7

The river makes an abrupt turn to the north, around Long Point. On the right, across from Live Oak Bar, are some beautiful exposures of slate, sandstone and siltstone. A close look at the layering in the sandstone reveals its marine origin; the grains of sand in the bottom layers are biggest, those at the top are smaller and lighter. Such an arrangement is typical of rock formed by the "settling out" of water-borne sediments.

Mile 3.1 Coffin Creek

Triple Threat Rapids begins.

Mile 3.2 Matblers Co. Placer Mining Site

The pile of river rock is actually a "tailings pile" from an 1851-2 mining operation.

Mile 4.0

The slate bedrock gives way here to a body of rock known as the Coloma Granite. This mass of rock originally intruded into the slate more than 5 miles beneath the surface of the earth, where temperatures are high enough to turn granite into a semi-fluid. These 5 miles of material eventually eroded away

and undoubtedly helped create the rich bottomland of the Delta.

The country opens up here into low-rolling hills, a marked contrast to the steep-walled canyon upstream. The reasons relate directly to the composition of the bedrock. The granite here is mostly quartz-free, and, in comparison to the slate, sandstone and volcanic rocks upstream, weathers fairly easily.

The hills are spotted with exposed outcroppings of granite. These outcroppings owe their existence to the fact that granite chemically decomposes when in contact with moist earth, but is much more resistant to pure rainwater.

Mile 4.2 Clement's Gardens

Louis Clement and his wife built the terraces back from the bank in the 1850's. Their flower gardens were reputed to be lush productions of imported roses and shrubbery where elegant dinners were served by Chinese lantern light. Today, it is still possible to identify some of their imported shrubs now intermixed with the "natives".

The Clements were also the first winemakers in the Coloma area. They used mulberries which they cultivated along with a variety of other fruits.

In 1861, the land was bought by Jacob Rhinehart who farmed it for years before finally selling to some Chinese miners who worked the gravel over in 1870.

Mile 4.4 Indian Creek

The first gold quartz mine in the state was located just above Indian Creek, seen entering on the left at mile 4.4. In 1851, the stamp mill there was a primitive apparatus using wooden shafts fixed with iron "shoes". It was eventually improved to a 12 stamp operation which finally went out of business in 1858.

On the the left bank at Indian Creek a sawmill was also in operation during the earliest days of the Gold Rush. It was owned by the Brooks and Clark Co.

Mile 4.5 Pleasant Flat

Some of the richest claims on the river were found along a short stretch on the south bank here in 1852. Known as "Pleasant Flat", the bedrock underneath the bank and low-lying terrain was exposed by a large number of sluicing operations. Ditch water from two different creeks and the river wrapped their canals around the hills and down to the flat.

In 1860, the bar was hydraulically mined by the Cox and Nichols Co., and later by a group of Chinese. Today the giant mounds of tailings and overgrown ditches are the only evidence remaining.



An 1850 Long Tom Operation. One of the earliest photographs to show Chinese laborers, this daguerrotype was taken in the Pleasant Flat area and has become a "classic" Gold Rush photo.

Mile 5.1 Dutch Creek

Dutch Creek enters the main channel on the right. "Dutch" was a Forty-Niner's inexact term for any Northern European, but in this case was probably applied to a German miner called "Dutch John" who explored and mined the ravine in 1848. The confluence was the site of an 1853 sawmill, operated by the Agnews family.

Mile 5.2 Troublemaker Rapids

The granite here contains a good deal of quartz and is consequently highly resistant. The cable just downstream originally supported as pipe carrying irrigation water from the Coloma-Lotus ditch to the Gallagher Ranch at the base of Mt. Murphy.

Mile 5.3 Mt. Murphy

The steeply sloped peak visible on the right is Mt. Murphy, where Henry Bigler, a survivor from the famous Mormon Battalion delivered a Christmas Day sermon in 1847.

The name comes from Patrick O'Brien Murphy, an Irishman whose concern about hostile Indians led him to construct a fortress at the very top of the mountain in the 1850's. When it finally became clear that the Maidu weren't going to storm the hill, Murphy began using the cannon he hauled up to signal the approach of the Sacramento stage. It was subsequently removed and mounted in front of the Coloma Community Grange Hall, where it can still be found today.

Murphy's Cannon.
The Maidu never attacked.



HENRY BIGLER AND THE MORMAN BATTALION

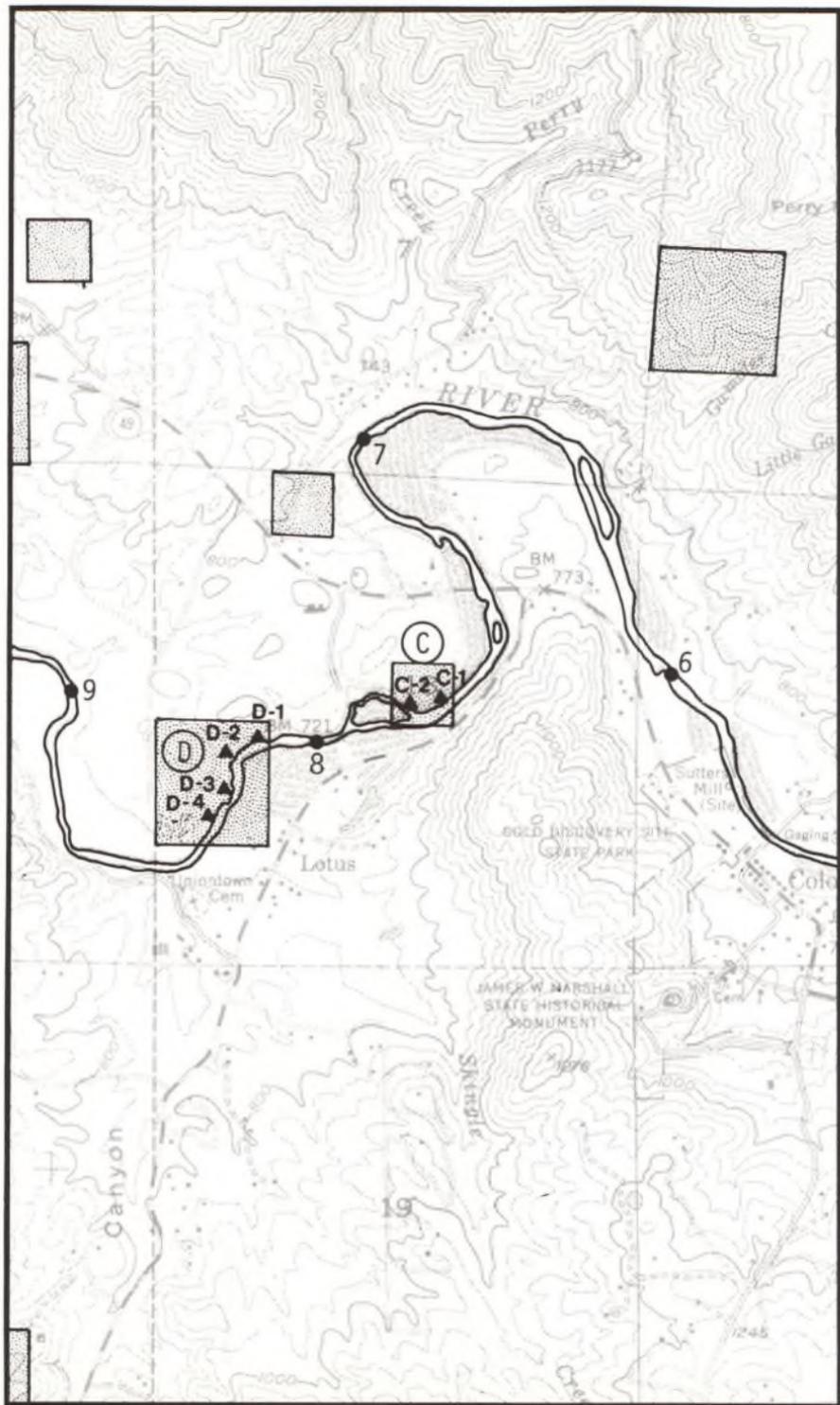
Working with Marshall on the construction of the wilderness sawmill was a group of seven men, Israel Evans, Azariah Smith, Alexander Stephens, James Brown, William Johnstun, William Barger and Henry Bigler — all of whom were Mormons who only two years previously had been with Brigham Young as he guided his people out of Illinois west toward a land where they would establish a new city. Midway into this great trek, war with Mexico broke out and President Polk suggested that the Mormons demonstrate their allegiance by forming a battalion of volunteers. This Brigham Young acceded to and persuaded some 500 of the men to enlist in Council Bluffs, Iowa on July 16, 1846.

Over the next six months the little army endured unbelievable hardships as they struggled over the 2,000 mile "southern route" with the avowed purpose of conquering California. In July of 1846, looking more like a scarecrow band of fugitives than a conquering army, the Mormon Battalion arrived near San Diego just in time to learn that the war was over.

Most of the group mustered out to head back to their families with Brigham Young, Henry Bigler among them. They chose a vaguely defined northern route, preferring unknown dangers to those they had left behind in the southwest. Their journey found them near Sutter's Fort in August of that year where many decided to spend the winter season working for Sutter.

Thus it was that the seven were in the Coloma valley some five months later when James Marshall came back from inspecting the tailrace with his hat cradled in his hands.

Henry Bigler eventually returned to Utah to settle in St. George, although not before doing some missionary work in the Sandwich Islands. He kept an extensive journal of his days in California and it was an entry of his that finally established the exact date of the first discovery: January 24, 1848.



Mile 5.6 Coloma Bridge

The one-lane crossing at Coloma is the tenth bridge that has spanned the site. Originally no more than a shallow fording spot, and then for a short time a ferry, the first bridge was completed at the site in 1850 by Ed Raun who charged for its use and reportedly collected up to \$250.00 per day in tolls.

High water years in the 1850's, '60's, and '80's kept the bridge builders in the area busy as a succession of structures came and went, the stoutest of which turned out to be a suspension affair built in 1881 that stood for 36 years. The existing structure was installed by the county in 1917.

Mile 5.4 Coloma

The town of Coloma sits by the South Fork in a broad, flat valley. The name, whose meaning is a matter of dispute, is of Maidu origin. There are indications that it once applied to a village in the area. Coloma is, of course, site of Marshall's gold discovery, and the town is now a state park.

In Marshall's later years he became something of a public, even controversial figure. He was called upon a number of times to authenticate his claim as the original "discoverer", and on one occasion set down his version of the events in this way:

Being a millwright by trade, as there was a ready cash sale for lumber, I concluded to seek a location in the mountains and erect a mill, to supply the valley with lumber. Some time in April, 1847, I visited New Helvetia, commonly known as the "Fort", where I made my resolution known to John A. Sutter, Sen., and requested of him an Indian boy, to act as an interpreter to the mountain Indians in the vicinity of the American River — or, Rio de los Americanos, as it was then called.

On the 16th of May, having completed my work for Capt. Sutter, I started, with an Indian boy, Treador, and W.A. Graves. On the 18th of May we entered the valley of Culluma; and on the 20th, Gingery joined our company. We then traveled up the stream now called Weber Creek — the Indian name for which is Pul-pul-Full — to the head of the creek; thence higher in the mountains until we arrived at the South Fork of the American River, where it divides into two branches of about equal size, from whence we



James Wilson Marshall

was born in Hunterdon County, New Jersey in 1810. As a boy he received a practical education, learning from his father the trade of wheelwright and carpenter. The journey that would eventually land him in California started in 1840 when he decided to seek fame and fortune in the far west. Initially, he settled down near Fort Leavenworth, Kansas, on the Platte Purchase, where he began to homestead a few acres. But over a period of several years his health worsened and, on the advice of a physician, he abandoned his home and joined an emigrant party bound for Oregon. That winter, in the year of 1844, Marshall spent at Fort Hall, on the Snake River. The following year he made his way to Oregon and thence California where July 1845 found him at Sutter's Fort.

Marshall's industry and skills soon enabled him to gather together the beginnings of another homestead some livestock, tools, and acreage in Butte County. But the Bear Flag Revolution broke out in 1846 and Marshall joined up with Fremont's California Battalion. That year he was a member of the rescue party that marched to Kearny's relief after the battle of San Pasqual.

In 1847 Marshall mustered out of the service in San Diego and made his way by foot back to Sutter's Fort where he discovered that his meager holdings had vanished in the revolution's turmoil. Consequently, Sutter's offer of partnership in a mill-building enterprise found in him a ready listener.

Marshall's later years were filled with frustration; his claims to the original gold discovery site were swept aside; his government pension was revoked; his health problems re-surfaced. He became something of a misanthropic recluse, working as a gardener in the Coloma valley area, until his death in 1880.

returned by Sly Park and Pleasant Valley to the Fort.

Marshall goes on to describe the months spent constructing the mill and the difficulties they had provisioning it. The moment of discovery is put in these words:

... we were in the habit at night of turning the water through the tail race we had dug for the purpose of widening and deepening the race. I used to go down in the morning to see what had been done by the water through the night; and about half past seven o'clock on or about the 19th of January — I am not quite certain to a day, but it was between the 18th and the 20th of that month — 1848, I went down as usual, and after shutting off the water from the race I stepped into it, near the lower end, and there, upon the rock, about six inches beneath the surface of the water, I discovered the gold. I was entirely alone at the time. I picked up one or two pieces and examined them attentively; and having some general knowledge of minerals, I could not call to mind more than two which in any way resembled this — sulphuret of iron, very bright and brittle; and gold, bright, yet malleable; I then tried it between two rocks, and found that it could be beaten into a different shape, but not broken. I then collected four or five pieces and went up to Mr. Scott (who was working at the carpenter's bench making the mill wheel) with the pieces and said, "I have found it."

"What is it?" inquired Scott.

"Gold", I answered.

"Oh! No," returned Scott, "that can't be."

I replied positively — "I know it to be nothing else."

Within a year of this portentous event, the lonely sawmill site became home to: bakeries, blacksmith shops, livery stables, meat markets, restaurants, bath houses, banks, hardware stores, law offices, a court house, a theatre, newspaper office, an art gallery, gunsmith's, post office, fire house, 13 hotels, 2 breweries, and a growing number of gambling halls and saloons.

One consequence of being the first place invaded by the Forty-Niners was becoming evident by the late 1850's when Coloma gained the less noteworthy distinction of being one of

the first abandoned by them. By 1883 the population had dwindled from a high of 10,000 transients to a more stable 2000, nearly all of them settlers.

Quite apart from its mineral wealth, the Coloma valley was blessed with the more lasting qualities of fine soil and a long growing season, and it was these that the new Colomans meant to exploit.

James Henry Gallagher, born in 1865 on a ranch near Dutch Creek, began an orchard on his homestead at the base of Mt. Murphy in 1904. He married Louisa Veerkamp, daughter of a well-known pioneer family, and had three sons, Melvin, Raymond, and Frank.

Frank and Raymond share their remembrances of Coloma from 1905 to 1930:

. . . We spent a lot of our time caring for the orchards and vineyards. There was the spraying and pruning, all the irrigating in the summer . . . and then the picking and loading. We grew pears and all kinds of plums and sent them by railroad to New York and Boston . . . the Freestone peaches went to San Francisco, and the lady apples, they used to be quite popular. Folks would use them as Christmas decorations. We had to polish each one before we packed them in shelf paper. Some were even sent to the islands.

We got all our irrigating water from the ditch. There was a cable that suspended an eight inch pipe across the river above our swimming hole. It was our job to keep the opening clear of twigs and leaves. One time we even found a turtle in the hole! We'd put a stick in the hole if we needed less water . . .

When our dad went to school in Coloma, there were over a hundred kids. There were six when I went. Everyday when we came home from school, we used to have to hike all over Mount Murphy to get the cows and bring them down to milk . . .

. . . in the summer, there was hardly any water. I've seen that old river when you could jump across. We didn't have much time then. We had

lots of work to do. But we used to take Sunday afternoon off and go down to the swimming hole and sand bar . . .

In 1970 the State acquired a large portion of the Gallagher property for the Marshall Gold Discovery Site Park and removed the 60 year old buildings and orchards.

Mile 5.6 Coloma Community Grange Hall

Just below the bridge on the left stands the Coloma Community Grange Hall. The property was originally donated to the townspeople by James H. Gallagher in 1930. During the depths of the depression the money was raised within the little community and the structure was built over a two month period with everyone pitching in.

The State Park "Master Plan" of 1980 called for the acquisition and relocation of the building, which has housed countless community events and get-togethers, but local sentiment has been strongly resistant.

Mile 5.7 Sutter's Mill

A replica of Sutter's Mill erected by the State stands up the left bank. The actual location of the original sawmill is about one quarter mile downstream and is marked by a stone monument.

John A Sutter was a Swiss immigrant who arrived in California in 1839 with ambitious plans. Looking around, he saw in the little bayside village of Yerba Buena plenty of opportunity for a man with energy and vision. So thinking, he set about finding ways to provide some of the necessities of growth for the new American territory.

In 1847, Sutter was involved in the construction of a flour mill at Natomo, but a shortage of lumber had stalled the project. It was just at this fortuitous juncture that James Marshall arrived, with his offer to build a sawmill in the mountains. A partnership was soon formed, the Coloma site located, and by the end of that year prospects for success must have looked excellent.

All of this, though, was before the events of January 1848.



Johann August Sutter

was born in Kandern, Baden in February 1803. The facts regarding his ancestry and early life are obscure, at least partially owing to the fact that his own statements are contradictory and frequently misleading. Amidst the confusion, it seems certain that in 1826 he married Anna Dubeld by whom he had three sons and a daughter, and, after a number of "escapades", took his abrupt leave from Berne in the spring of 1834, eventually arriving in St. Louis. The following three or four years were spent drifting about the West, joining an emigrant party to Oregon and sailing to Honolulu, Sitka, and finally arriving in San Francisco in 1839. Shortly thereafter Sutter received a grant to begin his colony "New Helvetia" in the Sacramento Valley.

Sutter's energy and ambition were soon rewarded by the early success of his new Californian estate. Land was cleared, irrigating ditches were dug, grain was sown, orchards and vineyards were planted and a fortified "post" was soon erected. Sutter was a delegate to the convention which drafted the first state constitution, and was a candidate for the governorship in the state's first election.

The discovery of gold, however, began a gradual decline in Sutter's fortunes. He left his Sacramento fort for Hocks Farm in Yuba County where he began a long, and ultimately unsuccessful, campaign to receive compensation for the loss of his land grants. He died in 1881 in Lancaster County, Pennsylvania, frustrated in his dealings with the government but remembered by history for his important, but unwilling role in the California Gold Rush.

While the new discovery meant riches for many, Sutter described it in these terms in 1857.

“What a great misfortune was this sudden gold discovery for me! All my great plans were destroyed. Had I succeeded with my mills and manufactories for a few years before the gold was discovered, I should have been the richest citizen on the Pacific shore; but it had to be different. Instead of being rich, I am ruined.”

His tannery, flour mill, saw mill and all his other “mechanical trades” languished and fell into disrepair when his workers, almost to a man, left their tools and took off for the new El Dorado. He himself made a brief effort at mining but “the expedition proved to be a heavy loss”. Following this experience, he decided to have no more to do with this gold affair and so left his fort and moved to Hocks Farms, near present-day Yuba City.

Sutter's Mill. Charles Nahl





A Contemporary View of the Sutter's Mill Site. The arrow indicates where the original mill was located. The tailings from dredge operations have turned the modern river out of its old bed.

Mile 5.9 "The Last Chance"

John Nicholson, one of the discoverers of the Last Chance Mine, shared in the \$90,000 worth of gold that was first found here in 1862. The story goes that three miners were ready to give up on the place when a Sacramento firm staked them with supplies. They resumed mining, struck it rich, and called the claim appropriately enough, "Last Chance".

Mile 6.1 Tunnel Bend

The river begins a turn to the left here and then cuts back on itself in an oxbow about $1\frac{1}{2}$ miles long. To the miners looking for ways to divert the water out of its bed the turn suggested an ambitious plan; and, in July, 1850, a group of them banded together to form the South Fork Tunnel Company, headed by John T. Little. One hundred men labored for almost a year cutting a water level shaft — six feet wide, seven feet high — through the granite hill below Coloma.

When the men were finally able to turn the river out of its bed, the diggings turned out to be an expensive disappointment and a flood soon caused the South Fork Tunnel Co. to close up operations.

Mile 5.6-9 Dredging

The depression era brought a resurgence of interest in placer gold mining. Wages and material costs were down, new extraction technology existed, and men were out of work. The three factors combined to create a mini-rush back to the Mother Lode for a look at what the Forty-Niners had left.

One of this new breed of miners formed a dredging operation that worked up and down the river from Coloma to Lotus. The dredge was described as a "Doodlebug rig," a barge with a generator powered sluice box that was floated within a man-made reservoir scooped out of the river bottom and attached by cable to the banks.

A dragline operated bucket collected and deposited gravel loads into a hopper that sorted out the gold. The entire operation was moved from time to time as the gravel played out. For six years one company, known as the General Land and Mining Co. worked this stretch of river. Whether they ever



A "Doodle-bug Dredge". From the 1920's

struck it rich or not is a matter for speculation. Landowners of the period report that the dredgers would never let on how they were doing.

Mile 6.4 and 6.5 Little Gambler and Gambler Creeks

The extent to which this section of the river was originally inhabited by the Forty-Niners is evident in the profusion of names given to nearly every creek and gulch. Witness these two small drainages on the right.

Mile 7.0 Old Scary

The river bends abruptly to the left and approaches the rapid "Old Scary". Originally the river's course was more direct, gradually bending over a quarter of a mile, but the Forty-Niners diverted it into an artificial channel where the river still flows today. The original bed shows the overgrown scars of placer and pocket mining, and is now a campground.

Mile 7.7 Cemetery

A Chinese burial grounds once existed on the hill above the road. The graves were emptied and the remains taken back to China when the last of the Asian miners left for their homeland.

Mile 7.8 Sawmill Site

On the left is the former site of the Stearns and Chapman Co. sawmill — next to Sutter's, the oldest in the area. The demand for lumber outstripped production in the early 1850's and for a time the mills were charging, and getting, \$500.00 per thousand board feet.

Mile 7.9 Lotus Bridge

Portions of cement piers and steel bar are the only evidence of the old Lotus Bridge that was first erected in 1850. From 1881 to 1917 it was the only wagon crossing between Salmon Falls and Placerville.

In the mid-60's Highway 49 was realigned and the old Lotus Bridge was demolished by Caltrans.

The Chinese in the Goldfields

Unquestionably the most distinctive of the foreign groups to work the California gold fields were the Chinese. Understanding how and why they arrived in such numbers (20,000 through San Francisco in 1852 alone) is helped by a little familiarity with conditions in China at the time.

In 1850, China was a vast collection of separately governed districts. The political picture was an ever shifting pattern of alliances made and broken between districts, with a good deal of economic hardship the results for a large percentage of the population. In addition, a revolutionary movement was gathering strength against the Manchu dynasty, who for 200 years had ruled over the political patchwork of China.

Against this background of political turmoil and economic hardship the news of gold and good wages in America excited a great deal of interest. Particularly in the Pearl River Delta, the area around Canton where sea voyages were nothing extraordinary, there were many who looked upon a sojourn to California as an adventure and a good opportunity to better their status at home.

Such an attitude reflects the major difference between the Chinese and many of the other ethnic groups that came to make their fortunes. The Chinese never really left home; they took it with them. They organized dozens of little "Chinatowns" throughout the Motherlode where they kept their language, appearance and customs intact. Their intention was not to settle down, but rather to work hard, gather up some savings, and finally to return home to family and motherland. And for the vast majority of them, that's exactly what happened.

Mile 8.2 Lotus

The town of Lotus sits back from the left bank.

“Marshall” was the name originally given to the mining camp that sprang up on the site in 1850; later that was changed to “Uniontown” to honor California’s admission as the 31st state. When the townspeople applied for a post office in 1881, it was discovered that the name was already taken. George E. Gallaner, the first postmaster, suggested “Lotus” because it seemed to him the inhabitants of the town were about as easy-going as Homer’s fabled “lotus-eaters”.

Lotus went through the same precipitous rise and fall back in the 1850’s and 60’s as did Coloma. From a peak of 2,000 transients in 1850 to a steady 20 families or so by 1900. The Bassi, Wagner and Herzig families — all of whom grew up by the little riverside village — share their memories:

“Everyone raised their own vegetables and all their fruit. We just bought our staples, like flour and sugar, at the stores. We made our own cheese and butter, salami, sauerkraut and wine ... we packed meat in lard and smoked all our ham and bacon in the smokehouse. We had beef cattle and milk cows. We hunted for deer, rabbit, squirrels, and sometimes we went fishing for suckers and pike at old Chesapeake.

Mostly we went to school and worked when we got home. The chores were lined up and that’s all there was to do. In the summer, we put bells on all the cows and herded them up to our property in the Sierras. There were all kinds of meadows for the animals to graze. And when we left in the fall, we stocked food in the cabins and left the places open, just in case hunters or travellers got caught in a storm.

Entertainment? Well, we played baseball at the ballfield in Lotus. We had picnics on Mother’s



“Entertainment? . . . Well, we played baseball at the ballfield in Lotus. We had picnics on Mothers’ Day, May Day, and the Fourth of July.” Herb and Al Herzig in a 1917 Reo, Lotus’s first truck.

Day, May Day and the Fourth of July. Everybody in town who wanted to come was invited. There weren’t any phones or telegraphs then. I remember the fight between Jim Jeffrey and Jack Johnson in Reno, one Fourth of July. One fellow rode all the way to Placerville to find out how it turned out.

We went to dances with our parents at Schultz’s (Sierra Nevada House II), and danced the fox trot and waltz to the orchestra music. We saw our grandparents every Sunday afternoon. And as soon as anybody new would move to town, everyone went over to visit them. We were glad to see anybody move here.

Mile 9.0 Camp Lotus

William H. Valentine first homesteaded the property now known as Camp Lotus in December 1868. President Andrew Johnson was in office.

Valentine planted his 160 acre piece in grapes, pears and peaches. He sold a portion of it to Albert Herzig in 1907.

In, 1939, the General Land and Mining Co. contracted with Albert for mineral rights to his riverbank. They proceeded to dredge the area for two years, leaving thirty foot piles of rock on Herzig's riverbank.

The El Dorado County Department of Roads removed most of the tailings in 1961 and levelled the remainder into a private access road.

"That's when our troubles started," Herzig remembers, "with a good road down to a nice picnic spot, you couldn't keep the public out."

Herbert and Marcella Herzig, who had inherited the 55 acre ranch, applied for the Riverview Park Campground permit in the late 60's. The property changed hands again in 1976 to become present-day Camp Lotus.

Mile 9.4

A shallow area marks an old ford where travellers frequently crossed the river to avoid the toll bridge at Lotus. It was known at the time as White's Ford.

Mile 10.0 Wagner Ranch

The Jessie Franklin Wagner Ranch used to front the river on the left here. Its nineteen hundred acres included nearly a mile of riverfront and was partially bought with the profits of a quartz mine that Frank and John Wagner first discovered in 1885.

Frank's son George remembers the early days of the Wagner Quartz Mine:

It was a four foot wide ledge of quartz that came out of the ground. There was a steam-powered engine to work the machinery and they just followed this ledge into the hillside. They only had

candles for lights, but they found \$10,000 worth of gold in six months!

They never worked the mine on a steady basis though. In 1906 my Uncle John sunk a 110 foot deep shaft with a 175 foot lateral drift (tunnel). He was trying to get at the whole ledge of quartz gold, but the shaft and tunnel were way below the vein. It was a real failure and he went broke. He had to go back to teaming, hauling freight by horse and wagon.

Then in 1913, my father took a notion to go back into it. He sunk another shaft 80 feet deep with an 80 foot horizontal drift off it. They timbered the tunnel to hold the walls out and the ceiling up. They used carbide lights ... and they only mined in the spring and the summer. It was just too wet other than that.

... There was a real staggered distribution of quartz that had big chunks of roscolite in it. It was within the black mineral that you could easily see the concentrated gold. It was a lot of work to hoist all that rock out of the shaft using a gas engine for power. By golly, though, within six months of starting to mine in 1913, my dad and uncle struck it rich! They made over \$10,000! I remember one brick that weighed thirteen pounds. That was a lot of money back then.

Mile 9.4 - 11.0

The riverfront acreage here is owned by the Bacchi family, one of the largest landholders in the valley.

The ranch was started by William Bacchi, a Swiss immigrant who came with the original wave of gold seekers in 1849, but, like many of the Forty-Niners, he soon turned to other pursuits less colorful, but a bit more reliable than gold panning.

By 1861 Bacchi had winter pasture for a herd of dairy cattle in the South Fork valley and had homesteaded summer range in the Sierras.

A son, Henry, was born to him in 1879. The younger Bacchi carried on the family business, homesteading acreage near Lotus and raising cattle for beef. His son — Francis, recalls what early ranching was like along the South Fork.

“We cleared thousands and thousands of acres of land. We girdled a lot of trees. We used a pole ax to chop all the bark off the base of the tree. When the trees died a year later, we cut them all down, and the roots rotted. We ran over five hundred goats in there to eat back any suckers. This way we made winter pasture for our cows, but we never planted any grass. We just got the shade off the ground and let the sun hit it and nature took over. The fillory, burr clover, and soft chess stem grass grew tall. . .”

In 1952 the Bacchi ranch totalled some 13,000 acres between Salmon Falls and the Sierras. Since then, however, government projects at Folsom and Stumpy Meadows have reduced their holdings.

William Bacchi



Mile 10.6

Rapid formed by resistant ledges of granite and stranded boulders.

Mile 11.1

Rapid formed by a gravel bar accumulated over a resistant granite ledge.

Mile 11.5 Greenwood Creek

Mile 11.9

A shallow area here was once called Hawk's Ford.

Mile 12.0

A stream flow gauging station is maintained here by the United States Geological Survey. The cable and car enable a worker to make precise measurements of the river channel.

Mile 12.3

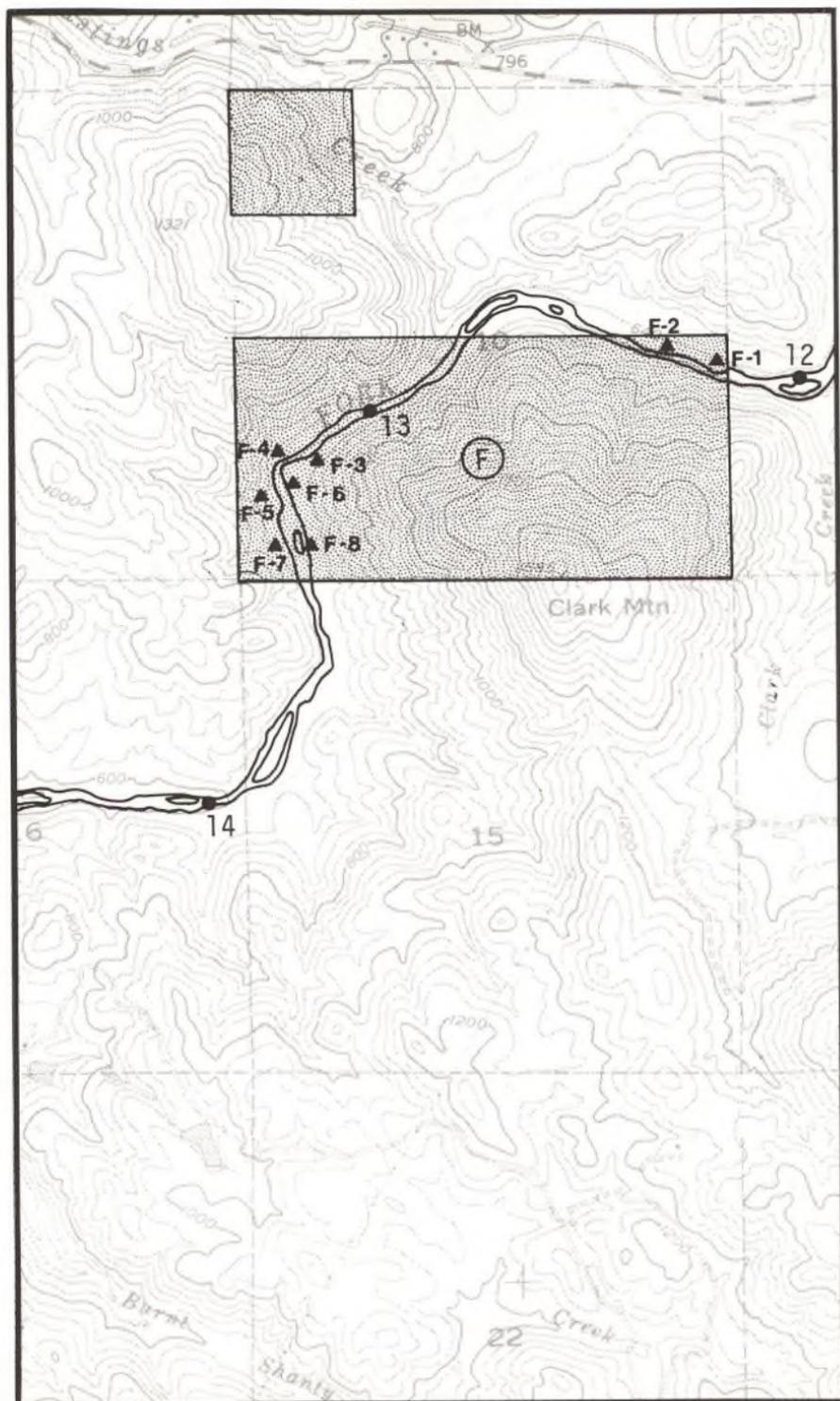
The river enters a new geologic zone called the "Sierra Foothills Melange". "Melange" means, literally, "a mixture". And the rock in this area is indeed well-mixed: fine-grained chert, dark greenstone, and dark speckled gabbro. All were originally ocean bottom sediment, compressed, heated and crushed to the point where they have been changed ("metamorphosed") into different rocks.

Mile 12.5 Hastings Creek

The flat on the right was formerly known as Dutch Bar. A green band of serpentite is downstream on the same side.

Mile 12.7

The river turns to flow southeast, parallel to fault lines in the melange bedrock.



Mile 12.9

One F.C.Nigley arrived at the South Fork placer diggings in August, 1849, and, after a variety of experiences, joined together with a group of other miners to dam and divert the river at this point.

Mr. Nigley, a native of Pittsburgh, Pennsylvania, kept a remarkable journal of his days in California, from which the following section is excerpted:

August 9, 1849

This town is now called Colloma and is the County Seat of El Dorado County ...found here an immense no. of miners, among them two Polish Mssrs. who got here yesterday. Quite a smart town here. Nearly every house is a store. The prices are at present: Flour, 50 cts. per 1 lb., Bacon 1 dollar and all other things in proportion. Boarding \$28 per week.

August 10

dug and washed all day and only got 2¢ dollars worth. Not enough to board one.

August 11

today two others with myself bought a washer or rocker. Paid 4 oz. for it and went to washing out gold with it. got about \$16 worth. It costs at least 2¢ per day to buy your provision and cook it yourself and sleep under the trees.

August 12

worked out a little better than yesterday, not much.

August 14

today got \$8 worth each. on last Sunday 11th wrote to my wife.

August 15

worked hard and only got about \$1 worth each and became a good deal discouraged.

August 16

today got 22\$ worth of dust for 3

Sept. 15

Prospected down the River and found a place to dam the river 7 miles down that I think is far better than the other one up the river, but on discussing the matter over, came to the conclusion, that it was too late in the fall to dam the river this year, so wrote out and posted notices of our claim to this portion of the river and decided to look for a place in

the Dry Diggings, where we could work during the winter and then put in our dam when the river was low enough in the summer.

July 1st, 1850

Left the others working our claim and took Patterson and went to work in another claim up to the 16th. Done very well-averaged \$33 per day. But the river has fallen low enough, so that we should commence our dam. We cleaned our claim. Put what property we did not take down with us into the cabin. Went seven miles to Coloma and down the South Fork 7 miles to our bar and we named it Butter Bar. other companies were trying to jump our daming claim so often that we had to send two men to maintain possession. and it cost us considerable. The name of the co. going into the dam, F.G. Wegely, I.O. Patterson, P. Bergan, J. Beiber, M. Herson, S.S. Beatty, Wm. J. Stewart, M. Mechling, John Chamberlain, Frank Gerbode, Thos. I. Tadbroke. I had bought the interest of the 12th man Greib out. so that I had two shares, hiring a man to work for me.

Aug. 1st-

Spent all the last part of July working on the dam or rather the race for the dam and during all the month of aug. continued ourselves and hired all the hands that we could get at \$6 per day on the race and getting out for the dam on the 10th.

Aug-Sept.

...all the last part of this month we worked at our dam and finished it on the 17th of Sept, 1850. From that day to the 24th had seven good days work in the bed of the river. The first days yield was \$364 worth of gold. 2nd day \$624. 3rd day, \$990. 4th day, \$1516. 5th day, \$2511. Sixth day \$4250. Seventh day \$6600. total takeout of our daming claim was \$16,855 and our total expenses were for wages, provision... and all other was \$11,460. leaving a profit of \$5855. being 12 shares made per share \$448. clear profit and as I had two weeks previously bought out Gerbode and Tadbroke I held 4 shares. All agreed to defer the reputing in of our dam until next summer and that we would go back to the dry diggings for the winter and come back and put the dam in again next summer. but as had promised my wife that I would not stay away more than 2 years concluded to start for Pgh. (Pittsburgh).

...Our dam held the longest against the flood. but about 2 o'clock the large logs of the dam at Dutch bar which was built on the same place as ours, came down. Stuck ours and took it away. Some very bad language was used about that time.

Sept. 25, 1850

Started for Penn. fully intending to bring my wife back with me to be at putting in the dam again next Spring.....

Riverbed Mining. A typical operation of the 1850's. Nigley doesn't mention the use of waterwheels, but they were quite common as means to pump seepage or move debris around.



Mile 13.6

Sharp right hand bend, just above a drainage called Clark's Creek. On the right side cliff are examples of hard greenstone knobs in a flattened rounded shape geologists refer to as "pillowed". Such a form is created when hot, semi-fluid lava settles onto an ocean floor.

Mile 13.7

The black, shiny rock on the right is a mineral known as serpentinite.

Mile 13.8 Old Chesapeake

Forty-Niners blasted channels all through this area, turned the river from its course and washed the riverbed gravel through sluice and rocker box. Known as “Old Chesapeake,” the deep holes became the favorite swimming spots for the Jessie Franklin Wagner family around the turn of the century.

Mile 13.9 Convict Rock

The granite boulder just off the left bank was named “Convict Rock” in late July of 1903 when Lotus storekeeper Chris Ulhenkamp spotted the clothes of thirteen Folsom Prison escapees spread all over it.

At the same time, the National Guard, which had been called out in the hunt for the thirteen, were only a few miles away, at the Wagner place. George, who was only four at the time, remembers:

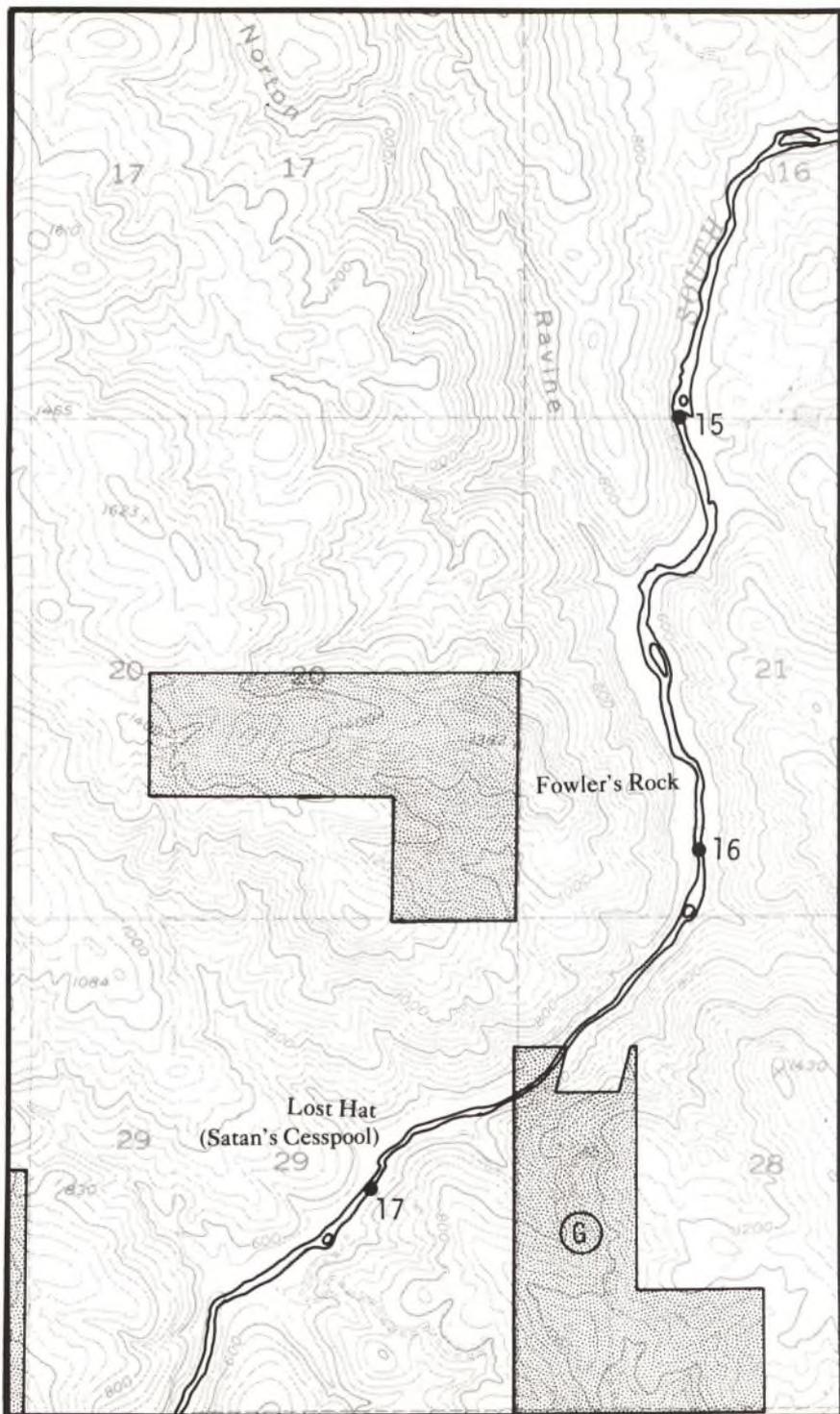
Blue uniforms with big white stripes down the side of the pants...and brass on their caps. They marched up to the house and stacked their guns. You know how they pile their guns, like a teepee. They left one man to guard them, while my mother fixed food for all of them. She sent my sister and I down to the chicken house and told us to get every egg we could find. They ate everything!

Within six months, six of the men were recaptured, tried, and convicted of killing a guard — a crime for which all six were hung.

The gang leader, “Red Shirt” Gordon, together with the other six, were never found.

Mile 15.0 Lolly-pop Tree

The signal for the approach of the lower gorge is visible on a downstream hilltop.



Mile 15.4 Burnt Shanty Creek

Mile 15.5 Norton Ravine

This drainage follows a major fault called the Bear Mountains fault zone. An early mining camp known as Rock Bridge formerly existed here.

Mile 15.6

The Albion Co. ran a flume and ditch wheel operation on this flat similar to the one pictured here.

Mile 15.8 Fowler's Rock

Named after Jeff Fowler, a boatman who once made a memorable, but unscheduled stop here. The boulders are of greenstone and chert. This is the first rapid of the gorge.

Mile 16.0

The river cuts through the Bear Mountain fault zone and encounters the hardest rock yet: amphibolite and chert. The amphibolite is highly metamorphosed ocean bottom sediment, subjected to intense pressure and temperature.

Mile 16.0 The Gorge and the American River Land and Lumber Company

The river narrows at this point as it begins to drop into a 3 mile gorge with steep granite banks and a constricted channel. It was in this section during the years 1891-1899 that river drovers working for the American River Land and Lumber Company used tons of black powder in an effort to clear a channel for timber felled on the Georgetown Divide and floated from a point several miles upstream of Chili Bar.

Their efforts were destined to fail, as one of the early workers commented: "...that river just couldn't be drove." But the ten years and one million dollars they expended in trying makes for a story worth retelling.

The Georgetown Divide is a ridge running westward from Lake Tahoe to the Central Valley, separating the drainage of the South Fork of the American from that of the Middle Fork. Around the turn of the century, its outstanding forest began attracting the attention of lumbermen, one of whom called it: "The finest growth of sugar pine of any section of the state; trees growing up to eight and ten feet being quite common."

Unfortunately, the area is very rugged and at the time was a considerable distance above the nearest railway line. It was, as the journal "Pacific Coast Wood and Iron" put it in 1889, "quite inaccessible."

One man, however, thought he had the key. Horatio Gates Livermore was an immigrant from New England where lumber companies had been driving timber down rivers for years, and with great success. There was no need to build expensive flumes or spur lines when nature provided a ready-made highway.

An early survey of the river seemed to indicate no insurmountable problems, although a dam would have to be constructed near the town of Folsom to create a holding pond at the end of the run. In 1866 Livermore first began construction, but it wasn't until more than twenty years later, after he had arranged with the state to use prison labor, that real progress began. Between 1888 and 1893 the convicts put in 520,000 man-days building a dam 89 feet high and 450 feet across the top. It backed water up for a distance of four miles.

In addition, they constructed a granite canal around the dam designed to carry logs to the mill pond and water to an electric generating plant. The same plant, incidentally, operated continuously from 1895 to 1952.

Once the dam was well underway, Livermore began forming his timber company, the American River Land and Lumber Co, and set his sights on the Georgetown Divide.

Over the winter of 1891, the first cutting took place. The timber was transported with the help of immense cattle powered trucks and a temporary chute was constructed down Slab Creek, a tributary entering the South Fork upstream of Chili Bar.

Once into the water, the logs were “herded” downstream by river drovers, most of whom came from Canada, “...fine men, all over six feet and tough. They were hard working, hard drinking men.”

Ed Morton, one of those so described, talks about his experiences on the very first run:

When the first boat started on the first log drive, I was in it at one oar, an Indian boy at another, and a Swede at the back of the boat with a pike pole. The Swede got his pole caught between some rocks when the boat was right opposite the mouth of the log chute. The crazy Swede couldn't get the pole loose and wouldn't let go. I was pulling for all I was worth on the oar. The Indian told me to be careful, that we'd be sunk if I broke an oar. I said, “Well, let me hit that crazy Swede over the head with it, then.” About that time the current pulled the pole out of the Swede's hands and the boat went on down and we beached it. Just then a string of logs roared down the chute into the river.

They lost a lot of boats in that rocky river bed. Usually they took them down the narrow places with snub ropes handled by men on the shore. But one Indian from Canada was really handy with a boat. He got to drinking and took the boat down the rapids by the swinging bridge (at the site of the present Old Mosquito Road bridge) at flood stage without hitting a rock. All the time he was singing and shrieking at the top of his voice.

The trickiest section of the river was found at the gorge and at Salmon Falls; not only did the falls themselves have to be negotiated, but a small diversion dam operated by the Natomas Water and Mining Co. as well.

That spring of 1891, the first year of operation, some 2,000,000 board feet of timber were started, but only 700,000 reached the holding dam. The rest were stranded at Salmon Falls and above. It was hardly an auspicious beginning, and, in fact, there was talk of building a railway around the falls and



River Drovers of the American Land and Lumber Company.

Horatio Livermore hired the best rivermen he could find for his timber venture. Most of them were from Canada, "all over six feet and tough".

gorge, or possibly a flume, but it remained only talk. Instead, boulders were blasted out of the narrows in an effort to open up the constrictions.

Meanwhile, at the head of the run, twelve miles of 3 foot gauge rail was brought from San Francisco to bring the logs from the interior out to the head of the chute. At the bottom, a small "splash dam" was built to enable the men to send a sudden surge of water downstream to "splash" jammed logs over obstructions.

The supervisor, Colonel Cummins, announced enthusiastically in the summer of 1891: "I am up to my ears in business; in fact, I am buried. There is timber enough to keep us logging for three or four years. This is good news and victory already perches on our Sugar Pine Banner." Perhaps.

The next season started well enough. Warm rains in April raised the river enough to start the drive, the *Placerville Mountain Democrat* reported: "We get word that the river at Chili Bar is full of timber. The weather, however, has turned a little cooler and the rain ceasing may check the rise of water for some time, but the snow is in the mountains and must come down."

It did, in fact, finally come down. But over the course of a very cool spring, and very slowly. Once again, most of the logs never made it past Salmon Falls. Those that did, however, were trapped by the new boom built just above the holding dam. Constructed out of solid cement piers and steel cable, it was, in the words of the *Sacramento Union*, "...sufficient to support any strain that might be put upon it." One shouldn't always believe what one reads in the newspapers, though, and, in December of that year, the boom broke in the midst of a huge storm, sending hundreds of thousands of board feet over the top of the dam.

Whether or not Colonel Cummins ever got the chance to unbury himself is never made clear because shortly after this event we read, "Colonel Cummins has been superseded as Superintendent of the American River Land and Lumber Co."

The owners were not ones to give up easily however. That summer each of the shareholders were assessed a \$15 per share fee and a new, permanent chute was built on the hill above the

mouth of Slab Creek at a cost of some \$60,000. It stretched steeply down to the river for 2900 feet at a 30 degree incline.

One witness described the trip made by logs down the chute as follows:

“An engine (steam donkey) at the head of the chute hauls the logs by means of wire rope from the rollways in groups of five to eight, and as they reach the verge of the hill, their speed is considerably accelerated; and after passing 100 feet or so down the chute, they vanish in a cloud of smoke caused by their friction in the chute, a rumbling, whizzing sound following them for several seconds and the final plunge into the river being distinctly heard a distance of a mile back from the canyon.”

The drive of 1893-94 was another disappointment, but the following season was an especially high water year and a near success. Buoyed by this experience, the main mill at Folsom — the first all-electric sawmill in the world - was pushed to completion. Meanwhile, up on the Divide, the cutting continued unabated. After another mediocre floating season, the crews had accumulated 20 million board feet of prime sugar pine at the head of the Slab Creek chute, ready for the trip to Folsom.

The loggers waited anxiously for the winter rains to begin, and when they did, the first of the 20 million was started. The rains continued and the logs stranded from previous years floated free, over the falls and into the boom. The basin was filling fast and it appeared that the long gamble was finally paying off. Meanwhile it continued to rain. And rain.

On March 25, 1899, the boom broke again, sending more than three million board feet over the dam and downstream — some as far as Rio Vista, more than 50 miles away.

It was the final blow. The American River Land and Lumber Co. was sold to its creditors. Horatio Gates Livermore never saw the end, having died in 1879, but his sons, to whom the enterprise had passed, managed to absorb the loss and indeed went on to help establish the Livermores as one of Northern California's foremost families.

Mile 16.6

The walls are black amphibolite. Tailings on the right are from an early mine site.

Mile 16.8

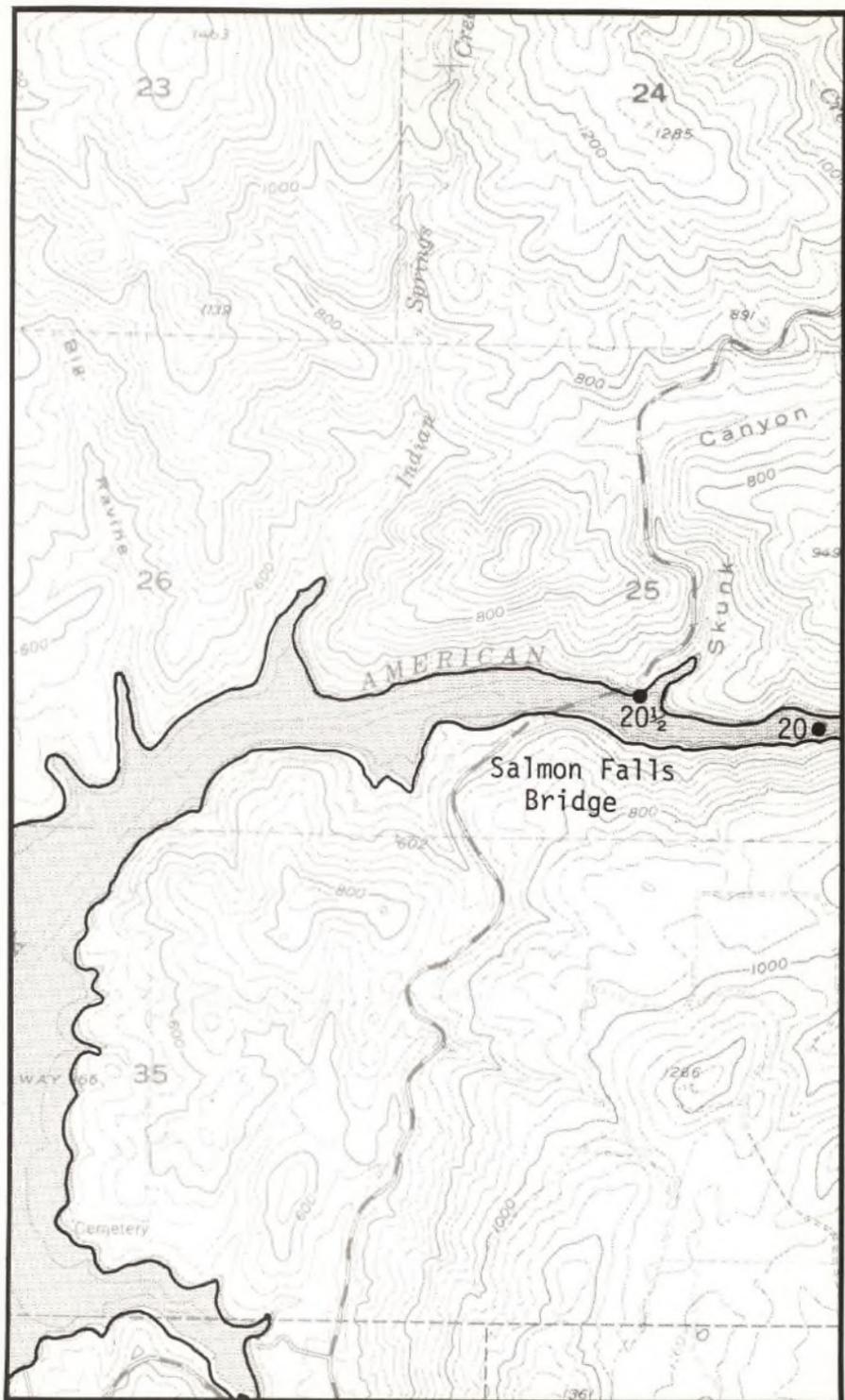
The large pool indicates the presence of a fault zone. The orange outcroppings on the right are serpentinite.

Mile 16.9 Lost Hat (Satan's Cesspool)

The ledges are of amphibolite.

Lost Hat Rapids. Under marginal control.





Boats on the South Fork

Very likely the earliest boaters on the South Fork were the river drovers of the American River Land and Lumber Company of 1891 through 1899. Negotiating the South Fork gorge today may seem challenging; but herding thousands of logs through the same passages while poling a fifteen foot wooden scow was very likely a whole different experience.

With the introduction of inflatables and canvas covered foldboats after the Second World War, it was inevitable that a few whitewater pioneers would try the stretch of river from Chili Bar to Folsom in the new craft; and by 1951 there are a few early reports of just such attempts. James White, for one, recalls taking a foldboat from Coloma to Lotus in the spring of 1951.

John Jastraub, of Sacramento, was another early river runner, and, along with Jim White, a part of a group called the Sacramento White Water Kayak Klub. The group sponsored trips on the Sacramento and lower forks of the American primarily in foldboats, but also in open canoes.

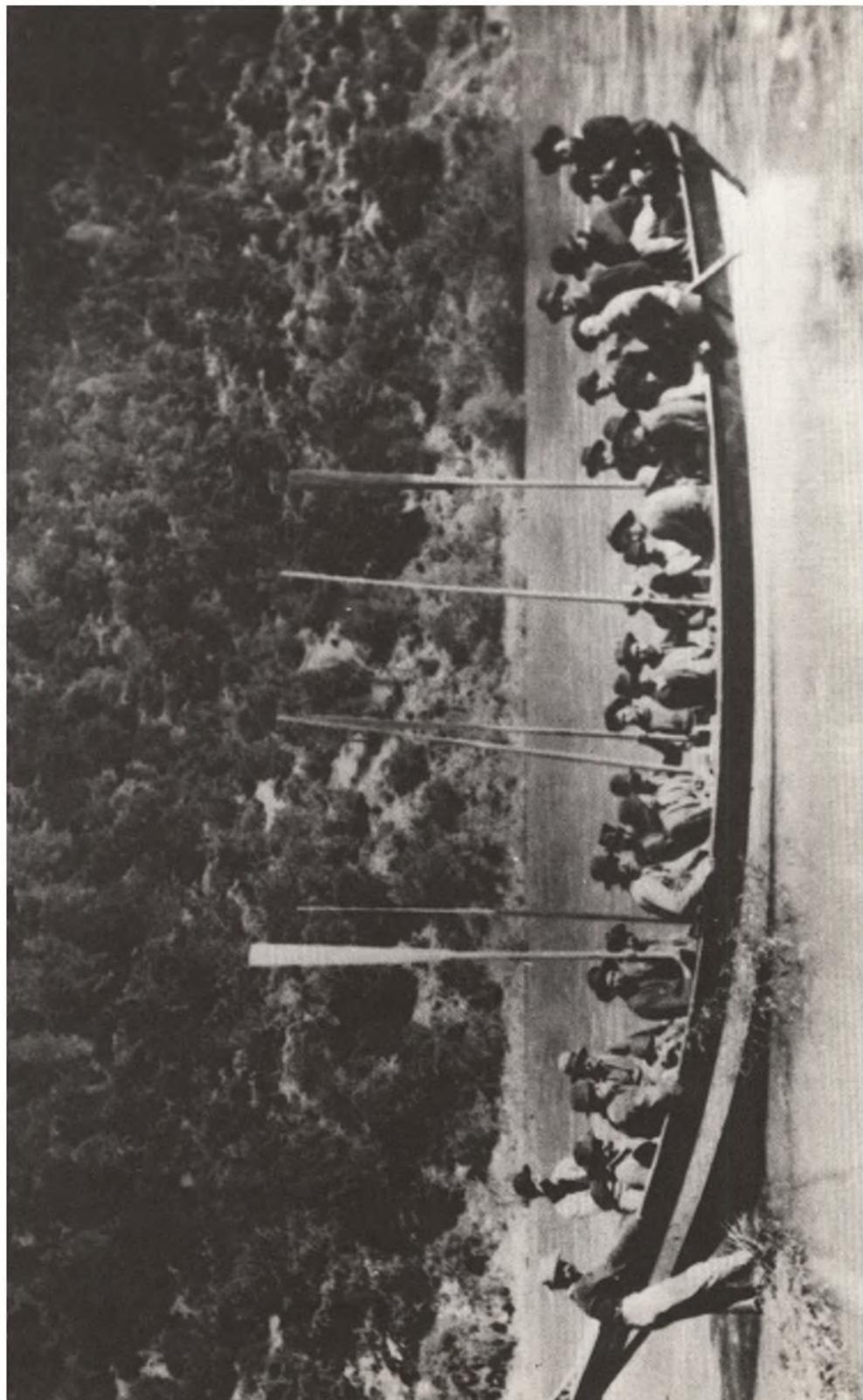
Jastraub remembers running the Chili Bar to Coloma stretch, as well as the "gorge" to Folsom, both in 1955. He used an open aluminum canoe and did occasional portages.

The South Fork continued to be run, although quite infrequently, through the late 50's and up to 1961 when fiberglass kayaks began to make their appearance. In 1963, Bryce Whitmore ran the first commercial raft trip on the South Fork, and soon the Sierra Club River Touring Section was using the river regularly from Chili Bar down.

It wasn't until 1971, however, that large numbers of people began to visit the river, mostly with the help of river trip outfitters.

Today, in 1981, the South Fork sees more than 100,000 visitors every summer and has become the most popular white-water river in the West.

South Fork Boatmen of 1898.



Mile 18.0 Weber Creek

Weber Creek enters on the left. The creek was named for Charles M. Weber, a native of Germany who set up a camp along the creek in the summer of 1848. Under Weber's employ, some 1,000 Indians brought him \$50,000 worth of gold from diggings on the South Fork, Mokelumne, and Stanislaus Rivers.



Charles M. Weber was born in 1814 in Steinwender, Germany. His father was a school superintendant from a family of Protestant ministers. It was assumed Charles would follow in the family's professional tradition, but early on he "overstrained" his mind in his studies and opted for a career in business.

Soon after he reached the age of 22, the allure of America proved too attractive for the young German, and he took passage to the New World in 1836. After a bout with yellow fever in New Orleans, some wanderings, and a vague involvement with the revolution in Texas, Weber found himself in St. Louis in 1841 where the air was buzzing with the talk of California. Once again the chance for adventure proved irresistible and Charles joined up with a part of emigrants led by John Bartleson.

Bartleson kept a detailed journal of the events of the trip. The group was the first emigrant party to attempt the Sierras and they did it – mistakenly – over Ebbet's Pass and through the drainage of the Stanislaus, a route which others that followed very wisely avoided. Their journey ended in October 1841.

After a short time at New Helvetia with John Sutter, Weber made his way down to San Jose where he was soon involved in a couple of successful business ventures. Shortly thereafter, Weber set about obtaining a landgrant from the Spanish government; and after some difficulty, finally obtained the Rancho Francesces, seven leagues of land now the site of the city of Stockton.

Weber didn't begin to settle into his new estate though until 1847, the intervening years being taken up with business, and then the War with Mexico. Finally, almost six years after having received the grant, Weber began the process of building a town in the wilderness of the San Joaquin valley.

March 1, 1848. Weber was on a visit to Sutter's New Helvetia from his rancho when he heard of the gold discovery at the mill. He immediately returned to begin setting up the Stockton Mining Co., a collection of Mexicans and settlers whom he soon led to the streams south of the American. After several unsuccessful efforts, the little group finally began showing some results along the Mokelumne and shortly after that established themselves downstream of Sutter's Mill, on the South Fork of the American, by the mouth of a small creek. They found excellent diggings here and moved up the stream a few miles to take better advantage of them. The little encampment they established here became known as Weberville and was a stop of California's first governor on his tour of the wondrous new goldfields in July 1848.

At about the same time, some of the Indians whom Weber had hired to collect gold for him returned from the Stanislaus River with the first samples of large, coarse nugget gold. Many of the original Stockton Mining Co. members hurried off to find these new diggings and their names have become a part of California's history in such places as Angel's Camp, Murphy's, Sullivan's Bar, and Wood's Creek.

By September of 1848, Weber had dissolved his company and returned to the business of founding Stockton, as he was now calling his rancho. He chose the name to honor an American military officer Thomas Stockton, who had saved his life during the war.

Within two years Stockton was a bustling little community, the "gateway to the southern mines" and Charles A. Weber "one of California's notable, wealthiest personalities."

Mile 18.0

Site of an 1850 sawmill, operated by W.B. Skellinger.

Pinchem Tight

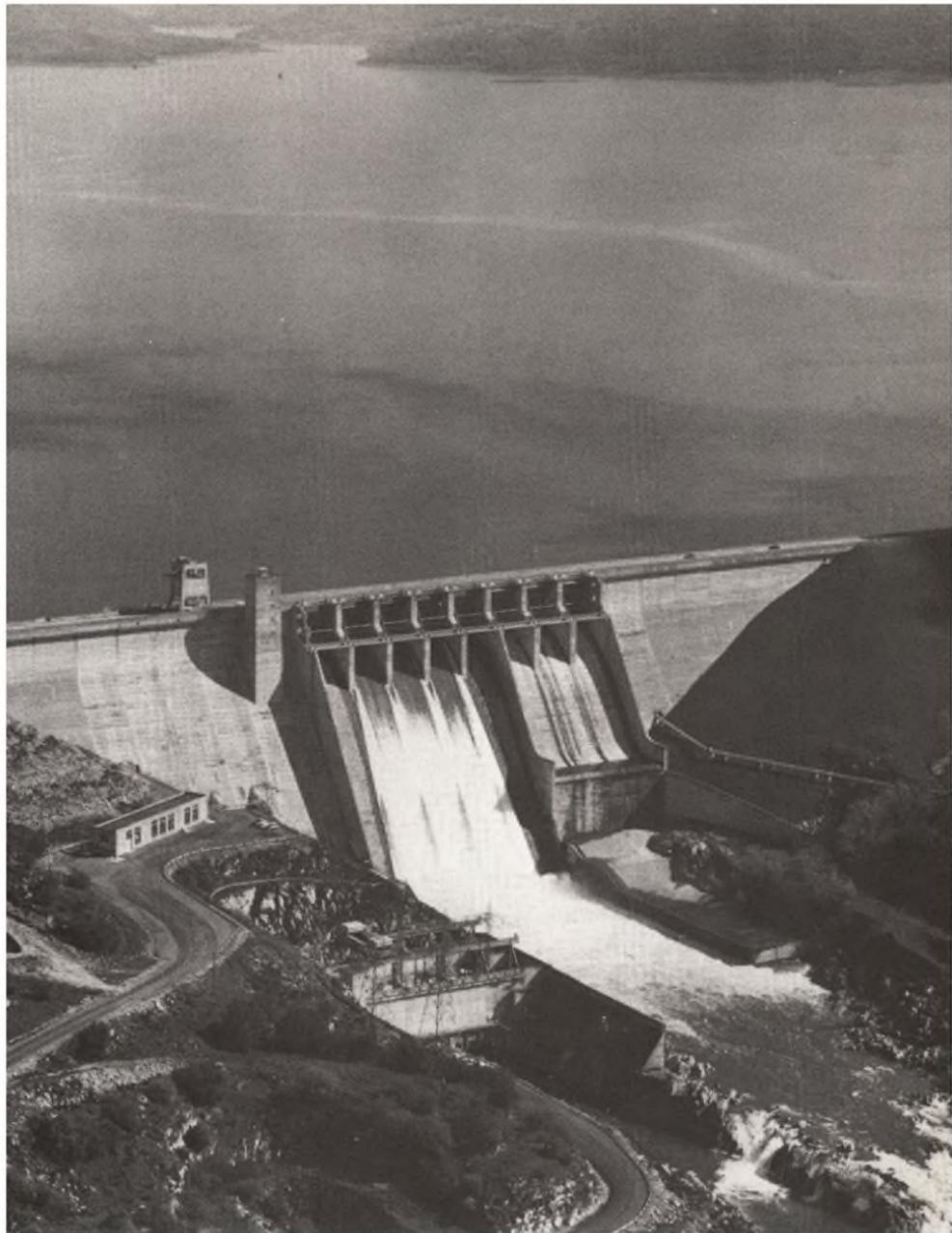
Actual gold dust became currency in 1848, a "pinch" supposedly equalling a dollar. Often the storekeeper, insisting on doing the pinching, would wet his thumb and forefinger, plunge his hand into the miner's pouch, and come up with a generous helping. The warning, "Pinch 'em tight" was heard coming out of Conrad Etzel's store so often that the camp located near Weber Creek soon became known by it.

Weberville. An 1850 rendering.



Mile 18.6 Hospital Bar Rapids

Mile 18.7 - 19.2 Headwaters of
Folsom Reservoir



Folsom Dam. Begun in 1948, and completed in 1956, Folsom was severely tested by the December 1955 flood and then again in 1964 when Hell Hole Dam failed on the Middle Fork of the American. In both cases the structure prevented serious downstream flooding.

Mile 20.5 Salmon Falls Bridge

The drainage on the right is Skunk Canyon, site of the river trip take-out.

Mile 22.0 Natomas Dam

Buried beneath the Folsom reservoir are the remains of the old Natomas Dam, built by prison labor between 1868 and 1893. This is the diversion dam built for irrigation purposes that used to obstruct Horatio Livermore's timber drives.

Mile 23.0 Salmon Falls

The settlement of Salmon Falls drew its name from a twenty foot falls a small ways downstream of the townsite. There was an effort around the turn of the century to blast the falls clear, in order to allow the salmon to go further upstream to spawn, but the attempt ended in failure.

Salmon Falls survived its tumultuous gold rush beginnings and eventually settled into small town respectability — a quiet, rural village with a one-room schoolhouse in 1935.

Lois Kelley, a former resident, recalls summertimes in the little town:

“We used to float in the Natomas flume, inside it. The ditch tender would walk on top and you always had to watch that he didn't catch you. It was really swift...you couldn't stand up in it. You sort of got in it and whoosh! You were through!”

In 1952 the Federal Government purchased the entire town as a part of the right of way for the soon-to-be-completed Folsom Dam. Lois Kelly's family re-settled in Brown's Ravine, near Folsom. Salmon Falls, meanwhile, was razed and eventually buried under the new reservoir.

Modern Development on the South Fork

By and large, the federal government and the city of Sacramento own the flow of the South Fork. Through its public utility the Capitol extracts an average of 1 billion kilowatt hours from the river each year by channelling it through a total of six

powerplants, over some 65 river miles and through approximately 5400 feet of elevation drop.

The water itself is stored by the Federal Water and Power Resources Service in their Folsom Reservoir and distributed for city and farm use as far south as Fresno.

Loon Lake



Chinese laborers work on the Loon Lake dam in 1895.

The Loon Lake reservoir is the oldest step in the SMUD “Staircase of Powerplants” on the river. Originally built in the 1890’s by Chinese laborers displaced by the completed transcontinental railway project, the dam was financed by the California Water Company, one of the dozens of private utilities that had already laced the watershed with flumes and canals from one end to the other. Most of these companies went bankrupt when the mines began to play out, others were absorbed by publicly held utilities — as in the case of the California Water Company.

An unusual feature of the Loon Lake Reservoir is that it actually lies over the Georgetown Divide separating the Middle and South Forks of the American. Until 1898, the water from Loon Lake descended through the Rubicon River into the American’s Middle Fork. Since then, by the construction of the Gerle Creek ditch, its water has fed the South Fork.

Water Flows Downstream of Chili Bar

How much water can be found in the stretch of river between Chili Bar and Folsom Reservoir at any given moment is dependent primarily on power generation needs, although policy is now starting to take into account recreational use of the river. The two plants directly upstream of this stretch are Chili Bar and White Rock. Their coordinated schedule of operations determines downstream flow.

In general, and neglecting such factors as holiday week-ends or equipment breakdowns, the following schedule can be expected in the mid-summer, after natural runoff has ceased to be a major factor.

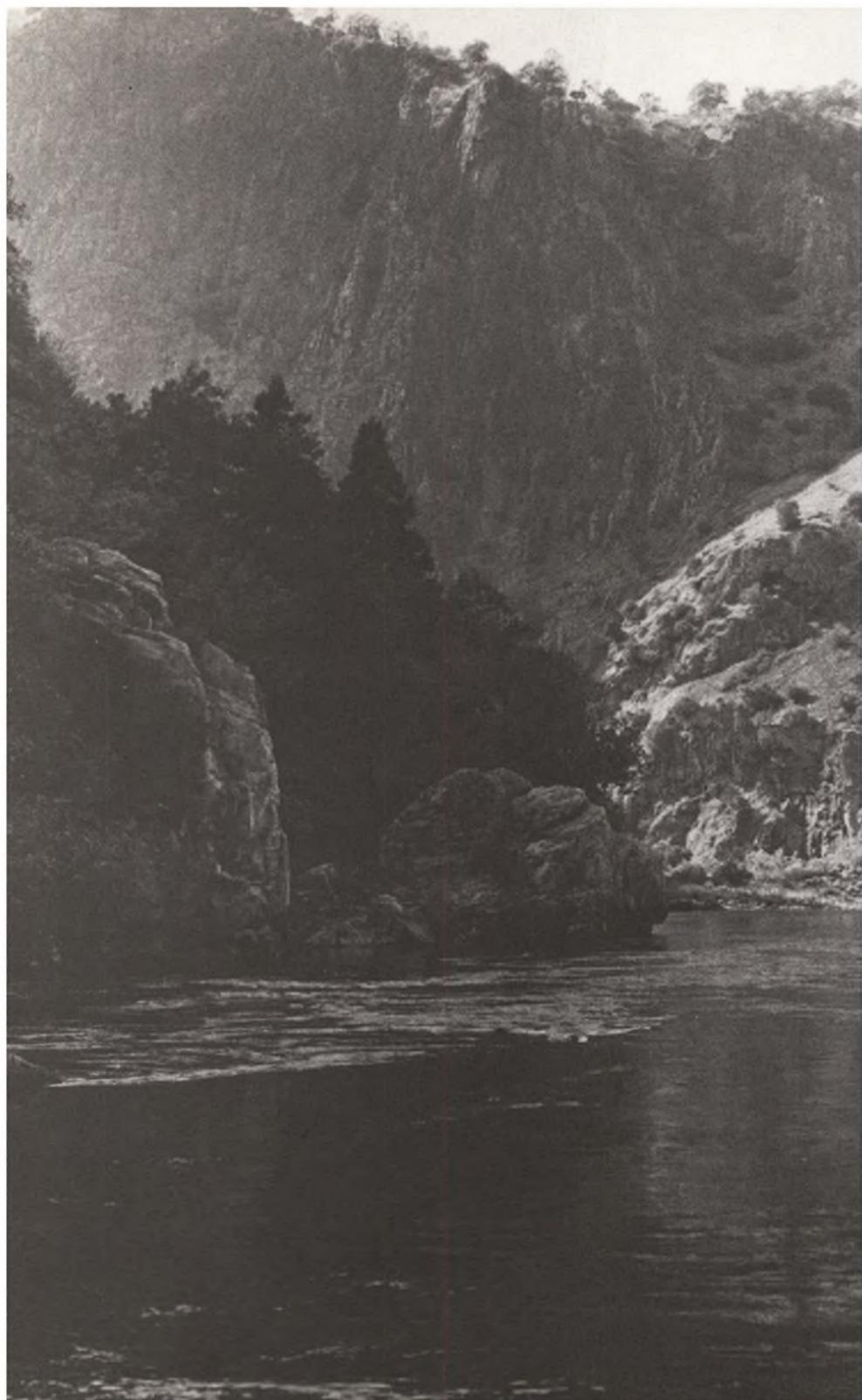
NOTE: Summer flows of 1500-1700 cubic feet per second travel at approximately 2-4 miles per hour on the South Fork, and this should be borne in mind when looking at the schedule below which refers to the timing of releases at Chili Bar; (e.g. water released at Chili Bar at 8 a.m. will not reach Camp Lotus 9 miles downstream until 12 noon, and it won't make the 19 miles to Folsom Reservoir until 3:30 — 4:00 p.m.).

MONDAY: Early morning flows are low (approximately 250 cubic feet per second) while the Chili Bar reservoir refills after the weekend with upstream releases from White Rock. By mid to late morning, Chili Bar should begin to operate, releasing approximately 1500 cfs, the normal summertime high level. Typically the plant continues operations until 7 or 8 p.m. when power demand begins to drop off. At that time, Chili Bar shuts down for the evening, and the water level drops to approximately 250 cfs.

TUESDAY-FRIDAY: Chili Bar generally begins operations by 8 in the morning and maintains them, with minor fluctuations, until approximately 6 p.m. Flow during this period should average 1500 cfs., summertime high.

SATURDAY/SUNDAY: Lowered power needs over the weekend affect the river's flow significantly. On Saturdays, Chili Bar will generally operate, but on a shortened schedule and at a reduced capacity. (1200 cfs between 8 a.m. and 2 p.m. would be typical).

Sunday schedules are generally even shorter and flows even lighter; 9 a.m. — 2 p.m. and 800 — 1000 cfs are average figures for Sunday.



THE STANISLAUS RIVER:
Mile by Mile

Researched by Carol Nelson

Exploration of the Stanislaus

A Spanish frontiersman by the name of Gabriel Moraga, exploring the interior of "Alta California" for possible mission sites was the first white man to see the Stanislaus River. The date was October 2, 1802 and the event was described by the expedition scribe, Fray Pedro Munoz:

We came across another river, similar in size and clarity of water to the former ones, but running in a much deeper canyon. It is bordered by an abundance of wild grapes, a bit of torote and many ash trees. Here we pitched camp, and from our base proceeded to explore. We named this river "Our Lady of Guadalupe".

Moraga and his men camped by their new discovery for four days, exploring its upper reaches. On the second day they came across an Indian village which Moraga called "Tualamne" and which modern historians guess to have been located not far upstream of present-day Knights Ferry. According to Fray Munoz, the natives were dwelling in caves in the rocky cliffs, inaccessible except with the aid of ladders. Despite efforts made by the expedition missionaries, the Indians showed little willingness to come down and receive conversion. As a consequence, the group soon moved on, north, apparently as far as the Calaveras River, having made little impact on religious beliefs along the "Rio Guadalupe".

Moraga returned to the "Guadalupe" six years later, this time with the purpose of recapturing "neophytes", coastal Indians who had fled Spanish missions. Again, the area was to prove frustrating, and the explorer confirmed his earlier, somewhat negative, impression of its suitability as a mission site. His journal entries are models of brevity:

"29th day of September. About ½ league we hit the Guadalupe River. This is all for today."

The following day he expanded a bit more.

“30th day of September. Today I set out exploring toward the sierra. I reached the foot of it, but nothing desirable was found except a few meadows. This is all for today.”

While this 1808 expedition may have done little for Moraga's literary reputation, it did help to establish him as the foremost Spanish explorer of the Sierra Nevada, dubbed by at least one historian “the Christopher Columbus of the California Wilderness.”

After Gabriel Moraga, official Spanish interest in the Guadalupe waned; and it wasn't until after Mexican independence in 1821 that another group ventured into the area. Antonio Soto, a military officer led the expedition whose purpose was to recapture a particularly wily neophyte from the Santa Clara mission with the Christianized name of “Estanislao”, after a Polish saint.

Sherbourne Cook, a noted scholar of the period, has described Estanislao in this way: “In type, although possibly not in stature, Estanislao belongs with King Phillip, Tecumseh, Pontiac and Geronimo, as an outstanding Indian chief who fought the white man with persistence and daring.”

Soto discovered the escaped chief camped along the “Guadalupe”, and attacked with his force of ten men. He was, according to reports, “forced to retreat with losses”.

Upon hearing of this, Governor Jose Maria de Eschandia decided to take more drastic measures, and on May 4, 1829, dispatched Jose Sanchez with 25 cavalrymen, 1 corporal, and 70 Indian auxiliaries. Once again the renegade's river camp was discovered and a second battle ensued — with, evidently, similar results for the attackers.

At this point the honor of Mexican arms was at stake. The third expedition left the San Francisco Presidio in the charge of Mariano Guadalupe Vallejo. It included 107 Mexican soldiers, a field piece and was under instructions to “administer a total defeat to the Christian rebels and the wild Indians who are aiding them, leaving them completely crushed.”

The results of this third campaign were more positive from the Governor's point of view. Although neither Estanislao nor his followers were captured, Vallejo managed to disperse the group by setting fire to the riverbank. It was, apparently, enough. Commandant Martinez wrote to Vallejo: "I rejoice exceedingly that this scum has been chastized and I congratulate you, your second in command, and all your troops, that you have upheld the honor of our nation's arms."

Thus subdued, the area around the river held little additional interest for the Mexican government and it is necessary to turn to the accounts of American explorers for the next chapter.

Jedediah Strong Smith is perhaps the best remembered of the American mountain men; and although his career throughout the West was filled with well-chronicled exploits, certainly one of the most famous was his crossing of the Sierra mountains in 1827 — the first trans-Sierra passage ever accomplished by a white man.

The exact location of this historic event has been the subject of a great deal of scholarly debate. Both Smith's journal and maps have been lost and secondary references are fragmentary. However, in recent years, four of the most "definitive" works on the explorer have reached a consensus: Smith apparently established a camp in the foothills along the Stanislaus in May of 1827 and, after several attempts, finally succeeded in ascending the river via its north fork and passing the crest in the vicinity of Ebbet's Pass.

In light of our current knowledge of the Sierras, it would seem that Jedediah picked one of the more difficult routes. But the mountain man was traveling light, in a small group, and exploring. In contrast, John Bidwell, who crossed the same way in October of 1841, was traveling with a large group of settlers, very slowly, and he picked the Ebbet's Pass route because his was the first emigrant party to attempt the Sierras, and he was lost.

After having struggled over the pass and inadvertently into the steep canyon of the Clark Fork (a major tributary of the Stanislaus) the group managed to finally "extricate" themselves and continue laboriously down the mountain. On

Jedediah Strong Smith

Born in 1799, Jedediah Smith was the archetypal mountainman - and at the same time the most extraordinary of all of them. Educated in his home state of Pennsylvania by a country doctor in Latin and mathematics, he arrived in St. Louis at the age of 23 with two books in his baggage - a Bible and The Journals of Lewis and Clark.



He soon hired on with William H. Ashley, an early entrepreneur who was putting together a band of trappers to exploit the seemingly endless supply of beaver pelts in the Rocky Mountains. The men who joined up were almost all young, most of them untested, but Ashley's band produced some of the most legendary names on the American frontier. Men like James Bridger, "Broken Hand" Fitzpatrick, David Jackson, Mike Fink, and of course, Jedediah Smith.

From the beginning Smith stood apart from the rest, both for his prowess as a woodsman, as well as for his personal habits, which, in the context of the time and place, seemed quite refined.

His career as a trapper and explorer occupied the next decade and was filled with the stuff of legend: a grizzly mangled an ear; the Great Salt Plain nearly parched him to death. He was jailed in California as a spy — escaping, he traveled north to the Columbia, trapping a fortune in furs as he went.

Throughout it all, there was a contemplative side to Jedediah Smith that surfaced most clearly in the year 1829 when he wintered in the Wind River Range. "I entangle myself too much in the things of time," he wrote his brother.

The following year he shocked his partners by selling his shares and settling down in St. Louis to begin writing a book. But in 1831, an opportunity to see one of the few places he'd never visited in his trapping years arose, and he joined on as a scout for a wagon train bound for Santa Fe.

A month later, the train was halted south of the Arkansas River while the scouts explored for water. Smith rode away, disappeared over a small rise, and was never seen again. Later it was said he'd been killed by a band of Comanches at a spring.

In his career of only ten years, the Pennsylvanian Jedediah Strong Smith managed to become the most Western of all the Westerners, having seen and done more in those territories than any man before him.

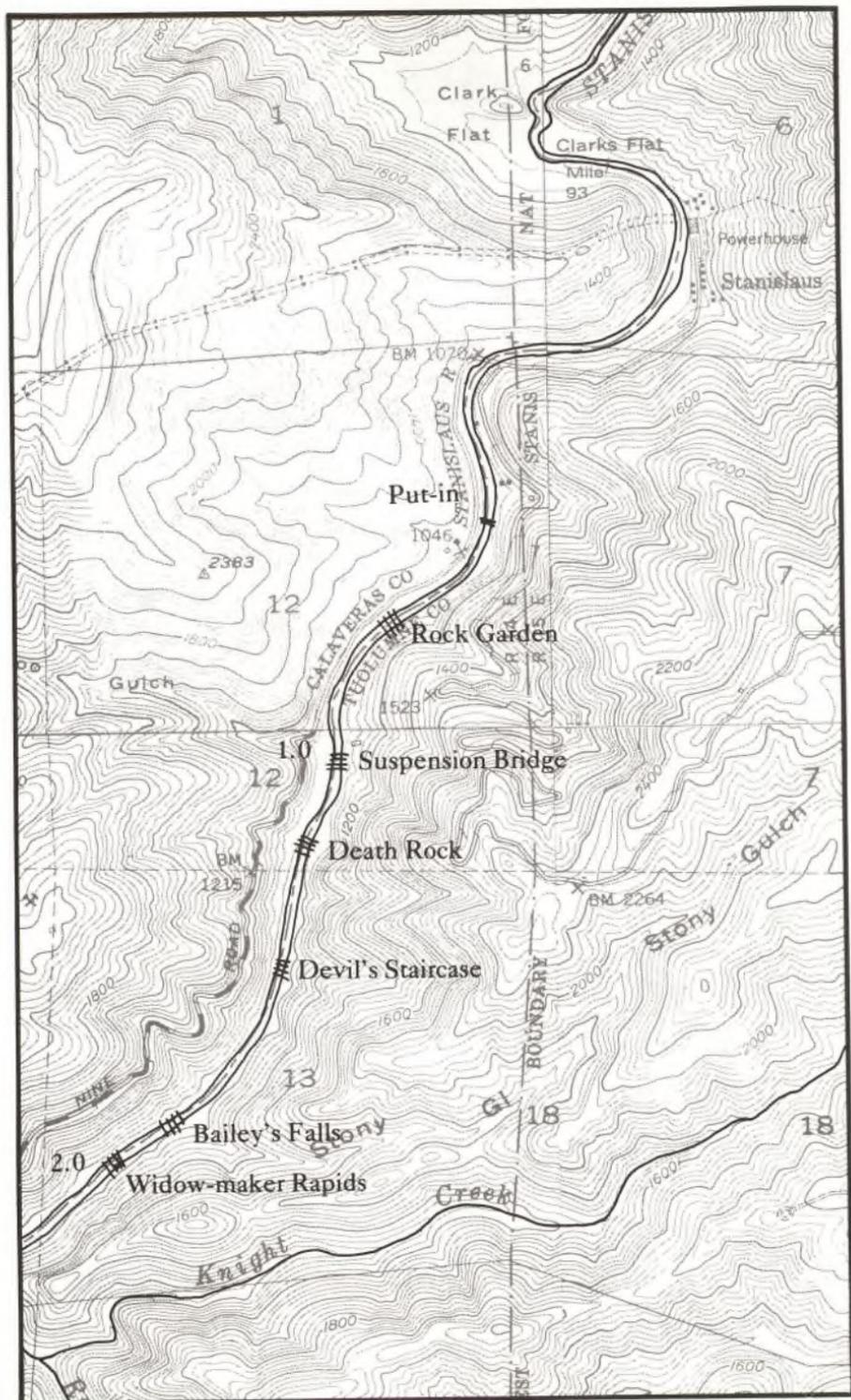
October 31st, 1841, they sighted the main river in its lower reaches.

From Bidwell's journal on that date:

Bore off in a N.W. direction to the nearest timber; plain dry and dusty, reached timber which was white oak (very low and shrubby) and finally, the river which we had left in the Mts., joyful sight to us poor famished wretches!!!

The route the Bidwell party pioneered never became an emigrant trail, but it did succeed in giving the Stanislaus canyon the distinction of having borne witness to two historic "firsts".

The final naming of the river fell to the lot of John C. Fremont, probably the most famous California pioneer of them all. In February of 1844, on his Second Expedition, Fremont made a dramatic, mid-winter crossing over Carson Pass. After having recuperated for several months at John Sutter's fort near present-day Sacramento, Fremont and his men continued south. On March 27, they struck the river which Fremont called, in his *Memoirs of My Life*, the "Stanislaus," an anglicization of the old Indian chief's Christianized name. Fremont's writings were widely read at the time and it is no surprise that his choice would stick.



THE STANISLAUS

Clark's Flat

Less than a mile upstream of the Camp 9 bridge exists a unique locality, a small, two or three acre meadow on the north side of the river, known as Clark's Flat. In a section of the canyon noticeably shy of meadows, and of recent history other than mining, Clark's Flat is an anomaly. Its story begins some 2,000 years ago, when the natives of the Central Valley were just beginning to migrate into the foothills. Archaeological evidence indicates that Clark's Flat was settled from the very beginning. The natives were doubtless attracted by its terrain, its proximity to the deer migration paths and salmon spawning grounds, as well as its mild, relatively low elevation climate.

Dona Clark originally homesteaded the flat in 1910 with the idea of selling his garden produce to the people of Camp 9. It turned out to be "a tough proposition" however and Clark soon quit the place for a job in the City. His garden eventually overgrew and the townspeople across the river began using his meadow for picnics and baseball.

After Dona Clark's death in 1919 or 1920, his homestead passed through his family and eventually ended up in his nephew Elgin Clark's hands in 1964. Elgin raises the possibility that the name "Clark's Flat" actually pre-dated his uncle's occupation of the place, although the coincidence seems remarkable. Elgin's memory on this point is vague, as are the early records, and as a consequence, it remains no more than a possibility.

Mile 0.0 Camp Nine

Across the river from Clark's Flat, and downstream just a bit, are a number of building foundations, the only physical evidence left of the little town of Camp 9, for 56 years one of the more isolated communities of Calaveras County.

The story of how the town came to be starts with a man named Beach Thompson, who, together with his partner Winsor Keefer, had a claim in Altaville in 1897. But in order to work their mine effectively, the two needed access to reliable water; and the only water rights they held were on the upper Stanislaus, 11 miles and a 2700 foot ridge away. In addition to their mine, the two held important water rights to the upper Stanislaus. But bringing Stanislaus water over a 2700 foot ridge and a distance of 11 miles to Altaville, was an extremely expensive proposition. Mr. Thompson, however, was apparently a man of many resources.

To begin with, his partner, Mr. Keefer, drops out of the picture, "under mysterious circumstances," according to contemporary reports, and Mr. Thompson is left alone to negotiate with several San Francisco businessmen, eventually striking a deal. In exchange for Thompson's water rights, and their valuable hydro-electric potential, the men from San Francisco agreed to build the siphons, flumes and tunnels necessary to move Stanislaus water over Table Mountain into Thompson's claim in Altaville.

As a result of these agreements, two companies were organized: the Union Construction Co. to build the proposed power plant, and the Stanislaus Electric Power Company to operate it. The power, incidentally, was intended to operate the City's new electric trolley system.

The first order of business was the building of a road down to the plant site, for which task a group of one hundred Slavonians were hired. Although Slavonia has never been in the forefront of highway construction technology, the Camp 9 road is a remarkable piece of engineering for the time, modern critics notwithstanding.

Victor Solari was a young man when he worked on the Camp 9 road, and he remembers three or four base camps were established so that the work could go forward at several points simultaneously. He also remembers the food and wages, which were both, he reports, "terrible".

At about the same time, work was progressing on Relief Creek dam, which would be the main storage reservoir for the project. Water would be stored at Relief, dropped downstream 6 miles to a small dam at Sand Bar Flat, and then diverted by redwood flume 16 cliffhanging miles to a holding reservoir just above the Camp 9 powerhouse site. Although the project has been augmented and modified in the years since, it still uses this same essential scheme, originated in 1904-7.

As the work was nearing completion, Beach Thompson discovered his Altaville claim didn't have the values to justify bringing in his water, so that aspect of the project was dropped. The footbridge just above the powerhosue today was built to carry Thompson's siphon pipe and is the only physical reminder of the whole scheme.

Meanwhile, the two companies formed to build and operate the Camp 9 road and powerhouse found themselves out of money, and thus became the property of the Sierra and San Francisco Co. The new owners proceeded to finish and operate

The One Hundred Slavonians. Led by their foreman Vulasinovich, these are the men that built the Camp 9 Road for the Union Construction Company in 1904-06.



the plant, and, simultaneously, begin the town of Camp 9. The name, incidentally, comes from the fact that it was the Union Construction Company's 9th camp on the project. It was changed, officially at least, in the 1930's when a post office was opened, to "Stanislaus".

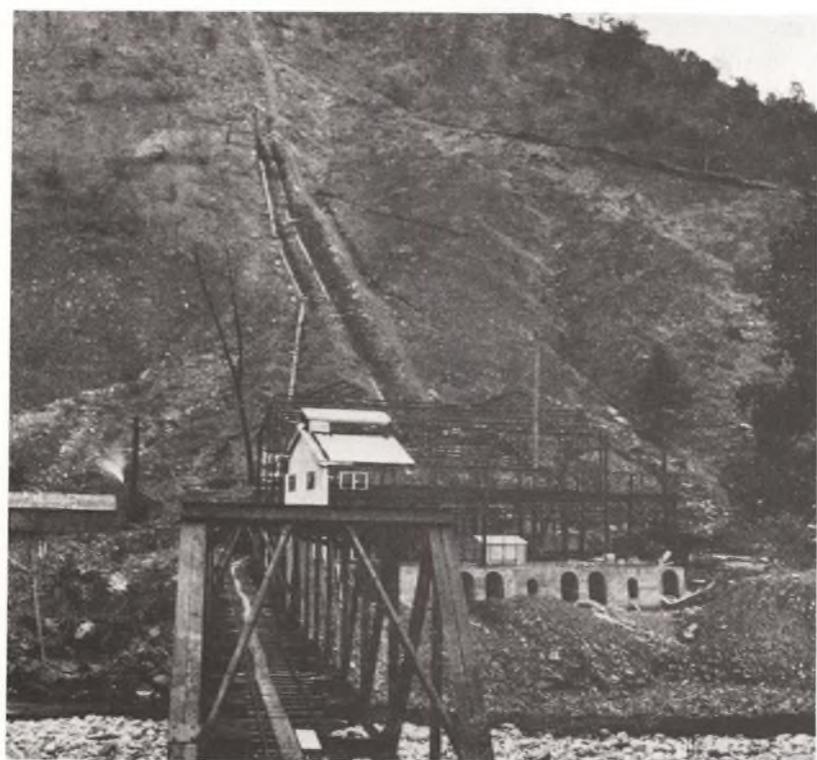
The company built homes for the families and a bunkhouse for "the single boys". There were two storage bins for machinery and maintenance materials, a guesthouse for visitors and a clubhouse that doubled as a cookhouse. In addition there was a little store and, at least until it burned down, a dance hall.

The population at Camp 9 hovered at around 6 or 7 families in those early days, perhaps 40 people in all. Groceries and necessities were delivered from Angels Camp, but townspeople still found occasion to venture over the hill — perhaps to the lodge in Murphys, the Eastern Star, or to all-night dances in Angels Camp. For a while, even, there was square dancing at their nearest neighbors, the Adams' place, a "showpiece" ranch up the Camp 9 road.

Work, meanwhile, was provided in ample quantity by the powerhouse and the 16 mile flume from Sand Bar. In the 20's, the men worked 6-day weeks, maintaining the machinery and patching the flume, which would inevitably break during winter storms. The problem was so chronic that every year 750,000 board feet of lumber would be hauled in by an 18 mule team and winched to the forebay at the base of the flume. In 1939, the system was finally put underground.

Helen McNamara arrived in Camp 9 in 1915 with her husband Matthew. They moved in just after their honeymoon and they did it in style — riding in a brand new Model T. Matthew McNamara became the hydro superintendent and Helen ran the little store and, later, the post office.

Bemis Grant recalls in particular one of the men, Charlie Avery, who, over the years, acquired a reputation as a "man-about-town", something not easily done by a family man in a place the size of Camp 9.





▲ **The Sand Bar Flume.** This sixteen mile stretch of open flume on the upper Stanislaus was a major maintenance headache to the crew based at Camp 9. A set of tracks was laid on top of the redwood trough and a small trolley was used to move men and equipment around. The flume was made obsolete when in 1939 a tunnel was finally drilled through the ridge for 11 miles.

◀ **Hydro-electric Plant of Stanislaus Electric Power Company.** The upper photograph was taken by M. Azevedo, a Sonora photographer in 1914 and shows the plant in operation. The lower photo was taken six years previously during its construction. Note Beach Thompson's siphon pipe branching off to cross the river on the footbridge.

The story goes that the actress Clara Bow, for reasons no one can remember, happened to be in town and that she was desirous of a ride on the little trolley car that ran on top of the flume. Charlie volunteered to be her driver, providing him with an experience that Mrs. Avery apparently never forgot.

Another Charlie Avery story concerns the time he stopped in at Vallecito for a bit of refreshment before driving down to Camp 9. There was apparently some concern about his general level of driver awareness at the time of his departure and a precautionary call was made down to the Camp. Their concern, it turned out, was well-advised. When a couple of hours had passed, with no Charlie, a search party was organized. They found evidence of his car's speedy passage through the trees beside the road and later that evening they found Charlie himself, wandering around down by the river. They got him out with ropes and he was back at work the next day.

In 1920 PG&E began leasing the facilities from Sierra and San Francisco and in 1927, acquired them outright. They replaced the existing powerhouse in 1963, then 56 years old, with a new turbine plant. At the same time, they installed the "check" or "crest-control" dam just above the bridge. Its purpose was to mitigate sudden surges of water which could possibly endanger lives downstream.

The new plant had nine times the generating capacity of the old one and as a consequence the water flow pattern below Camp 9 changed. Springtime "highs" were lowered while later summer "lows" were increased.

In addition, the new plant was almost entirely automated; the sixteen operators and the master mechanic had become obsolete. As a consequence, the little company town was abandoned and dismantled, both a product and victim of progress.

Today operations are controlled remotely and maintenance is performed in the course of a daily visit from a PG&E worker out of Angels Camp.

Mile 0.4 Bureau of Land Management Put-in Site*

The small, exploratory shaft on the wall behind the parking area was sunk by Charles Pierce as part of his Deer Lodge Claim in 1880.

The put-in rapid is formed by a resistant ledge of hard chert which has stranded a collection of flood-swept boulders.

Mile 0.6 Rock Garden Rapids

Mile 1.0 Suspension Bridge

The swaying bridge that crosses the river at this point was originally a cable crossing built by Jesse Welch to provide access to his Bear Foot Lode claim on the left bank. Welch was a prospector who came into the area in 1938. The cabin he lived in was located just above the left side footing of the bridge and was built with whole logs and copper nails — material commonly used before the turn of the century.

In 1948 Welch sold his claim to Warren Boone, a self-declared “Okie” who had just recently arrived from West Texas. Warren, and later his brother Arthur, improved Welch’s crossing into a footbridge and prospected on both sides of the river, particularly at the mouth of Yea Hoo Gulch, just downstream on the Calaveras side.

The rapid here is called Suspension Bridge Rapids.

The New Camp Nine Bridge

The new Camp Nine bridge was constructed for PG&E by the Army Corps of Engineers in 1978. The project, which cost 10.5 million (tax paid) dollars, was built to enable the private

*Mileages will be figured on United States Geological Survey quad maps. By convention, Mile 0.0 is the original Camp 9 bridge. Also by convention, left and righthand refer to those directions as viewed looking downstream. Consequently, since the river serves as the county line, the left side will always be Tuolumne County, and the right will always be Calaveras.

utility to truck a new turbine into place if two events should ever coincide in time: (a) the existing Camp Nine bridge become inundated by maximum storage of the New Melones Reservoir, a possibility itself dependent on the outcome of Friends of the River's efforts to halt filling as well as the state Attorney General's pending suits. Even neglecting these uncertainties, the old Camp Nine bridge would still be unserviceable for a maximum of three months on occasional years. (b) The existing turbine should fail without warning.

The likelihood of these two events ever occurring simultaneously was an issue in a legal battle waged by Friends of the River and the State Attorney General's office at the time of construction. Among the more cost effective alternatives proposed were: reimbursement to the utility for the period of lost generation; or, preventative replacement of turbines on a predetermined schedule — twenty years is their estimated service life.

However, by the time these issues were brought to light, construction had progressed to the point where Secretary of Defense Harold Brown — after some apparent second thoughts — gave his approval to finish the project.

As a consequence, it appears the bridge will be used for its "design purpose" possibly four or five times over the next century.

Mile 1.3 Death Rock Rapids

Mile 1.5 Devil's Staircase

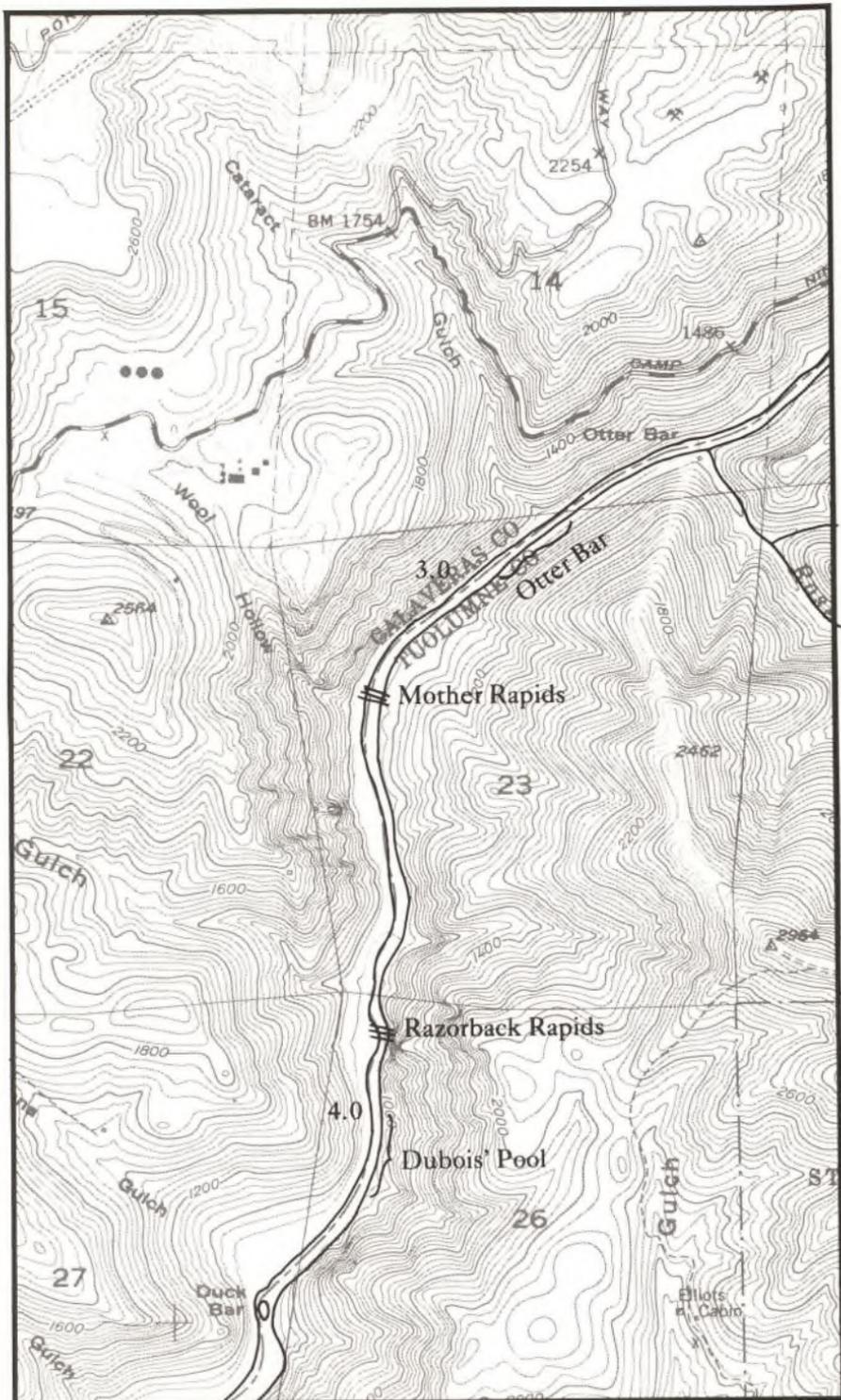
The narrow, vertical ("dike") slab of rock cut into "steps" is made of diorite.

Mile 1.8 Bailey's Falls

Elsa Bailey, one of the earliest female kayakers in the state, left her name and a portion of her boat here in 1961.

Stony Gulch enters from left.

Mile 1.9 Widowmaker Rapids



Mile 2.5 Rose Creek

In the upper portion of the Stanislaus Canyon, above Rose Creek, there is little evidence of any mining done before the 1880's when some of the banks were sluiced, and miners sunk quartz tunnels in a kind of haphazard way throughout the canyon, looking for the isolated gold bearing "stringer vein". Thirty years after the initial strike, it was clear that the "easy" money was gone.

It was during this era that John Newcomer and Tom Dorsey developed a claim up on Knights Creek, a tributary of Rose Creek, where they built a two-stamp mill.

Mining partnerships have a long history of going sour, a tradition well maintained by the Newcomer/Dorsey association which terminated abruptly in a shootout, leaving Dorsey dead of a gunshot wound.

Forty years later, and a few miles downstream, several Modesto men were looking for likely quartz gold prospects in the Rose Creek canyon. After some initial tests they found what seemed to be a promising site. A few dollars were exchanged and two men, Adlai Supan and Fred Brown ended up equal partners in the "Lucky Strike" claim.

Originally the two hiked down to their new claim from the Italian Bar road, but when they began hauling supplies in, it made more sense to skid them off the Camp 9 road and then pulley them across the river on a cable crossing they built for the purpose.

It was an arduous process. Some of the machinery had to be dismantled before it could be loaded onto the cable, and then reassembled on the opposite bank. It was more than a year before the two men could begin getting down to the actual business of mining.

By 1931, the initial drillings had looked good. There was a rich vein, but too narrow, and in order to exploit it at a better point they would need more equipment — and more money. So Adlai Supan and Fred Brown went back out, looking for investors in the midst of the Depression.



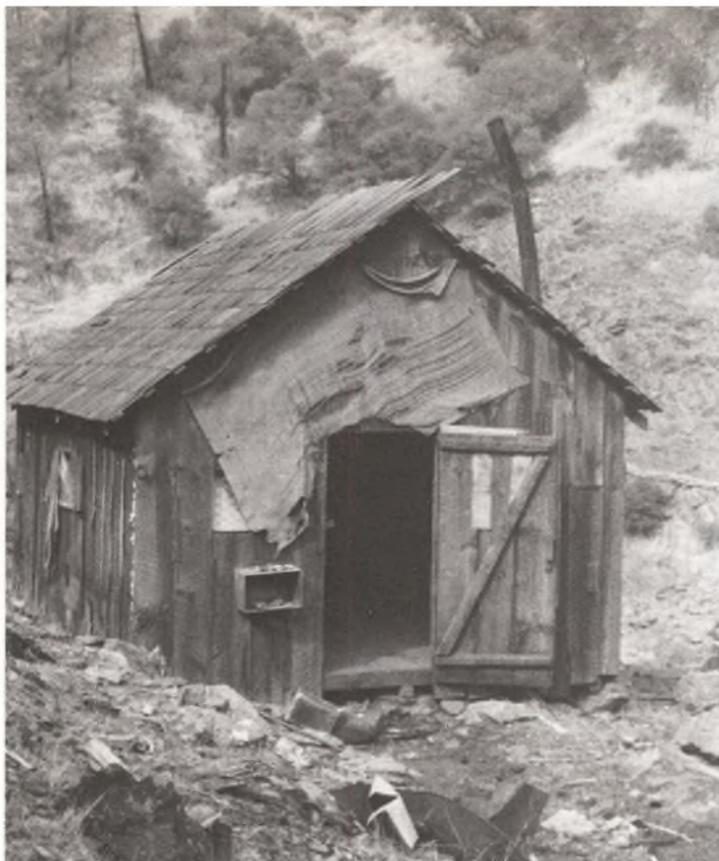
Supan's Cable Crossing. Rex Alexander, a co-worker on Ad Supan's "Lucky Strike" "Hillside" claims, is shown in the trolley at Rose Creek. From 1931.

They were back within a year, this time with two gas engines, an air compressor, forge, drill, steel, piping and an assortment of miscellaneous hardware. Thus equipped, they began pushing a tunnel down from above the vein, hoping to intercept it deep where it would be broad and solid. After a season of blasting and timbering they found it—narrow and fragmented.

For a time, they quit. But gold mining thrives on frustration, and over the next five or six years Ad Supan and his partner returned for additional dosages. They brought with them a jackhammer and a compressor and they sank the shaft another two hundred feet. Again they struck the vein, and again it was worthlessly thin.

When they came back the next time, the tunnel had filled with water, and so they left.

Mile 2.7 Cataract Gulch



Rose Creek Cabin. Located downstream at the main river, Supan, and later his brother and sons, would hike up the creek to their claims. This photo of their cabin, taken not long after its construction, helps resolve the mystery of why mining cabins always look as ancient as they do: they're built that way.

Mile 2.8 Crystal Stanislaus

A "significant cave" located on the north wall about 120 feet above the water, Crystal Stanislaus was once known as Mobley's Cave after the man who had hoped to guide tourists into it. The trail he cut is still visible, heading upstream from the higher of the two entrances and winding up into Cataract Gulch where it intersects the Camp 9 road just below the limestone quarry. Mobley never completed his scheme, but died shortly before he finished his trail.

Although the cave has been heavily vandalized, it is still a "maternity cave" supporting a substantial bat population.

Mile 2.8 Otter Bar

Some of the clearest evidence of sluice mining on the river is apparent on the slope behind this bar on the left bank. The water was flumed out of Rose Creek, held in a small pool above the slope, and then released in surges. The resulting slurry of dirt and water was then sluiced in boxes.

The operation almost certainly dates from the 1880's, some twenty years before hydraulic mining was made illegal.

A cabin foundation on the lower end of Otter Bar belonged to a place probably built by Jack Richmond around the turn of the century, who also built a cable crossing nearby. During the depression, a man called Tremain — described by James Supan as being something of a loner — occupied the claim.

The steam engine still in place at the bottom end of Otter Bar, below Richmond's cabin, dates from the late 1800's, when it was probably used to operate either an overhead crane for shifting boulders, or a dragline dredge. In either case, the goal was to obtain deeper river gravels for sluicing.



Otter Bar Steam Engine

The miners were able to move steam engines such as this one around by mounting the entire apparatus on a sled base, connecting one end of a cable to a tree and the other to the engine's drum. Then, with a judicious application of steam, the engine could be made to pull itself along. This particular steam rig was probably moved in this self-propelled fashion from Vallecito to the rim, then skidded on a cable and sled down the hillside, and finally a log barge ride over the calm stretch just upstream.

Mile 3.1 Cataract Quarry

At the top of the ridge just above Wool Hollow is the Cataract Quarry overlook, part of the Flintkote Company operation located on the Camp Nine Road.

Occupying some 1,200 acres, the quarry and plant opened in June 1971 at a cost of approximately \$18 million.

The material being quarried is limestone, part of the Calaveras Formation; and it is crushed at the millsite at the rate of approximately 600 tons per hour. The granulated material is then combined with water and a wood fibre by-product into a 70% solution which is then piped 14.7 miles to a processing plant in San Andreas. The slurry line is an insulated 7" diameter pipe, the first one of its kind in the U.S.

The entire plant is run by computer and requires a crew of about 21 during the day, and 2 during the night. At the current rate of depletion, the limestone deposit has an estimated life-span of 80 to 90 years.

Mile 3.3 Wool Hollow

Rocks and debris washed out of Wool Hollow on the right helped to form Mother Rapids (named by Bryce Whitmore, a dutiful son, on Mothers' Day in 1963).

Mile 3.4

On the left bank, the limestone has been sculpted and fluted into fantastic forms by the dissolving action of river and ground run-off.

Mile 3.8 Grapevine Gulch

The water from Grapevine was used to ground sluice the banks behind Razorback Camp, located just downstream.

Mile 3.9 Razorback Camp and Rapids

The gravel bar on the right has forced the water against the steep cliff on the opposite side, undercutting it very sharply. The nodules in the cliff and in the mid-stream rock are chert embedded in limestone.

The hanging garden springs here run year-round and support a beautiful growth of maidenhair fern, quite rare at these elevations.

Mile 4.0 - 4.3 Dubois' Pool

An especially peaceful stretch of river. Along the banks are incense cedars, yellow pines, big leaf maples, willows, white alders, Oregon ash, live oak, digger pines, and one well hidden fig tree.

Mile 4.4 Mariana Gulch

Mile 4.5 Duck Bar

The large flat on the right is known as Duck Bar, between Clark's Flat and Parrotts Ferry, probably the most habitable spot on the river.

Duck Bar has a mining record going back to the 1890's and certainly knew prospecting before that; however, it isn't until 1908 that a claim was filed of which we know much about today. The Duck Bar Placer Mine of 1880 was filed by Frank Cooper and Al Gianelli, a pair of ambitious prospectors whose first order of business at their new claim was to provide access. Accordingly, they, and a crew of four others, cut the upper portion of the present-day Duck Bar road and proceeded to skid equipment and supplies down to their camp on the flat. They planned to construct a wing-dam and work the exposed gravel with a tub and hoist apparatus known as a "skip and stiff-leg". During the months they were able to excavate, they only got a

fair return, although they did uncover a 3 pound axhead nugget.

In 1909 their wing-dam was washed out when the new Camp 9 powerhouse ran its first turbine test and the six decided to abandon the claim. The rapid at the head of Duck Bar today is all that remains of their labor.

It wasn't until twenty years later, in the early 30's that another claim was filed at Duck Bar. This one by an ex-Navy diver who installed a pair of waterwheels on a 3" steel axle that he supported for the width of the river. He used the power these wheels generated to help operate a pump and barge rig. High water eventually washed him out, but for years afterward the axle lay partially exposed in the old wing dam, and, in fact, inspired the name "Pipeline Rapid". The rest of his equipment was hauled out during the war and sold as scrap.

In the early 60's partners Charles Baldwin and Bill Armstrong worked the Duck Bar claim and had quite an operation. The road had been cut down to the bar by that time (Frank Cooper's son, Horace, did the work) and Baldwin and Armstrong cleared it the rest of the way to the water's edge. With the road in place, they were able to bring in a back hoe, dredge, welder, drag line and all the paraphernalia for a "first-class operation". For a time, they lived in tents, but they eventually got around to building a cabin (which stood, incidentally, until 1975 when the Bureau of Land Management took it out).

The limestone bedrock out in front of Duck Bar lay underneath 3 to 4 feet of gravel and was perforated with caves — one of which the divers followed for 40 feet.

Although the 3 years they spent working the claim were never very profitable, Baldwin remembers Duck Bar as "the most peaceful place I ever lived in my life."

Charles Baldwin was not the only one to feel a special attraction for this spot on the river. Even before Frank Cooper and crew set up shop there in 1908, it was home to a man by the name of Indian Walker who lived, some say, to the age of 110 and became a legendary figure within both the white and Indian communities.

The stories surrounding Indian Walker are various, and frequently conflicting. He was said to have been 17 when the first white man came to Vallecito in 1850, and that he was a "captain" among his tribespeople, although he appears to have lived much of his life apart from them.

His home, in fact, was down at Duck Bar where he lived with his wife Suzanna in a small cabin. They had an orchard, and Walker caught salmon in fish traps to sell to the white community.

He was a familiar sight to the people of Vallecito and Douglas Flat, and was sought out for his advice and knowledge of herb medicine.

Rose Schowerer of Murphys relates a story told her by her mother, in which Walker bathed Rosie (then only a week old) in specially prepared bath water in order to cure her of a colic temper. The treatment was a great success, judging by Mrs. Schowerer, who was a serene 86 when she told of it.



Indian Walker.

A Miwok Indian who watched the Americanization of his native land, Walker lived for a time at Duck Bar. When he died, in 1943, he was said to have been more than 100 years old.

The photo is pre-1920.

Indian Walker and his wife had one daughter, Sara, who married an Englishman, John Long. They in turn, had another daughter Sara with whom it is said Indian Walker lived out his final years after the death of his wife.

He died in 1943, and was buried in Murphys. He was mourned by members of both races and received both a Protestant as well as a traditional Miwok funeral.

Mile 4.6 Coral Cave

Coral Cave, between Duck Bar and Chinese Camp, is one of the very few places in the foothills where any suggestion has been found of an occupation previous to the Miwoks of 2,000 years ago.

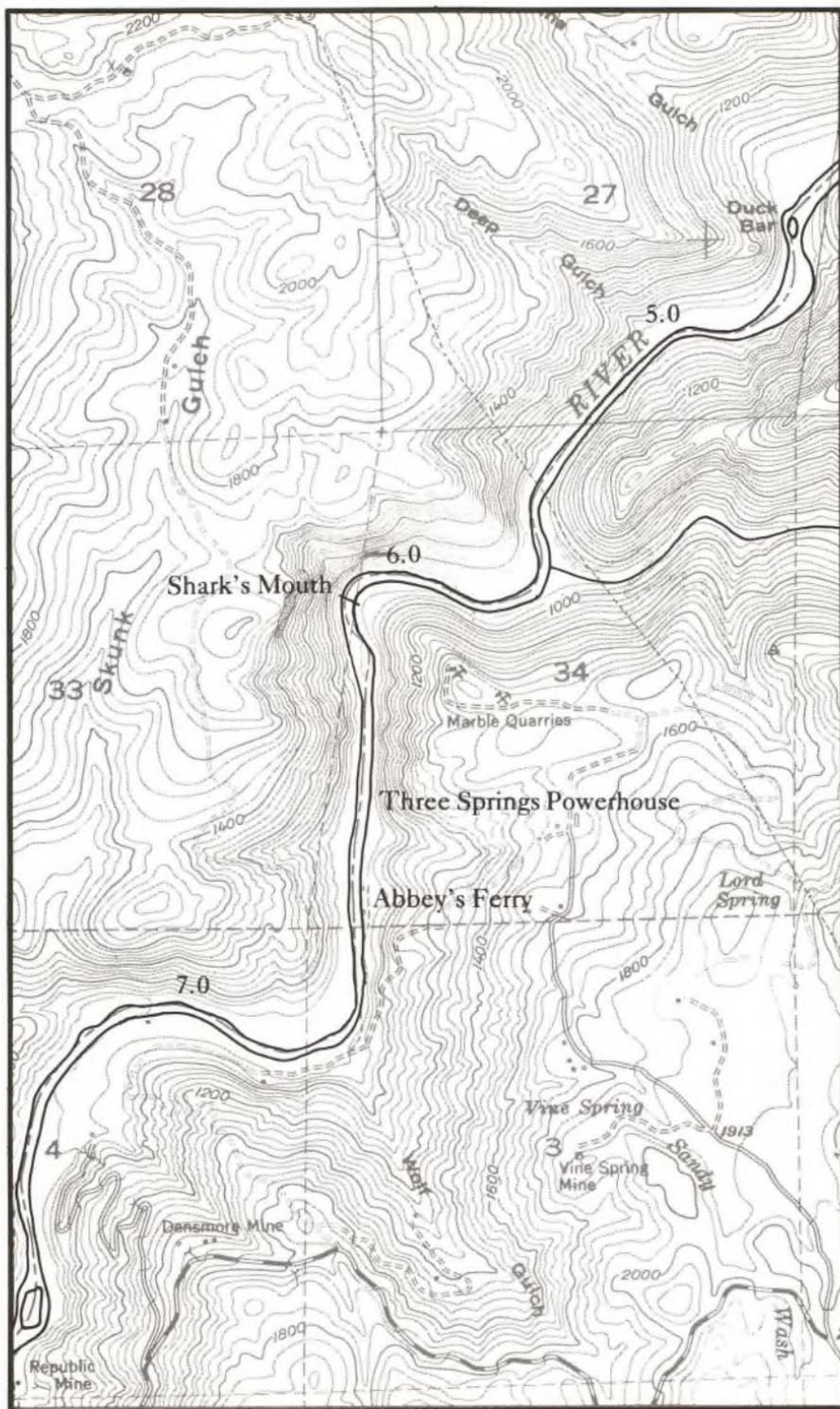
The evidence is ambiguous and consists of a single bone implement very similar to one found in a Shasta area cave and positively identified as being more than 2,000 years old.

Whether the implement is native to the spot, or brought in at a later date, is difficult to say. Nevertheless, it raises an intriguing possibility concerning aboriginal occupation of the area.

Other evidence of more recent Miwok occupation has been clearly documented. The calcite deposits were mined and shaped into "charmstones", examples of which have been found among tribes of the Central Valley, testifying to their value as a trade good. In addition, mortar holes can be found near the entrance.

Mile 4.8 Chinese Camp

The name is of recent origin and probably derives from the belief that much of the sluicing work done at this site was of Chinese origin. Mining records indicate that Duck Bar claims frequently went far enough downstream to include this lower bar, as well as the beach upstream on the Tuolumne side (sometimes called Duncan's Camp). The extensive wall work and channeling done here directed a slurry of mud and water into sluice boxes. The water was flumed out of the main river above Camp Nine.



The rockwork evident on the left bank was part of a wagon trail connecting the South Fork with the upper canyon mines. The trail forded the river in the shallows at Duck Bar.

Mile 5.0 Deep Gulch

Mile 5.1 Cop Rock

The number-one nemesis of unwary boaters in late summer.

Mile 5.4 New Rock Rapid

In the winter of 1980, on Washington's Birthday, a warm rain on a deep snowpack brought the river up to a phenomenal 48,000 cubic feet per second. This rapid was formed by a shifting of the riverbed boulders as a result of that flood.

Mile 5.6 South Fork of the Stanislaus/Pine Log

Over the last hundred and thirty years there have been only three white settlements of any size on this stretch of river: Camp Nine, at the very top; Melones at the bottom; and Pine Log, which, although not directly on the main stem of the Stanislaus, was located just a few miles away — on the banks of its South Fork.

Gold was discovered at Pine Log in the late summer of 1848, only six months after Marshall's discovery on the American. The townsite itself is a beautiful, 20 to 30 acre flat, nestled within a rugged, V-shaped canyon. The Miwoks knew of it, and used the natural, pine log bridge there to connect their trails. Indeed, it was the Miwok trail which originally led the Sonoran miners into the site, which they called "Paso del Pino".

As early as October and November of 1848, numerous claims were already staked out at Pine Flat, where the diggings were reputed to be "excellent". Within a year, 1,500 miners were reported to be camped there, and already the basics of civilization were on hand: a trading tent, an eating tent, and a gambling tent.

By far the most productive mines at Pine Log were the riverbed placer claims. Although the men would doubtless work back from the banks during high water months, their real interest lay in turning the river out of its course, an activity that could only be pursued during the late summer.

In October of 1850 a traveller to the camp gives this account of it:

The most successful point on the Stanislaus river has been the "Pine Crossing", a beautiful deep dell, surrounded by the most majestic mountains. Here the sun is visible for only a small portion of the day, and then his fervid rays are neutralized by the cooling influence of the bright waters fresh from their snowy sources in the Sierra Nevada. In this delightful spot, the river has been turned from its bed; and a rich and golden harvest has rewarded the miners' toil.

That same year, 1850, a Mrs. Patch, thought to be the first white woman resident of Tuolumne County, gave birth to the county's first white child in Pine Log.

By 1855, the Tuolumne County Water Company had solved the Pine Loggers perennial problem of too much water by erecting a diversion dam upstream with ditches supplying claims in the Columbia area. In fact, they solved it so efficiently that the downstream miners were camped by an empty river bed — with nothing to wash the gravel. A letter was soon sent to the water company pointing out the problem and ending with the note: ". . . if yous Dont Comply presently — we will find Means in supplying our wants." It was signed by 126 miners.

What sort of response the men of Pine Log expected is not known, although they were almost certainly caught by surprise when the offending dam failed completely in 1857, sending a wall of water rushing downstream that virtually washed Pine Log away, drowning four of its residents in the process.

Over the next few years, the little settlement rebuilt itself and indeed recorded some of its richest strikes. One claim, the Blacksmith, yielded fifteen pounds of "pure gold dust" in the course of one week's sluicing. Nearby, according to newspaper

accounts, three miners were able to wash out thirty ounces in three days.

Five years after the dam disaster, the town consisted of a “store, saloon, blacksmith shop, eight or ten private residences, and a good deal of mining property.” Unfortunately, Pine Log’s continuing water problems re-surfaced again in the winter of 1862 in the form of the most disastrous flood of all — one that apparently cleared off every building in the flat.

It was a blow from which the townspeople never fully recovered. Although reports of Pine Log activity persist into the 1880’s, gold values were declining and by the turn of the century the little town, whose claims had reputedly yielded several millions in gold, was all but abandoned.

Mile 5.9 Shark’s Mouth

Much of the cliff face here is flowstone or travertine. Mark and Gar Dubois once hiked and climbed up to the large cave opening about 300 feet off the water here, only to discover that, at its deepest, it extends no more than 25 feet.

Mile 6.1 Columbia Marble Quarry

The oldest operating marble quarry in the state is located above the left bank of the river. Originally opened in 1860 by the McNamee Family, the quarry produced construction grade marble. A report published in 1868 described the operation:

Machinery was erected for working the marble, and a mill built for cutting the blocks into slabs and polishing them. The works consisted of a revolving derrick with a boom 60 feet in length, by means of which two men could take blocks weighing 10 to 15 tons from any part of the quarry and place them on cars which ran on a track laid around it and connected with the mill. This mill had 100 saws and four polishing machines, moved by water power. Many thousands of tons of marble were cut here between 1862 and 1866.

Production slowly declined over the years, partly as a result of foreign competition, partly as a result of changing fashions.

The last blocks of marble were hauled out in 1968 and used as flooring in the San Francisco International Airport terminal.

The present day owner is the Merck Company of New Jersey, who operate the quarry intermittently. The marble, incidentally, is no longer sawn but blasted out and the resultant material is used in the manufacture of, among other things, milk of magnesia.

Mile 6.5 Three Springs Powerhouse

Less than half a mile below the Marble Quarry, on the left, is the site of the Three Springs Powerhouse constructed in 1898 by the Tuolumne County Electric Power Co. Built by Sydney Sprout and Harris Coffill Sr., it relied on spring water from Lord, Vine and Gold springs to power its pelton wheel and was, in fact, the first "high-head" powerhouse in the state. Coffill, who designed it, had also been involved in designing the city of Boston's first trolley car system and had helped with the lighting at the Chicago's World Fair in 1895.



Three Springs Powerhouse. the first high-head powerhouse in the state was supplied with water from springs more than 1000 feet above the brass bucket Pelton wheel that drove the single generator. Wade Coffill reports that the water hit the buckets with sufficient strength to bend the ½" thick material and that pebbles would occasionally shoot through the brass like bullets.

When in operation, the plant required two operators for two twelve hour shifts per day. A total of four buildings existed at the site, including two residences, the powerhouse itself, and a barn.

In 1920 PG&E purchased the plant and shortly thereafter dismantled it.

Mile 6.7 Abbey's Ferry

Before the first bridge at Melones was completed in 1907, travel between the southern mines of the Sonora area and the diggings on the Calaveras side depended almost totally on the Stanislaus ferries. Between Melones and Camp 9 there were four, the highest of which was Abbey's Ferry, located at this calm, wide stretch just below the marble quarry.

Today, the clearest evidence of the operation are the old roads which come down from both sides to face each other on opposite banks. On the Calaveras side, the road connects to the Camp 9 road via Skunk Gulch. Over on the Tuolumne side, the route joins with the Parrotts Ferry Road via the Marble Quarry drive.

George W. Abbey started the ferry in 1851, some nine years before Thomas Parrott began his operation just downstream. Over the next ten years it changed hands at least half a dozen times — in one instance being sold for \$7,500. The last record of operation is in 1863.

Among the thousands of passengers who must have ridden the ferry, only two are known to have been too heavy for the barge to accommodate. Their story is related in the following item which appeared in the San Francisco *Herald*, dated July 3, 1860.

THE DAN RICE SHOW — DEATH OF VICTORIA

The highly trained elephant Victoria, of the great Dan Rice show, died lately from injuries received while swimming the Stanislaus river on her way from Columbia to Murphys. The river was running with immense velocity, and as the ferry boat could not take the ele-

phants, an attempt was made to swim them across. Albert went over safely, but Victoria put back to the same side from which she started, and she was so terribly bruised by being rolled over the rocks by the swift and powerful current, that she died two or three days afterward. Had the accident occurred earlier in the season, the loss would have been much heavier upon the proprietors than it is now likely to prove. Albert will continue to perform as heretofore.

The Dan Rice show will be in Placerville tonight and tomorrow night.

A follow-up article over a month later gave this information:

San Francisco Herald — August 23, 1860.

VICTORIA — It will be remembered that the celebrated trick elephant, Victoria, died from injuries received while swimming the Stanislaus River. Her hide was sent as a present to the proprietor of Biggs and Kibbe's old stand, on the corner of Montgomery and Commercial Streets, and by him offered to be stuffed.

The work was confided to Mr. F. Gruber, naturalist, and performed in a style most creditable to the artist and to California. Victoria now looks as natural as if she were still in the flesh, and ornaments the saloon above referred to. If Albert could get a glimpse of the stuffed figure of Victoria he would certainly tear the side of the room down to meet his former companion in the belief that she was still alive.

Mile 6.9 Wolf Gulch

Sierra Club Rapids begins at this small left-side tributary.

Mile 7.0 Steiner's Cabin Site

Walter Steiner built a sturdy yellow pine log cabin here on the left around 1930 to work his 270 acre claim. Steiner was a "proto-type of the American individualist" and did the work almost entirely by hand.

A fire destroyed the building in 1978.

Mile 7.5 The Densmore Claim

Some two hundred yards back from the water, on the Tuolumne side of the river, is the old Densmore claim, site of some of the best preserved mining relics in the canyon.

The original claim was filed in April of 1900 when the names associated with it were the Densmore Quartz Mine, the Young America Quartz Mine, and various extensions of each. Over time, however, the name "Young America" was dropped, and as far back as anyone can remember, the claim has simply been known as "the Densmore".

Up until the late 1890's, little more than assessment work was done at the mine, but the next few years saw a succession of new owners and, according to one source, at least \$600,000 was taken out of the granite vein being worked. By 1909, though, the values had apparently diminished significantly; and in 1920, the Densmore was on the block for back taxes. It was sold at auction for \$491.49. Included on the deed were not only the mines and mill sites, but a ten-stamp mill, concentrators, cyanide plant, and a bunk house.

Power to the Densmore was originally supplied by water from Vine Springs Gulch, although in later years it was electrically driven.

Unlike most of the canyon quartz mines that were filed around the turn of the century, the Densmore was re-opened again in 1939 when George Raye, an Alaskan, put his \$125,000 stake into it. Among the many improvements Raye added to the property was the road that extends from the original mine down to the river.

The old mill had been destroyed by fire and Raye's second order of business was to replace it with a new ball mill, this one closer to the river. It is this mill whose foundation and machinery can still be inspected today.

Both mills were built after a fashion that became very popular after the turn of the century. The mechanism used to crush the ore was a huge rotating drum in which iron balls were placed. By rotating the drum, the quartz was ground sufficiently to be



The Duchess Mine.

The Emery family gathered around the mine site, around 1904.

sent to the classifiers where it was separated by density. The “riddlings”, waste ore, was either recycled back through the drum or thrown out onto the tailings heap.

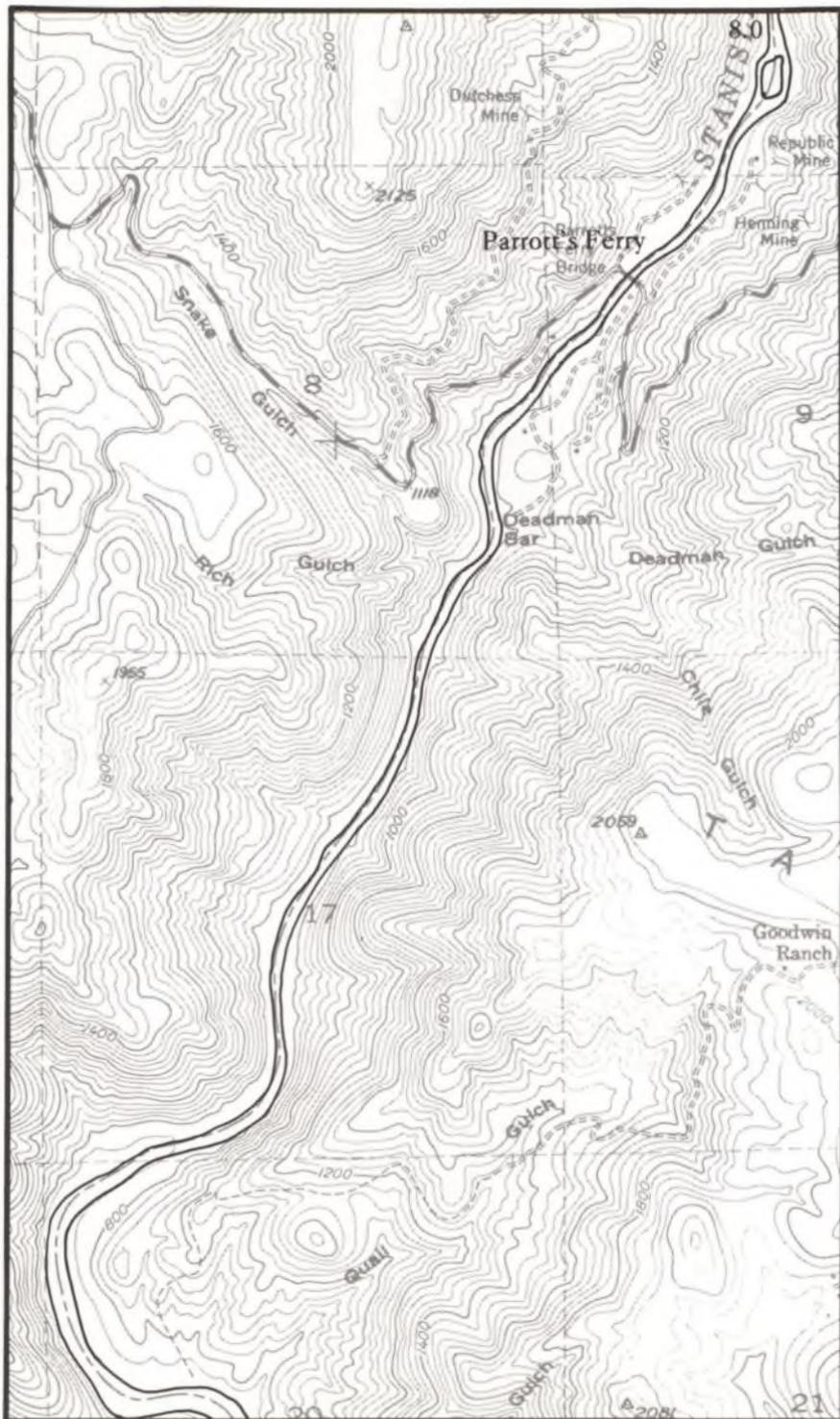
Contrary to popular myth, gold mines can very frequently be anything but profitable. George Raye sank not only his original \$125,000 into the Densmore, but an additional \$50,000 loan as well before finally giving it up.

Zeke Goodwin reports having seen George Raye some years afterwards working on the San Francisco wharves, many miles from the nearest gold mine.

Mile 8.4 Duchess Mine

About 600 feet up on the Calaveras side of the river, is the old Duchess mine.

The first name associated with this claim is that of John



Drussel who apparently did some preliminary prospecting there in the 1890's but soon quit the claim and returned to his home in the midwest. He took with him some ore samples, though, which he showed to William and Eliza Emery who became sufficiently excited to sell their Indiana limestone business and move with their three children to California. As it turned out, the samples hadn't come from the Duchess, but that was a lot of time, money and effort later.

The family arrived in Vallecito during its mini-boom of new quartz mining activity on September 18, 1898. They took up residence on the Bishop property and the children soon began to attend the one room school house. From all accounts, the Emery's were "a devoted couple, sure they were going to make it".

At all events, they soon plunged into the gold mining business "in a big way". They and their partner Charles Lilly built access from the Parrott's Ferry road to their claim, blasting it out of the hillside. With a five man crew they put up an assay office, a ten stamp mill, a bunkhouse, a mess hall — and they dug. One shaft extended 1,824 feet into the hillside. Green Lewis, uncle of Ruth Solari, was their foreman and he reports it was quite a little operation.

Unfortunately, it didn't pay. It took several years, but eventually their money was gone and the Emery's quit. George died in 1907, a "frustrated man", it was said, and the rest of the family moved to San Jose.

Mile 8.5 Republic Mine

Just downstream of the Densmore, on the same side of the river, is the Republic mine. Like most of the claims in this section of the canyon — the Henning, Manzanit and Breece, for example — it was worked intermittently between 1900 and 1930, with indifferent results.

At its peak the mine was worked by a crew of five or six who sank 1500 feet of tunnel into a 6 foot vein. They processed the ore with a 9 stamp mill and shipped it to Jackson for cyanadization and the final steps of extraction.

Zeke Goodwin reports the place had a relatively short lifetime and never really was a good producer.

As for the Duchess, a couple of other outfits tried sporadically, the last one in the 30's, but it never had the values to make the effort worthwhile. Since then, the claim has lain idle, the equipment rusting away, a California pot of gold that never materialized.

Mile 8.5 Parrot's Ferry

Thomas Parrott and A.G. Bradbury first began operating this ferry crossing in 1860. It quickly became the most important crossing upstream of Robinson's, serving pedestrians at 25¢ each, loose stock, 20¢ a head, and mounted travellers, 50¢ apiece.

Between the years 1861 and 1871, the ferry changed hands nine times, eventually coming back to Parrott who continued to operate it until his death of "paralysis of the brain" in 1894.

His daughter, Celia, then took over the business and ran it until 1895 and then again from 1897 until 1903 when the Tuolumne and Calaveras counties collaborated on the construction of a bridge. The crews from the two counties apparently operated somewhat independently of one another and when the two halves of the bridge were joined in the middle it was discovered that the Tuolumne end was five feet higher than the Calaveras end. At the time, the counties regarded each other a bit competitively and the discrepancy was felt to have symbolic meaning.

In December of 1937, however, during a massive flood, the bridge and the Tuolumne-side abutment washed away. John Solari, an Italian immigrant who had supervised the construction of the Calaveras side of the project, is reported to have been so excited by the results of this ultimate test that he took his whole family down to see the evidence. "My side," he exclaimed, "he no go."

The following years the counties again collaborated on a bridge, this one about a quarter of a mile upstream of the old site. Built by Nelson and Wallace of Escalon, it cost \$26,662.

During the 1860's and '70's, the area around Parrott's Ferry was quite popular with Chinese placer miners. It was also, according to legend, quite popular with the notorious bandit



The Opening of the First Parrott's Ferry Bridge, 1903. The heartless march of progress is well captured in this scene showing both the old ferry barge in the background as well as the new trestle bridge on its ceremonial opening day. The project had been a joint venture between Calaveras and Tuolumne Counties, with the two crews working separately, and at times even a bit competitively, towards its completion. From the photo it would seem the two county delegations were still trying to keep their distance.

Joaquin Murieta and his partner in crime, Three-fingered Jack.

The story has it that Joaquin so terrorized the Chinese community at Parrott's Ferry that they collected a reward for his capture from among themselves and when they heard he had been caught and killed, they declared a holiday.

The Tuolumne side of the crossing, the broad flat where the Bureau of Land Management now maintains a campground, has a history of miners and settlers going back at least to 1860. For a time, the area was called Walker's bar, after one Daniel Walker who worked a hydraulic claim there. He was killed on it in July of 1873 when a bank of earth collapsed on him.

Since then his claim, never patented, passed through many hands, most recently Ron Sperry in the 40's, George and Mildred Boggs in the 50's, and Dan Schmira in the 60's and early 70's.



Mile 11.8 - 12.0 Horseshoe Bend

The river makes a sweeping right—hand turn at this point, completing three-quarters of a circle in an ox-bow known as Horseshoe Bend.

The Miwok tribespeople knew of this turn in the river, and probably dwelt upon its shores for a period of almost two thousand years, making it, along with Clark's Flat the most ancient of the river settlements. Although the archaeological evidence has been seriously disturbed by gold mining activities, a collection of over 300 mortar holes exists at the site — the largest on the river.

In more recent times, Horseshoe Bend has been the scene of two waves of gold miners: the first group arrived in the 1850's and were on the fringe of the fabulous placer strikes 2 miles downstream at Melones. The second group began arriving around the turn of the century, bringing with them the new equipment and technology of hard rock mining.

Among this second group, probably the most prominent was the Horseshoe Bend Mining Co., funded by Eastern capital and operated by a man named Heath. At its peak, around 1903-1906, the mine supported a settlement of twelve residences and a boarding house, all on the Tuolumne side.

In 1904, a stamp mill was hauled down the steep road and a foundation prepared. But the poor ore values forced the aban-

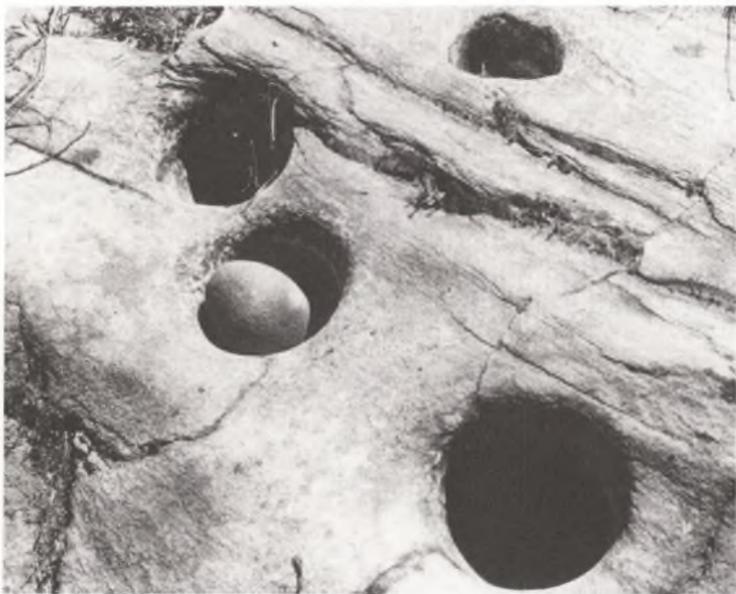
◀ The Infamous

Joaquin. Attempting to separate fact from fiction in the Joaquin Murieta myth would be a frustrating — and probably misdirected — task, something like wondering where Joaquin's galloping steed was going to put his flying hooves down next in this rendering of the famous Motherlode outlaw by Charles Nahl.

The acorn was the Miwok staff-of-life. They made from it biscuits, soup, mush and bread — both leavened and not. Harvest time was fall, when whole villages would gather the year's crop in burden baskets and make loaves upon loaves of bread for storage. A good crop was cause for feast and ceremony; a poor one, tightened belts and growling bellies.

The Miwok graded the oaks for the value of their acorns. The Black oak was their mainstay: good acorns, easy to husk, generally plentiful. Next came the Valley oak: excellent acorns but hard to husk. Afterwards, the Interior live oak, Blue oak, scrub oak and tan oak.

Preparation began with shelling, mashing and then a leaching process since all acorns contain bitter tasting tannin. Crushing was done by pestle and mortar ("uluwe" and "lupu"). Granite outcroppings along the foothill rivers are frequently pocked with these acorn mill sites where Miwok women would gather and chat while mashing the shelled acorns.



The meal was leached of tannin generally in small sandy depressions by the water's edge. The women would pour water through the meal slowly, beginning first with one or two applications of cold and finally working up to quite hot.

Afterwards, the meal could be cooked in a couple of ways, either in an earthen oven, or boiled in a cooking basket. Heat was applied with white hot rocks and the basket was prevented from burning by constant stirring.

Today the preparation of Native American food threatens to become a lost art. Particularly in the case of Black oak acorn bread, though, such a loss would be more than merely cultural. Acorn bread makes a hearty, nutritious loaf with a dark, nutty flavor; spread with blackberry preserves, it makes for a meal far more American than hot dogs.

What follows is a modern-day recipe provided by Roxanne Maloney.

*2 cups acorn meal (Black oak 2 cups milk
are easiest to hull;
Valley oak, 1 tsp. salt
the best tasting) ½ cup honey
2 cups corn meal (or brown sugar)
1 cup flour (rye is good) 1 tsp. baking powder
3 eggs*

Cover the shelled acorns with boiling water and let sit for 24 hours. Drain and repeat, either once or twice more, depending on your patience and taste. Afterwards, either in a food mill or blender, grind the resulting mixture to a meal-like consistency.

Combine the acorn meal, corn meal, salt, flour and baking powder. Mix in the eggs, milk and honey. Bake at 375 for 30 minutes or until done. (One variation is to use 3 cups acorn meal to 1 cup corn meal. Much more acorny.)

donment of the project, and indeed the closure of the whole mine, around 1913.

Since then, the area has been used as summer range, most recently by the Pedro and Airola families of Columbia and Angels Camp respectively.

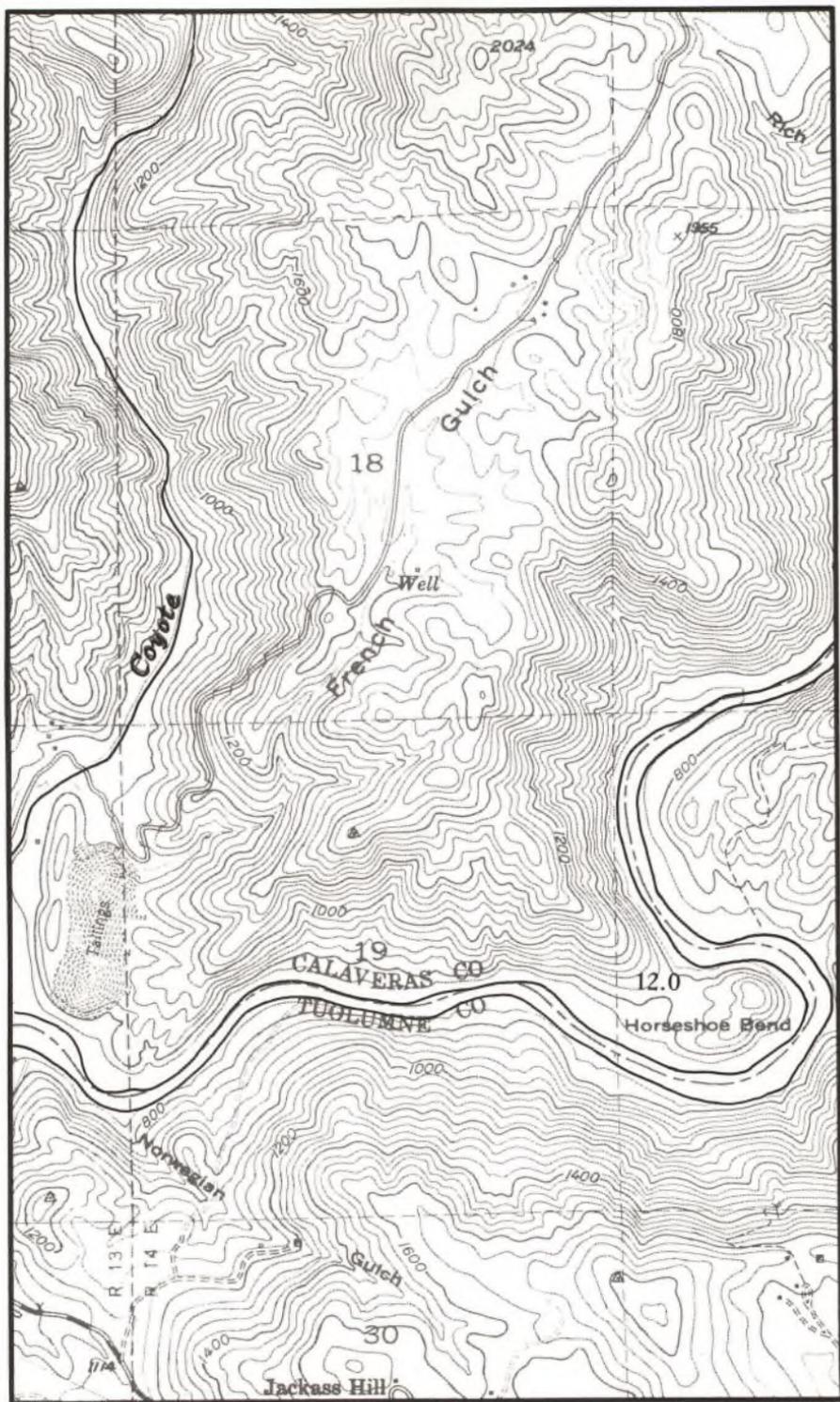
Mile 12.4 McLean's Ferry

Among the four ferries operating between Abbey's and Melones, the earliest was started by George McLean, an Englishman from Hawaii, in 1849. McLean apparently had a swift sense of tradition and within a year he was publicly referring to his operation as "the old, established ferry on the river Stanislaus." He also, according to reports, had upon his premises "no less than two respectable women" at a time when such a thing was quite uncommon.

Indications are that the ferry closed operations when Harvey Wood, the owner of the prosperous Robinson's Ferry downstream, bought McLean out in 1858.



McLean's Ferry. "The old established ferry on the Stanislaus River". *Charles Nahl painting.*



Mile 12.4 The Sierra Railroad

A series of cement trestle pilings on either side of the river marks the former crossing of the Angels line of the old Sierra Railroad, a 19 mile long branch connecting Jamestown and Angels Camp built between 1899 and 1902.

The Sierra Railroad was incorporated in February, 1897. Its five directors hoped to capitalize on the quartz mining boom currently in progress in the Motherlode as well as to facilitate the growth of timber and, even in those days, tourism. The first line constructed connected Oakdale and Jamestown and was completed in 1897. Finishing the branch to Angels Camp however, presented some serious engineering problems — namely, Table Mountain and the Stanislaus Canyon. The railway's first engineer, in fact, declared the Stanislaus "unmanageable" for all practical purposes. His replacement, however, W.H. Newell, was apparently more resourceful and much of the credit for the line's eventual construction success is due to his conception.

Throughout late 1899 and early 1900 work progressed well towards Tuttletown. Table Mountain was successfully graded, avoiding the apparent necessity of an expensive tunnel. At about the same time, summer 1900, a steel trestle 140 feet long and 24 feet high was constructed over the river, despite the fact that the formidable canyon walls were as yet unapproached.

As the bridge was being completed, William Ralston, the hard bargaining owner of the Melones Mine, refused to grant right-of-way unless he was given substantial freight discounts. The railroad men responded by halting construction and threatening to re-route. They even went so far as to offer for sale their, as yet unused, trestle. A compromise was eventually reached, however, and beginning in August 1901, the work was recommenced with vigor.

The Tuolumne side of the canyon drops 700 feet in two miles and was finally negotiated with a double switchback, called the McArdele switch because it began on the property of Ferguson McArdele. Two hundred men, laboring at \$1.50 per day, kept the work progressing.

Ascending the Calaveras side was slightly less difficult, re-

quiring only one major switchback, the top of which was called "Gee Whiz Point". By late August 1902, the grading crew had mastered Carson Hill and most of the relatively easy stretch between the Hill and Angels Camp. On Monday, September 15, the first train rolled between the two towns.

Angels Camp held a parade for the event that the San Francisco *Chronicle* called "the largest celebration in the little town's history." Two brass bands played, a hot-air balloon went aloft with a parachutist aboard, and there were games, picnics, and square dancing all day long.

Archie Stevenot, a lifetime resident of Carson Hill, recalls one day in particular in the history of the railroad — June 26, 1906. A boxcar loaded with dynamite jumped the track near Gee Whiz Point and exploded. The brakeman managed to survive by jumping clear, but one — and possibly two — passengers were not so lucky. It was never exactly clear how many had died; the only evidence was a gaping hole where the tracks had been.

The Sierra Railroad Trestle.



Unfortunately for the railroad promoters, the mineral, timber and tourism business on their new line failed to materialize as hoped for. Meanwhile, the new trucking industry was becoming more and more competitive. Service was gradually cut back over the period 1917 to 1936, until finally, in 1939, it was officially discontinued. Shortly afterwards, the tracks and trestle were taken up, marking the end of the canyon's brief railroad era.

Mile 12.7 Robinson's Ferry

Probably the most important of the four ferries established on the Stanislaus between Melones and Abbey's was the one begun at the base of Carson's Hill by John Robinson and Stephen Mead in 1849.

Robinson's Ferry, as it came to be known, linked the settlements of Angels Camp and Sonora along a road that followed the present Highway 49 route quite closely.

As prosperity hit the Southern mines, and in particular the Carson Hill claims, business on the new ferry boomed. During one six week period in 1849, the two ferrymen reportedly took in \$10,000.

Robinson and Mead sold their interest in the operation in 1853 and in 1856 it fell into the hands of Harvey Wood who operated it continuously until 1895 and became the best known ferryman on the river.

Robinson's Ferry. Harvey Wood escorts a buggy across the Stanislaus.





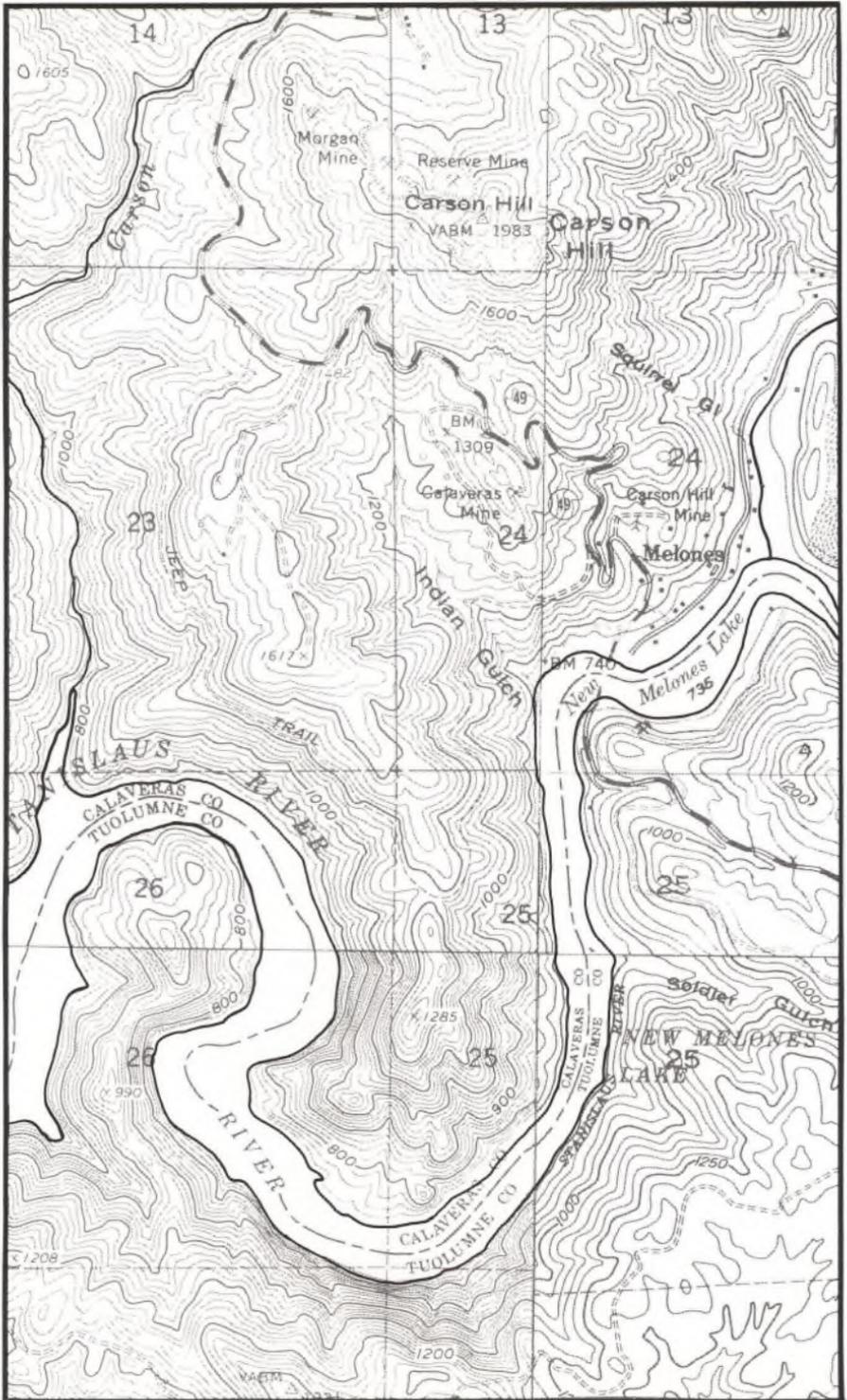
Harvey Wood.

Grandson of a Bedford, New York Squire, Harvey Wood forsook Eastern amenities for Western adventure in 1849, arriving in the Melones area in July. For a time he divided his energies between a general store and a prospect hole that he and two partners had a great deal of (misplaced) faith in.

Worthless gold mines are undoubtedly frustrating places to work under the best of circumstances. Melones, in 1849, though, must have been particularly galling to the partners — a fact reflected in Wood's recollections of the period:

“It was always a mystery to me what particular qualifications a worthless drunken vagabond possessed that he almost inevitably had the richest and best claims, while a hard-working, industrious man, striving to make a fortune, very often found it nearly impossible to make expenses.”

Despite the inequities of fortune, Wood went on to become a prosperous businessman and well-respected member of the community. After his death in 1895, his wife and son continued to operate Robinson's Ferry until shortly before the first bridge was constructed at Melones in 1907.



Mile 12.8 Carson's Hill/Melones

The river makes a riffled turn to the right bringing into view Carson's Hill, a small flattened peak that for a time appeared to be the fabled "mother mountain of gold" beside which every other strike in history was destined to pale into insignificance. These were Carson's Diggings, and the hill was known originally as "the crater"; and for a very few lucky Forty-Niners, this is where their rainbow finally came to rest.

During the first few months of the Gold Rush, when the territory was still wide open, a few enterprising whites enticed the Miwoks with beads and other trade goods to bring back the "shiny stones" from the creeks and river bottoms of the backwoods. Charles M. Weber was one of these early entrepreneurs and it was to his camp, on a creek near the American river, that a group of Indians brought back samples of "nugget gold" that galvanized the American miners of "Weberville" and brought them hurriedly south to the Stanislaus.

Arriving separately, and a few months beforehand, was a group of men discharged from Colonel J.D. Stevenson's New York Volunteers, part of the defunct California invasion force of the War with Mexico. Among them was one James H. Carson, a former Second Lieutenant who gave his name to the creek which watered their camp.

For those first few miners at the new diggings, the placer values were phenomenal. Carson and a few of his men, over a period of ten days, were reported to have taken out 180 ounces each.

The news of these discoveries had a predictable effect on the hordes of gold seekers already crowding the northern diggings and the resultant rush made Carson's the biggest camp in the Motherlode by the fall of 1850.

It was at about this time, or a little later, that accounts of the diggings began to refer to them by the name Melones, rather than Carson's. The new name was the Spanish word for "melons" and derived from the fact that the creek bottom nuggets from the area had been washed smooth into the shape of watermelon seeds.

Up until the end of 1850, the focus of the activities had been on Carson and Coyote Creeks, as well as the main river. As extraordinary as these finds had been, they were quickly overshadowed by a discovery made by William Hance on October 20, 1850 when he uncovered a quartz gold vein on the top of the "crater" that was eventually described as "the largest mass of vein gold ever found in the world, allowing all reasonable latitude for exaggeration."

Among the six partners that Hance took in to exploit the vein was one by the name of Colonel Alfred Morgan, and together the seven staked out a claim that eventually became the basis for the world-famous Morgan mine.

A mining report filed in the year 1868 described the find and the first efforts at mining it: ". . . the rock was extremely rich; indeed, if the statements of those who lived at the place are to be taken, the gold was abundant beyond any parallel. On one occasion gold to the amount of \$110,000 was thrown down at one blast."

Understandably, the discovery electrified the little camp as indeed it did the entire state, creating a second rush of "chaotic" proportions. Thousands of miners staked claims on the "crater" recently digging within just a few feet of one another in a feverish rush to get to the best ore first. It was the height of the California Gold Rush, and Melones became the archetypal camp.

Hance made his discovery on October 20, 1850, and his Carson Creek Consolidated Mining Co. filed their claim on November 15. Little noticed at the time though was the fact that Hance, Morgan, et al were attempting to monopolize the entire find by laying claim to the full 1700 feet of vein. On the basis of the accepted "laws" of the camps that limited each miner to a spot no larger than 25 feet square, this was an outrageous excess; and when Morgan and company began efforts to enforce the self-proclaimed limits of their claim, the ensuing uproar effectively stopped all activity on the hill for a period of almost a year while the "People's Mining Co." battled with the seven partners in the courts, in the pages of local newspapers, and occasionally in the streets.

As an outgrowth of this conflict, Melones became the scene of heightening racial tension between the Anglos and Mexican miners — many of whom were working on shares for the Morgan Company. Captain Leonard Noyes, who, together with some partners, went in on a claim not far from Melones and described the early days in his diary:

Soon after we bought the Block and Tackle claim, a crowd from San Francisco came up, and pitched all the Mexicans from the Morgan Claim and took possession of it. Before this the whole hill was worked by Mexicans hired on shares and a Town called Melone was started on the opposit side of the Hill from Carsons. This place called Melones was built of Brush streets say 10 feet wide lined on each side with these Brush houses where Gambling was carried on at an enormous extent, all the Mexicans having money. It was supposed that they stole more gold than they accounted for to Morgan & Co. I dont think there was ever in the Mines so wicked a crowd. Some are killed every night, shooting and cutting all the time. Our Cabbin was the opposite side of the hill some 2 miles from Melones. We would usually go there Sunday nights in a bodey keeping together so as to be able to protect each other. I always felt in those narrow streets that I was liable to have a knife shoved into me at any moment . . .

Eventually the bickering and legal squabbles took their toll on the Morgan Company and by 1853 they were soliciting buyers for their operation. After some negotiations it ended up in the hands of James G. Fair, a businessman with investments in the area. Fair, incidentally, went on to become one of the Comstock silver barons and the founder of the Fairmont Hotel in San Francisco.

It was under Fair's ownership, in 1854, that the famous "Calaveras Nugget" was discovered. Richard Coke Wood gives this description of the nugget, generally acknowledged to be the largest ever found in the United States.

“The nugget was fifteen inches long, nearly six inches wide and of irregular thickness, averaging four inches. Attached to one side were pieces of quartz, but over eighty per cent of the lump was gold. It was weighed on Adam Express Company’s scales in Stockton and balanced at 2576 ounces, or 214 pounds and 8 ounces, Troy. The gold was valued at seventeen dollars an ounce and the worth estimated at \$38,000, making allowances for the quartz attached to it.”

The speed with which the camp at Carson’s sprang up was only equalled by the speed at which it was abandoned. By 1858 a visitor to the camp describes “crumbling remains of stone chimneys and adobe ovens” and “ancient cabin remains.” Rarely has history been on a faster track than among the goldfields of California.

Melones Around 1900. Looking across Coyote Creek. The Carson Hill stamp mill is visible in the center back.



A second era opened for the town of Melones in 1898 when William Devereaux, a wealthy investor from New York City, constructed a 60 stamp mill and began driving a new shaft into the base of Carson's Hill. Power to the mill was provided by flume water taken out of the Stanislaus with the help of a diversion dam installed approximately one mile below Parrott's Ferry.

Following Devereaux's lead, four other companies soon began operations at Melones, injecting new life into the old camp. In 1920 all five were consolidated into one corporation — The Carson Hill and Melones — which between 1920 and 1926 produced \$6,000,000.

Operations continued on a reduced scale until 1942 when the War Order L-202 shut down non-essential industries for the war effort. It was the final blow, as it turned out, for the remarkable Carson Hill claims; they were never re-opened.



BLACK BART

Charles E. Boles, alias Black Bart, was a gentlemen's highwayman — possibly the original of his kind in the West. Beginning in July of 1875 he successfully held up twenty-eight stages before his luck finally turned on November 3, 1883, and cruel fate delivered him into the hands of the law.

Bart was a man of some sensibilities and he built his reputation in crime and not only for his success, but also for his style. He was blunt with the drivers but unfailingly chivalrous with the ladies. And he left behind poetry. Bad poetry, to be sure — Bart considered it a major part of his crime — but, nevertheless, it was a classy touch.

Black Bart's final hold-up occurred in the Stanislaus canyon, downstream by a few miles from Melones and is a story worth retelling:

Reason E. McConnell, driver for the Nevada Stage Company, pulled out of Sonora at four o'clock in the morning Saturday, November 3, 1883. He stopped in Tuttletown and picked up a strongbox containing several hundreds of dollars in gold dust and coin. His next stop was Reynold's Ferry, the crossing downstream of Robinson's where Jimmy Rolleri asked to hitch a ride up to Funk Hill. He had recently acquired a new rifle and intended to do some hunting with it.

At the foot of the hill, Rolleri hopped off to continue on foot and McConnell's stage began inching up the steep incline. It was near the top when Bart made his move. Leaping out of the underbrush, brandishing a shotgun and wearing a flour sack over his head, he must have been an arresting sight. McConnell instantly recognized the thief and his intentions and reined his team in. The next few minutes were spent wrestling with the strongbox and forcing its latch. Meanwhile, Young Rolleri happened on the scene. There was a quick exchange of shots and Bart, wounded in the hand, scurried off down the slope. Unfortunately for the bandit, he left behind a number of articles —

his brown derby, a bag of crackers, a handkerchief, a pair of field glasses, a belt, a magnifying glass, a razor and two flour sacks. The handkerchief proved to be Bart's undoing for it was stamped with a San Francisco laundry mark which soon led the authorities to Charles E. Boles.

Boles was convicted and sentenced to six years at San Quentin, during which time he took the opportunity to write to his sentencing judge expressing no hard feelings. Upon his release he took his leave of California and was heard from no more.

Jimmy Rolleri, for his part, was presented by the stage line with a new rifle inlaid with silver scrollwork — a generous gesture lessened somewhat when the gun exploded with the first shot. Jimmy was uninjured, however, and soon received a replacement — without the scrollwork.



Boats on the Stanislaus

Although written descriptions are lacking, it seems probable that various, isolated individuals floated the stretch between Camp Nine and Melones in rubber boats commencing soon after the Second World War. When, how many, and with what success, though, would be hard questions to answer accurately.

The first well documented trip took place in April, 1961, when a group of eleven Sierra Club kayakers put in at Camp Nine. Included among the group were: Elsa Bailey, Ray Cochran, John Bombay, Ray DeSaussure, Bob Elliott, Ted Fostiak, Glen Gaumer, Monte Rowell, Charley Smith, and Barbara Tilden. In 1961, whitewater kayaking, at least in the West, was still in its infancy, and the "Eskimo roll" was not a widely practiced technique. In fact, none of the group even wore protective helmets for this first Stanislaus trip. An upset generally meant a quick exit and a swim.

Later that spring, Bryce Whitmore, who had just two years before built the first fiberglass kayak in the West, ran the

Elsa Bailey. One of the very first female kayakers in California, Elsa boated the Rogue River in Oregon in 1959, the first time it had been done with modern-style kayaks. Shown here at the 1961 Salida, Colorado races.



same stretch with Peter Whitney and Maynard Munger. Within a few weeks of this trip, Bryce was back with rubber boats and the first paying passengers.

In 1962 and 1963, Bryce's was the only outfit rowing passengers down the river. His brochure could guarantee the participants complete solitude. But in the summer of 1963, the old Camp Nine powerhouse was replaced with a larger, more modern plant which re-distributed springtime high water to late in the season. The Stanislaus suddenly became runnable throughout the summer. Shortly thereafter, Lou Elliott, Henry Felaney and a few others began offering trips on the Stanislaus.

By 1980, the number of outfitters on the Stanislaus has grown to more than 30, and the total number of annual visitors to the river now exceeds 60,000 — making the Stanislaus the third most popular whitewater river in the country.

Ray DeSaussure. A spelunker as well as a white water boater, DeSaussure first became familiar with the Stanislaus out of his interest in caves. It was his suggestion that brought the Sierra Club boaters to Camp 9 in April 1961.



Modern Development on the Stanislaus:

There exist fourteen dams on the Stanislaus and its principal forks. They range in size from 147 feet at Relief Creek to the 623 foot monolith at New Melones. Between them they generate 138,000 kilowatts of power and yield 1.7 million acre-feet of water. The Stanislaus resource, to borrow a term, has been exploited; it's a hard-working river.

The primary benefactors of the river's energy and water are the customers of PG&E and irrigators in Stanislaus and San Joaquin Counties.

Water Flows Below Camp Nine:

At the onset of this section, a point should be made which occasionally becomes lost in the description of water releases from behind dams. The Pacific Gas and Electric Company, whose Camp Nine facility determines the timing of the water flow in the late summer, manufactures no water. They redistribute water. If an August afternoon sees a healthy flow of 1200 cubic feet per second of water, it is because a June morning has been depleted of a similar amount.

Bearing this fact in mind, what follows is a typical week's schedule of water flow in the Stanislaus after spring run-off has ceased to be an important factor, and before the onset of winter rain.

NOTE: Water in the Stanislaus travels at a speed of 2-4 miles per hour. The hours quoted below refer to Camp Nine. Downstream locations will experience a delay proportional to their distance from the powerhouse.

Monday — Friday: An average flow would be 900 cubic feet per second, more than enough to make the river navigable. Camp Nine releases for approximately twelve hours per day, 7 a.m. to 7 p.m., although minor fluctuations during the middle of the day are not unknown.

Saturday — Sunday: Weekend flows do not differ dramatically for those released Monday through Friday on the Stanislaus. Exceptions are generally caused by holiday weekends which reduce power demand, or equipment malfunctions.



New Melones Dam. Fourth largest earthfill dam in the world.
Completed in 1979 at a cost of \$341 million.



**THE TUOLUMNE RIVER:
Mile by Mile**

Researched by Larry Shepherd

Jawbone Country

Seen on a topographic map, where it doglegs around Hunter Bend, the name is appropriate: from Lumsden Bridge, the steep range of hills north of the river is called Jawbone Ridge. Originally pioneered and homesteaded by the Lumsden family at the turn of the century, it is a formidable land, and those who followed were to soon discover that it was suited to a single venture — cattle.

A number of Groveland ranchers ran their cattle into the Jawbone Country in the early years of this century. Prominent among them were three families of recent Italian immigration: the Ferretti's, Boitano's, and Rosasco's. When spring arrived with its long warm days, and the hillsides of Jawbone Country turned green with luxuriant grasses, the drive began, and hundreds of cattle were herded down the Lumsden trail, across the old covered bridge, and into the prime grazing land. The area centered around the Meyers Ranch, a few miles into the country, and went as far back as Cherry Creek. In September, before the rainy season, the cattle were rounded up and trailed back out.

In 1918, the county was afflicted by a particularly virulent strain of flu. The illness, referred to as Spanish influenza, reached an epidemic of such proportions that by the autumn of that year, county residents were required to wear protective cloth face masks in public, or risk a fine and/or imprisonment.

Out on the range, several of the cattlemen contracted the disease, and quickly became extremely ill. In a desperate attempt to reach home, they tied themselves to their horses and set out to find the crossing at Lumsden. They finally reached their Groveland ranches, but for two of the men it was too late. John Frederick Rosasco died on November 6, 1918 of "broncho-pneumonia and influenza". His partner, Joseph Augustus Ferretti, died a week later of similar causes. A third

partner, Joseph Boitano, recovered, and survived his contemporaries by fifty years.

Another Groveland rancher who summered his stock in the Jawbone Country was Tim Carlon. A native of the country, Carlon was the first local cattleman to die a millionaire. He was strictly a self-made man, and earned his fortune through hard work — although reportedly his neighbors would now and then notice a few freshly branded Carlon calves trailing after their own heifers. For whatever reasons, Carlon was usually accompanied by a hired gun, a man by the name of Morrain.

The cattle drives down the Lumsden Road continue to this day. One of the contemporary cowboys, Les Peters, estimated that he has helped owner Leonard Brooks move upwards of 800 Hereford and Angus cattle into the Jawbone Country in each of the last several years. It takes a full day to drive the herd down the dusty road, and it is not uncommon to lose an animal or two over the side.

Tim Carlon

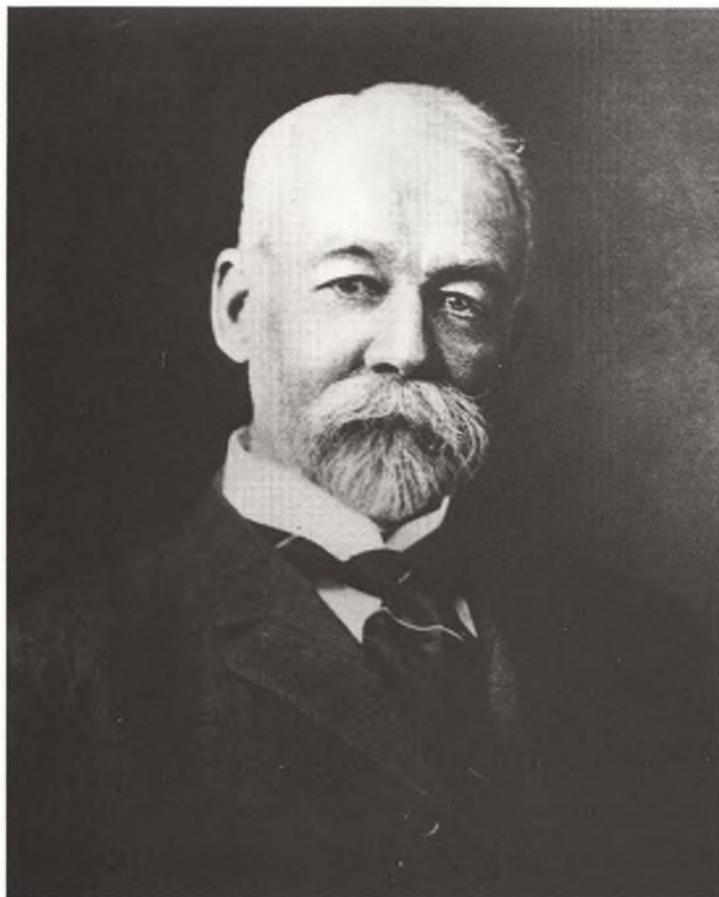


Tim Carlon wasn't the only man to make a fortune in the Jawbone Country, another rugged individualist by the name of William Ham Hall did the same thing. And he did it in only four years without herding up a single head.

Ham Hall, as he was known, was state engineer from 1878 to 1889 during which time he conducted preliminary survey work in the Elanor and Cherry Creek drainages — two major tributaries to the Tuolumne. In 1901, when the city of San Francisco was preparing its plans for the Hetch Hetchy project, it was generally recognized that water rights to the Cherry and Elanor tributaries would also be required, in order to make adequate the project's entire water and power yield. However, to properly locate water rights, certain prescribed "improvements" have to be made in the drainage or the applied-for rights will legally expire.

This was a requirement apparently neglected by the City as it spent the years between 1902 and 1906 embroiled in the Hetch Hetchy battle. Mr. Hall, however, now in private practice, was not nearly so distracted. He spent the time forming a private corporation, the Sierra Water and Ditch Co., buying out all the private holdings in the two basins, and building the necessary improvements — in this case many miles of access trails. The road that heads upstream from Lumsden bridge, in fact, connects with an old Ham Hall trail going up Cherry Creek. As a result of this activity, when the City finally got around to beginning work on its Elanor and Cherry dams, it found itself without the necessary water rights.

Despite the public outcry and a series of court challenges, it was finally determined that Mr. Hall had indeed successfully "jumped" the City's claim. The final act in the scheme must have been particularly galling to the project's promoters when they were forced to approach Hall in order to buy back the water rights — at his price — a bit over one million dollars.



Ham Hall. An extremely competent businessman and engineer, Hall resigned in disgust from government in 1888 when the legislature refused to fund his office adequately. Before becoming embroiled in the Hetch Hetchy controversy, Hall spent the years 1890-1898 in South Africa as a mining consultant, and in 1899 developed a Transcaucasus irrigation system in Czarist Russia. He died in 1934.

Lumsden Road

Clinging to the precipitous south slope, the Lumsden road, known to the old-timers as the 8-9 Road, descends for five perilous miles to a flat alongside the river. Thence upstream for 2.1 miles to the Lumsden bridge where it crosses the river and heads on up into Jawbone country. Originally a trail scratched out of the hillside in the 1890's by the Lumsden boys, David and James, together with a crew working for the Golden Rock Water Company, the Lumsden trail became a road for its first 2.2 miles in 1916 when Hetch Hetchy workers opened it up down to their Adit 8-9 Camp. The Adit 8-9 was a short tunnel driven into the ridge some 25 or 30 feet with the purpose of providing construction access for the main Mountain Division Tunnel taking Hetch Hetchy water on the 2nd leg of its 149 mile journey to San Francisco.

During the depression, the Civilian Conservation Corps took the road the rest of the way down to the river. Currently it is kept up by the Forest Service who maintains two public campgrounds at its foot, one on either bank of the river.

Sons of a Scottish immigrant, James and David Lumsden were drawn from their native Vermont to California in the late 1850's, and settled in an area known as Boneyard, in southern Tuolumne County, in 1859. Although the quest for gold was their original ambition, the energetic brothers were to learn that other endeavors could be as lucrative, and frequently more reliable, than prospecting.

By the late 1890's, the numerous quartz mines dotting the Tuolumne River canyon and surrounding area had a continuing need of water to power their milling machinery. During the 90's both James and David were employed by the Golden Rock Water Co., the owner and operator of a system of ditches and flumes supplying many of these sites with South Fork Tuolumne water. James was in charge of building and maintaining fluming for the system. Both he and David additionally



Tuolumne Grove Dead Giant. James and David Lumsden cut this Yosemite landmark with hand augurs and axes in 1912.



The Lumsden Bridge.
Between about 1912 and 1928 the Lumsden Bridge was covered to protect the decking.

cut trails and built bridges in the still virgin backcountry. It was probably James who, in the early 1880's, put in the first trail bridge at the site which is now spanned by a structure put in by the CCC in 1934, and known as the Lumsden bridge.

The Lumsden families had grown by the turn of the century; and in addition to owning ranches on the south side of the river, they began to explore and homestead the Jawbone country on the river's north side. They developed a number of mines, had a cattle ranch, horses, and even for a short time in that remote region, supported a post office.

The brothers continued to be enormously industrious during the early years of the new century. In 1902, David became a part owner of the Big Oak Flat — Yosemite Stage Company, whose line carried passengers from Chinese Camp to Yosemite Valley until 1916, when completion of the Hetch Hetchy Railroad made the stage run obsolete. At the same time, James was serving as the assessor for the Fourth District, which included the town of Groveland.

The Lumsden's were long-time residents and very prominent figures of Tuolumne County, David settling down to his ranch not far from Priest's Station on the road to Coulterville.



James Lumsden and Family. From left to right: Jimmie, Lee, Forrest, Mattie, James Sr., (back) John, Tommy, Mrs. Lumsden, George, David and Calvin. A Tuolumne County pioneer, James built miles of back country trails and a number of bridges before the turn of the century. Taken at his place near Priest Station in 1910.

Their activities were continually chronicled in the county newspaper, the *Independent* — from David's nine month sojourn in Vermont, to letters from James, long after he had moved to Richmond to work for the Standard Oil Company.

When David died in 1913, the *Independent* described him as "... one of the most honorable of men, with the kindness of heart and ready generosity which was characteristic of the old pioneers." According to the brothers' contemporaries, the words described them both equally well.

Mile 0.2 Meral's Pool Rapid*

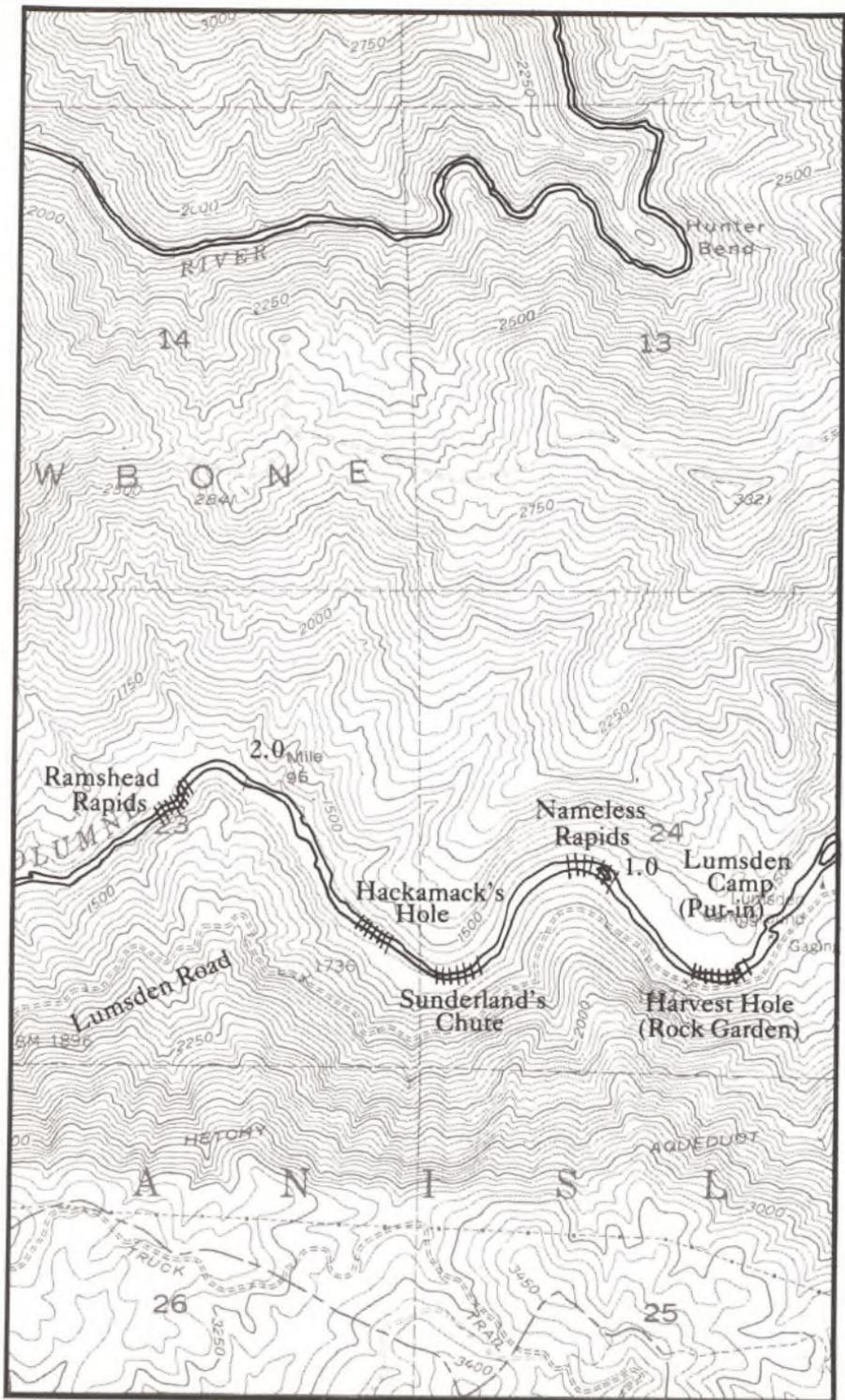
Formed by a gravel bar and collection of boulders collected behind a granite ledge located at the top of Meral's Pool.

The starting point for most boating trips on the Tuolumne got its name from Gerald Meral, who, together with Dick Sunderland, was the first to boat the upper section of the Tuolumne from Cherry Creek to Lumsden Bridge, in November of 1968. Gerry became one of the founders of Friends of the River in 1974 when he helped direct the campaign to pass Proposition 17, the ballot measure written to save the Stanislaus River. In 1976, newly elected Governor Jerry Brown appointed Gerry to a deputy directorship at the State Department of Water Resources.

A couple of water gauges are also installed at Meral's Pool. The Forest Service put in the simple stick gauge in 1973 as a part of a federal study of the river. A key to the gauge's numbers exists on a signboard up the bank near the parking area. The second gauge used to be maintained by the United States Geological Survey. Formerly it contained a mechanical clock-works that recorded daily fluctuations on a year-long roll of paper.

A cable once stretched across the water by the gauge. It was used to carry a worker out to the middle of the stream where he could lower a flow gauge.

*Mileages will be figured according to the United States Geological Survey quad maps. By convention, Mile 0.0 is located at the confluence of the south and main forks of the Tuolumne.



Mile .6 Bond's Goat Camp

Just below Harvest Hole, the river pools up for a short stretch. To the right is a sandy bar at the downstream end of which are the burnt remains of an old cabin. This was the Bond brothers' old place, Goat Camp.

Fred Bond first began taking a herd of sheep and goats down to this beach around 1915. He and his wife Viola, a Miwok woman, built a cabin down on the river and ended up spending a good part of each year there — tending their herd, raising a small garden.

Fred died unexpectedly in 1928 — Les Phelan remembers him as a “good provider” — and his younger brother Jim took over the herd, spending part of each year at the cabin along the river, and part of it up at Greeley Flat. During the time he spent there, he lived on fish, milk and an occasional slaughtered goat. Sometimes his brothers Bub and George would come down to pay a visit, but for the most part he kept the camp to himself.

Around 1940 Jim Bond left the camp and went to work at the Myers Ranch outside of Groveland. His visits to Goat Camp became less and less frequent until finally the place was destroyed in the Walton Spur fire of 1949.

Mile .9 Gold Queen Mine

The Gold Queen Mine sits atop the uppermost ridge of the south canyon, more than 1500 feet above the river, a short distance downstream from the Adit 8-9 site.

Its location is deceiving, because the Gold Queen is not a hard rock mine, but an unusual “hillside placer”. A formation called the Gravel Range cuts through the area; over millions of years, this former river bottom has become stranded and raised above its northward moving source. Among the many miners who sought their fortune in the dusty foothills were some who recognized that in these tightly packed formations of hardpan gravel, the potential for rich deposits of placer gold was great. Mining operations commenced in the early 1850's and continued on a commercial scale until 1900.

Caleb Dorsey, one of the county's more illustrious and civic-minded citizens, had an interest in the mine during the latter

part of the century along with his son, Colonel Dorsey. An association with the mining community seems to have been unfortunate for the younger Dorsey, as he is reported to have been shot to death some years later in a cabin on the Philadelphia Diggings claim, near the Stanislaus River.

The gravel slopes of the Gold Queen lent themselves well to hydraulicking and were being shredded by the water "monitors" in the late 1860's. Like most hydraulic site, the Gold Queen was shut down by the Sawyer decision of 1884.

Claims continued to be filed on the Gold Queen site by private individuals for many years, however, continuing to the present. In the early 1930's an elaborate sluicing system was constructed, employing an elevated tank which conveyed water to the operation. In the latter 30's, a group of 8 claimants filed a series of contiguous claims around the site, the Gold Queen number 1-5. The limited availability of a constant source of water, however, has always restricted the scope of mining activities here.

Mile 1.1 Nameless Rapids

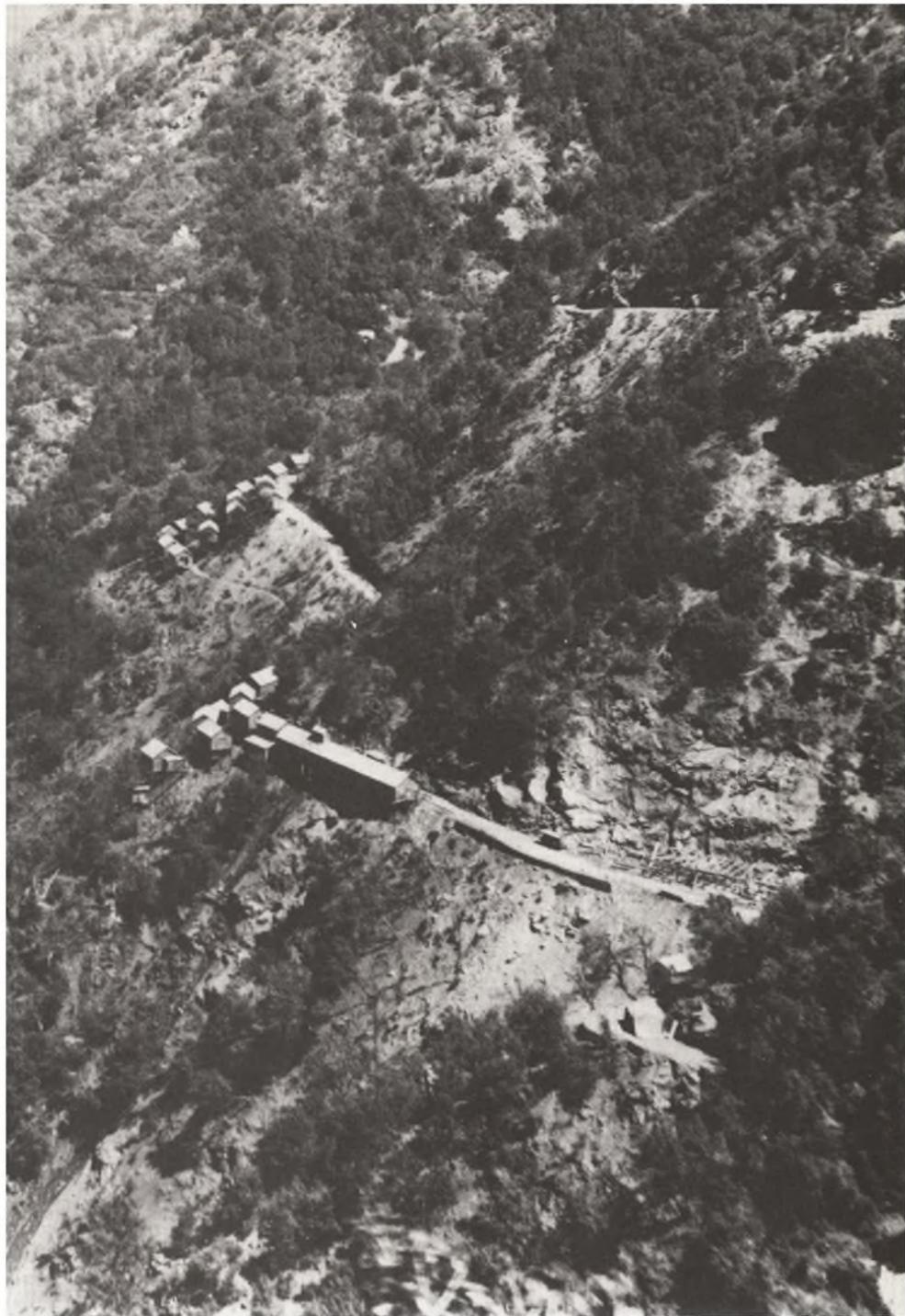
The bedrock here is granite, but the boulders are of a mineral known as "chert" and must have slid from high up on the canyon walls.

Mile 1.5 Adit 8-9

At Sunderland's Chute, the river makes a sharp turn to the north. As you approach the bend from upstream, you can see tailings a few hundred above the river on the south side wall. These are from the old Bossy Bar claim that reputedly yielded a \$30,000 pocket around the turn of the century.

Approximately 1000 feet up the wall from Bossy Bar is the portal to Adit 8-9 of the Hetch Hetchy Mountain Division Tunnel. Adit 8-9 is a short tunnel driven laterally into the wall. It enabled Hetch Hetchy crews to begin working on the main tunnel from an additional two faces.

Like the other adit sites, 8-9 required a large and permanent work force. A construction camp was built in 1917 at the location and the workers lived in 22 adjoining bunkhouses. Food



The 8-9 Adit Camp. Taken in 1920.

and supplies were shipped up from the valley on the Hetch Hetchy Railroad which paralleled the aqueduct, and then trucked to the camp.

Certain personal items were not always stocked in the company's stores and, as a result, traveling salesmen would make weekly visits into the adit camps, hawking a varied selection of sundries. Vernon Peugh remembers one such man in particular who evidently wheeled his Model T around on the 8-9 access road a bit too hastily. The drive was steep and unrailed and salesman and flivver vanished over the brink. Unluckily for the man it was evening, and no one observed his abrupt departure.

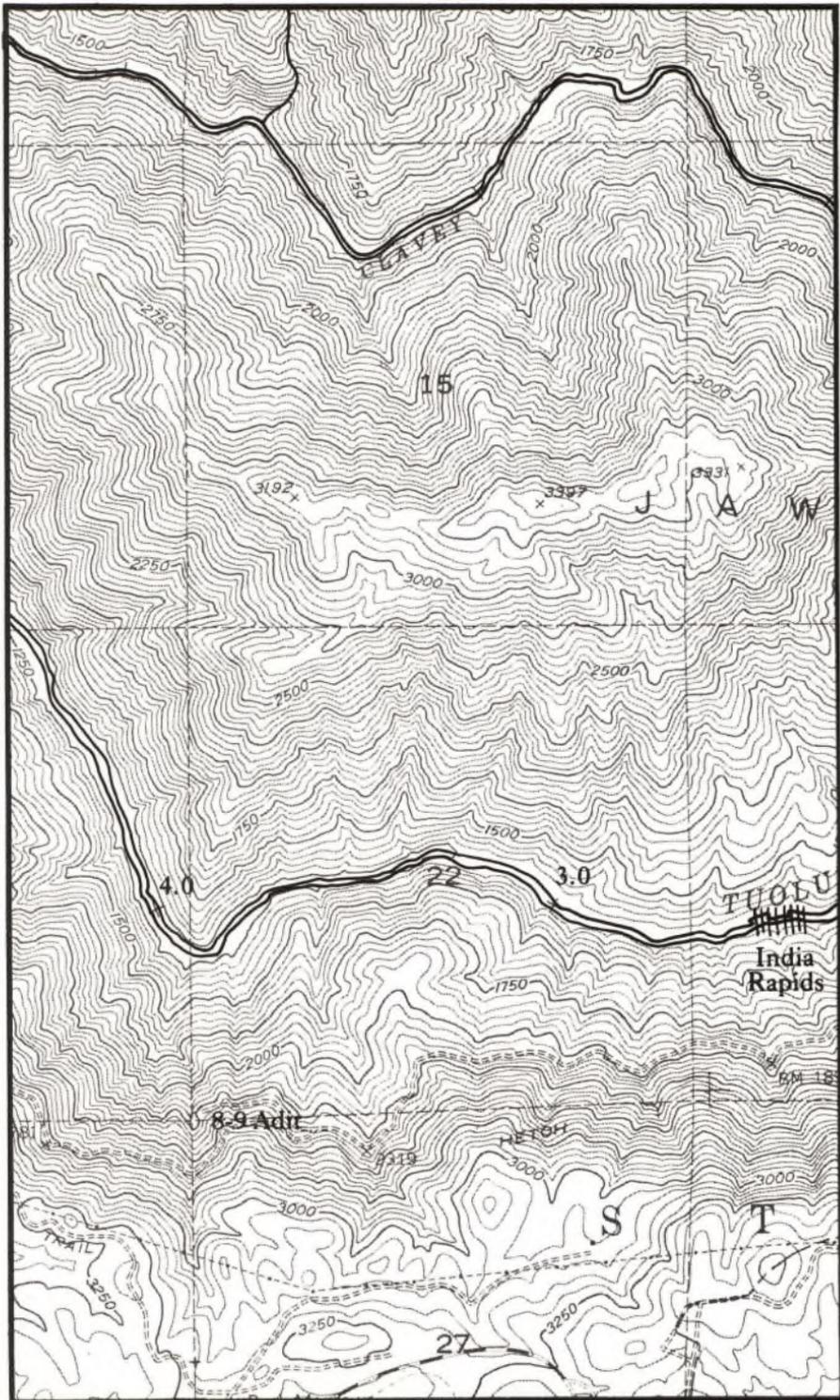
The next morning, as the crews prepared to go to work, someone spied a battered and bruised arm suddenly appear over the spoils pile. It had taken the unfortunate businessman all night to crawl back up the hill. Vernon reports that his pride suffered the worst.

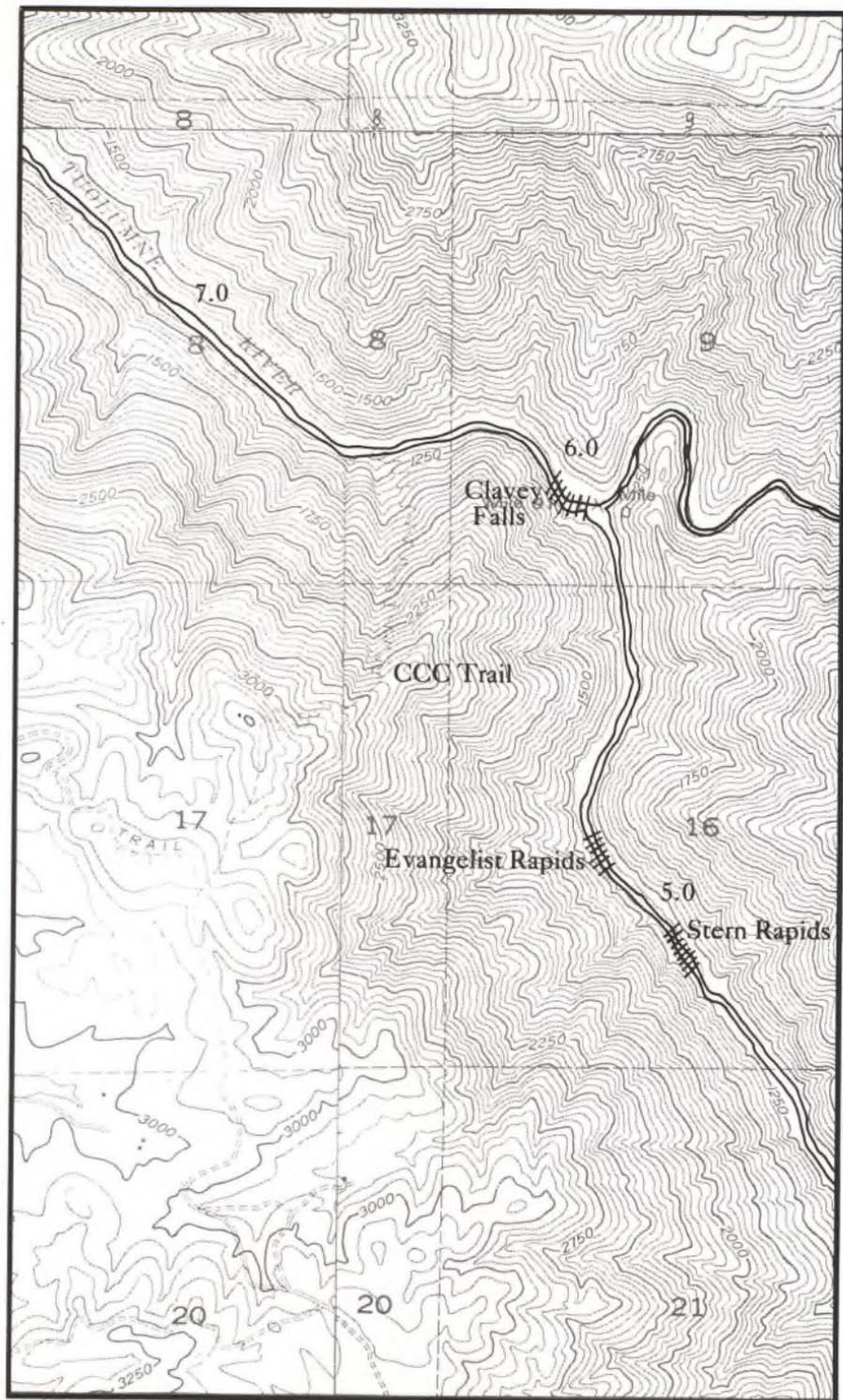
Ernie Beck, an Englishman who chose the rigors of the American West over those of the British Navy in 1909, ended up working on the project during its heyday and remembers what boom times they were. Seven hundred men were working around the clock in 8-hour shifts.

For a time Ernie was a locomotive hostler for the Hetch Hetchy Railroad and had three train crews to wake up every morning at 4 a.m. He soon discovered he could save time by starting his rounds with the "public establishments" where most of his charges could generally be found in varying states of readiness.

The fact that the Prohibition Act was still in force at the time seems to have had a reverse impact in Groveland where a teetotaler might have died of thirst. Catherine Cobden Haight, a long-time resident, guesses that there were "only two public establishments in town that were never either saloons or bordellos — the church and the post office."

In 1922 the Mountain Division Tunnel was completed and the camp was packed up. Twenty years later, when the fire towers were being manned year round on the look-out for Japanese Zeroes, a 24 hour guard was posted at the Hetch Hetchy Reservoir to prevent any efforts at poisoning the citi-





zens of San Francisco. And, just to be on the safe side, all the adit portals, including 8-9, were bulldozed shut.

Mile 1.6 Hackamack's Hole

Bob Hackamack is a Modesto area activist who has been battling for the preservation of the Tuolumne River for almost 15 years. In 1971 he coordinated the publication of a Sierra Club study on the river and has been the lead spokesman for the conservation forces ever since.

Mile 2.1 Ramshead Rapids

Mile 2.5 India Rapids

Named after India Fleming, the first woman to kayak this stretch of the river (she was 14 at the time).

Mile 3.2

A contact zone exists in the bedrock here between granite and a "melange" (literally, "mixture"), of chert-argillate. These minerals were all originally layers of sediment on a pre-historic ocean floor. Intense heat and pressure have combined to fold, warp and eventually transform ("metamorphose") these early sediments into the much harder minerals we see today.

From this point to Wards Ferry the river flows through chert, argillate, schists, metamorphosed volcanic rocks and marble. All of which have been intruded by bands ("dikes") of granite and basalt.

Most of the rapids are formed with the river cuts across the chert bedrock at an angle to its deformations and fold-lines.

Mile 4.9 Stern Rapids

An excellent opportunity to observe a chert boulder at extremely close range.

Mile 5.3 Evangelist Rapids

Mile 6.0 Clavey River

The confluence of the Clavey River and the main Tuolumne marks the western boundary of Jawbone Ridge. The upper drainage of this stream, indicated on maps prior to the turn of the century by various names, — including Big Canyon Creek and the Middle Fork of the Tuolumne, — was first used as a summer grazing area by an English immigrant named William Clavey in the 1890's.

From his ranch in La Grange, Clavey would trail his cattle into the Dodge Ridge area. The family soon began to homestead the territory, and obtained grazing rights to large tracts of National Forest land. Around 1906, the stream that watered this area became known as the Clavey River.

A son, William Robert Clavey, Jr., continued the family's cattle interests into the 1940's. The younger Clavey, who as he advanced in years was affectionately known as "Old Man Clavey", seems to have been widely respected. He preferred the old ways and was described as "a horse and buggy man". He traveled everywhere in a buckboard wagon, long after automobiles became commonplace. He was also known to enjoy a drink or two. Sharing a demijohn of wine with the old man on a cattle drive, or while working on his property, was a frequent and pleasant ritual, according to Miller Sardella.

Sardella worked on several cattle drives for Clavey. The trip would take four days from La Grange, with stops at Chinese Camp, Sonora, and Middle Camp, before reaching the Clavey Camp destination. The herd often numbered between three and four hundred.

A particularly vivid recollection of Sardella's concerned the time that he, Al Hagen, and Old Man Clavey were on a buckboard trip to La Grange. Clavey was at the reins, and the two others were sitting atop a couple of beehives. They stopped near Sullivan Creek for a bit of refreshment before continuing their journey. It was near Jamestown that the ride became exceedingly rough, and in the jostling one of the hive lids worked free. Immediately the wagon was swarming with furious bees. Both Sardella and Hagen jumped clear, but Clavey continued on, last seen swatting wildly at the bees with his hat

William Clavey, Jr. At his homestead in the upper Clavey drainage, around 1938.



and trying to control the team, as his buckboard careened down the road.

The Clavey River was also the water source for the twin turbines of the Tuolumne Company powerhouse, located two miles downstream on the main river. Water was flumed out of the Clavey at Hunter Bend, a point four miles up from the confluence.

Further downstream on the Clavey, less than a couple of hundred yards from where the two rivers met, a temporary diversion dam was constructed about 1904. This provided water for a secondary flume and additionally served as a holding pond for the construction lumber cut at Quilty Mills and skidded to the ridgetop from which a dry lumber flume stretched 1100 feet to the holding pond below. Lumber would come smoking down the conveyance and explode into the water. The work was extremely dangerous, and on the morning of October 20, 1906, a serious accident occurred. An 18 foot piece of

lumber jumped the chute and struck a young Groveland man just below his right shoulder. The force of the blow nearly severed the arm of James White, who was 17 at the time, and for three days, while his co-workers were unable to transport him over the rough terrain, he was close to death. It was finally decided that he would have to be moved, and accordingly he was carefully put into a flume boat and floated down to the powerhouse where Dr. Pond from Big Oak Flat finished the amputation.

While it is remarkable that young White was able to survive this experience, what is perhaps just as remarkable is that today he is still able to tell of it. After having recovered from the accident, Jim White taught himself to write with his left hand in 1912, ran for county tax collector. He won then, just as he was to win more than a dozen times before retiring in 1967. Today he lives in good health with his wife near Monterey, one of the oldest surviving pioneers of Tuolumne County.

The Clavey River confluence has also been the site of some placer mining activity, although with results generally less than overwhelming.

Charles Jones, who had a fine reputation as a mountain man and trapper, but was not, apparently, so well known as an acute judge of mineral prospects, held a claim at the Clavey for some years just after the turn of the century. Jones, an easy going Placerville native whose uncharacteristic voice earned him the nickname "Sister", was never able to show much in the way of results for his work on his Clavey claim, although he remained undaunted.

In later years, Sister became a ranch foreman on Ed Cobden's place, outside of Groveland, and would occasionally entertain the younger Cobden's with tales of past adventures — of narrow escapes and nearly found fortunes. It was in this last category that Sister was certain his Clavey claim belonged.

In 1927, remembering the conviction of his father's foreman, Harry and his schoolmate Melvin Belli took what was probably the first boat trip down the Tuolumne, using a roughly constructed log raft. The ostensible purpose of their trip was to file a placer claim down at the Clavey, but by the time they got

there— two days after having started out — their interest in mining seems to have waned, perhaps because of the rigors of the trip. For whatever reason, they hiked out, and the mining industry lost a pair of young prospects to the legal profession, as both Cobden and Belli went on to become well-known attorneys. (See *Boats on the Tuolumne* for a longer description of this trip).

Around 1932, a young Connecticut native, tired of depression-era Stockton, decided to try his hand at prospecting. His name was Alexander Klimas and he figured that sleeping out in the open air might be better for a man than the cement floors of an S.C.R.A. camp, so he headed into the mountains.

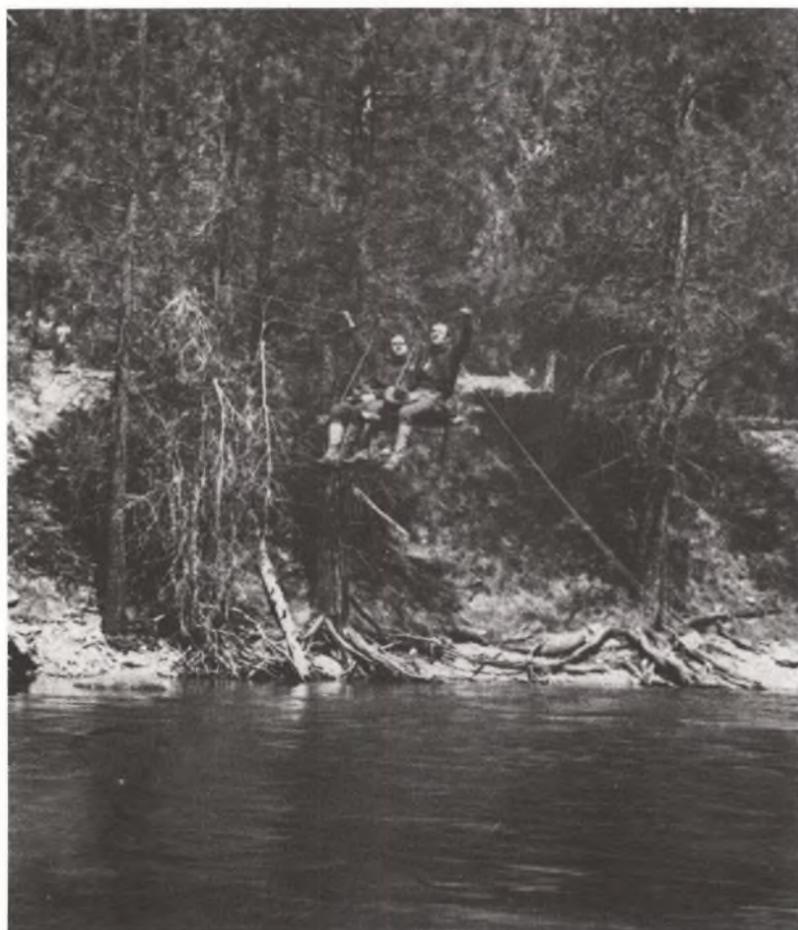
Not many of the “bedrock scratchers” of that period made fortunes in gold, and Alexander’s chances of bucking those odds were significantly reduced when he landed down at Sister Jones’ old claim on the Clavey. Apparently the values hadn’t improved much in the twenty years since Sister left the place and Alexander was hard pressed sometimes just to keep himself in beans and bacon. But there are many less attractive places in the world to make a living — however slim — and Alexander kept at it over the years, spending his summers down by the river and wintering up on top in the Groveland area.

Alexander built a couple of cabins on his claim, the first one during the thirties. It was dug into the hillside on the south side of the river, just upstream of the falls. In 1955 or so he improved on his old structure, hauling six bags of foundation cement down the old CCC trail from the ridge top and salvaging materials from the abandoned cabins at Indian Creek that the powerhouse crew used to bunk in.

Particularly during his first few years, Alexander shared the upper canyon with a number of other prospectors. On one occasion, a neighbor of his who’d been working the beach just across the river became stranded by rising water. For six weeks Alexander watched him become increasingly distressed as the rains continued to fall. A rescue was finally effected when Alexander managed to throw him a pieced together rope and cable.

Sometime in the 40's, Alexander put up a cable crossing at a point about a quarter mile upstream from the confluence. Not long thereafter the Forest Service replaced it with the crossing that can still be seen today.

Nowadays, Alexander spends most of his time in a cabin up along the Middle Fork of the Tuolumne, although he still prospects for a part of each summer down on the main river — just as he has for 49 years. His cabin was inhospitably torn down by the Forest Service in 1970, but Alexander has no bitterness. Despite the fact that the panning never was any good down at the Clavey, one has the feeling that Alexander Klimas had found what he'd come looking for.



Mile 6.0 Clavey Falls

A chert bedrock ledge with stranded boulders makes for one of California's more legendary rapids.

Mile 8.2 Tuolumne Power House

The massive foundation seen on the right bank once supported the twin 500 horsepower turbines of the Tuolumne Power House. Built in 1905 and 06, the plant was the one and



The Tuolumne Powerhouse. Apparently the only photograph still in existence. Taken by Sonora photographer M. Azevedo in 1908.

◀ Cable Crossings.

During the 30's, the Forest Service cut a series of firebreaks into the Tuolumne Canyon, and at the point where these breaks hit the river, built cable crossings. The only crossing still in place is at Mile 5.8, just above the Clavey, although two others were put in at Mile 3.8 and 10.3.

only installation of the Tuolumne Electric and Transmission Co., a firm headed by a couple of ambitious San Jose businessmen, R. W. Hersey and C.W. Quilty. The two hoped to capitalize on the new power market created by the recent upsurge in Southern Belt quartz mining.

By 1904 the two entrepreneurs had obtained necessary water rights from the Clavey River and a deed to a construction site, a sandy bar 1 mile upstream of Indian Creek. Although the site had a number of advantages — it was level and well situated with respect to a substantial water supply — it had one major disadvantage — lack of accessibility. But, in 1905, a precipitous road was cut down the south side and into the drainage of Indian Creek. The work was contracted out to the young Boitanos, Vic, Joe and Bob, and was known for a time as the Boitano Road. Its final mile ran alongside a river on a foundation of intricately laid masonry.

Across from the plant itself, the road spanned the river via a plank and cable bridge whose stone abutments are still standing today.

By February of 1907, the powerhouse had been built, and the lines to Groveland had been surveyed and strung. All that remained was the completion of the four and a half miles of Clavey flume. When the sixteen man carpenter's crew finished that task, it launched the electrical age for many of the mines south of the river.

The next summer turned out to be one of the driest on record, but Hersey and Quilty's little utility stayed in full operation, thanks to the size of the Clavey watershed. That same year, construction was being finished on an auxiliary flume from Grapevine Creek, to be used whenever the main channel needed repairs. Meanwhile, times were still flush for the local mines and the Tuolumne Electric and Transmission Company was thinking expansion. In 1910, a crew was beginning the foundation work for a new 1200 horsepower Pelton turbine wheel.

But it was never installed. The powerplant was as dependent on the mines as they were upon it, and when they began to play out after 1910, the company's fortunes began a slow decline.



Modern-day View of the Powerhouse

Shortly thereafter, it was acquired by the San Francisco and Sierra Electric and Water Co. who were, in turn, bought out by PG&E in the early 30's.

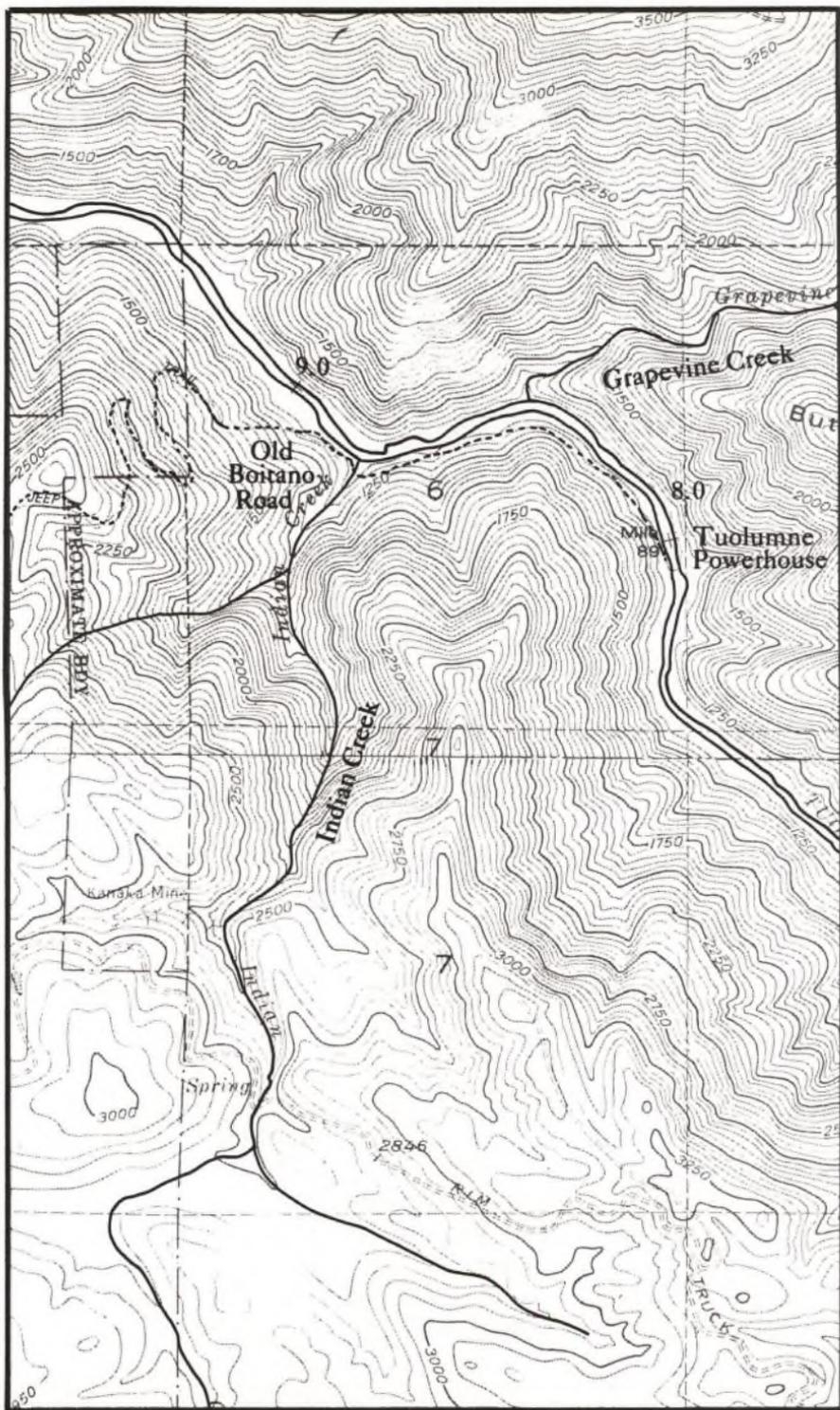
In the meantime, the Tuolumne powerhouse had gone out of operation in 1914, made obsolete by a more modern system. The structure itself was largely destroyed by the Cave Diggings fire of 1928 and the flood of 1937 that nearly took out the Lumsden and Wards Ferry bridges as well.

Mile 8.5 Grapevine Creek

Mile 8.8 Indian Creek

Indian Creek meets the main river from the south. Shortly upstream of the confluence, and just off the powerhouse access road, is a hard rock shaft that penetrates the hillside for over a quarter of a mile. It is likely that this was the Golden Cliff, worked in 1921 by Lee Bean who lived in one of the powerhouse crew cabins on a bench just up Indian Creek.

Alexander Klimas reports that a couple of depression-era miners also tried their luck at the claim in the early 30's. They



soon left, though, for railroading jobs, and better pay perhaps.

Although many who knew him were unaware, Lee Bean was a full-blooded Cherokee, born in Sheep Ranch, Calaveras County of parents who had come from the Cherokee Nation in Missouri. Bean was very familiar with the Tuolumne Canyon, having worked on quartz mines there as early as 1890. Among his claims were the Grand Prize, the White Hawk, and the Cherokee.

Perpetually barefoot, Bean was an excellent outdoorsman who lived by hunting, trapping and fishing in the canyon. He lived for a time in Jawbone Country, as well as on Indian Creek where he installed a bear trap at the top of the hill.

Lee lived out his final years in a cabin near the Joice place, at the top of Indian Creek Road. He gradually became quite reclusive. Harry Cobden reports that his mail and groceries were left for him in a tree. Charlie White, the older brother of Jim who suffered the accident on the Clavey flume, took a special interest in Lee and would look after him. Cobden, too, became something of his friend when a stormy night drove him to the hermit's door once on a hunting trip.

Lee Bean died of pneumonia, September 2, 1937. By the few who knew him, he was remembered well.

Mile 8.8 Indian Camp

The beach at Indian Creek has been formed by sand settling out in the eddy formed on the inside of this sharp right hand bend. A section of the Tuolumne River Power House penstock can be seen on the beach.

Mile 9.3 Mt. Diablo Base Line

The river crosses the U.S.G.S. Mt. Diablo Meridian. The mountain's peak is 98 miles away, due west.

Mile 10.1 Gray's Grindstone

Mile 11.9 Thread-the-Needle ("Chicken Shot") Rapids

Mile 12.4

The white streaks on the cliff directly downstream are granite dikes.

Mile 12.8 The Ellie Winton Claim

The Ellie Winton claim, an unpatented quartz mine, exists here on the left, just at the top of Steamboat Rapids. Winslow Hubbard originally filed it in 1874 and may have been the one to cut the trail into it. Hubbard was a leading citizen of the area when Groveland was still known by the descriptive name of Garrote, meaning “hanging” in Spanish.

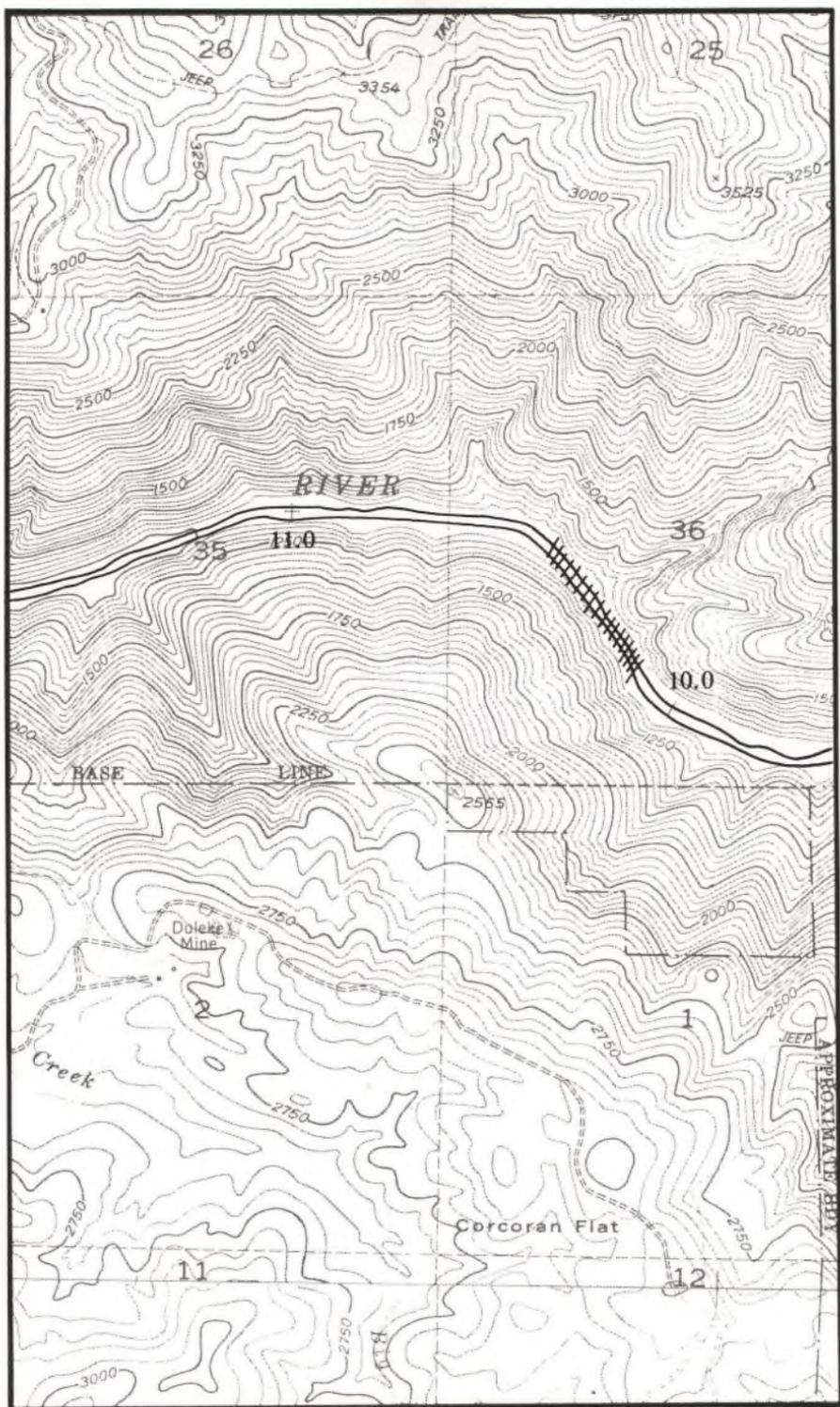
Les Phelan helped his father haul timber down to the Ellie Winton when the shaft was being extended around 1904. At the time, the patentee was T. J. Crowley who had a crew of 12 working for him.

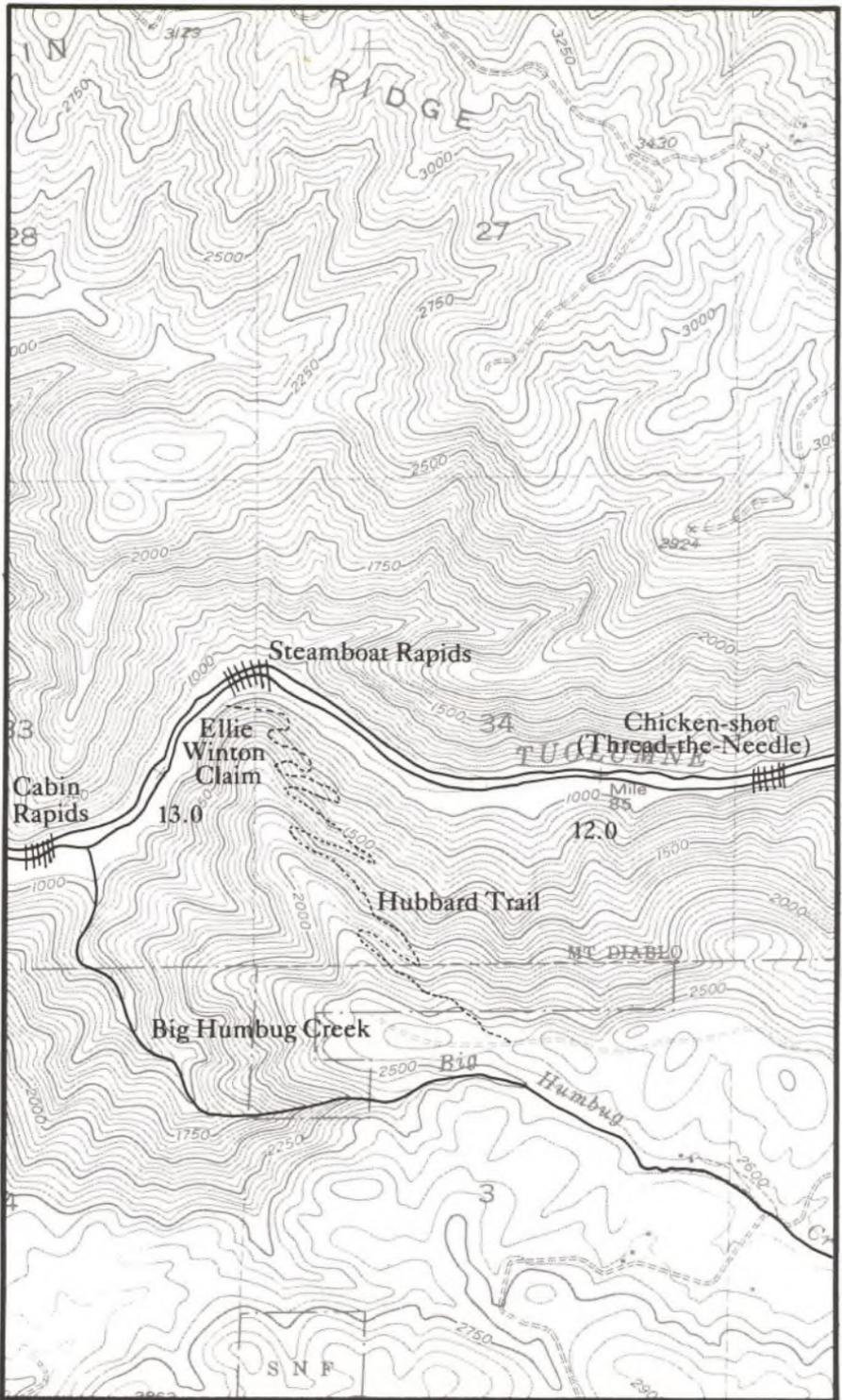
The Ellie Winton shut down suddenly, sometime around 1909, and the machinery and crew's quarters were left abandoned. The *Tuolumne Independent* lamented: “This is one of the numerous properties in this district that has been mismanaged. The former operators, Turett and Jacobs, were not only inexperienced but deadbeats — taking their departure and leaving our merchants and miners in the lurch for several hundred dollars.”

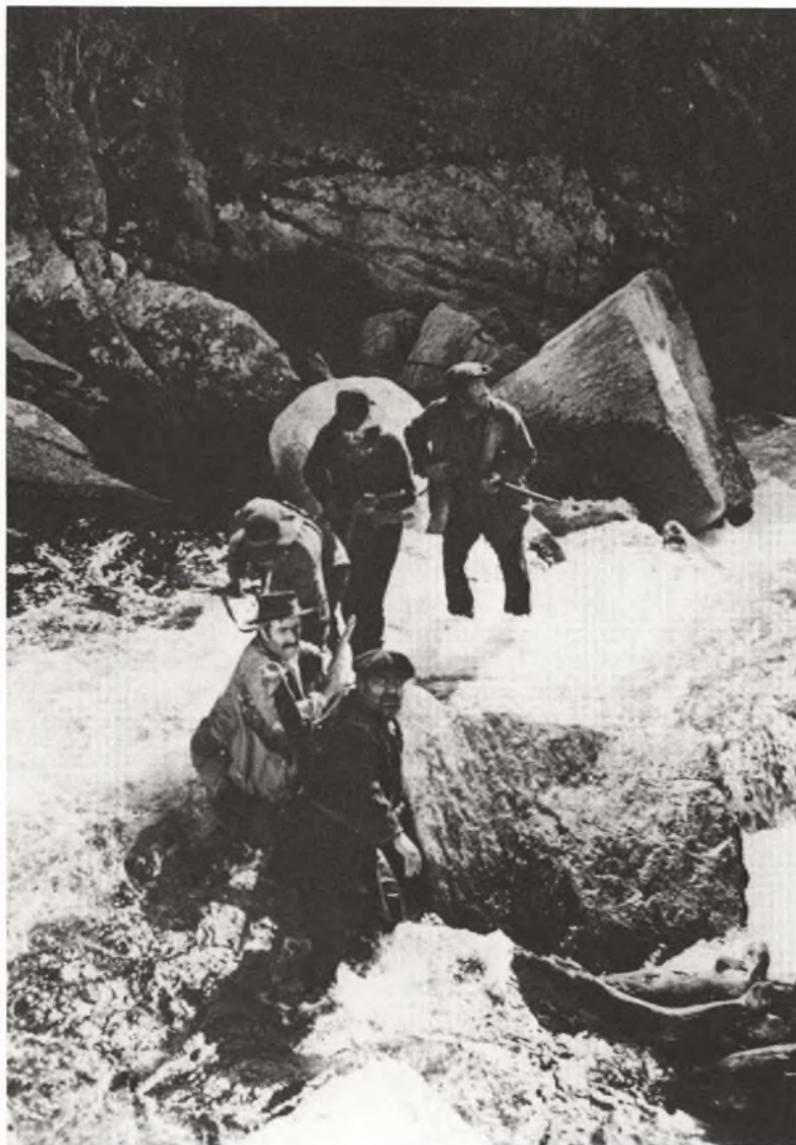
Jim Burns, an old time Groveland resident, was eventually hired to caretake the place. Burns, who apparently had a powerful liking for raw garlic, found the solitary style suited him well. Les Phelan remembers he would sit alone at each setting at the crew's 12 place table until it became mounded over with the remains of his garlic habit, at which time he would simply move down a spot. Les goes on to remark that Jim entertained very little.

The original cabin burnt down sometime in the 20's, there have been fishermen's cabins on the site for periods on and off ever since. The most recent, still standing, was erected in the mid-50's.

Directly across from the Ellie Winton, some evidence of quartz mining can be found, probably from the old River Bend claim filed January 1, 1920 by Herbert Shaw.







The Battle of the Tuolumne. Not many battles of the Spanish Civil War took place on Tuolumne County soil. One of the very few is pictured above, as a group of Loyalists apprehensively waded in the river at a point just upstream of the Lumsden put-in. Not pictured are Gary Cooper and Ingrid Bergman — who were also involved. The date was 1940. The picture was *For Whom the Bell Tolls*.

The Walton Spur Fire

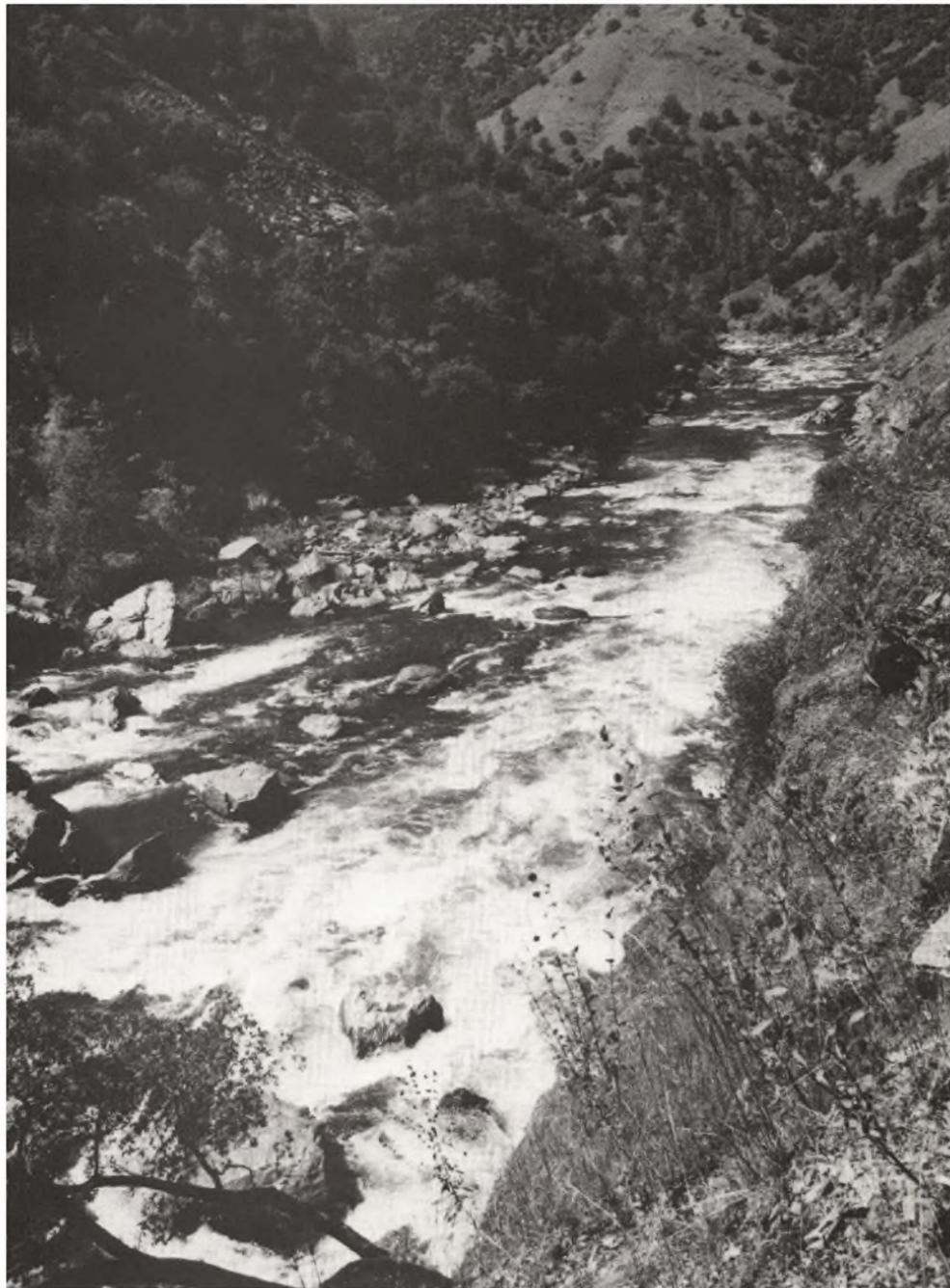
The Tuolumne Canyon, like all the major foothill canyons, experiences a daily wind pattern. Early mornings, winds are light and down canyon as the cool mountain air sinks. After the day progresses, heated valley air reverses the flow, and afternoon winds are almost inevitably up canyon.

In the presence of a fire, this fact of topography can often result in a "wind tunnel" effect that makes canyon fires a particularly dreaded breed. Of this last category, the Walton Spur Fire of 1949 is an outstanding example.

First spotted on August 21, 1949, Walton Spur was the result of a lightning strike in the Grapevine Creek drainage. The forest was tinder dry after a rainless summer and by the second day both Groveland and Sonora Districts were putting men on it. Initially, the fire burned upstream into the Clavey drainage and crews were cutting breaks trying to contain it against the Clavey to the east and the main river to the south. But the intense heat of the fire was creating a fierce up canyon draft and on the second day it jumped both steams. For the next week, nearly a hundred men battled the blaze as it leaped back again and raged out of control into Jawbone Country.

For the first time, helicopters were used to shuttle men and equipment around as the wind generated intense flare-ups. Art Selby was working on the fire-line in the Indian Creek drainage when just such a flare-up jumped the break and trapped him. Although he was soon rescued by other members of his crew, it was hours before they could get him down to the river for a helicopter evacuation. Unfortunately, it was too late and Art Selby died of his injuries. Later that day, Harry Myers suffered the same fate when a falling limb hit him as he was topping a tree on the line.

It wasn't until September 3, 13 days after it was first spotted, that the Walton Spur fire was finally mopped up, having burned some 5,000 acres. Afterwards, the Forest Service erected a plaque at their Buck Meadows station, honoring the two fire fighters, Art Selby and Harry F. Myers.



Gray's Grindstone. At mile 10.1 the river makes a northward turn across the "grain" of the bedrock foliations. The result is a steep "washboard" river bottom with stranded, floodswept debris. Almost $\frac{3}{4}$ of a mile long, Gray's Grindstone is an impressive rapid at any water level.

Mile 13.1 Big Humbug Creek

Big Humbug Creek comes in on the left, just at the top of Cabin Rapids. The name derives from the original Gold Rush period and was probably bestowed by a particularly frustrated Forty-Niner. The lower portion of the Big Humbug drainage, a few miles upstream from the main river, was the location for two of the larger quartz mines in the district, the Duleke and the Kanaka. Both were shut down shortly after the turn of the century.

At the river itself there are no records of any mining activity before 1934 when Swedish-born Joel Wahlquist filed a placer claim there. The scattered remnants of his cabin are still visible at the mouth of the creek. His unpatented claim, which he filed in October 1934, read in part:

The direction of this claim runs in an easterly and westerly direction and is located on the Tuloumne River near Eagle Bluff quartz mine. The easterly end takes in cabins at mouth of Bumbug (sic) Creek. This claim runs 200 feet easterly from discovery point. Monument claim is 600 feet wide and corner monuments have been erected with writing in tin cans describing same.

The tin can signature became characteristic of the Swede, who worked his placer claims with the help of a hand-operated hoist, with which he could move large boulders from their position in the stream. This enable him to then sift the contents of long protected areas of river bottom.

By the end of 1935 Wahlquist had added another site to his little placer empire. Although recorded by Rena Wahlquist the Red Bud claim located just upstream in the middle of the river was almost certainly a "surrogate claim" filed by his wife enabling the miner to circumvent restrictions in the mining laws.

Just downstream of Big Humbug Creek, at mile 13.2, an old cable crossing used to exist to provide access for the Eagle Bluff quartz mine located almost directly up the north side of the canyon several hundred feet. The claim was originally filed by the ambitious Winslow Hubbard (of Ellie Winton fame), but by 1900 the patentee was a man named Meigs from San

Francisco. When he was only eleven or twelve, Les Phelan would go down to the Eagle Bluff with his dad to do Meig's assessment work for him.

Mile 13.5 Big Creek

Big Creek enters on the left. Its upper drainage is relatively populated and as a consequence its water should be considered suspect.

The Preciosa Placer Mine, one of the few patented claims in the canyon, embraces 27 acres and extends across the river to include the gravel fan at the mouth of Big Creek. Originally patented in 1912 by the Preciosa Mining Co., it was sold for delinquent taxes in the 30's. Jim White, the county tax collector, went in with a partner to buy it for \$121.19. Unlike the dozens of unpatented claims in the canyon where ownership reverts to the state if the claimant fails to put in at least \$100.00 worth of "assessment work" per year, the Preciosa Claim is privately held property.

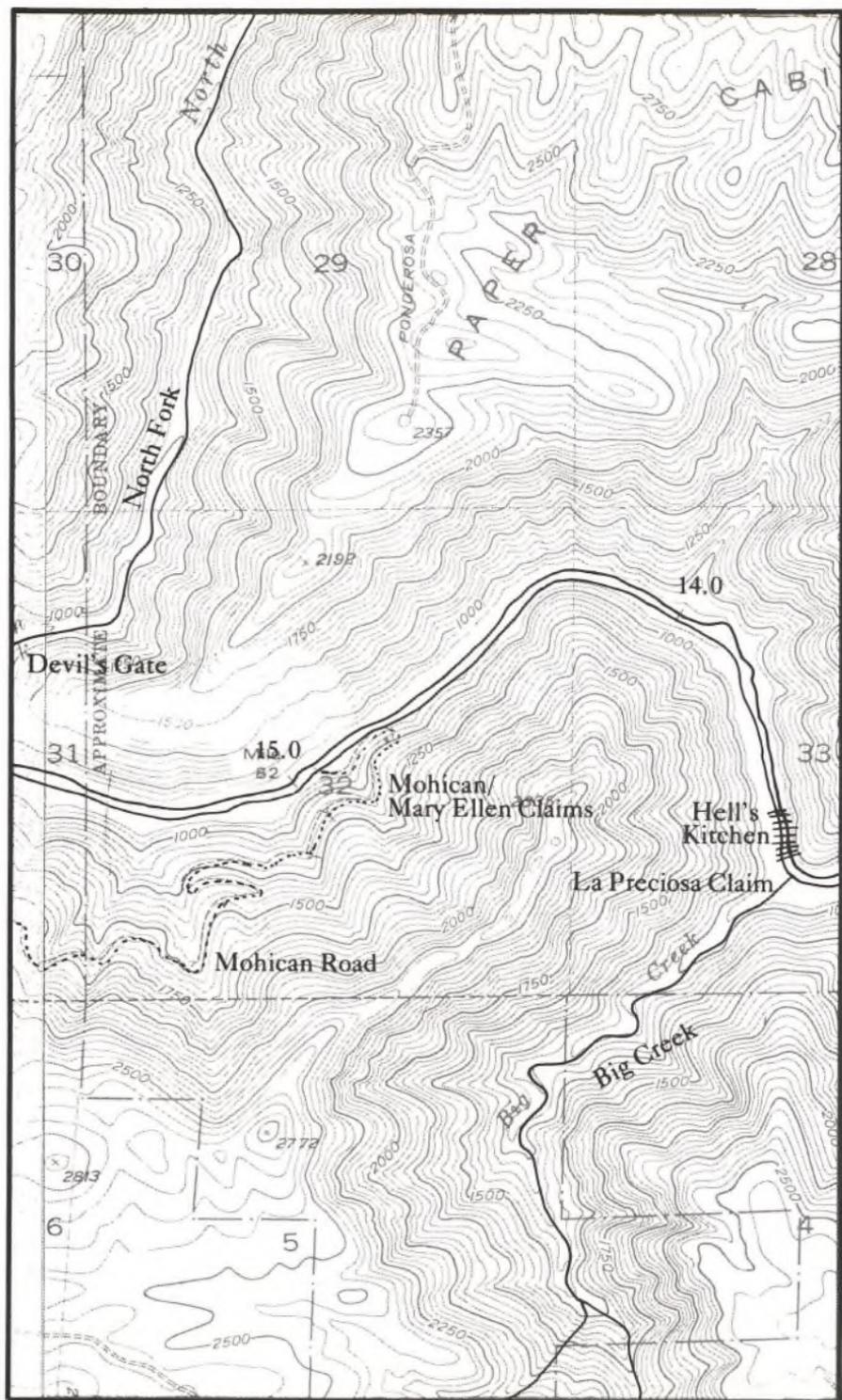
The equipment visible at the confluence dates from the early 1900's. Access to the claim was by means of a short trail upstream to the Ellie Winton and then out to Hubbard's trail.

Jim White reports that a cabin was still there at the mouth of Big Creek in the 30's, but no evidence of it remains today. The driftwood cabin at the western edge of the claim, on the north side of the river below Hell's Kitchen, probably dates from the depression era when unpatented placer claims stretched nearly the length of the river.

Hells' Kitchen Rapids is on the turn immediately after Big Creek.

Mile 14.5 Paper Cabin Ridge

Below the Clavey, the north side of the canyon climbs to Paper Cabin Ridge, an area smaller than Jawbone country, but just as tough on man and beast. Starting around the 1920's the area was used as a summer range by the Ingalls, Sanguinetti and Baker families. The Baker ranch, in fact, ran their stock into the Paper Cabin country until 1977 when drought conditions finally put an end to a 50 year tradition.





Sugarloaf Lookout. Overlooking the canyon from a peak of 1900 feet, Sugarloaf was built in the early 20's and dismantled in 1951. Except during the war, when it was manned year round on the lookout for the Japanese, Sugarloaf was occupied from early June through September — usually by married couples. The photo was taken around 1935.

Mile 15.0 Mohican and Mary Ellen Claims

The old suspension bridge, with its failing grasp on the banks, marks the site of the Mohican and Mary Ellen Mines. The Mohican is actually composed of five separate claims, including the Lillian Nos. 1 & 2, the Oakland, North Star and Golden Eagle. The claims total 97 acres and extend to both sides of the river.

The Mary Ellen claim is directly contiguous and includes some 25 acres, all on the south side.

The years from 1855 to 1880 were a period of great quartz mining activity in the Tuolumne region. From Big Humbug west, the canyon is pocked with hard rock shafts, and the ruins

of once-thunderous stamp mills rust and blister in the sun. Although few recorded many years of profitability, the Mohican/Mary Ellen complex probably constituted the largest operation actually in the river canyon and between Lumsden Bridge and Wards Ferry.

Both mines were working a belt of mica schist that had been made economic by the new extraction processes developed after the Civil War. Charlie Sell, probably the only man alive today with a direct memory of the Mohican, reports that the operation was never electrified. All the work was done by “double-jacks”, sledge driven drills, and dynamite. The ore was hand-loaded onto carts and hauled out to a stamp operation. By 1903, the mine reported nearly half a mile of tunnelling.

The Mary Ellen was the first of the two filed. Matthew Foot, who later built the Groveland Hotel, was given a patent on the place in 1889: “To have and to hold said mining premises, together with all the rights and privileges, immunities and appurtenance of whatsoever nature thereunto belonging unto the Said grantee above named and to his heirs and assigns forever.” Benjamin Harrison was President at the time.

Not long thereafter, the Mohican Mining and Milling Co. of San Francisco began prospecting the ground directly upstream — and met with enough success to apply for a patent. This they were granted in 1904 for their south side claims, and in 1912 for those on the north side. The suspension bridge was put in

Mohican Bridge. Built around 1900 and formerly a link on the Cruikshank trail to Tuolumne, this suspension was bought and partially dismantled in 1951 to prevent accidents. Considering its age today, and the likelihood that it was underwater in the floods of 1937 and 1955, it is remarkably well-preserved. Photo from 1908.





The Mohican Mine.
Ruins of the assay house
and later vintage gasoline
engine.



sometime between 1895 and 1902, probably to facilitate the working of the North Star and Golden Eagle as well as provide access across Devil's Gate to Tuolumne, some 8 miles away.

Access to the site was provided originally by a trail on the south side starting at the old Ferretti Road near the Morgan Ranch. It was improved to wagon road status in 1902 by a labor force composed largely of Chinese.

Records indicate that the period from 1900 to 1903 saw the greatest activity at the two mines. Bunkhouses were built, an assay house, and at least one crushing mill. At its peak, the Mohican employed 65 men.

The peak, however, was brief. By 1906, the crew was down to five; by 1915, two; and by 1924, it was on the block for unpaid taxes. The winning bid — \$155.44.

The Mary Ellen suffered a similar fate in 1934 when the market for played out gold mines appears to have been even more depressed — \$23.88 took the whole works.

Both properties have changed hands several times in the past forty years and are currently held by families in Sonora and La Grange.

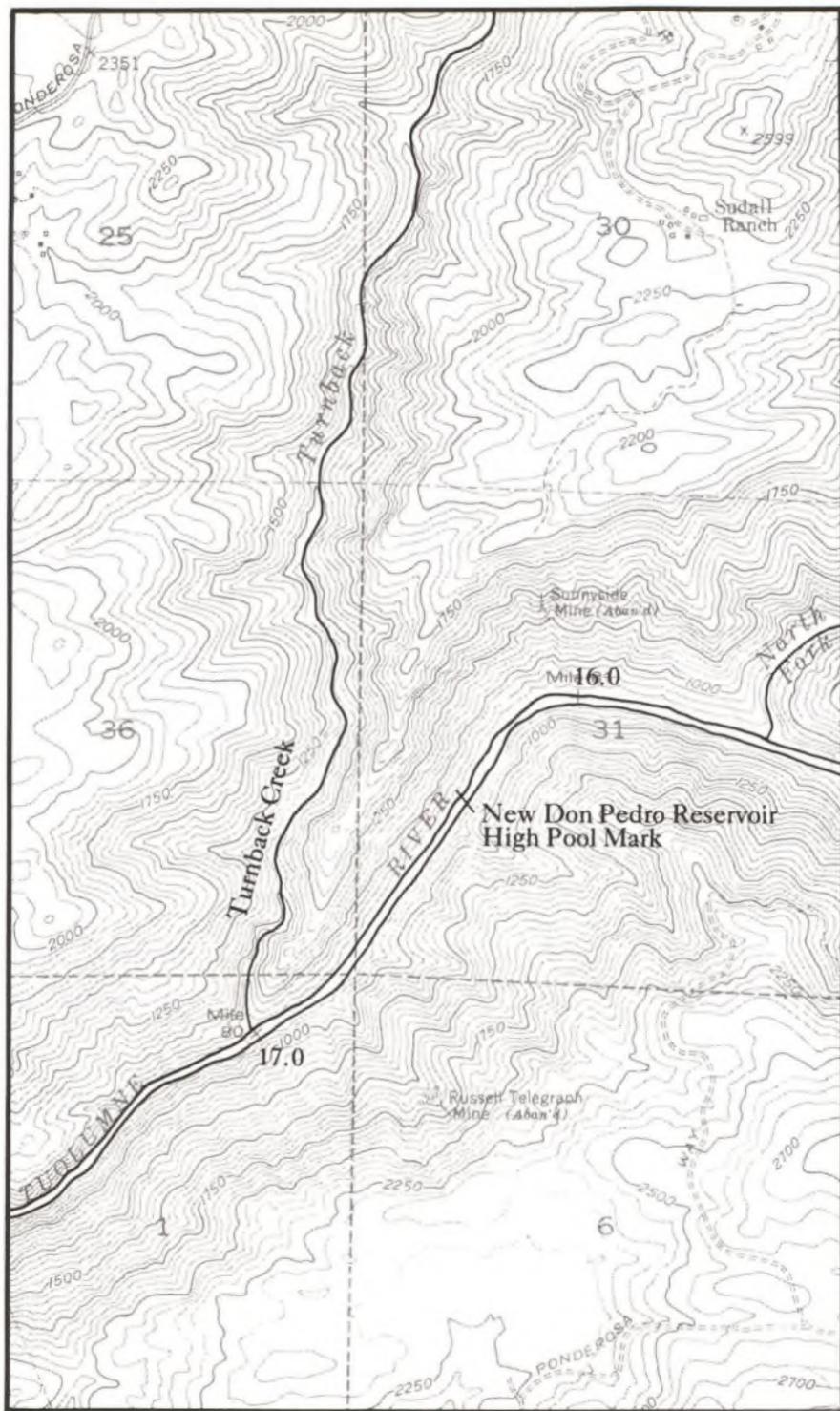
Mile 15.6 The North Fork of the Tuolumne

Mile 16.0 Sunnyside Mine

Approximately a half mile below the confluence of the North Fork of the Tuolumne with the main river, on the north side of the canyon just as the river begins a turn to the south, the Sunnyside sits 500 feet above the river, and a quarter of a mile back from its edge.

Perched on a rather steep slope, access to the mine was eased by the construction of a series of more than one thousand wooden steps from the top of the cliff to the mine site. Machinery and supplies were transported via a gasoline-powered tramway.

The Sunnyside had a short commercial life, from around the turn of the century to 1910. It was a hardrock mine, and small crews worked a 40 inch vein of quartz along a 200 foot tunnel. The stamp mill was powered by water provided by the nearby Sunnyside Ditch.





Devil's Gate. No more than a mile up the North Fork is the site of this old bridge crossing, known as Devil's Gate. It linked the Mohican trail with the trail that came south out of Tuolumne and past the old Sudahl place. The bridge is gone now, last seen in 1918, four years after this was taken. Nowadays the trail is almost completely obliterated, except the last few miles into town where it's been paved and turned into the Apple Colony Road.

Mile 16.4 The Reservoir *

The quiescent and murky water that greets you at this point is the upper limit of New Don Pedro Reservoir.

One of the earliest, and largest, boom towns of the gold rush along the Tuolumne River was called Don Pedro's Bar. Founded in 1848, the settlement grew rapidly on the banks of both sides of the lower river, and in 1860 its citizenry cast 1500 votes in President Lincoln's election. On Saturday nights hundreds of miners would carouse the streets, and frequent the town's many saloons long into the night. Its glory days were short-lived, however, for by 1862, when its placer deposits were exhausted, only a few families remained. The town, now simply called Don Pedro, did survive into the new century, but never again enjoyed the prosperity and the vigor of the 1850's.

But who was Don Pedro?

There exist two different accounts of the town's original namesake. The first has it that Don Pedro was a landowner of either Mexican or Chilean descent who, long before the gold rush, took several donkey loads of gold out of the area that later bore his name.

The more likely, and lately more authenticated, version concerns the Frenchman, Pierre Sainsevain. Arriving in Los Angeles in 1836, Pierre began to learn the craft of wine making with his uncle and kinsman, Jean Luis Vignes of Bordeaux. For several years Pierre traveled the coast selling his wines, finally settling in San Jose, where he became known as Don Pedro: Don, a title given to anyone who owned a rancho in early California; Pedro, Spanish for Pierre. When the news of rich gold strikes in the nearby foothills reached him, the enterprising Don Pedro left San Jose and began prospecting in the Tuolumne area in the summer of 1848. In August, he dis-

*Approximately. Depending on the time of year and snowpack conditions, the reservoir may be as high as mile 16.4 or as low as mile 18.0.

covered a sizable deposit of gold in a gravel bar along the river. News of this strike spread and soon hopeful prospectors were hurrying to the area. Don Pedro was not a man to linger, however, and other interests soon summoned him from the burgeoning settlement near his original strike, which locals were already calling Sansevina, or Don Pedro's Bar. He moved to Stockton in 1849, and later in that year attended the California Constitutional Convention as a delegate.

Don Pedro's final destination was San Francisco, where he continued to operate and expand his wine interests.

He became a fairly prominent social figure, and today is remembered as a pioneer of the California wine industry, and is even credited with developing the state's first champagne.

In 1923 the town of Don Pedro disappeared under the waters of Don Pedro Reservoir, impounded behind the world's tallest dam at the time, a joint construction of the Modesto and Turlock Irrigation Districts.

The Don Pedro Dam: 1925



The reservoir was further enlarged in 1971 by construction of the New Don Pedro Project, which provides water, as well as electric power, to the joint irrigation districts, and the City and County of San Francisco.

Mile 16.8 Russell Telegraph Mine

Nestled in its steep side-canyon, the Russell Telegraph Mine can be easily seen from the river, several hundred feet up on the south side.

The structure houses the surprisingly well-preserved stamp milling machinery, while the main shaft is just upstream.

The Russell Telegraph began operations in the 1870's. It was then known as the Telegraph Line Mine, because of its close proximity to the Sonora-Yosemite telegraph line, constructed in 1871. The original equipment was brought in along the Mohican Mine road, and then skidded down on a cable and sled to the mining site.

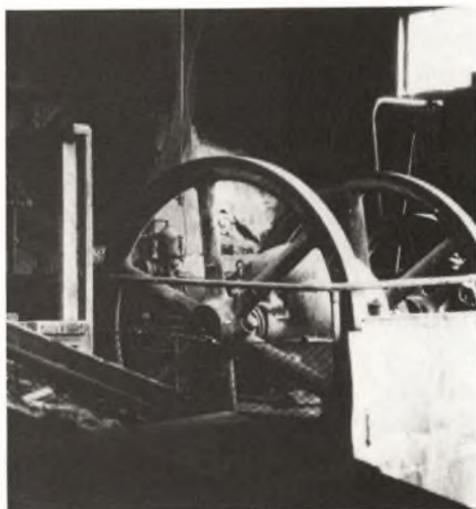
After the turn of the century, the mine was purchased by Sylvester Carlon, a Tuolumne County Supervisor and brother of Tim Carlon, the wealthy cattlemen. Apparently Sylvester's financial position wasn't nearly as secure as Tim's, and the acquisition of the Russell Telegraph did little to help matters. Reportedly, it was Sylvester's concern over matters such as these that led to a dispute with his sister, Elizabeth Phillips, which in turn led to his suicide in February of 1910. His brother tried to gain control of the mine after Sylvester's death, but Elizabeth must have intervened because it is her husband Sylvester Phillips who is listed as the eventual owner.

During the early 30's the mine continued to be worked on a small scale. Frank DeFerrari reports that a crew of no more than 8 were employed. The men lived at the site during the week, but spent their weekends on the outside.

Although the Russell Telegraph was never a big producer, and has been inactive for years, it continues to hold an attraction for individual prospectors, the most recent claim being filed in January 1981 by Robert Wilson of Mariposa.



The Russell Telegraph Mine. A present-day view.



Milling Machinery.
From the Russell
Telegraph.

Mile 17.0 Turnback Creek

According to local legend two Cornish prospectors were exploring the creek's headwaters and stumbled onto a large Miwok camp. Their subsequent decision to concentrate their search elsewhere led to the creek's name.

Mile 18.0 Pinball Rapids

One of the most aptly named rapids on the river is normally covered by the New Don Pedro Reservoir except on occasional years in the early spring.

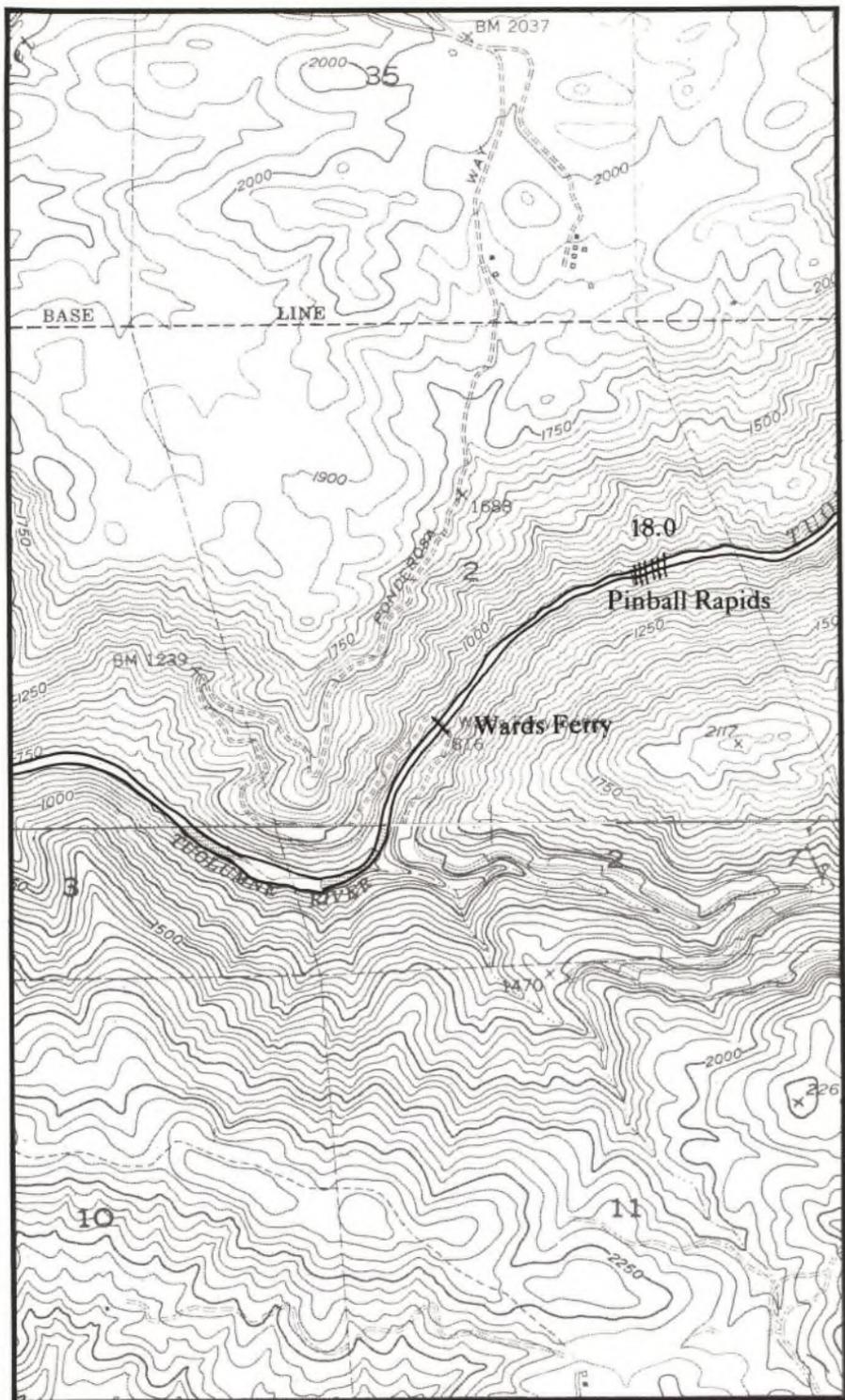
Mile 18.5 Wards Ferry

The take-out location for commercial and private rafting ventures is at the site of the old Wards Ferry Bridge; the new, existing structure is just downstream. This area has a long and turbulent history; from the county's earliest days it has been the scene of both civic cooperation and private violence.

As early as 1850, the diggings on either side of the Tuolumne River were thronging with newly arrived prospectors. To accommodate and supply them, towns of considerable size were developing at Sonora and Garrote (Groveland). The difficulty of travel between these two centers led Joseph Ward to construct a ferry across the river in 1850, as an alternative to the more circuitous route through Chinese Camp, Moccasin, and or the Priest grade, before arriving in Garrote and the southern mines region.

The actual ferry site is a quarter of a mile downstream from the bridge. Little remains to indicate its location, although from the mouth of Deer Creek on the south, you can see the skeleton of the old horse trail switch back up the hillside and then follow below the course of the present road for a distance. It soon crosses the road, and can be seen for several miles ascending high above on the left.

Constructed of "hand-hewn logs", Ward's was not the first ferry on the river: of the 35 ferries that operated in the county in the 1850's, 12 were on the Tuolumne — Ward's had the distinction of being the furthest upstream.





Ward, and a partner named Clements, charged their customers twenty-five cents if they were on foot, and fifty if they were horsemen. They built a small house and supply store, the remains of which can be seen on the north hillside, at a point below the road, a few hundred yards up from the bridge.

As traffic increased, the Sonora-Garrote trail needed improvement, and in June of 1853, the county Board of Supervisors ordered a road built from Campo Seco, down Rough and Ready Creek, to Wards Ferry.

It was at Wards Ferry in the latter part of 1853, that the escaped murderer, Robert Bruce, was finally captured. Bruce, who had been convicted for the murder of a mulatto at a Sonora fandango house, had escaped from the county jail along with another prisoner, Henry Hays. They had sawn through their shackles with instruments purportedly "furnished by outsiders", and gotten as far as the river. There, as luck would have it, one of their fellow passengers was a member of the jury that had convicted Bruce; the juror recognized the escaped felon and a struggle ensued in which Bruce was shot in the side. Undaunted, though, he jumped from the ferry and swam to shore, seeking refuge in the undergrowth. He was finally discovered by the sheriff, and later returned to meet his fate by hanging. His partner, Hays, was also recaptured, and sentenced to a stint at hard labor in the state prison.

Tuolumne County Pioneers. Top row, left to right. Caspar Koch, a rancher and miner from Second Garrotte (3 miles east of present-day Groveland); Jack Bell, miner from Garrotte (Groveland); Barney Fox, fero dealer and gambler from Garrotte, died at the age of 105; Nate Screech, trapper and mountain man, discovered Hetch Hetchy Valley; Culbertson, Moccasin Creek rancher, discovered gold on Canada's Fraser River. Bottom row, left to right. Chaffee and Chamberlain, mining partners from Second Garrotte, possibly the inspiration for Bret Harte's *Tennessee and His Pard*; Jim Ballantine, rancher from Deer Flat; "Gig" Maxey, miner from Spring Gulch; Winslow Hubbard, filed the Ellie Winton and Eagle Bluff claims, master carpenter who brought the first Mason Chapter to the Motherlode.

According to one story, Joseph Ward was murdered in 1853 for the gold he had collected in tolls. Whether or not he was actually killed, it is clear that the ferry operations were taken over by James Berger and Sam White in 1854.

The two continued to run the ferry until 1859, when White was murdered. Some accounts insist that Berger suffered the same fate; robbery, in either version, was the motive and as was so often the case, the assailants were never discovered.

By the 1860's, violence and robbery had become so common along this section of the Sonora-Garrote road, that the tributary canyon that intersects Deer Creek near the route south of the river became known as Murderers Gulch. The problem, as Louise Nau in her article "Tuolumne County's Pioneer Ferries" points out, was that while the route was much shorter, the risks were obviously greater:

"This cutoff from the Sonora area to Garrote (Groveland), when made feasible by a ferry, was very enticing. Who wanted to go clear down to Chinese Camp and climb up again by way of Moccasin Hill when, by means of a rough trail, one could travel more directly? Countless miners, both afoot and mounted, came by way of Ward's Ferry. Murderer's Gulch was a dangerous and bandit infested place. Early travelers, when possible, made this portion of their journey in groups, being sure that they knew those who were in their company. Many a lone man left his bones on this trail."

For years, the area kept its reputation. One of the victims in the 1860's was a Mr. Tuttle, who followed Berger and White as ferry operator, and was robbed for his toll receipts and murdered. Yet despite this reputation, and the very real hazards it presented to travelers, the route continued to be heavily used; by the 1870's there was more discussion about improving the road again, and opening it up to wagon travel.

In 1878, work began in earnest. A "Wards Ferry Road Committee" had been formed, (including the ubiquitous Caleb

Dorsey) and subscriptions were collected from citizens on both sides of the river for the work. It was a time of great civic activity, with committee meeting weekly and many citizens contributing funds and labor. The Tuolumne *Independent* report dated February 16, 1878 captures the optimism of the time by describing the project's potential to "... smooth off the rough edge of hard times by increasing trade and travel in and through the county."

In February, although work on the road was progressing, the means of conveyance across the river had still not been established. In June, however, a group of three individuals, J. F. Sears, R.J. Starbird, and Sidney Smith began construction of a toll bridge. In September of 1878, the bridge abutments had been completed; they are the stone and mortar structures that face each other at the take-out location today.

In January 1879, the road and bridge were finished, and the road committee conducted a test run, issuing the following report:

The road is in fair condition for light travel, requiring a few more turnouts and widening in some places — which the contractors agree to do — and when done it will make a good road for all purposes required.

The trip from Sonora to Groveland took four hours; the route through Chinese Camp, taken for comparison, five and a half. The 1879 road is almost the exact route that the present paved road follows.

The bridge, called the "Wire Suspension Bridge", consisted of two inch thick wire cables, three on each side, and a wooden platform. The bridge owners applied for, and received, a license to operate it as a public toll bridge for twenty years, beginning on April, 1879. The following tolls were also established:

Foot pass	\$.25
Horse and rider	\$.50
2 animals and wagon	\$ 1.00
6 or 8 mule or ox teams	\$ 1.50
12 mule or ox team	\$ 1.75

The Tuolumne *Independent* described the bridge in the most radiant of terms:

The bridge across the Tuolumne will be the finest structure in the county, and will stand for generations an heritage for public use and source of wealth to the heirs of its constructors. It will not be at once profitable, but as the county develops will in time yield a revenue ample to justify the outlay and the waiting.

Actually the bridge barely lasted a decade. In the early morning hours of February 1, 1891, the most violent and spectacular event in the history of the area occurred. Charles Pease, the tollkeeper, and a visiting friend B.N. Lowe, were robbed and shot to death. The cabin was then set afire causing a blaze which spread to the bridge. By morning it was completely destroyed. Both Pease and Lowe were elderly and respected members of the county, and the community was horrified by the destruction and double murder. The district attorney, Frank P. Otis, immediately wrote to Governor Markham and requested that the state offer a \$500 reward for the arrest and conviction of the fugitives.

By March, no progress had been made in solving the murders, and although several Indians were later arrested and questioned about the matter, the mystery remains officially unsolved. (Years later, though, Sheriff Jack Dambacher was summoned to the bedside of a dying man who, in a last moment of repentance, confessed to the terrible deed).

As the shock of the tragic events receded by the middle of 1891, a controversy began to develop over whether the county should purchase the property and replace the bridge. There were many arguments against such an action. It was pointed out that the route had not been as regularly used as the longer Chinese Camp route, and that the previous bridge had failed to meet its expenses for a long time. In addition, available public funds are inadequate. Nevertheless, when the matter was presented to the voters in November 1892, they voted to issue bonds to build a new public bridge and further improve the road for three miles on either side.

In spite of the public mandate, there seems to have been considerable official reluctance to embrace the project; it was nearly five years before the board of supervisors finally voted to take the preliminary steps towards construction of the free bridge, in May of 1897. It was about this time too that official opinion began to reflect what the local population had obviously sensed in 1892 — and even that was an extension of Ward's early vision — that a permanently maintained road from Sonora to Groveland was a vital thoroughfare for the county. The *Independent*, speaking of this and two other road projects maintained:

With the completion of these highways the country, for the first time in its history, will offer to the public free access over and through its broad domain. Heretofore its tolls have been a menace to its interests.

The modern era had certainly arrived, because the undertaking was no longer a local effort, supported by subscriptions and toiled on jointly. In August, 1897, bids were taken from contractors, and shortly thereafter Cotton Bros. and Company were selected to do the actual bridge construction.

Work on the iron structure proceeded rapidly, aided by utilization of the stone abutments from the Wire Suspension bridge, and the 173 foot bridge was officially completed on November 12, 1897. Given the area's tumultuous tradition, it seems fitting that the official opening and celebration the following week, was cancelled because of severe storms.

There were other, more peaceful, moments at Wards Ferry. Although the river has been recently inundated, and downstream dams have long restricted their spring and autumn spawning runs, prior to 1890, salmon were plentiful in this area. Each year the river was teeming with these strong and beautiful fish as they fought their way upstream to ancestral waters. At Wards Ferry Bridge, the salmon were so numerous that locals like Carlo DeFerrari Jr. could spear enough fish with a pitchfork to last the winter, when smoked and dried.

The subsequent history of Wards Ferry is remarkably quiet. It was not until the 1960's that the road was finally paved, and the last act of consequence was the destruction of the 1897 iron structure, and the completion of the new concrete bridge, as part of the New Don Pedro Project, in 1971.

The Placer Czar: William Wimpy

The economic rigors of the Depression initiated an unprecedented activity in placer mining claims in the 1930's. Known as "gopher-miners", or "bedrock-scratchers", hundreds of prospectors scoured the sand and gravel bars of the river, particularly below the Clavey confluence. Many found that although the work was exhausting, the little gold they could wrest from the canyon earned them more than they could garner when work was available in the surrounding towns.

Of these, the most prolific must have been William Wimpy of Turlock; who from 1936 to 1940 filed over twenty claims on placer sites from the powerhouse to the North Fork confluence. His claims included the Big Rock, Peg, Florence, Carolyn, Cable Crossing, Wimpy, and Brown placers. Wimpy, whose wife Bee ran a Groveland Bar called "The Bee's Nest" for years, honored her by naming three of his claims the Bee, the B.B., and the Beulah B.

In January of 1940, Wimpy, perhaps concerned lest he leave some bend unclaimed, filed a massive placer claim along with seven others; the Enterprise numbers 1-9, which identified separate sites the length of the river between the powerhouse and the North Fork.

Boats on the Tuolumne

For reasons that are not hard to imagine, the Tuolumne between Lumsden Bridge and Wards Ferry was not regarded as a navigable river during the early part of this century when access points were first being put into it. By 1920, it was possible to travel from Lumsden to the Clavey on the north side of the river, along a trail that the Bond brothers, and later the Forest Service improved; and from there, along the old flume bed to the powerhouse site. Thence across the river on the wagon bridge and downstream to Indian Creek. Below that point, trails were intermittent and it probably behooved a hunter to climb out to the ridge. Despite these difficulties, the alternative must have appeared substantially worse; trusting a wooden boat to the rock strewn rapids of the Tuolumne seems even now a marginal proposition.

But there will always be those attracted to the margins, and in 1927, two such characters eschewed the Bond's trail, lashed together a log raft near the South Fork confluence and set off for the Clavey. Their names were Harry Cobden and Melvin Belli. Both were attending Boalt Law School in Berkeley and both had grown up in Tuolumne County. Belli came from an established Sonora family, part of the original wave of Genoese families that left Garibaldi's Italy for the California Gold Rush. Cobden came from a pioneering Groveland area family with Parliamentary English roots.

Their late spring raft trip, whose ostensible purpose was to stake a placer claim down at the Clavey, was memorably disastrous. They ate "whitefish and salt pork", and spent two days negotiating the 6 miles of river. Some rapids they dragged around, some they careened through; and some they just swam. They camped on a beach and burrowed into the sand to sleep. By the time they got to the Clavey, their log raft had taken a serious beating; as, apparently, had their enthusiasm for mining, enough so that they decided to hike out, leaving behind them the remnants of the Tuolumne's first boat.

Melvin Belli went on to become one of San Francisco's more illustrious attorneys, with a nation-wide reputation for courtroom flamboyance. Harry Cobden graduated from Boalt in 1933 a year after he had run Upton Sinclair's nearly successful gubernatorial campaign. Subsequent to that, he became a close associate of Pat Brown's and worked in the attorney general's office under his administration. Although he has repeatedly tried to retire, Cobden still practices law, still stays in touch with politics ("I'm Jerry Brown's godfather, but he won't listen to me") and is a gold-mine of early Tuolumne County history.

After the Belli/Cobden trip, there were no records of any more attempts before 1962. It seems likely that various individuals made an effort — Alexander Klimas reports seeing a pair of men on a log raft in the late 50's abandon ship and walk out from the Clavey — but no personal accounts exist before that of Helmut Donner.



Harry Cobden and Melvin Belli. Around 1927.

In October of 1962, Donner and two others, Henry Millard and Rod Kiel, took two rubber rafts the full length of the river, carrying around Clavey Falls. All three of the men were associated with the Sierra Club's newly formed River Touring Section, out of which most of the early river runners came. Three years later, in the spring of 1965, Noel DeBord made the first known descent of the river without carries. He used a fiberglass kayak and did the trip solo.

Bryce Whitmore, a pioneer member of the River Touring Section, and Don Segerstrom, a local river enthusiast, were the next to float the Tuolumne. They took it in August 1968, in a Whitmore-designed "Supersport" boat made out of modified rubber bridge pontoons.

That winter, Gerry Meral and Dick Sunderland made the second kayak run in November. The next year, 1969, saw the first commercial river trip on the river, and in the years intervening thousands have made the trip, in kayaks, closed canoes, and most commonly, inflated rafts.

Although the river is best enjoyed at a leisurely pace, it has been boated a number of times at anything but. One of the quickest trips was undoubtedly recorded by Roxanne Maloney and Michael Schlax when they took it in kayaks in July of 1980. At the time, the water was flowing past Meral's Pool a bit in excess of 10,000 cubic feet per second.

Noel DeBord



JOHN MUIR AND THE BATTLE OF HETCH HETCHY

In its broadest outlines, 20th Century politics share most of the qualities that make history in general (and politics in particular) distressingly repetitive. One of the bright spots, perhaps an exception to the rule quoted above, has been the raising of an environmental consciousness to the level of a significant political force. This uniquely modern development has deep philosophic roots, but its emergence onto the political wrestling mat dates most easily from the year 1901 when John Muir began the struggle to preserve the Hetch Hetchy Valley on the upper Tuolumne River.

Muir, the Scots writer and self-taught naturalist, began the battle when he was 63 and died not many years after its conclusion, in 1914. It was not his first initiation into the political arena, he had helped to form the Sierra Club in 1892 and had been very active in making Yosemite a National Park in 1890. But Hetch Hetchy began Muir's emergence as a national voice of conscience, one that the intervening 70 years have done little to still.



The battle itself was a multi-chaptered political struggle oscillating between San Francisco and Washington, where approval came, and went, and then came again, as a succession of three administrations dealt in turn with the City's application for permission to build within Yosemite National Park.

In San Francisco, official hesitation stiffened and then finally formalized with the passage of a Board of Supervisors' resolution explicitly abandoning the plans; but when it was discovered that a competing private utility had managed to "buy" the vote, the Board was forced to resign in disgrace and the official position of firm support was re-taken and in fact strengthened by the scandal.

John E. Raker, a Congressman from the Central Valley, drafted a piece of legislation in 1913 that was eventually passed, sealing the valley's fate. Known as the Raker Act, the bill purported to contain provisions that would appease all the competing interests. Given the range of opinion expressed at the time, that was a tall order, and the bill was an intricately written statute whose full implications are still being interpreted in court today.

The benefit of the intervening 70 years gives us today a revealing perspective on the Hetch Hetchy struggle. Not unexpectedly, a number of predictions made on both sides of the issue have failed to materialize: the National Parks System has not been similarly invaded since — a fear much expressed by John Muir and his supporters — nor has the reservoir made "Hetch Hetchy more beautiful than before" — a claim made in a special "Washington Edition" of the San Francisco *Examiner* published in 1908. What value the experience had for the nation was in the launching of a new era of environmentalist politics, and in the introduction of new terms into old debates.

More locally, the river itself has survived the experience in fine style. It still waters the incomparable Tuolumne Meadows, still cascades through the "Grand Canyon of the Tuolumne" and still thrives in the Middle Canyon between Lumsden Bridge and Wards Ferry. It is today for us, just as it was for John Muir then, a national treasure, one well worth fighting for.

Modern Water Development on the Tuolumne

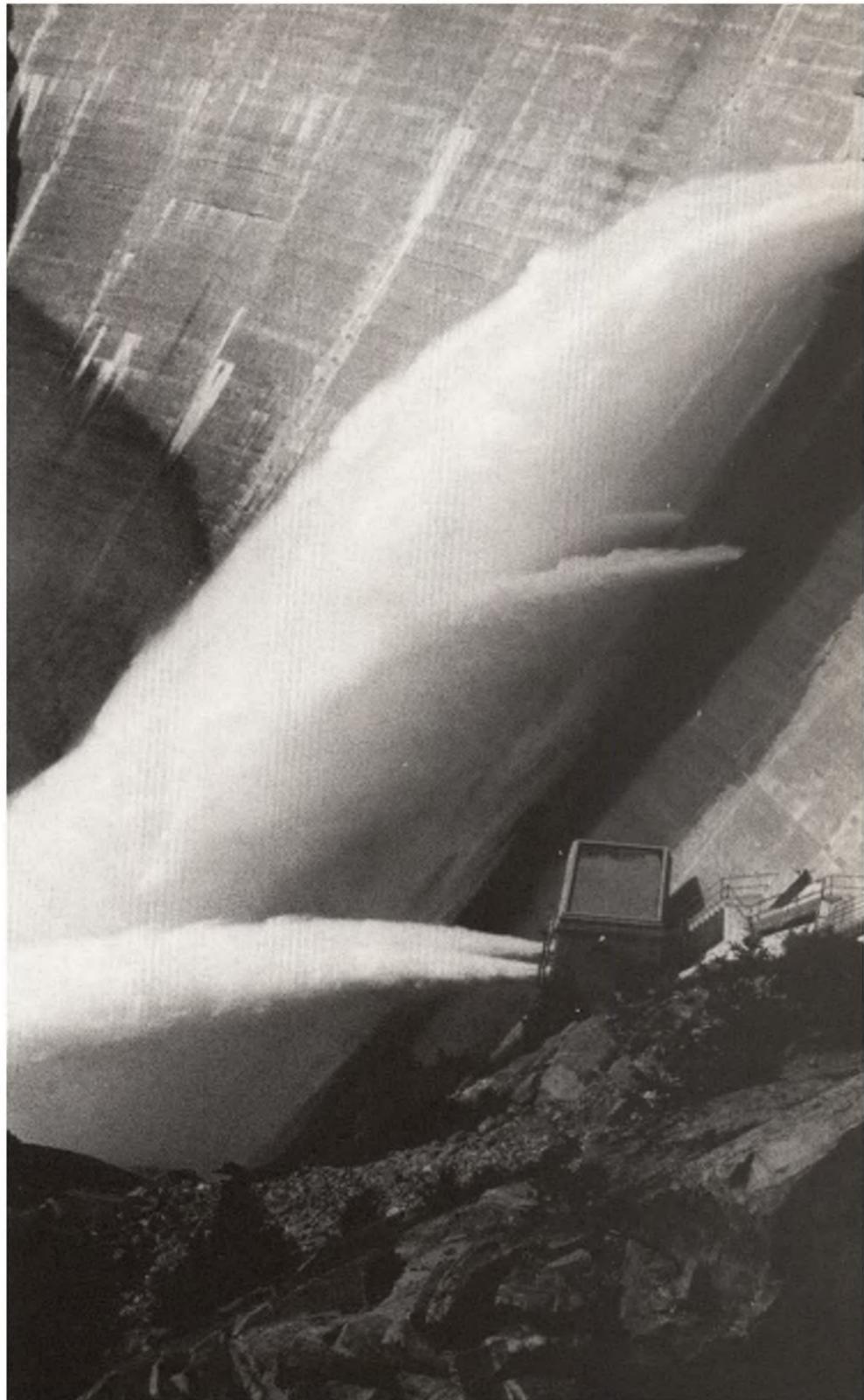
By and large, the City of San Francisco, in partnership with the Modesto and Turlock Irrigation Districts, owns the flow of the Tuolumne River. Upstream of the Lumsden to Wards Ferry stretch, there are three major dams, O'Shaughnessy in the Hetch Hetchy Valley being the largest. Downstream, the major dam is the New Don Pedro. The combined capacity of these two structures today is 1.5 million acre-feet of water and 245 megawatts of power.

WATER FLOW BETWEEN LUMSDEN BRIDGE AND WARDS FERRY

During the spring months of April, May, and June, water in the Tuolumne below Lumsden is partially a result of natural runoff from Jawbone Creek and the South Fork, and partially a result of power release from the Cherry Creek reservoir. Nearly all the water from the upper Tuolumne is shunted around the lower river via aqueduct, en route to San Francisco and the Peninsula.

Occasionally, after an especially wet winter, both Hetch Hetchy and Cherry Creek will spill excess inflow resulting in high, uncontrolled springtime flows.

During the months of July, August, September and until the winter rains begin, Cherry Creek power release provides most of the water between Lumsden and Wards Ferry. On average snowpack years, the release varies between 900 and 1100 cubic feet per second on weekdays and reaches Lumsden put-in by 9:00 in the morning. Saturday flows are lighter — and later — 700 to 900 cfs and 10:00 a. m. would be typical. Sundays, and some holidays, the flow frequently drops below 700 cfs, the lower limit of navigability.



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For the Future

In California today there are some 1200 operational dams, impounding the water of every major river in the state except one, the Smith. The three rivers described in this guide are already harnessed by a total of 24 dams and today contribute 1591 megawatts of generating capacity to the state's total. In addition, they yield 2,100,000 acre-feet of water, most of which goes to agricultural uses in the Central Valley.

There are few today who would argue that the Stanislaus, Tuolumne and South Fork are idle workers, welfare recipients on the state's energy dole. In recent years though, a number of new proposals have surfaced which, if implemented, would mean the construction of an additional 6 dams on these rivers. The value and justification of these plans has been the focus of a long and continuing debate — a debate whose immediate result has been to re-define the kinds of values and benefits allowed into water use decisions, but whose final result depends, very simply, on the numbers of people who express support for these new, non-electrical benefits. To put this debate in context, what follow are a few, hopefully indicative numbers.

Hydroelectric plants on the South Fork, Stanislaus and Tuolumne Rivers account for 18% of the state's total hydroelectric capacity. If every new dam planned on these three rivers was installed and operated at maximum capacity, that share would be increased by about 3.5%. In terms of "new water", the additional construction and maximal storage at New Melones would yield an increment of approximately 6% over the contribution the three rivers are making currently. These are the major benefits; in general, they translate easily into numbers. A discussion of the costs, which follows, is less mathematical.

To begin with, and at the risk of being obvious, it should be pointed out that neither water nor power are "priceless". Above a relatively fixed base-line need, both are as subject to

the law of supply and demand as orange juice and battery driven swizzle sticks. The truth of this observation bears illustration only because little is ever remembered of the thousands of dams and powerplants rejected because of a price tag too steep. Frequently the decision is made on a simple dollars and cents basis (e.g. a plan put forward in the 60's to tunnel a portion of the Yukon into California); other times "softer values" enter in, (both Yosemite and the Grand Canyon are fabulous hydro sites). In this context, the debate over the future of these three California rivers takes on a bit of historical perspective.

The easiest price tag to attach to these development plans is their estimated cost of construction, figured today at \$880 million — an amount equal to 75 times the state's annual art support budget, 5 times the annual law enforcement budget, or 80% of the cost of a new nuclear submarine, depending on your personal preference.

Additionally, and still within the realm of numbers, recreational use on the three streams has contributed a growing amount to local county economies estimated in 1979 at 10 million — a number that has caused more than one chamber of commerce member to reflect on the fact that while the state's power demand seems to be flattening out, no one is building any new mountain rivers.

The other half of the cost side calculation is, of course, the "softer" one, incorporating values that translate poorly onto an accountant's ledger: a grumbly old oak, a simple willow by the river's edge, a lasting sense of place and strength.

What value we place on these things is a matter of individual conscience. But it is one of the redeeming facts of human-ness that they are of value; that people continue to visit places of quiet and beauty for reasons basic enough to frustrate explanation. And in the context of what history has shown us to be human, it will be to our great good fortune if this fundamental need is added to that portrait and put into whatever final record is made of our stay upon this land.



The Proposals

The Stanislaus

The struggle over the Stanislaus River and the operation of the New Melones project is now almost fifteen years old. The river has been the subject of two Congressional bills, one popular referendum, one state bill, one Supreme court decision, dozens of administrative acts, numberless letters and phone calls, at least three public acts of civil disobedience, a half-dozen lawsuits and two jailings. Both for energy and duration, the history of the American environmental movement has few comparisons.

As of this writing, April 1981, the issue has been reduced to a question of operation policy. The New Melones Dam, a 643 foot earthfill structure, was completed in 1979. At maximum storage, the dam is capable of inundating a 26 mile stretch of river, up to Camp 9. The State of California, through its water control agency, is officially opposed to full storage in the reservoir until contracts for the use of the water have been signed — a condition unlikely to be met for several years. In the meantime, what reservoir level the state *will* endorse is a complex question involving physical, legal and political constraints not easily untangled. In addition, overriding the entire issue, is the legal question of jurisdiction. The New Melones Dam is a Federally funded and operated project; what obligation the United States Government has to abide by the state's conditions is not at all clear, despite a Supreme Court ruling on the issue.

While this question is being debated in the courts, the Federal agency operating the dam is behaving as if it is under no restraints; 1981 will see the highest level of reservoir to date, although still far short of maximum.

For the newcomer to the entire struggle, the front-line issues are complex variables of politics and law; but they are actually just the terms of the argument. The fundamental question is simple, unchanging and rests on an ordering of priorities. We

have today a large reservoir behind the dam at New Melones; and we also have a remarkable stretch of river just above that reservoir. Is it worth a marginal increase in power and storage to create a still larger reservoir, at the cost of that stretch of river?

To the objections that this question is: (a) beyond the powers of an average citizen to evaluate, or (b) already a dead issue because of the dam's reality — there are two responses.

Firstly, the question is actually beyond the authority of anyone *but* the average citizen to evaluate. It was raised by average citizens, has been pursued by average citizens, and will, one day, even be resolved by them. The only qualification necessary to take part in the debate is a simple concern for the kind of world we live in.

As far as the second objection goes, the supposedly foredoomed nature of a struggle to limit the size of a reservoir behind an already completed dam, this is actually no more than the latest phrasing of an argument that has lost its strength through the sheer weight of repetition. The stacking of hopeless odds is nothing new to the Stanislaus struggle, indeed it's been the hallmark of it from the very beginning. There are many people who've been battling this issue for ten years or more who wouldn't know how to function under more favorable circumstances. It's an attitude that has lost a lot of battles, but, every now and then, wins a war.

Tuolumne

The City and County of San Francisco, in collaboration with the Modesto and Turlock Irrigation Districts, is actively pursuing a three dam project on the Tuolumne River. The impact on the stretch of river between Wards Ferry and Lumsden Bridge would be complete. From Lumsden to the Clavey confluence, normal flows would be reduced to a relative trickle; from the Clavey downstream, there would be a new reservoir. The objective benefits would be 300 megawatts of new power (no

new water); the objective costs would be \$660 million and 18 miles of river.

The Tuolumne has also been studied by another group though, and for another purpose. In 1979 the Federal Government completed a study of the river recommending that it be protected from further development under the terms of the Federal Wild and Scenic River Act. That recommendation was passed along to Congress for possible action. As of April 1981, a bill implementing this recommendation has not yet been introduced. The most logical, and critical, sponsor would be the current representative from the area, Norman Shumway. To date, though, Mr. Shumway has not made clear his feelings on the issue, although a Tuolumne County referendum in 1978 showed a 2-1 plurality against the City's proposal.

Under the terms of Federal law, if a Tuolumne bill is not introduced by the end of 1981, then the moratorium on preliminary construction work in the canyon will be lifted.

It would be hard to imagine a more critical juncture for the future of a river than 1981 is for the Tuolumne.

South Fork of the American

The El Dorado County Irrigation District is pursuing a multi-dam hydro-electric project on the South Fork of the American known as the Upper Mountain SOFAR Project. Physically, the scheme involves a network of tunnels, pipes, diversion dams and holding reservoirs located on Alder Creek, the Silver Fork American, Weber Creek and the South Fork itself. The impact to the stretch of river between Chili Bar and Salmon Falls would be mostly in the area of flow control. Springtime high water would be held back, diminishing the natural scouring function that floodwater has upon a canyon.

The section of river between Khyburz and Riverton, along Highway 50, would be more severely affected. Flows in that stretch would be reduced to a relative trickle.

The project is primarily designed to generate electricity, 470 million kilowatt hours per year, according to its supporters,

with a modest yield of 30,000 acre-feet of water. The cost of construction (1980 estimate) is \$190,000,000.

Local feeling regarding the scheme has been strongly polarized. The growth rate in El Dorado County is one of the steepest in the state, and many residents, who initially settled in the area for its rural flavor, are becoming increasingly concerned. a referendum on the project in 1980 was the subject of vigorous county-wide debate, which, despite passage of the measure, shows no signs of abating.

Local opposition to the Upper Canyon SOFAR Project is being coordinated by the *American River Recreation Association*, Box 221, Coloma, CA 95651.

**THE PLANT AND
ANIMAL COMMUNITY**

**Descriptions by Diane Posloski
Illustrations by Diane Posloski
and Robin Center**

INTRODUCTION

The river canyons of the Motherlode support a rich array of flora, containing over 400 species of trees, shrubs, herbaceous plants, and ferns. As a result of the different climatic and geological influences, five distinct plant communities are represented: digger pine/oak woodland, blue oak savannah, foothill chaparral, grassland, and riparian or streamside. In some places, no clear dividing line exists between these communities and they gradually blend into one another; elsewhere, on opposing north and south facing slopes for example, there is a dramatic contrast.

Along lower portions of south facing slopes occur the blue oak savannah and digger pine/oak woodland communities. The *blue oak zone* is rich in forage for wildlife and is characterized by pure stands of blue oak, separated by fields of annual grasses. Plants such as interior live oak, poison oak, and toyon can also be found there.

The *digger pine/oak woodland* is a more diverse community. Digger pines, valley oaks, interior live oaks, blue oak, buckeye, redbud, chamise, and poison oak are among its plant inhabitants. This plant community may also be seen on the upper north facing slopes across from south facing chaparral slopes and in the more shaded areas and gulches where yellow pines and incense cedar have washed down from the high country.

On higher slopes, where exposure to the sun is more intense and moisture is nearly non-existent during the hot summer months, trees become sparse and give way to the *foothill chaparral community*. Here, plants such as chamise, toyon, ceonothus, poison oak, and yerba santa grow in great abundance. The *grassland community* may also occur on these same hillsides. Its fields of annual grasses are dry and golden brown in summer and fall, yet lush and green in the spring and winter. In the spring of rainy years, these fields burst forth with prodigious blooms of native flowers — poppies, baby blue eyes, goldfields, and lupines — creating a colorful impressionistic scene.

Adjacent to the rivers and their tributaries, the *riparian community* provides valuable forage for many animals and cool relief from the relentless summer heat. With its fertile soils, the riparian zone is indeed the richest, most diverse and productive habitat in the Motherlode. It is also the most rapidly vanishing habitat in California. White alders, Oregon ash, and several species of willow are omnipresent in this zone, sometimes shading places where hedges and grasses remain green all summer. Also interspersed are the ubiquitous poison oak, buttonbush, buckeye, Indian rhubarb, bay, an occasional big leaf maple and more commonly, the introduced tree of heaven. Several species of fern can also be found in the shade of steep cliffs and riparian trees. Along the luxuriant side canyons, wild grape and black berry grow in profusion — their vines intertwining among trees to make a lush impenetrable forest. Both of these plants, along with the tree of heaven and fig tree, were introduced during the Gold Rush and have enhanced the forage potential of the river canyons.

Of the 400 different plant species represented in the river canyons of the Motherlode, only 50 of the most prominent species are described in this glossary. For those interested in further exploration of the Motherlode flora, there is a list of good resources at the back of this book. Have fun exploring and may this small glossary serve as a seed to carry forth your sprouting curiosity of all that is growing and green.

CONIFERS

DOUGLAS FIR (*Pseudotsuga menziesii*)

DESCRIPTION: Large conifer with narrow pointed crown of slightly drooping branches. **Height:** 70-200 feet; **Needles:** evergreen; spreading mostly in 2 rows; ½-1½ inches long; lemony smell when crushed. **Bark:** reddish-brown, deeply furrowed into broad ridges; often corky. **Cones:** 2-3½ inches long; light red-brown; rounded cone scales; **Habitat:** rocky soils of mountain or canyon slopes, in pure stands and mixed coniferous forests.

The Douglas-fir tree adapts to many soil and climatic conditions and succeeds well with many species. Its thick bark helps to make it fire and drought resistant. It regenerates vigorously and is often one of the first trees to sprout after a fire. Its light-winged seeds are capable of traveling ¼ mile in a moderate breeze. The Douglas-fir was used extensively by California Indians for lumber, harpoon shafts, and other implements. The pliable roots were used in basketry and the cambium layer was utilized as an emergency food. A tea can be made from the young fresh needles and is purported to be high in vitamin C. One of the world's most important timber species, it ranks first in the U.S. in its total volume of timber, lumber production and veneer for plywood. This can be accredited to its yield of large logs with straight grain. It is also one of California's tallest trees. Squirrels, meadow mice, shrews, wrens, and song sparrows are just some of the Sierra fauna that feast on its seeds. Deer and grouse frequently nibble on its foliage.

DIGGER PINE (*Pinus sabiniana*)

DESCRIPTION: Conifer with crooked forking trunk and branches; wispy, irregular, and broad crown with large heavy cones; frequently leans at right angles to the hillside; **Height:** 40-90 feet; **Needles:** evergreen; 3 in a bundle; 8-12 inches long; slender and drooping; sparse; dull gray-green; **Bark:** thick, dark grey; deeply and irregularly furrowed into scaly ridges, becoming slightly shaggy; **Cones:** 6-10 inches long; weigh up to 4 pounds when green; bent down on long stalks; cone scale tip is sharp and claw-like adapted to protect the large

plump seed from squirrels; *Habitat*: dry slopes and ridges in foothills and low mountains; with oaks and other conifers.

This picturesque and delicate pine tree is the most common conifer in California. John Muir writes: "no other tree of my acquaintance is so substantial in body and yet in foliage so thin and pervious to light. The sunbeams sift through even the densest needled trees with scarcely any interruption." Some of the first pioneers dubbed the Indians they met in the Central Valley "Diggers" because roots and bulbs comprised much of their diet. Also, when these newcomers learned that Natives subsisted largely upon the rich seeds of a foothill pine, they called the tree "Digger Pine". Understandably, the Miwoks treasured this grey-green pine. John Muir described the Digger Pine nut harvest as follows; "The Indian men climb the three like bears and beat off the cones with sticks while the women gather the big generous cones and roast them until the scales open sufficiently to allow the hard shelled seeds to be beaten out. Then, in the cool evenings, men, women, and children form circles around campfires on the banks of the nearest stream and sit in easy independence cracking nuts and laughing like squirrels." White settlers considered this tree to be rather worthless except for fuel because its wood is lightweight and not very durable. The Miwok Indians also boiled the twigs, needles, and bark into a strong tea to treat rheumatism. Seeds strung on thread made from wild iris fiber were used to decorate costumes worn in dance rituals. The pitch of the digger and most pines was used for fastening arrowheads and feathers and for mending canoes. The nuts are also a staple food for squirrels, wood-peckers, jays, and other foothill birds.

INCENSE CEDAR (*Calocedrus decurrens*)

DESCRIPTION: Aromatic evergreen tree with dense symmetrical crown that forms a perfect pyramid; not a true cedar; *Height*: 50-150 feet; *Leaves*: $\frac{1}{8}$ - $\frac{1}{2}$ inch; opposite in 4 rows; dark shiny green; spicy incense fragrance when crushed; *Bark*: thin, cinnamon-red; irregularly furrowed into shreddy ridges; *Cones*: $\frac{1}{4}$ - $\frac{1}{2}$ inches long; red-brown; *Habitat*: mountain soils; in mixed coniferous forests.

Incense Cedar seldom forms pure stands as seedlings grow very slowly and other species tend to out-compete it. Often, it is found as an understory tree to younger and taller Douglas fir

trees. Although it is drought resistant, it is easily damaged by smog. Miwoks used the durable shreddy bark to make their huts called "oochums". Pioneers also used the bark for roofing their cabins. Today the Incense Cedar is of great commercial value. Its wood is used to make moth-proof cedar chests and closets. It supplies more than 75% of the wood for the world's pencils because it is soft yet not splintery and can be sharpened in any direction with ease.



Digger Pine



Incense Cedar



Douglas Fir

HARDWOODS AND SHRUBS

VALLEY OAK (*California White Oak*) *Quercus lobata*

DESCRIPTION: Large deciduous tree with stout short trunk and large, widely spreading branches, drooping at the ends and forming a broad open crown; *Height:* 40-100 feet; *Bark:* light grey or brown; "checkered" or deeply furrowed and broken into thick plates; *Acorns:* 1¼-2¼ inches long; oblong and pointed; ⅓ of nut enclosed by half-round cup with light brown, knobby scales; *Habitat:* valleys and slopes on rich loamy soils; forming groves in foothill woodlands.

The Valley Oak is the monarch among deciduous oaks of the West and a graceful shade tree. It receives its species name, *lobata*, from its deeply lobed leaves. Due to rapidly encroaching housing developments, over-grazing and agriculture, this picturesque tree is gradually disappearing from the California landscape. It bears an abundant acorn crop, reputed to be the sweetest of all, but are difficult to hull. This oak's copious mast of acorns also provides nourishment for flocks of band-tailed pigeons and acorn woodpeckers.

BLACK OAK (*Quercus kelloggii*)

DESCRIPTION: Deciduous tree with stout, spreading, irregular branches forming a broad round topped crown; *Height:* 30-80 feet; *Bark:* blackish-brown; thick; becoming furrowed in small irregular plates; *Acorns:* 1-1½ inches long; elliptical; pale chestnut color with deep cup covering ⅓-½ of the nut; *Habitat:* sandy, gravelly, and rocky soils of foothills and mountains; often in pure stands or in mixed conifer forests.

The Black Oak is slow growing, yet long lived. The California Indians prized this oak for fuel and for drying seeds as it burns very slowly. Tree squirrels and some owls nest in rotted cavities of the trunks and limbs. Its summer foliage provides food and nesting for many birds. Deer relish the acorns and browse on the leaves of young trees. Although bitter, the Black Oak acorn is the favorite food of acorn woodpeckers. They store a cache of acorns for winter in hammered holes on the sides of trees and telephone poles. Today its primary commercial value is for fuel, furniture and flooring.



Valley Oak



Black Oak

BLUE OAK (*Quercus douglasii*)

DESCRIPTION: Small to medium sized deciduous tree with short, leaning trunk; short, stout branches and a broad rounded crown; sometimes shrubby, recognized by its bluish foliage; **Height:** 20-60 feet; **Bark:** light gray; thin and scaly; **Acorns:** $\frac{3}{4}$ -1½ inches long; stalkless; oval or tapering; **Habitat:** dry, loamy, rocky slopes; with other oaks and digger pines.

Blue oak receives its species name from David Douglas, a Scottish botanical explorer. It offers perches for many foothill birds and its abundant crop of acorns is eaten by livestock as well as by wildlife. It is used principally for fuel.

CANYON LIVE OAK (Golden Oak) *quercus crysoleops*

DESCRIPTION: Evergreen tree with greyish bark and large spreading branches that form a rounded crown; often shrub-like; **Height:** 25-75 feet; **Bark:** light grey; smooth to slightly scaly; **Acorns:** $\frac{3}{4}$ -1½ inches long; egg-shaped nut; **Habitat:** sandy soils in canyons, rolling foothills, and rocky slopes; in pure stands and mixed forests.

The species Latin name means "golden-scale" and refers to its acorn cup which is the Canyon Live Oak's most distinguishing characteristic. This oak is slow growing and long lived. It has dense straight wood that seasons well. This hard and heavy wood was used by early settlers for farm implements, wagon wheels, furniture, floors, and wedges for splitting redwood logs into railroad ties. It was favored by pioneers for the heads of mauls. Acorns and leaf insects of the Canyon Oak are food for many birds and tree-climbing mammals. Band-tailed pigeons can swallow the entire acorn and let their powerful gizzards do the shelling. More than fifty types of gall-forming insects work on this oak.

INTERIOR LIVE OAK (*Quercus wislizenii*)

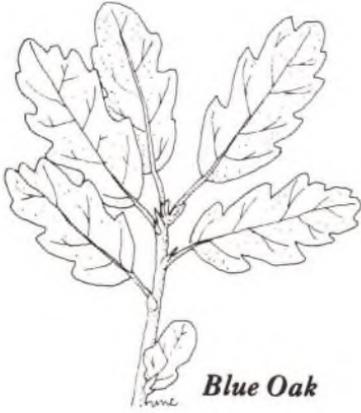
DESCRIPTION: Evergreen tree with short trunk and stout spreading branches that form a rounded crown; sometimes a shrub; *Height:* 25-75 feet; *Bark:* grey becoming furrowed into narrow scaly ridges; *Acorns:* 1-1 $\frac{3}{4}$ inches long; egg-shaped, long-pointed; *Habitat:* slopes and ravines in foothill woodlands or near chaparral; with other oaks and Digger Pine.

The Interior Live Oak is very slow growing. Its dense, dark green foliage gives protected roosting places for valley quail and other birds. Insects found munching on its leaves are food sought by warblers, viroes, titmice and other Sierra birds. Deer browse its young leaves and its wood is used for fuel.

TANOAK (*Lithocarpus densiflorus*)

DESCRIPTION: Evergreen tree with a great central trunk and crown varying from narrow and conical to broad and rounded; sometimes a shrub; not a true oak; *Height:* 50-80 feet; *Bark:* brown and thick; deeply furrowed into ridges and plates; *Acorns:* $\frac{3}{4}$ -1 $\frac{1}{2}$ inches long; maple chestnut color in saucer-shaped shallow cup; *Flowers:* numerous tiny whitish flowers in catkins; 3-4 inches long; unpleasant odor; *Habitat:* moist valleys and mountain slopes; in oak forests.

Tanoak is placed in a separate genus with more than 100 species native to southeast Asia. While its acorns resemble those of true oaks, its flowers contain tannic acid used for tanning hides hence, its name. In recent years, sources of low cost tannin from abroad have reduced the demand for its bark. Indians also used this acorn for meal although it was not a first choice due to its high acid content. Also, insects infect about half the acorns produced.



Blue Oak



Canyon Live Oak



Interior Live Oak



Tanoak

CALIFORNIA BUCKEYE (*Aesculus californica*)

DESCRIPTION: Shrub or small deciduous tree with short trunk, often enlarged at the base; broad rounded crown of crooked branches, with many showy flowers; *Height:* 10-25 feet; *Bark:* light grey; smooth and thin; *Flowers:* many white flowered spikes at the tips of branches; clusters 4-8 inches long; fragrant; bloom in May; *Fruits:* 2-3 inches long; round to pear-shaped seeds; shiny brown reminiscent of a buck's eye; mature in late summer; *Habitat:* moist soils of canyons and on hillsides in chaparral and oak woodland.

The only native buckeye in the West, this species is sometimes grown as an ornamental. Indians used the buckeye as an emergency food and made flour from the poisonous seeds after leaching the toxins with boiling water. Miwoks used the buckeye to stupify fish. They ground up the seeds and threw them into a temporarily dammed stream which in turn caused the stunned fish to float to the surface making it easy to scoop them up in willow baskets. The toxin did not effect those who ate the fish. Chipmunks and squirrels readily consume the seeds, but bees are poisoned by the nectar and pollen.

BIG LEAF MAPLE (*Acer macrophyllum*)

Description: Small to large deciduous tree with broad rounded crown of spreading or drooping branches; *Height:* 30-90 feet; *Bark:* grey-brown furrowed into 4-sided plates; *Flowers:* ¼ inch; many yellow fragrant flowers on slender drooping stalks up to 6; male and female flowers together on same stalk; mature in spring; *Fruit:* 1-1½ inches; brown long-winged seed structure with stiff yellow hairs; bears 1 seed; mature in autumn when they twirl like heliocoopers to the ground; *Habitat:* Stream banks in moist canyon soils; rarely in pure stands.

The common and scientific names both refer to the large leaves of this beautiful shade tree, particularly showy in autumn. The California Indians made cane paddles from the wood and obtained maple syrup from the sap. They also used the bark of the Maple for making rope and the wood made excellent fires for smoking meat and fish. The seeds are food for mice, woodrats, squirrels, chipmunks, and some birds. The tender twigs and leaves from the young seedlings are important browse food for deer. The only western maple with wood of commercial value, it is used for veneer, furniture, handles and woodenware; but, because it rarely forms pure stands it is hard to harvest. Delicious maple syrup can be made from the sap in winter.



California Buckeye

Big Leaf Maple



OREGON ASH (*Froxinus latifolia*)

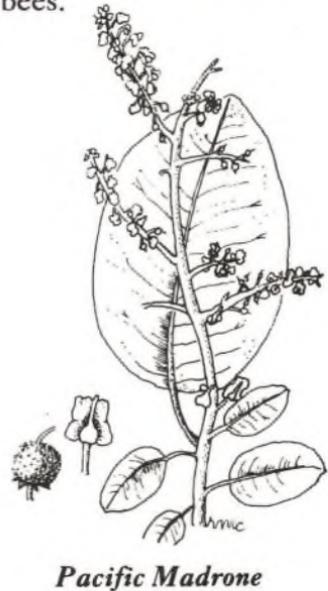
DESCRIPTION: Tall deciduous tree with long straight trunk and usually narrow dense crown; **Height;** 80 feet; **Bark:** dark grey or brown; thickly furrowed with scaly ridges; **Flowers:** 1/8 inch; male yellowish and female greenish on separate trees; many together in small clusters; mature in spring before the leaves sprout; **Fruits:** 1 1/4-2 inches; light brown rounded wing shape like canoe paddle; hanging in dense clusters; mature in early autumn; **Habitat:** wet soils along streams and canyons; with alder, black cottonwood willows, and oaks.

Oregon ash is the only ash native to the northwest. Its wood was used by the California Indians for canoe paddles and digging sticks. Indians believed that no poisonous snakes would live where the ash tree grew and that a stick made from its wood would make a rattlesnake retreat in fear. Also, a tea brewed from the bark was thought to cure worms. The wood of the Oregon Ash is used for furniture, flooring, paneling, boxes and fuel but it is hard to harvest due to its scattered growth.

PACIFIC MADRONE (*Arbutus menziesii*)

DESCRIPTION: Broadleaf, flowering, evergreen tree; tall reddish brown trunk with peeling bark; open, rounded or irregular crown of stout smooth branches; **Height:** 20-80 feet; **Leaves:** 3-6 inches long; narrow and elliptical; turning red before falling; **Bark:** reddish-brown and smooth; peeling off in thin papery scales leaving a smooth greenish underbark; scaly plates on old trunks; **Fruit:** ½ inch diameter; berry-like; orange-red and finely warty; mealy pulp; mature in autumn; **Habitat:** upland slopes and canyons; in oak and coniferous forests; often an understory plant.

Its scientific name, "menziesii", honors its discoverer, Archibald Menzies, a Scottish physician and naturalist. The thin bark of the Madrone makes it especially vulnerable to fires but even if burned it easily stump sprouts. California Indians ate the fruit raw and cooked; however, overeating causes cramps. They also made a lotion from the leaves to treat sores and cuts. Charcoal from the Madrone was employed by the early California settlers in the making of gunpowder. The wood of this tree is very brittle and not commercially developed but can be used for making weaving shuttles. The berries are a popular food for deer and many Sierran birds. Band-tailed pigeons are the principal disseminators of its seeds. The sweet odor of the flowers attracts many honeybees.



WHITE ALDER (*Alnus rhombifolia*)

Description: Medium sized deciduous tree with tall straight trunk and open rounded crown; *Height:* 70 feet; *Leaves:* 2-3½ inches long in 3 rows; dull green above, light yellow-green and slightly hairy beneath; *Bark:* light greyish-brown; inner bark white when peeled; dark shaped marks where branches start; *Flowers:* tiny; male and female grow on same branch; male yellowish long drooping catkin; female reddish woody catkin that looks like small cone; both dangle from tree all year; *Cones:* 3-7 clustered on short stalks; elliptical with many hard black scales; *Habitat:* near streambanks and in foothill woodlands; with chaparral and Ponderosa Pine.

White Alder is named for its pale green foliage and is a reliable indicator of running water as it is usually confined to streams that run all summer. Its leaves drop when still green. They are fast growers and have a short life span of about 80-100 years. The California Indians obtained a red dye from the bark by chewing it and using the colored spittle to dye stems of ferns for basketry. A tea made from the bark was used as a blood purifier, to produce perspiration, and to check diarrhea. Lumbermen consider it to be a "weed" tree.

BAY (*California Laurel*) (*Ubellularia californica*)

DESCRIPTION: Evergreen tree with short trunk usually forked into several large spreading branches forming a broad rounded crown of aromatic foliage; *Height:* 25-80 feet; *Leaves:* 2-5 inches long; shiny dark green above, spicy, menthol-like smell when crushed; *Bark:* thin; dark reddish-brown with flat scales; *Flowers:* Pale yellow clusters on stalks at base of leaves; bloom in late winter or early spring; *Fruit:* a nearly round berry; greenish to purple with thin pulp and large brown seed; matures in late autumn; *Habitat:* moist soils, especially in mountain canyons and valleys; mixed forests.

The Bay tree requires damp soil and is fond of growing along streams in shade. Their volatile leaf oils induce perspiration and were employed by both California Indians and pioneers in steam baths and as a rubbing compound for rheumatism, to repel fleas, and to get rid of head lice. The Miwoks made hunting bows from the bay and often bound the leaf to their forehead to cure a headache. The leaves were also crushed and sniffed to clear stuffy sinuses (too much though, can induce a headache). The trappers of the Hudson Bay Company brewed the leaves into a medicinal tea. The Bay has an attractive light brown wood that takes a beautiful finish and is used for panel-

ing, veneer, bowls, boxes, and other wooden ware. Often commercially marked as "Oregon Myrtle" it is actually in the Laurel Family. Its leaves are prized as an Italian seasoning and are beginning to take the place of the European variety.



White Alder



Bay

WILLOWS (*Salix* sp.)

Note: There are about five different species of willows along the rivers of the Sierra foothills and rather than describing them each in detail, they will be dealt with as a family.

DESCRIPTION: Deciduous, often aromatic trees and shrubs; flexible branches forming an irregular crown; *Leaves:* simple; long and narrow; alternate on twigs; turning yellow in autumn; *Bark:* grey or brown; smooth becoming scaly or furrowed; bitter and aromatic; *Flowers:* tiny yellowish or greenish flowers in elongated catkins known as "pussy willows"; bloom before leaves appear in spring; male and female flowers on separate trees; *Fruit:* a capsule opening in 2-4 parts, containing many minute seeds with cottony hairs; takes 2-12 million seeds to make 1 pound; germinate within 24 hours of being released; *Habitat:* wet soils along streams, or gullies in valleys, foothills, and mountains; often in pure stands or with cottonwoods.

The willow's name is derived from the Celtic "sal", meaning "near" and "lis," meaning "water". Willow species are quick growing with a short life span. Their thickly matted root systems are valuable in preventing soil erosion along stream banks

and consequently help to stabilize watersheds. California Indians wove strips of the willow bark together for twine and the twigs were widely used in weaving baskets. They also boiled the bark and used the strong tea to remedy sore throats and tuberculosis. Powdered willow bark was also used like aspirin and as a poultice for burns. Beavers use willows almost exclusively for food.

BLACK COTTONWOOD (*Populus trichocarpa*)

DESCRIPTION: One of the tallest and most massive broadleaved trees in North America; open crown with erect branches; resinous buds with balsam odor; *Height:* 50-125 feet; *Leaves:* dark shiny green above, silvery-white beneath; turning yellow in autumn; *Bark:* smooth yellowish-white when young, becoming dark grey and deeply grooved with age; *Flowers:* male and female flowers on separate trees; both in the form of drooping catkins 1½-3½ inches long; appear in early spring before leaves; *Fruit:* ¼ inch in diameter; round, greenish-brown capsules; each capsule contains tiny woolly seeds that cover the ground like cotton and germinate best in wet river bottoms; *Habitat:* moist to wet soils of valleys, mainly on streambanks and flood plains; often in pure stands or with willows and alders.

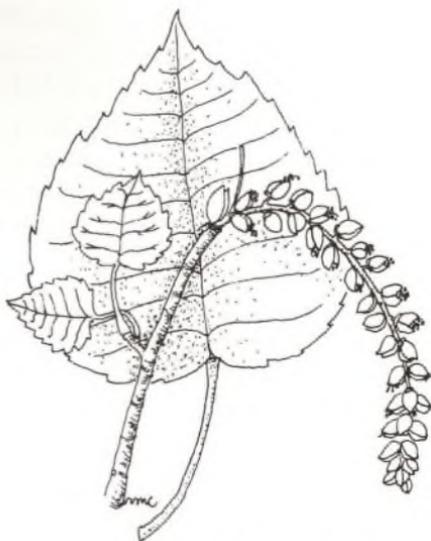
Black cottonwood is the smallest native western hardwood and is always found growing near water, which it uses and stores in large quantities. This tree is particularly fast growing and reaches its maturity in 60 years. It was especially significant to pioneers as an indicator of a nearby water source and as a shade tree. Today the wood is used for boxes, crates, plywood, veneer, and barrels. The Black Cottonwood is particularly suited for huge platform-like stick nests of blue heron, ospreys, and bald eagles. Beavers use cottonwoods for food and building purposes, sometimes toppling trees 2 feet thick.

TREE OF HEAVEN (*Azlanthus altissima*)

DESCRIPTION: Tall, slender, deciduous tree with rounded open crown of stout branches and coarse foliage with disagreeable odor; *Height:* 30-80 feet; *Leaves:* 1-2 feet long; green above, paler beneath; *Bark:* light brown and smooth, becoming fissured with maturity; *Flowers:* red in bud but cream colored in bloom; 5 petals; in large branched clusters 6-10 inches long; male and female flowers on separate trees; mature in late spring and early summer; *Fruit:* 1½ inches long; showy, crimson, mature in late summer and autumn; *Habitat:* streambanks and widespread in waste places.



Willows



Black Cottonwood

The name of this tree comes from a Chinese phrase meaning "tall tree" which is a bit ironic since it is not that tall. It is native to China and was planted by the early Chinese miners of the Sierra Nevada foothills where it has become naturalized along watersheds. They brought it with them to remind them of home, as it grows very rapidly. The Tree of Heaven is tolerant of crowded dusty cities and smoggy factory districts and often sprouts out of the cracks in concrete like grass.

TOYON ("Christmas-berry") *Heteromeles arbutifolia*

DESCRIPTION: Small evergreen tree or large shrub with short trunk, dividing just a few feet above the ground; many branches forming a rounded crown; **Height:** 25-35 feet; **Leaves:** 2-4 inches long; oblong, thick and leathery; sharp saw-toothed margins; glossy dark green above, paler beneath; **Bark:** light grey; smooth and aromatic; **Flowers:** ¼ inches; 5 white petals; in upright cluster 2-6 inches long; **Fruit:** ¼-½ inch; clusters of small red berrylike fruits; mealy and sour; usually 2 seeded; remain attached in winter; **Habitat:** along streams and on dry slopes; often on sea cliffs; in chaparral and oak woodland zones.

Toyon is very showy in winter with evergreen leaves and abundant red berries and is popular for Christmas decorations. It is a pioneer plant in eroded soil and sprouts vigorously after fire or cutting. The berries were prized by the California Indians who ate them boiled, baked, or dried and ground into meal. A tea was made by crushing them and pouring boiling water over them. Also, a tea made from the bark and leaves was used to relieve stomach aches. Berries are winter food for robins, waxwings and a few other birds. There is a small toyon tree growing at the State Capitol in Sacramento just below the Governor's window. It was carried from the lower Stanislaus River Canyon on a 86 mile protest walk and transplanted as a memorial just before the lower canyon was drowned by New Melones Reservoir. It is a symbol of hope and promise for the preservation of the upper canyon.



Tree of Heaven



Toyon

REDBUD (*Cercis occidentalis*)

DESCRIPTION: Large flowering shrub or small tree with rounded crown of many spreading branches; *Height:* 8-20 feet; *Leaves:* 1-3½ inches; dark green above, paler beneath.; *Flowers:* ½ inch long; pealike with 5 unequal purplish-pink petals; 2-5 in a cluster, blooming in early spring before leaves appear; *Seedpods:* 2-3½ inches long; brown or purplish thin pods hanging in clusters along twigs; mature in late summer; *Habitat:* canyons and slopes of foothills and mountains.

Redbud is one of the most showy and beautiful trees along the river canyons in early spring. The California Indians used the wood for bows and the strong pliable bark in weaving baskets. The bark is also very astringent and, when made into a tea, provides a remedy for dysentery. Deer browse on its young foliage.

BLACKBERRY (Native Californian or Himalayan)

Rubus ursinus or *Rubus procerus*

DESCRIPTION: Both the Native and Himalayan varieties of blackberry are thorny trailing or climbing shrubs forming a typical briar thicket; stems, branches, and foliage all have stout spines; *Height:* stems 3-20 feet long; *Leaves:* 3-6 inches long; compound; evergreen; Native has 3 leaflets, Himalayan has five leaflets; *Flowers:* white, in clusters of 2-15; 5 petals; 5 sepals; many stamens; *Fruit:* ½-¾ inch long; sweet, black, many-lobed berry; mature in summer and fall; *Habitat:* streams and moist soils; shady woodlands, fields, and empty lots.

The Latin word "Rubus", naming the Genus of this plant, means bramble and relates to the tickets that blackberries form. The berries are sweet and very delicious. They can be prepared in many ways: jams, jellies, pancakes, muffins or just eaten fresh off the vine. The California Indians dried the berries for preservation. Fresh berries were pounded to form cakes or mixed with dry meat and fat to make pemmican. Tea made from the roots was the most frequently used remedy for diarrhea and for sore throats. The leaves also make a good wild tea. Blackberries rank at the top of the list of summer foods for much of the Sierra's wildlife particularly birds and wood rats. The stems and foliage are browsed by mule deer and the dense thickets provide great nesting sites for birds and protective cover for many small mammals.



Redbud



Blackberry

CHAMISE (*Adenostoma fasciculatum*)

DESCRIPTION: Shrub diffusely branched and clothed with evergreen leaf bundles; *Height:* 2-12 feet; *Leaves:* $\frac{1}{4}$ inch long; in thick bundles; sharp tips; linear and leathery; often resinous; *Bark:* reddish to greyish-brown, becoming shreddy with age; *Flowers:* 5 roundish white petals; 5 sepals; crowded in terminal clusters; *Habitat:* most common plant of the chaparral community; from the lower foothills up to the Ponderosa Pines; often in pure stands.

Chamise often grows in thickets that are almost impenetrable to man and pack animals but afford favorable shelter for many small mammals such as rabbits and rodents. Its stump sprouts abundantly after a fire. A tea made from the leaves was considered by the California Indians to be valuable for colds, cramps, and lockjaw. The oil from the stem was used in healing sores and infections and an infusion from the leaves and bark was also said to be useful in treating syphilis.

BUCK BRUSH (*Ceanothus cuneatus*)

DESCRIPTION: Evergreen shrub with tough trunk and low branches that form a rounded to irregular crown; *Height:* 3-8 feet; *Leaves:* $\frac{1}{4}$ -1 inch long; opposite; *Bark:* greyish-brown; *Flowers:* small white

clusters with a sweet odor; *Fruit*: 3-lobed brown capsule; *Habitat*: dry chaparral slopes in foothill belt.

The leaves and stems of Buck Brush are favorites with the deer, giving the plant its common name. The California Indians made a tea from the bark and roots to aid in digestion. Some tribes used the reddish roots for a dye. The flowers make a good lathery soap when crushed and mixed with water.

MANZANITA (*Arctostaphylos viscida*)

DESCRIPTION: Large, dense, evergreen shrub branching near base, with stout, crooked, twisted trunks and branches forming a rounded crown broad as it is high; *Height*: 4-20 feet; *Leaves*: 1-2 inches long; thick and leathery; dull green on both surfaces, sometimes with tiny hairs; *Bark*: dark reddish-brown and extremely smooth; *Flowers*: ¼-½ inch long; lantern-shaped; white to rosy pink; numerous in many branched clusters, drooping at end of twig; mature in late winter to early spring; *Fruit*: ¼-½ inch diameter; round and berry-like; light brown to deep red; mealy pulp with several nutlets; mature in late summer; *Habitat*: dry slopes of mountain canyons, chaparral foothills, and oak woodlands.

Manzanita is Spanish for "little apple", referring to its small berries. The Miwoks, and later Spanish settlers, made the ripe berries into a cider. They also ate large quantities fresh or dried for flour. The dried seeds were beaten to a fine flour and made into mush or thin cakes that were baked in ashes. The attractive reddish-brown branches of the Manzanita become twisted into odd shapes which are trimmed into collectors' items called "mountain driftwood". The berries of the 43 species of Manzanita are consumed in vast quantities by wildlife. Its foliage provides shelter for birds and small mammals and deer love to browse the leaves and twigs.

BUTTONBUSH (*Cephalanthus occidentalis*)

DESCRIPTION: Deciduous shrub or small tree with many spreading branches that form irregular crowns; bears balls of white flowers resembling pin cushions and has a strong fragrance; *Height*: 12-20 feet; *Leaves*: 2½-6 inches long; opposite or 3 in a whorl; shiny green above, paler, sometimes hairy beneath; *Bark*: gray or brown, becoming furrowed into rough scaly ridges; *Flowers*: ½ inch; tubular, four-lobed corolla; white and fragrant; arranged in tight button or ball-like clusters 1-1½ inches in diameter; blooms from late spring through summer; *Fruit*: rough brown balls composed of many small dry nutlets, each 2-seeded; mature in autumn; *Habitat*: wet soils bordering streams and lakes.

The poisonous foliage of this abundant species is unpalatable to livestock. Its flowers produce large amounts of honey. Ducks and other water birds and shorebirds consume the seeds.



Chamise



Manzanita



Button Bush



Buck Brush

YERBA SANTA (*Eriodictyon californicum*)

DESCRIPTION: Shrubby, aromatic, evergreen plant with shredding bark ; **Height:** 2-8 feet; **Leaves:** alternate, thick, and irregularly toothed; oblong sticky, and leathery; glossy green above, whitish and dull with vivid veination below; very sticky or resinous; **Flowers:** ½-¾ inches; whitish-lavender in coiled clusters; tubular with 5 lobes; blooms from May to June; **Fruit:** white gummy capsule with black seeds; **Habitat:** open, dry, rocky slopes and ridges; especially prevalent in chaparral communities.

The common name of this plant, meaning "saintly herb", was given to it by a Spanish father who learned of its many medicinal properties from the California Indians. The Miwoks boiled a tea from the leaves for colds, coughs, and sore throats. A poultice of fresh leaves was applied to promote healing of the wounds and over fractures to reduce the swelling. The dried leaves were the principle ingredient in a pleasant smoking mixture called "Kini-kinick". This herb entered the U.S., pharmacopoeia in 1894 and has been employed as a tonic and to relieve coughs, colds, stomach aches, diarrhea, and asthma. To make a tea, tear up 2-3 leaves and pour boiling water over them, cover, and let steep. Chewing the fresh leaves produces a sweet refreshing taste after the initial bitterness dissipates.

POISON OAK (*Rhus diversiloba*)

DESCRIPTION: Woody deciduous shrub or vine; erect or spreading; **Height:** 2-8 feet; **Leaves:** 1-4 inches long; alternate; compound with 3 leaflets; variable roundish or ovate; wavy, shallow-lobed margins; shiny green; **Bark:** light brown and slightly scaly or furrowed; **Flowers:** greenish-white with 5 petals; arranged in clusters of small flowers; **Fruit:** whitish-brown berry-like clusters with stony seeds; **Habitat:** moist soils of streams, through foothill belt to lower mountain slopes and valleys.

Poison Oak is the most widespread California shrub and has one of the largest gene pools, allowing for a great variance in its form — ranging from a small woody plant to a massive vine or dense shrub. Many people have allergic reactions to Poison Oak ranging from a slight itch to a massive rash with blisters and severe swelling. Immunity to poison oak is erratic and may come and go; so, it is best to always exercise caution after coming in contact with this plant. Wash the skin with cool water and soap, preferably fels-naptha. There are a couple of plants that are found in close proximity to poison oak that can be used

as remedies. A strong tea made from manzanita leaves applied to the rash helps to dry it up. Also, the pulverized bulb of soap root mixed with a little water to make a slight lather applied to the rash and left to dry may have good results. It is important to remember that the oils are toxic on the branches of the plants even when the leaves have fallen. Full-blooded Indians seem to have a lasting immunity to the poison in this plant or are only slightly affected. Some are said to have eaten a small piece of a young leaf in early spring to prevent the poison from affecting them the rest of the year, although this technique is *not* recommended. Poison Oak had many important uses to the Miwoks. The stems were sometimes used in weaving baskets and the juice from the stems or leaves was used as a cure for warts. The juice was also used as a black dye after it had oxidized and was employed in basket fibers and in tattooing the skin. It had yet another use as a cure for ringworm. The fresh leaves bound tightly over a rattlesnake bite were thought to counteract the poison if applied immediately. Quail love the berries of poison oak and help in its propagation by scaring the seeds in digestion making it easier to sprout after they come out. In fall its brilliant red foliage covers many slopes and roadsides.

WILD GRAPE (*Vitis californica*)

DESCRIPTION: This woody vine has the same appearance as cultivated grapes climbing 5-50 feet by tendrils; *Leaves:* deciduous; 1½-5 inches wide; alternate, roundish, heart-shaped at base; wooly surface; opposite; *Flowers:* 5 greenish-white petals; in branched clusters; very fragrant; *Fruit:* ¼-½ inch; juicy purplish berry; large seeds; *Flowering:* May-June; *Habitat:* stream banks and canyons below 4000 feet.

Wild grape often climbs in oaks and cottonwoods, and sometimes its foliage blankets and kills the tree by excluding the sunlight. The California Indians used the wild grape much as we use the cultivated grape today. They ate the fruit fresh or dried. Vines were sometimes used for weaving baskets and the juice from the leaves was taken for diarrhea. In emergencies, water may be obtained by cutting the vine at the bottom and letting the juice drain into your mouth. The sweet smelling blossoms attract many bees and the large leaves are often used to wrap other foods.



Yerba Santa



Poison Oak



Wild Grape

BROAD LEAFED HERBS

MONKEY FLOWER (*Minulus guttatus*)

Note: There are about 6 different species of Monkey Flowers in the river canyons of the Motherlode, varying in color and structure, but the actual shape of the flower itself is similar.

DESCRIPTION: A leafy plant ranging from spindly and tiny to large and bushy with yellow flowers on slender hollow stems; it is a perennial herb; *Flowers:* ½-1½ inches long; yellow, often with red or brown speckles near the opening resembling a monkey face; 2 lobes of upper lip bent upward and 3 lobes of lower lip bent downward; 4 stamens; *Height:* 1-3 feet tall; *Leaves:* ½-4 inches long; *Flowering:* April-September; *Habitat:* wet places from sea level to high mountains; frequently along stream banks.

There are 80 different species of monkey flower in California with colors ranging from yellow to purple. Its juicy leaves may be eaten raw as a salad green but have a slightly bitter flavor.

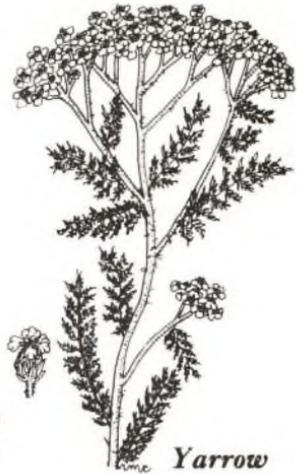
YARROW (*Achillea millefolium*)

DESCRIPTION: An aromatic perennial herb with fernlike leaves and clusters of white flowers; *Height:* 1-7 feet; *Flowers:* flattish dense cluster of small white to pink flowers at the head of a tough fibrous stem; composite with 3-5 ray flowers and 10-20 disk flowers; *Leaves:* blades are divided into fine feathery segments; *Habitat:* occurs in open areas in a vast variety of habitats from the coast to high mountain altitudes.

The genus name of yarrow, *Achillea*, refers to Achilles, who in the legendary siege of Troy, revealed the healing powers of this herb in treating the wounds his warriors received in battle. Also, a tea from the leaves and flowers mixed with equal parts of mint has been used in treating fevers and colds. It is reputed to have anaesthetic properties and the powdered root may be inserted in the hollow of a decaying tooth to relieve the pain or applied to deep bodily wounds. Yarrow was greatly esteemed by English herbalists for stomach cramps and to stimulate the appetite. An old legend says that an ounce of Yarrow placed under the pillow before going to sleep will bring a vision of a future husband or wife.



Monkey Flower



Yarrow



Lupine

LUPINE (*Lupinus sp.*)

Note: There are at least 5 different species of Lupine in the river canyons of the Motherlode, ranging from the small, delicate Miniature Lupine to the shrubby Bush Lupine.

DESCRIPTION: A greyish, hairy, branched plant with palmately compound leaves and blue-violet and white pea flowers arranged in whorls. In some species the flowers are yellow; *Height:* 4 inches-7 feet; *Flowers:* ½ inch; violet to yellow pea flowers; 10 fused stamens; whorls arranged in spikes; *Leaves:* hairy, greyish-green; *Fruit:* flattened hairy pod with 2-12 seeds; *Flowering:* March-August; *Habitat:* open grassy meadows to rocky slopes

The genus name, *Lupinus*, means wolf and refers to the obsolete notion that the lupine is wolf-like in character, devouring nutrients from the soil. Actually this is far from the truth as

they prefer poor soil which they enrich with nitrogen. Their thin deep roots help to stabilize sandy soil and in fact were planted on the sand dunes upon which Golden Gate Park was built. In 1967, Arctic Lupine seeds were discovered frozen in a lemming burrow. They were estimated to be 10,000 years old and when planted, germinated in 48 hours; sturdy seeds. As their pods mature and dry, their walls become elastic and burst open, instantly throwing the seeds a long distance. On sunny warm afternoons they can be heard softly popping like muffled popcorn. Many species are toxic to livestock.

STONECROP (*Dudleya cymosa*)

DESCRIPTION: A perennial succulent with few reddish flowering stalks with dense flower clusters that grow from a basal rosette of thick succulent greyish-green leaves; *Height:* 4-8 inches; *Flowers:* 5 yellow to red petals; fleshy and joined to base; 5 fleshy sepals; flower stalks grow from the side; *Leaves:* 2-4 inches long in basal rosette and also along stem; those along the stem being much smaller; *Flowering:* April-July; *Habitat:* hot, dry, rocky cliffs at lower elevations.

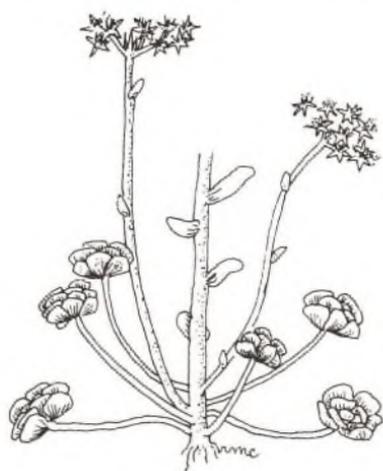
The species of stonecrop in California hybridize easily, making their identification difficult. Their leaves have pores that open at night to let in carbon dioxide for photosynthesis, but close in the day to prevent water loss. They were considered a delicacy by some California Indian tribes and the fleshy leaves were eaten raw. Many plants in this genus, "Dudleyas" are on the rare and endangered species list and they should only be eaten in survival situations.

CALIFORNIA POPPY (*Eschscholzia californica*)

DESCRIPTION: A brilliant yellow- to orange bowl shaped flower born on a single stem with bluish-green fern-like leaves; *Height:* 8-24 inches; *Flowers:* 1-2 inches wide; 4 fan shaped petals; deep yellow to orange; many stamens; sepals joined into a cone which is pushed off as the flower opens; *Fruit:* 1¼-4 inches long; slender and slightly curved capsule; *Leaves:* ½-2½ inches long; divided into narrow segments on long stalks; *Flowering:* February-September; *Habitat:* open meadows to grassy slopes.

The genus, *Eschscholzia*, was named by Chamisso, a German naturalist who found the California Poppy on San Francisco's sand dunes in 1816 and named it after his expedition's surgeon, Eschscholz. The California Indians used the

poppy's narcotic qualities as a painkiller and ate the leaves as a vegetable. The spicy fragrance of this plant attracts many beetles which serve as pollinators.



Stonecrop



California Poppy

LARKSPUR (*Delphinium hansenii*)

DESCRIPTION: Perennial herb on single stem with large violet-blue flower and deeply lobed palmate leaves; **Height:** 1-2 feet; **Flowers:** dark bluish-purple and white flowers on dense spikes; 4 petals; 5 large sepals extending into a backward projecting spur that looks like an elephant's trunk; **Leaves:** 2-3 inches long; divided into narrow lobed segments; basal leaves wither before flowers bloom; **Flowering:** March-July; **Habitat:** well drained soils; grassy slopes in chaparral and pine forests.

This plant is not a friend to ranchers; it is very poisonous to cattle.

OWL'S CLOVER — ESCOBITA (*Orthocarpus* sp.)

Note: There are 4 or 5 different species of Owl's Clover in the river canyons of the Motherlode.

DESCRIPTION (general): Many golden-yellow or rose-and-white colored flowers, protruding from hairy bracts at the top of this erect annual plant; **Height:** 4-16 inches; **Flowers:** terminal cluster of tiny

flowers; 3-lobed pouch peering from hairy bracts, angled upwards; above pouch is a short, hooked, velvety beak; vary from yellow to rose to white and combinations thereof; *Leaves*: long and narrow; sometimes divided into 3 lobes or segments; *Flowering*: April - September; *Habitat*: fields and open woodlands

“Escobita”, this plant’s Spanish name, means “little broom” and refers to its flower cluster. Its common name, Owl’s Clover, refers to the swollen head-like ends of the flower that seem to peer from the bract as an owl peers around from the leaves of a tree. Following a wet spring, meadows are carpeted with this beautiful flower.

STINGING NETTLE (*Urtica holosericea*)

DESCRIPTION: Annual or perennial herb with square, stout, unbranched stems bearing bristly stinging hairs; *Height*: 2-7 feet; *Flowers*: tiny green hanging loosely in clusters at the base of leaves; *Leaves*: opposite, coarsely toothed margins; strongly veined; oval with pointed ends; green above, greyish and downy beneath; also with stinging hairs; *Flowering*: July-September; *Habitat*: moist soil especially along streams.

The stinging hairs on this nettle contain formic acid, the same toxin in red ants. Touching them causes a stinging irritation and may leave tiny white dots on the skin. Cooking them removes this unpleasant property and once boiled they are a nutritious green, high in vitamins A & C, protein, and have more iron than spinach. When gathering them, one should use scissors and gloves for obvious reasons. The juice of stinging nettle acts as an antidote for its own sting. California Indians use a decoction of the roots to bathe joints afflicted with rheumatism, as did the Aztecs. Stem fibers were used by the Indians in making bowstrings, fishing line, and baskets; and by Europeans for fiber in clothes. A yellow dye may also be obtained by boiling the roots. A tea of nettle leaves has been employed by modern herbalists to remedy dysentary and reduce fever. Nettles are rich in nitrogen and are often used to ferment compost heaps by commercial nurseries that sell purely organic fertilizer.

GOLDFIELDS (*Lasthenia chrysostima*)

DESCRIPTION: A small slender annual herb with reddish stems, narrow leaves and a small yellow flower head at the end of each branch; *Height*: 4-10 inches; *Flowers*: composite, golden-yellow

flower head with about 10 oblong rays surrounding many tiny disk flowers; *Leaves*: $\frac{1}{2}$ -2 $\frac{1}{2}$ inches long; smooth margins; *Flowering*: March-May; *Habitat*: open fields or meadows and hillsides at low elevations

Goldfields can be found in open areas with poor soils, where the grass is sparse. If the moisture is ample, it will form carpets of gold; hence its name, particularly appropriate for Motherlode Country.



Larkspur



Owl's Clover

POPCORN FLOWER (*Plagiobothrys nothofulvus*)

DESCRIPTION: A slender hairy plant with basal and stem leaves and small white flowers in a spiral or coil resembling popcorn; *Height*: 6-20 inches; *Flowers*: clusters of small flowers with five fused white petals that have a yellow ring of pads in the center; *Leaves*: those at base spatula shaped in a tuft; those on stem becoming progressively smaller towards top; *Flowering*: March-May; *Habitat*: open places; commonly in grasslands and meadows.

Many species have a purple dye in the stems and roots.



Stinging Nettle



Goldfields



Chinese Houses



Popcorn Flower

CHINESE HOUSES (*Collinsia heterophylla*)

DESCRIPTION: Annual herb with purple intricate flowers in several widely spaced whorls at the top of a sparse leafy stem; **Height:** 4-12 inches; **Flowers:** 2-lipped with the middle lobe of the lower lip sunken into a structure like the keel of a boat containing the 4 stamens and pistil; **Leaves:** opposite; narrow and triangular; scalloped margins; in pairs; **Flowering:** March-September; **Habitat:** Dry, open, and rocky slopes and shaded places at lower elevations.

This is one of the most common and most spectacular wildflowers of the Motherlode. The flowers grow in perfect rings of widely spaced bands around the stem, forming a fairytale pagoda of "Chinese Houses".

CALIFORNIA BUTTERCUP (*Ranunculus californicus*)

DESCRIPTION: Erect stems branch from fibrous roots giving rise to bright yellow flowers with a shiny upper surface; **Height:** 1-2½ feet; **Flowers:** 9-16 lemon-yellow petals with a nectar gland at the base of each petal; **Leaves:** widely spaced, paired, pinnate leaves with 3 lobes at the end; **Flowering:** February-June; **Habitat:** moist slopes and meadows.

The genus name, *Ranunculus*, means "little frog" and refers to the wet habitat where both the buttercup and frogs abound. There are several species in the river canyons of the Motherlode but the most common is the California Buttercup. The Miwoks gathered their seeds in late June and afterwards winnowed, dried, and stored. Before eating, they were parched and pulverized in a grinding hole, then often added to pinole, a seedy cereal.

BABY BLUE EYES (*Nemophila menziesii*)

DESCRIPTION: A low sprawling annual plant with pale to bright blue bowl shaped flowers that bloom singly on slender stalks; **Height:** 4-12 inches; **Flowers:** 5 broad petals, often paler near base; generally with radiating lines of tiny black dots; 5 stamens; **Leaves:** ½-2½ inches long; oblong; opposite divided into segments with teeth along the edges; **Flowering:** March-June; **Habitat:** grassy hillsides, meadows and among brush

Baby Blue Eyes is considered to be one of the most charming and delicate wildflowers in California. The tiny black dots serve as nectar guidelines for potential insect pollinators.

MULE'S EARS (*Wyethia angustifolia*)

DESCRIPTION: This plant appears as if it is varnished with resin; the stout leafy stems grow from clumps of low leaves ending in several large deep yellow flower heads, resembling sunflowers; *Height:* 12-32 inches high; *Flowers:* central head 3-5 inches wide; 13-21 bright yellow ray flowers at bases of disc flowers; *Leaves:* those at base 8-24 inches with long blades on short stalks; larger than those on stalk which have their bases wrapped partly around stem; *Flowering:* May-July; *Habitat:* open hillsides, woods, and meadows in the foothills.

Only a little stretch of the imagination is necessary to see the large basal leaves of this plant as alert mules ears. The California Indians parched and ground the large seeds of the Mule's Ears and made them into pinole, a seedy cereal. Young shoots were eaten raw, after peeling off the outer coating. The Miwoks made a tea from the leaves to bathe fever patients.

INDIAN RHUBARB (*Peltiphyllum peltatum*)

DESCRIPTION: Coarse perennial herb that forms masses of round jaggedly toothed leaves on rough hairy stalks; *Height:* 2-6 feet; *Flowers:* small 5 petaled; whitish-pink; in large round branched clusters; appears before the leaves; *Leaves:* roundish with shallow lobes; stiff hairs; appear after flower stalk wilts; *Flowering:* April-June; *Habitat:* banks of mountain streams and foothill river canyons.

The fleshy leafstalks of this plant may be peeled and eaten as is, in a salad, or cooked and added to stews, although cooking destroys some of their flavor.

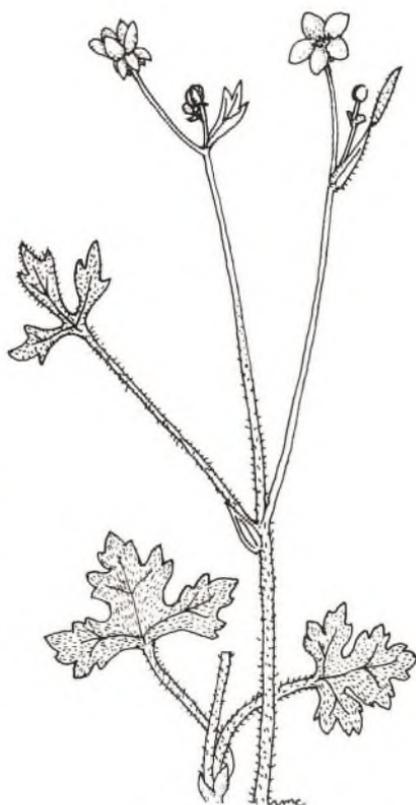
MUGWORT (*Artemisia douglasiana*)

DESCRIPTION: Perennial herb with downy, silvery leaves and stem; *Height:* 1-5 feet; *Flowers:* greenish to red-brown composite flowers growing in dense spikes; flower head consists of 6-10 ray flowers and 10-25 disk flowers; *Leaves:* 2½-6 inches long; alternate and very aromatic; lobes or teeth on margins; silvery green above, paler beneath; hairy; *Flowering:* July-October; *Habitat:* moist, shaded areas of woods and along streamsides.

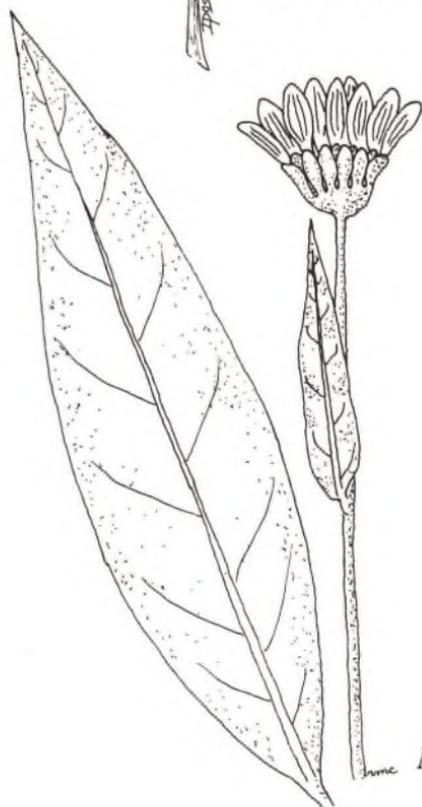
Well known since antiquity, Mugwort is described on an Egyptian papyrus dated 1600 B.C. as a useful medicinal herb. Medeval legend says that sleeping on a pillow filled with Mugwort allows a person to dream into their future. The Miwok Indians took small balls containing Mugwort and other "medicine" plants and wore them strung on a necklace to prevent dreaming of the dead and to repel ghosts at night. Corpse handlers rubbed themselves with Mugwort for the same



Baby Blue Eyes



California Buttercup

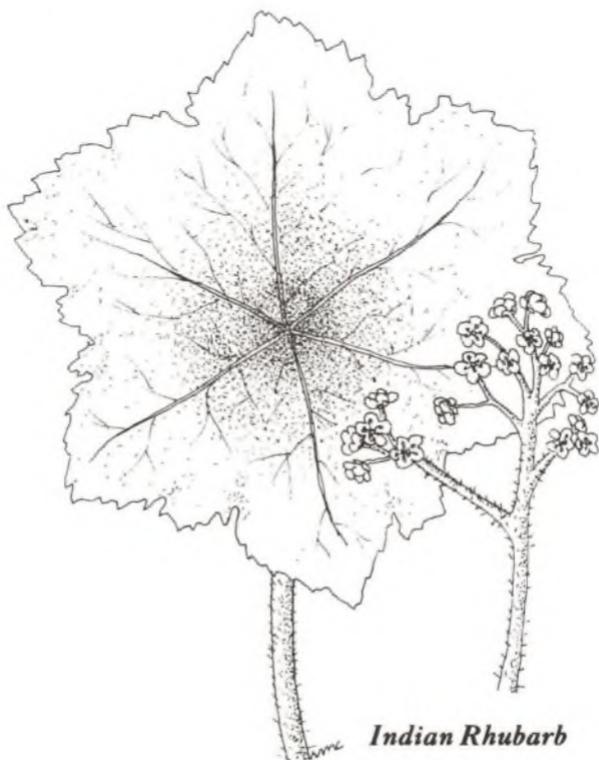


Mules' Ears

reason. The leaves were also worn in the nostrils of mourners when crying, the pungent odor clearing the head. A Mugwort was used as a remedy for rheumatism, and even today has been taken to relieve obstructed menstruation and to quell the itching from a poison oak rash. Chinese doctors rely upon Mugwort for use in moxibustion, a process whereby the herb is made into incense, then burned and lightly applied to acupuncture points to stimulate them instead of using a needle.

MINER'S LETTUCE (*Indian Lettuce*) *Montia perfoliata*

DESCRIPTION: Annual herb with basal roundish leaves that emerge from a long fleshy stem; *Height:* 1-14 inches; *Flowers:* white to pinkish; tiny; 5 petals and 2 sepals; paired or in a bundle; emerging from the center of the leaf; *Leaves:* basal; two types, round and erect or lanceolot lying close to the ground; *Flowering:* March-July; *Habitat:* Loose moist soil in shady places; frequently near streams.



Indian Rhubarb

Miner's Lettuce is one of the few native plants from this country that have been introduced into Europe. It was a popular salad herb for the California Indians who also decocted a laxative tea from it. The miners, who had little fresh food, used it to stave off scurvy. Miner's Lettuce makes a tasty nutritional salad and can also be steamed like spinach. Its black tiny seeds are an important source of food for small songbirds.



Miners' Lettuce



Mugwort

LILY-LIKE MONOCOTYLEDONS AND FERNS

BRODIAEA (*Brodiaea* sp.)

Note: There are 5 species of *Brodiaea* that commonly occur in the canyons of the Motherlode. They are: Grass-nuts, Golden *Brodiaea*, Harvest *Brodiaea*, Blue Dicks, and Twining *Brodiaea*.

DESCRIPTION (general): A violet-purple or yellow flowered perennial and relative of the lily that grows from a bulb, technically termed a corm; *Height:* 1-2 feet; *Flowers:* funnel-shaped petals that form a loose to tight cluster or umbel on top of a single leafless stem; 6 stamens; bluish-violet in most species except the Golden; *Leaves:* long and slender; grass-like with parallel veins making it a monocot; basal; usually wither before the flower appears; *Flowering:* March-June; *Habitat:* open grassy meadows and hillsides.

Brodiaea was named for James Brodie, an early Scotch botanist. The bulbs of this plant are thought to have been one of the most important underground food plants of the Miwoks. They were gathered in large quantities with digging sticks and eaten raw, fried, boiled, or roasted. When eaten raw, they are somewhat mucilaginous and their flavor is improved if boiled slowly for a few minutes. But they are at their best when roasted slowly in hot ashes for a half hour to an hour, during which time they become rather sweet. Gophers are also fond of the bulbs. *Brodiaeas* are beautiful wildflowers and should be sampled only in emergencies or when growing in great abundance.

MARIPOSA LILY (*Calochortus venustus*)

DESCRIPTION: Perennial herb that stems from a bulb with narrow basal leaves and a showy bowl-shaped flower; *Height:* 4-16 inches; *Flowers:* 3 large wedge-shaped petals, each with a big glandular pit near the base; bowl-shaped; upper dark red spot with yellowish border; 6 stamens; *Leaves:* 1-2 long, slender, basal leaves; few on stem; *Flowering:* April-July; *Habitat:* sandy, rocky soil; dry open slopes.

Mariposa (meaning "butterfly" in Spanish) have a delicate beauty fine enough to have become the stuff of legend. Several thousand years ago it was believed they encouraged virtue and purity. Another myth warns that close sniffing of this lily will cause freckles to appear on one's nose. The bulbs of the

mariposa were a very important food to the Miwoks, and in April, after budding, were dug with a stick by both men and women. They were roasted for about 20 minutes in hot ashes and when done, were like soft boiled potatoes. These are one of the most spectacular wildflowers of the Motherlode so it is wise to eat their bulbs only in emergency situations. They offer far more with their flowers than they ever could with their food.

GLOBE LILY OR FAIRY LANTERN (*Calochortus albus*)

DESCRIPTION: Perennial herb that sprouts from underground bulb with narrow basal leaves and a delicate nodding white flower; *Height:* 1-2 feet; *Flowers:* branched stem gives birth to 2 or 3, white to rose globelike nodding flowers; 3 broad petals folded over one another; 3 sepals; *Leaves:* 2-6 long slender basal leaves; those on stem are smaller; smooth margins; dull green on both sides; *Flowering:* April-June; *Habitat:* shaded rocky places; open woodlands and brush.

This lily with its delicate globe shape, is often referred to as a fairy lantern.

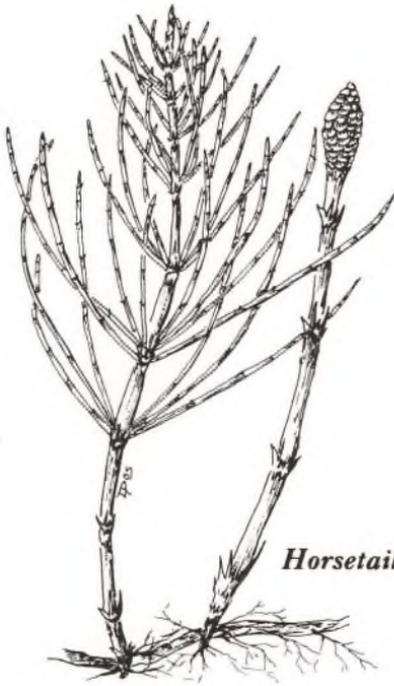
HORSETAILS (*Equisetum arvense*)

DESCRIPTION: Rush-like plants with creeping rootstocks and perennial stems that are very short-lived; *Stems:* cylindrical, fluted or bamboo-like; surface of branches and stems is covered with silica; at top of each fertile stem is a solitary cone that contains the plants spores; *Spores:* minute; numerous and round or oval; contain chlorophyll and moisture; when ripe they only live for a few days and germinate in a few hours; *Height:* 2-20 inches; *Habitat:* moist soil along streams and rivers; in marshes and other damp places.

Horsetails are considered to be the most primitive of the fern families with a history better known than any other living order of plants. It existed as a large tree-like plant, up to 60 feet tall, in the Carboniferous age, nearly 300 million years ago. Its present appearance has hardly changed other than its height. Horsetails were so numerous that their spores left behind the great beds of coal and oil. The California Indians used the silica-covered stems to scour pots and pans (which is why sometimes they are referred to as scouring rushes). The young tips were used as a diuretic for bladder and kidney problems. Also, a strong tea boiled from the stems and applied externally is said to stop the bleeding of wounds and contains effective

antiseptic and disinfectant properties. In Chinese medicine, a tea boiled from the stems is used as a pain reliever and to expel gas.





Horsetails



Globe Lily

FERNS

GOLDBACK FERN (*Pityrogramma triangularis*)

DESCRIPTION: Triangular leaf, (frond), on shiny black stem; *Height:* 4-12 inches; *Leaf (frond):* stout; triangular-shaped; pinnate with deep lobes; dark green above, yellow-white powdery spores below; *Stem:* shiny and smooth; black-brown; *Rhizome (rootstock):* short and stouter; *Habitat:* sun or shade in rocky soil and crevices.

The dark stems of the Goldback Fern were prized for use in basketry to add color. Indian children would make leafprints on their clothes by slapping the leaf on them with the bottom spore side down.

MAIDENHAIR FERN (*Adiantum jordani*)

DESCRIPTION: Evergreen, delicate, creeping fern with black shiny stem and fan-shaped leaves; *Height:* to 24 inches long; *Leaves (fronds):* fan-shaped with lower margins smooth and upper margins toothed or lobed and curling under (which is where the spores are stored); *Stem:* delicate; shiny and smooth; blackish-brown; pinnately branched at top; *Rhizome (rootstock):* slender and creeping; *Habitat:* Damp soil; sometimes hanging vertically on wet limestone rocks, usually near a spray of water

Their stems were treasured by the Miwoks for use in adding color to their baskets. The dried fronds may be made into a tea and used for coughs, sore throats, and as a hair tonic. This plant is found in the micro-plant communities, the hanging fern gardens that flourish on the face of limestone cliffs, unique to the Stanislaus River.

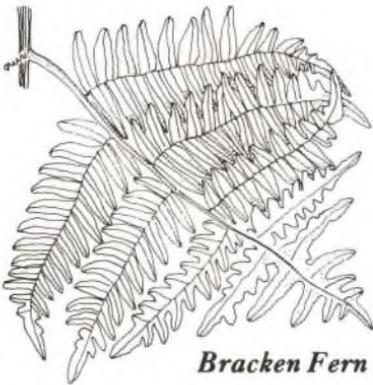
BRACKEN FERN (*Pteridium aquilinum*)

DESCRIPTION: Triangular stiff green fronds, reddish at base; erect, large and many branched; *Height:* 2-5 feet long; *Leaves (fronds):* triangular; pinnate with deep lobes; large; turning brown and still in the autumn, dull green above, lighter and hairy beneath; spores; along veins on underside; *Stem:* long, erect, and rigid; widely spaced; *Rhizome (rootstock):* long, stout, and prolific; extending horizontally; *Habitat:* open fields, woods, and burned areas.

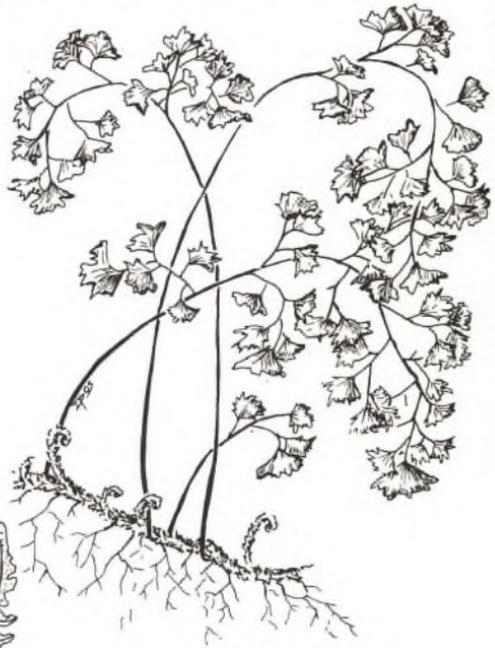
Its vigor, fertility, and adaptability, make the Bracken Fern the most common and widely known of all ferns. It is the first to poke up in the spring and produces fronds until the first frost. It

grows abundantly where fire has burned other groundcover. The California Indians cooked the rhizomes and young fronds for food and they wove baskets and textiles from the long rhizomes. A greenish-yellow dye may be obtained from the stems. The old fronds are poisonous in large amounts especially to grazing cattle.

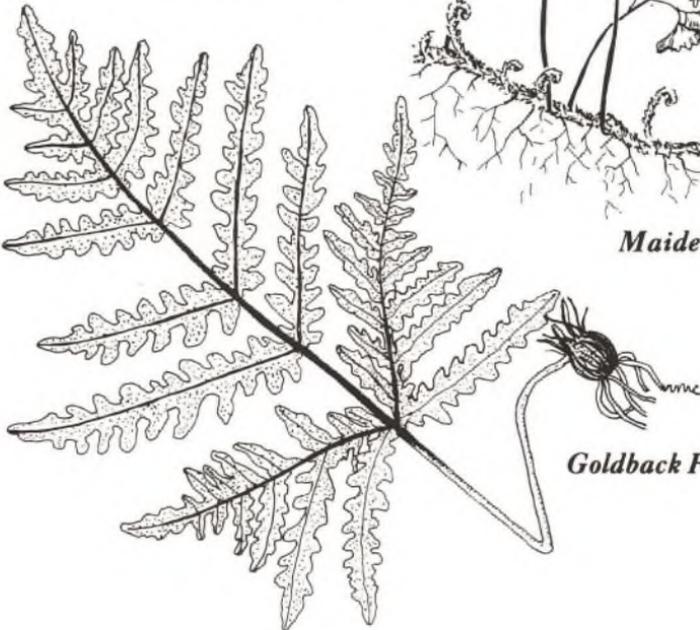
A strong tea made from the rhizomes and roots was used to expel worms and gas. Indian women also used this tea to relieve menstrual cramps. These lively ferns can be found carpeting fields from Alaska to the southernmost parts of the United States.



Bracken Fern



Maidenhair Fern



Goldback Fern

BIRDS

GREAT BLUE HERON. *Height* about 48", spread to 72"; *head* white on top, black on sides; *back, wings,* and *tail* grayish blue; *ends of wings* black; *neck* pale gray; *under parts* streaked black and white; *legs* long and bare. *Voice.* A loud, harsh croak, repeated. *Nest.* Mostly in colonies; a crude platform of sticks, usually high in an open tree near water; *eggs* 3-6, dull greenish blue, 2½" - 1½".

In flight the blue color, slow flapping of the large broad wings, and trailing long legs make identification of this heron easy. Either standing or flying the neck is crooked (whereas that of a crane is extended). The Great Blue may appear along any open stretch of water, marsh or meadow, wading in the shallows or stalking slowly over grassland in search of food. The slender bill, 4½" to 6" long, is an effective pincer, serving to grasp a fish in water, a frog on the bank, or even a mouse in dry grassland — all of which serve as food.

CLIFF SWALLOW. *Total length* 5"-6". Size of linnet, wings long and narrow, *tail* short, squarish; *forehead* creamy white, *back, wings,* and *tail* black-appearing, *rump* pale brown, *cheeks* and *chin* reddish brown, *throat patch* blue-black, *under parts* light gray. *Voice.* While feeding, a low shurr; when disturbed at nest, a plaintive kleeer repeated; song "squeaky" notes. *Nest.* In colonies, on rough cliffs, or under eaves of buildings; spherical with narrow-necked openings, of mud pellets; *eggs* 3-6, creamy with brown spots, 1" x 1". Cliff swallows are found on nearly every bridge located on the three rivers described.

This highly colonial swallow originally made nests on cliffs but now commonly uses rough-surfaced buildings, crowding a dozen to a hundred on some favorable site. Each nest is made of great numbers of mud pellets gathered singly at some water margin. The narrowed roundish entrance at the top leads into an expanded chamber provided with light fibrous lining. Nests are safe from most enemies, but the birds will fly about and utter complaining cries if a person approaches a colony. On the west slope adults arrive in March but nesting is delayed until early May. By then flying insects are more abundant, so that they can alternate feeding with nest building, incubation, and caring for the young.

WATER OUZEL or DIPPER. *Total length,* 7-8½". About size of robin, tail very short; all *plumage* dark slate gray; a small white spot on upper eyelid. *Voice.* Call a short *bzeet*, singly or in rapid series; male has elaborate varied song. *Nest* on rocks near or over rushing water, of moss, entrance on side; *eggs* 3-6, white, 1 x 1".

This is our only "song" bird that lives solely on perennial cascading streams. The dense feathering that sheds water is its only aquatic

adaptation, the feet being unwebbed. When perched on a midstream rock, the Ouzel bobs down and up every few seconds. It flies along a winding stream course, keeping close over the water and uttering the short call repeatedly. To feed, the bird forages in the shallows or plunges right into the water, where it can walk on the bottom while searching for aquatic insects. The Ouzel is a yearlong resident wherever streams remain unfrozen during winter, up into the Lodgepole-fir belt. Its song may be heard at almost any season, being most impressive in winter when other bird voices are few. The nest is usually placed where moistened by spray, even behind a waterfall, so that its mossy exterior remains green so long as used.



Great Blue Heron



Cliff Swallow



Water Ouzel



Canyon Wren

CANYON WREN. *Total length, 5½"-6½".* Bill 1", slender, slightly curved; more than half size of linnet; *color* rich reddish brown, *throat* and *breast* pure white; *upper surface* with fine black and white dots, *tail* with 4 or 5 narrow black bars. *Voice.* Call a short bertz; *song* about 10 loud clear notes, descending in pitch and slowing at end. *Nest.* Near stream in rock crevices or building, of twigs felted over with moss or other soft materials; *eggs* 15-6, white with brown dots, ½" x ½".

Anyone who visits a rock-walled foothill valley during the spring is likely to hear the loud clear song of this wren. Its color is striking — a pure white throat and reddish back. The bird hops in zigzag path on bent legs; every few seconds it slowly raises and then quickly depresses the body. When foraging it prowls into all manner of crevices in search of insects. The nest has a smoother exterior than that of other wrens.

BLACK PHOEBE. *Total length, 6¼"-7".* Head with low crest; *plumage* black except for white on belly. *Voice.* A single plaintive pser, the song 2 pairs of similar notes, with alternate rising and falling inflection. *Nest.* On ledge or rock or flat surface in a building, a cup made of mud pellets mixed with grass; *eggs* 3-5; white, ½" x 1".

The Black Phoebe is our only resident flycatcher, able to find insect food at all seasons. In spring it must be near water to obtain mud for nest making. Then it forages over a stream or pool and even takes insects from the water surface. In winter the bird occurs more widely, sometimes living around farmyards. This phoebe commonly sits in exposed places, on streamside rocks, on bare branches or twigs, and on the roofs of small buildings, but in the heat of summer it seeks shady perches. Because of its special nesting needs it is of less uniform occurrence than many other birds, although man-made bridges and buildings have increased the places where it can live.

VIOLET-GREEN SWALLOW. *Total length, 4½"-5½".* *Wings* long, pointed; when closed extend 1" beyond short slightly notched tail; above bronzy green, violet on rump; sides of head and rump and all lower surved white. *Voice.* A plaintive tsee, sometimes repeated. *Nest.* In cavities of trees, cliffs, or buildings, lined with grasses and feathers; *eggs* 4-5, white, ½" x ½".

Far the commoner swallow with a white undersurface is the Violet-green, which summers over the lower parts of both the east and west slopes. Often it forages much higher in the air than other swallows and may sometimes be seen near White-throated Swifts, when the differences in form and manner of flight between swallow and swift are evident. For nesting the Violet-green uses either natural cavities or woodpecker holes in trees or small crevices in cliffs, so that many sites are available. The species is present from late April into September.



Black Phoebe



Violet-green Swallow

SPOTTED SANDPIPER. *Total length 7"-8".* Smaller than robin; above pale brown, below white with round black spots in summer; spread *wing* shows a narrow white band; tail short. *Voice.* A clear *tweet-tweet-tweet*. *Nest.* On wet meadow or gravel, scant lining of grasses or none; *eggs* 4, pear-shaped, buff, darkly blotched, $1\frac{1}{2}'' \times 1''$.

The pale brown and white body, inch-long bill, and incessant bobbing of the hind parts mark this little freshwater sandpiper. As it walks, the head moves fore-and-aft in unison with the feet. On taking to flight it makes an arc over the water to some more distant shore; after the first few strokes the wings are held spread, curving downward and moving only at the tips. The bird forages in the shallows or on the shore close to water, picking up small aquatic animals or insects for food. It is seen singly or in pairs and does not flock.

BELTED KINGFISHER. *Total length. 11"-14½".* Head big with loose crest, *bill* stout, tail small; above blue, below white; neck collar white; breast band blue; below this on female a 2nd band of rusty brown extends on sides. *Voice.* A loud rattle. *Nest.* Near water on vertical sand or clay bank in 3-6 feet tunnel; *eggs* 3-6, white, $1\frac{1}{2}'' \times 2''$.

Sooner or later the Kingfisher's rattling call may be heard on most waters. The bird perches on some bare branch or snag, then moves on over the water or circles among trees. Its prey is of large aquatic insects and small fishes usually caught by a direct plunge; sometimes the bird hovers on beating wings while searching. Fishermen deem the kingfisher a competitor and enemy, in consequence of which many of the birds are shot. Decline in abundance of fish, however, is more a matter of human fishing pressure and the kingfisher is only a minor element.

RED-TAILED HAWK. *Total length 19"-25", spread 48"-56";* similar to the size of the turkey vulture. *Wings* broad, tail broad, fan-shaped in flight. *Above* dark brown, *tail* bright reddish in adults; *below* dark brown to

white in different individuals. *Voice.* A shrill long whistle. *Nest.* A bulky twig platform well up in trees or on cliffs; *eggs* 2-3, dull white, brown-spotted, 2½" x 1½". Common on the foothill rivers and elevations up to 12000 feet.

Singly or in pairs, Red-tails circle and glide high in open air as they watch for squirrels or rabbits on the ground. When prey is sighted, the hawk swoops and strikes with its large sharp claws. The larger animals are torn apart and eaten where killed, but smaller ones are carried off to a tree perch. Like other large flesh-eating birds, a Red-tail may gorge a large meal that will suffice for several days. When not hunting, the hawk will perch high in a dead or live tree where it has a wide view. If disturbed it leaps off, bets strongly with the big wings and soon begins to soar. Hunters mistakenly call this the "chicken hawk" and shoot on sight, but the species is highly beneficial.



Spotted Sandpiper



Belted Kingfisher



Red-tailed Hawk

GOLDEN EAGLE. *Total length.* 30"-40". *Spread* 80"-90"; *plumage* dark brown, paler (golden brown) on head; base of *tail* below and patch on outer part of wing whitish (except old adult). *Voice.* A single loud cry, sometimes repeated. *Nest.* High in large trees or on cliffs, a large pile of sticks and twigs, lined with grass; *eggs* 2, dull creamy white with brown spots, 2½" x 2½". Foothills to 14000 feet range.

The golden eagle of the hills and mountains exceeds all other resident Sierran birds in size. It soars skillfully with the wings stretched horizontally and at times goes so high as to become a mere speck in the sky despite its 7-foot spread. More commonly it nests in the foothills but some occupy crags in higher parts of the Southern Sierra. Its principal food is like that of the *buteo* hawks — ground squirrels, and rabbits. Many persons believe this eagle is powerful enough to kill and carry lambs of domestic sheep, but evidence is scant or none. There are several reports from Sequoia National Park of efforts by eagles to take young deer fawns and one instance of an eagle actually carrying a very young one.

COMMON MERGANSER. *Total length:* 21"-27"; *bill* long slender, reddish; back of head with short crest; feet reddish. Adult male: Head and neck glossy green, upper back black, lower back and tail gray, neck, much of wings, and under surface white. Adult female and immature: Head and neck reddish brown, but throat white, back and tail gray, wings black with white patch, under parts white. *Nest.* In hollow tree or on ground, lined with grasses, roots, and down; *eggs* 6-17, ivory, 2½"-3½".

This fish duck bears horny "teeth" and a hooked tip, useful for catching the various kinds of fishes taken for food. It dives and swims readily under the surface when searching for prey. Over the years broods of mergansers have been reported at many places in the sierra, but they are particularly common on all three rivers here described. Trout fishermen consider the bird a competitor, but its numbers are small and the total effect is slight.

TURKEY VULTURE. *Total length:* 30"-42", *spread* 72"; *plumage* dull black, lower surface or inner part of wings grayish; head naked, red. *Nest.* In hole of cliff, no lining; *eggs* 2, white, brown-blotched, 3" x 2".

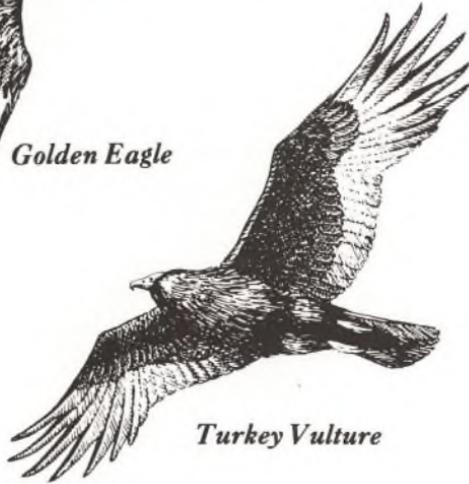
Turkey vultures ("buzzards") soar overhead with their large wings tilted upward. Whenever the air is warm they circle and spiral on upwelling currents with little change in the set of wings or tail. The individuals usually are spaced out, perhaps one per square mile, scanning the ground for any dead animals — ground squirrel, rabbit, horse, or cow. When one sees such food it glides down, rocking sideways while descending. Other vultures are attracted by this signal and soon converge toward the site. A large carcass may bring a dozen or more to tear off and devour the carrion. In morning and evening and on dull days the buzzards perch on open trees in hunched posture with the head between the shoulders. During migration they are often in loose flocks.



Golden Eagle



Common Merganser



Turkey Vulture

**INTRODUCTION TO GEOLOGY
OF THE SIERRA FOOTHILLS**

Terry Wright

Introduction to the Science of Geology

Geology is the study of the earth: the rocks that make up the earth and the landforms on the surface of the earth. The Sierra Foothills is a perfect geology laboratory; all of the materials and principles of geology are beautifully displayed along the river canyons and the high ridges. This introduction is geared for the layperson and is intended to be an introduction both to the language of geology and to the history of the rocks and landforms in the Sierra Foothills.

Principles of Geology — The Rock Cycle

The rock cycle (Figure 1) is a device for introducing geology language, illustrating the various processes active in geology and their interactions with materials of geology. The cycle shows how rocks originate, react and change due to geologic processes.

We can start the cycle with molten rock (MAGMA) which can be seen in active volcanos. Magma is melted rock formed deep in the earth. Because it is less dense and hotter than the surrounding rock the molten rock works its way to the surface. When magma reaches shallow, cooler parts of the earth, the atoms in the magma arrange themselves into crystals. Geologists call natural crystals MINERALS. The names of some common minerals are in Table 1. When magma changes to a solid by forming minerals, it becomes IGNEOUS ROCK. Igneous rock can form on the surface of the earth as lava flows or ash deposits from volcanos, in which case it is called VOLCANIC IGNEOUS ROCK. Magma may cool beneath the surface where it becomes PLUTONIC IGNEOUS ROCK.

Volcanic rocks have tiny crystals, or are glassy, because magma is cooled quickly on the surface. Plutonic rocks are cooled slowly in the hearth beneath the surface. The atoms have more time to arrange themselves in mineral structures, so the minerals in plutonic rocks are large, usually clearly visible to the naked eye. Granite is a typical plutonic igneous rock ex-

posed in the Sierra Foothills. Names of common igneous rock and descriptions of the common rocks found in the Sierra Foothills are given in Table 1.

A very important process in geology is uplift of the land, and wearing down of the land surface (EROSION). Rocks are broken down by WEATHERING, which either breaks individual minerals apart, or dissolves them with dilute acids. Weathering forms soil. The red soils of the foothills are caused by the weathering of iron-rich rocks.

Erosion by running water, glaciers, wind or landslides will cause weathered rock to move to lower elevations. A volcanic igneous rock is formed at the surface and is readily eroded. A plutonic igneous rock must be uplifted and the rock above it must be eroded off before weathering and erosion can take place. Some granite exposed in the Sierra Nevada may have had as much as 10 miles of overlying rock eroded off.

The broken and dissolved rock material is called SEDIMENT. In the next step in the rock cycle, sediment is carried to lower elevations. When the "erosion agent" runs out of energy (for example, when a river runs into the ocean) sediment is deposited, compacted and made into layers of SEDIMENTARY ROCK. Sedimentary rock thus is the recycled remains of other types of rock, which are deposited in low areas on the land surface and in the ocean. Most sedimentary rocks form in the ocean, because it is the biggest hole available. Such rocks are called MARINE and tend to have continuous layers. NON-MARINE rocks accumulate in deserts, river channels and flood plains. These rocks tend to have discontinuous layers. All sedimentary rocks are very sensitive indicators of the history of their source and deposit area. The origin and names of typical sedimentary rocks are on the Rock Cycle (Figure 1).

Heat and directed pressure will cause rock to break or bend. When rocks break they do so along planes either as FAULTS, when there is movement of rock, or as JOINTS, when no movement takes place. EARTHQUAKES are caused by movement along faults. When heat and directed pressure are applied very slowly, the rocks will bend, and layers will form curved structures we call FOLDS.

With greatly increased heat and pressure, minerals will start to change shape, because the atoms are not "comfortable" in many minerals under such conditions. Clay minerals in sedimentary rocks will change to silver or black platy micas (muscovite and biotite). The rocks become changed from igneous and

sedimentary to METAMORPHIC ROCKS. If high directed pressure is applied to clay-rich sedimentary or ash-rich volcanic rock, micas formed will line up as parallel plates, and impart a platy, flat structure to the rock called FOLIATION. Tombstone-shaped rocks in the Sierra Foothills are formed by weathering of foliated metamorphic rocks. NON-FOLIATED metamorphic rocks form when there are no micas to line up. Common metamorphic rocks are shown on the rock cycle diagram (Figure 1).

The key to understanding the geology of the Sierra Foothills is to interpret what the original rocks were before metamorphism. Descriptions of metamorphic rocks found in the foothills and their original rocks are shown on Table 1.

If extremely high heat is applied to already hot metamorphic rock, the rock will melt and become magma. Usually, this only happens deep in the earth, where temperatures are extreme. So the rock cycle is complete, from magma to magma. (Note that some shortcuts are possible in the rock cycle, see diagram for the possibilities).

Occasionally any kind of rock may be uplifted and, over a long period of time, eroded to a nearly flat plain. Sedimentary rock layers may form on this eroded surface. When young sedimentary rocks overlie much older igneous, sedimentary or metamorphic rocks on such an erosion surface, the period of time missing is called an UNCONFORMITY. This occurred in the Sierra Nevada, and is visible in the rocks of the foothills.

The most unusual thing about the science of geology is that the time that it takes to do all of the things we have been talking about is immense. We talk in terms of millions of years in the geologic time scale. The oldest rocks in the Sierra Nevada may be over 300 million years old. Geologists have adopted names for different parts of geologic time based on evidence of life forms in the rock (FOSSILS) and their evolution. Specific numbers of years are found by analyzing specific minerals for radioactive elements, which break down at very slow rates and can be used to determine true age. The geologic time scale and ages of rocks in the Sierra Nevada is shown on Table 2.

What drives all of the processes that we see in the rock cycle? A revolutionary new theory named "PLATE TECTONICS" seems to answer this question. This theory is a continuation of the idea of continental drift, which used the jigsaw fit of South America and Africa as well as similarities in rocks and fossils on

either side of the Atlantic ocean as evidence that the continents had once been together, and have since drifted apart. Plate Tectonics looks at the earth as a series of gigantic slabs, about 60 miles thick, which move relative to one another. These slabs (or "plates") include ocean basins. Plates are constantly being made by igneous rocks along mid-ocean ridges in a process called SEA-FLOOR SPREADING. This process is evident in the volcanoes of Iceland, which sits on top of a continuous chain of mountains on the ocean floor called the Mid-Atlantic Ridge. This ridge is the seam that split to form the Atlantic Ocean and force South America and Africa apart.

Continents ride around like rafts on the tops of the plates. Where plates meet and move toward each other, they will slide one under the other in a process called SUBDUCTION. In zones of subduction, often the ocean floor slides under the edge of the continent on the adjacent plate. Such a process forms a broad fault zone with many sheared fragments of ocean floor rock called MELANGE. The Sierra Foothills bedrock has been formed in such a plate setting. Ocean floor sedimentary rocks may be dragged down into the subduction zone and melted to form magma. This magma can move up through a continent to form granite plutonic igneous rocks and volcanos. This process is thought to be responsible for the Sierra Nevada granites and the recent eruption of Mount Saint Helens. A general cross-section of subduction is shown in Figure 2, with possible settings for granites and volcanos like Saint Helens.

Plates may also slide by each other on great TRANSFORM FAULTS where there may be thousands of miles of horizontal movement. Some rocks in the Sierra Foothills and Coast Ranges appear to have been born south of the equator, and have since slid north along transform faults to their present position. Thus the rocks of the Sierra Foothills are far from home and have been moved both by the subduction and transform fault process. The San Andreas Fault, for example, is an active transform fault.

Knowledge of the constitution of ocean floor rocks has increased greatly with new data from deep sea drilling and field studies on land. In particular, rock sequences which probably represent sections of ocean floor, extending to a depth of 6 miles, are exposed on land in areas of ancient subduction. This ocean floor has been faulted up onto land by the subduction process, and deep erosion has exposed it on the surface. Such

sequences consist of ocean floor sediments, such as chert and sandstone, which lie on top of lava with "pillow structure" indicating they were erupted on the ocean floor at a mid-ocean ridge. Deeper in the sequence we can see plutonic igneous rocks which were magma "feeders" for the lavas, and beneath that are iron-rich rocks representing the mantle, a deep layer that lies beneath the ocean and continent. The mantle rocks are metamorphosed to serpentinite, a shiny green rock that commonly occurs along fault zones; and is also, incidentally, the state rock of California.

This type of sequence is called an OPHIOLITE and represents ocean-floor crust and mantle. Parts of ophiolite sequences are found in the Sierra Foothills, further evidence that ocean floor rocks make up the bulk of the Sierra Foothills. Only through the plate tectonic processes of subduction and transform faulting could these rocks exist where they do today.

Geology of the Sierra Foothills

Examples of all rock types and processes are beautifully displayed in the Sierra Nevada Foothills. The complete rock exposures along the river canyons have provided the key to understanding the complex history of this area. A hike or float along any river is in a perfect geology lab.

Most of the Sierra Nevada is composed of a large mass of granite and related plutonic igneous rocks called the Sierra Nevada Batholith. The granite intruded a miles-thick pile of sedimentary and volcanic rocks which were metamorphosed. The metamorphic rocks are now visible only in a belt which underlies the western foothills and in several isolated patches in the high Sierra.

A diagrammatic east-west cross section of the Sierra Foothills is shown in Figure 3. All of the Sierra rivers cut canyons 1000-2000 feet deep through the foothills, so each river displays part of this cross-section. The extent of this section for each popular river run is shown on Figure 3.

The lower part of Figure 3 shows the involved structure of the BEDROCK COMPLEX. The bedrock complex consists of ancient metamorphosed sedimentary and volcanic rocks. The main groups of rocks in Figure 3 include the following:

1. Granite of the sierra Nevada Batholith (GR)
2. Calaveras Formation (C) with highly folded and meta-

- morphosed chert (triangle pattern), volcanic rocks (v) and limestone-now marble, (brick pattern)
3. The Melones Fault Zone (MFZ) with serpentinite (black)
 4. The Mother Lode Belt (MLB) with volcanic and sedimentary rocks
 5. The Sierra Foothills Melange, Bear Mountains Ophiolite and Bear Mountains Fault Zone (SFM)
 6. The folded Western Volcanic Belt (WVB)

Along the American River, the Ophiolite and Western volcanic belt have been intruded by plutonic igneous rocks of the Pine Hill Gabbro.

One of the important things to notice about this cross-section is that all rock groups are bounded by faults. The major faults are the Melones Fault zone (which is coincident with the Mother Lode gold deposits) and the Bear Mountains Fault zone, which seems to be the main west boundary of the Sierra Foothills Melange. Rock types, simple descriptions and origin of bedrock complex rocks are shown in Table 1. This table can be used in the field to identify all rocks of the bedrock complex and their structures.

The flat-topped hill in the middle left of Figure 3 represents the Table Mountains which sit on top of the bedrock complex. These rocks are called the SUPERJACENT SERIES and consist of gravels, volcanic ash deposits and lava flows which are flat-lying. On the canyon floors, accumulations of sand, gravel and boulders are found in the stream bed and on the banks.

Geologic History

The geologic history of the central Sierra Nevada is summarized in Table 2. Some of the oldest events in the Sierra Nevada are recorded in the metamorphosed sedimentary and volcanic rocks of the Calaveras Formation. Individual rock types of the Calaveras Formation have been highly deformed and mixed together into a melange by submarine landsliding, faulting and folding. Although metamorphism has disguised the original rocks, recent studies have shown that they were originally sedimentary, deposited in a deep ocean basin with volcanic floor. Afterwards, they mixed together as sediment in submarine landslides and by faulting in a subduction zone. The original limestones, shales, sandstones, cherts, and volcanic

rocks have been metamorphosed to marble, quartzite, slate and schist.

No distinctive fossils have been found in the Calaveras Formation, so its age is questionable. One poorly preserved fossil of Permian ages was reported in the late 1800s, but the sample has been lost. Fossils on the Clavey River are metamorphosed, and can only give a general late Paleozoic age (320-225 million years - my). Recent discovery of Calaveras-type pebbles in the Great Valley have a younger Triassic age (225-190 my). The age then is open to question, but most probably includes much of the Late Paleozoic. The Calaveras Formation was folded and metamorphosed in Triassic time as part of a major event called the Sonoman Mountain Building.

The Bear Mountains Ophiolite originated as part of the ocean floor far from the continent about 300 my ago. This piece of ocean floor was metamorphosed to amphibolite 190 my ago.

The first granite was formed in the Lee Vining area 200 my ago.

During the early and middle Jurassic (190-150 my) a series of volcanic and sedimentary rocks accumulated in an island chain and ocean basin similar to the modern Aleutian Islands. These rocks were mixed with continental sediment, so must have been near the edge of the continent, marked at that time by the Melones Fault zone. This is the Mother Lode Belt of relatively undeformed volcanic and sedimentary rocks exposed near Chili Bar on the American River. Metamorphism later changed these rocks to slate.

The granite bodies near Sonora and at Parrots Ferry were intruded about 162 my ago. The plutonic rocks of the Pine Hill Intrusive complex (gabbro) and dark basalt dikes on the Stanislaus River also have this age. The dark gabbro of the Pine Hill intrusion is very hard and forms the major part of the gorge on the American River.

Recent field research in the area west of the Melones Fault has uncovered the Sierra Foothills melange, a belt of sheared, faulted ocean floor rocks. These pieces of ocean floor are now metamorphosed to greenstone, greenschist, metachert and amphibolite. They occur as fault-bounded slabs from inches to miles in size, surrounded by sheared serpentinite and shale. They are exposed on the American River above the gorge. The melange is probably the product of subduction of ocean floor about 190 to 160 my ago.

The granite of Yosemite Valley was formed about 140 my ago. About the same time, the rocks of the Mother Lode belt were deformed and metamorphosed and all other rocks were deformed by a major event called the Nevadan Mountain Building. Metamorphism and folding in the Calaveras Formation took place for a second time and originally horizontal layers were forced into a vertical position. The Bear Mountains and Melones Fault zones were active at this time.

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The Nevadan Mountain Building caused a great uplift of the Sierra Nevada and initiated 90 my of erosion. During the period of 140 to 50 my ago the rocks from the ancient High Sierra were eroded and deposited into the Great Valley to the west, which was a marine basin at the time. Estimates of the volume of sediment now in the Great Valley indicate that a thickness of 10 miles of material was eroded off the present Sierra Nevada. A last granite intrusion occurred in the Tuolumne Meadows area 90 my ago, as erosion was going on.

The rivers that caused erosion probably cut deep canyons at first, but with time these canyons and divides were worn down to broad valleys and a series of low hills on resistant bedrock units. Five major streams flowed west and north, with the largest streams approximately following the course of the present Yuba and Calaveras Rivers. These streams deposited beds of gravel and sand eroded from the Sierra. Gold veins, associated with the granite, were also eroded and particles of this valuable metal were concentrated in gravel beds as placer deposits. These Auriferous Gravels are the oldest representative of the Superjacent Series in the central Sierra. During the period 26-9 my ago, other major river channels were formed by eruptions similar to the recent eruption of Mount Saint Helens.

A series of lava rivers extended down canyons along the present Stanislaus River drainage about 9 my ago. Erosion has exposed these hard rocks and they form the flat tops of the Table Mountains. From an airplane, these mountains have a sinuous pattern, outlining the ancient river course.

Slow uplift and erosion formed the present Sierra Nevada. Uplift began about 9 my ago and continues today. The broad, flat, gently sloping divides are remnants of the broad plain that the ancient rivers flowed across. These have been used for 150 years as cross-country access roads. This surface is also an unconformity (surface of erosion) between the Superjacent Series and Bedrock Complex. The Superjacent Series rocks and the unconformity were uplifted and tilted gently to the west, and cut by the modern river canyons. The uplift took place mainly along steep faults which mark the escarpment on the east front of the Sierra Nevada. The modern rivers tapped more gold in the bedrock complex and reconcentrated the placer deposits from the Superjacent series. Marshall discovered gold in a modern placer on the American River. The rivers are actively eroding and moving sediment today, except where their work has been temporarily stalled by dams.

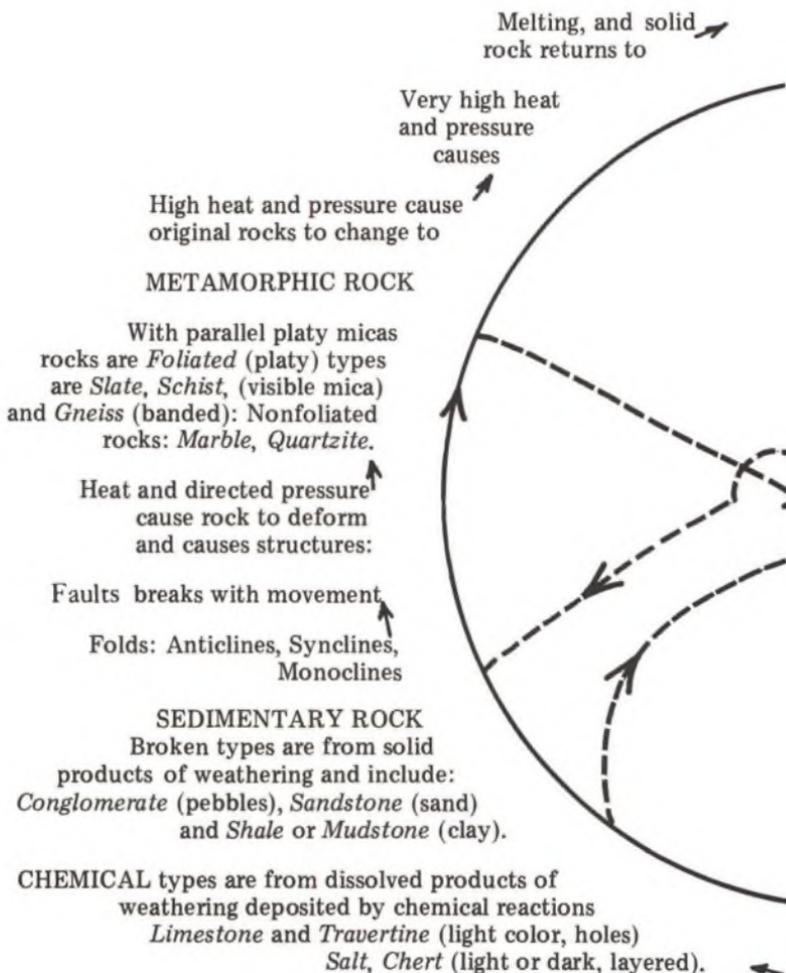
The Sierra Nevada rivers have roughly parallel courses flowing westward. This is typical of consequent streams which develop their courses on a regional slope. The tilting of the topographic surface created a low-angle westward slope. Water flowed from low place to low place to the west down-slope. Rivers formed deep canyons as uplift continued. The rivers probably did most of their canyon cutting during the glacial ages (2.5 my to 10,000 years ago) when abundant rain and glacial melt-water caused high water flows. Most channel erosion and sediment moving is done at flood stage today. What we now consider flood level was probably the common flow during the Pleistocene glacial epoch.

Rapids and the Rivers

There are many bedrock irregularities which form pools and rapids in the beds of Sierra Nevada rivers. Resistant bedrock ledges (usually chert and hard granite) which act like ribs in a gold sluicelox, trap sand, boulders, and cobbles that are bounced or rolled along by the river. These trapped materials, especially boulders, account for the rocky nature of the rapids. Gravel and cobbles in the load tend to occur in bars which may migrate downstream. Also large blocks may slide and roll down slopes and become trapped on bedrock ledges, or make rapids by themselves. River gradients are steepest in hard bedrock areas. Massive chert underlies Clavey Falls, chert causes the steep

rapids on the Stanislaus River above Rose Creek, granite and gabbro cause the rapids on the upper and lower gorges of the American River.

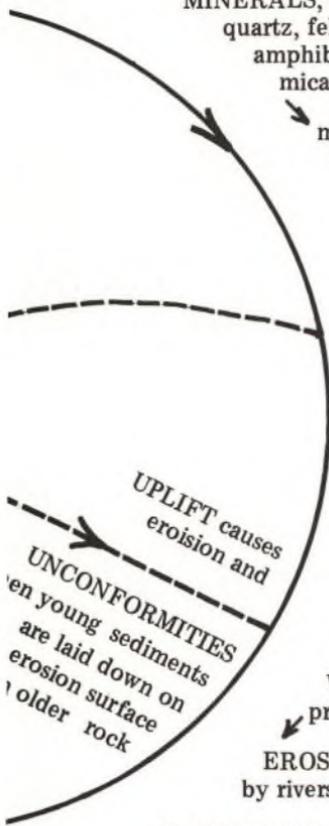
FIGURE 1: THE ROCK CYCLE,



AN INTRODUCTION TO GEOLOGY

MAGMA-molten rock

→ cooling allows atoms to organize into natural crystals called
MINERALS, common types are
quartz, feldspar (light color)
amphibole, pyroxene, olivene (dark color)
micas (platy), gold!



→ many minerals together make ROCK
Rock formed of crystals from magma is an

IGNEOUS ROCK

→ VOLCANIC igneous rock is from magma erupted on the surface
common names are: *Rhyolite* (light color), *Andesite*, *Basalt* (dark color), *Tuff* (volcanic ash), all fine-grained.
PLUTONIC igneous rock is cooled slowly below land surface, coarse grained. Common types are *Granite*, (light color), *Diorite* and *Gabbro* (dark color).

→ Rock exposed on the land surface is broken down or dissolved by

WEATHERING, there are solid and dissolved products which are carried off by

→ EROSION, transportation of weathered rock by rivers, streams, glaciers, landslides

DEPOSITION occurs when erosion agent runs out of energy and weathered rock (SEDIMENT) is deposited

→ COMPACTION and CEMENTATION creates layers of solid rock

Figure 2: Cross-section of a subduction zone

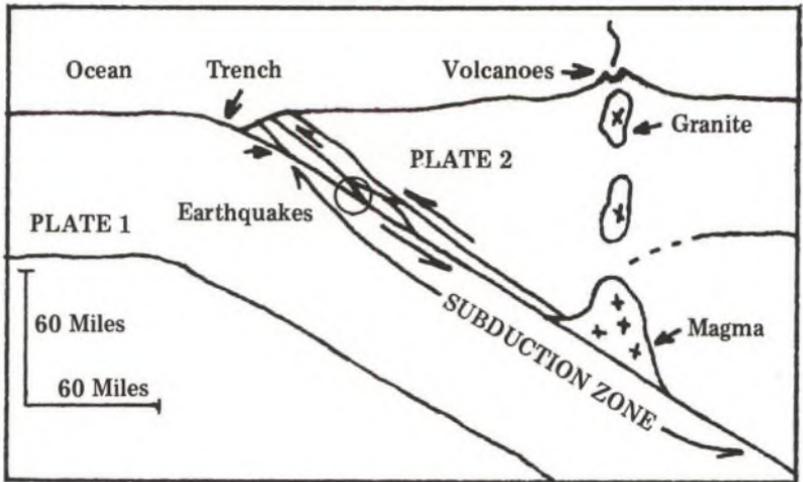
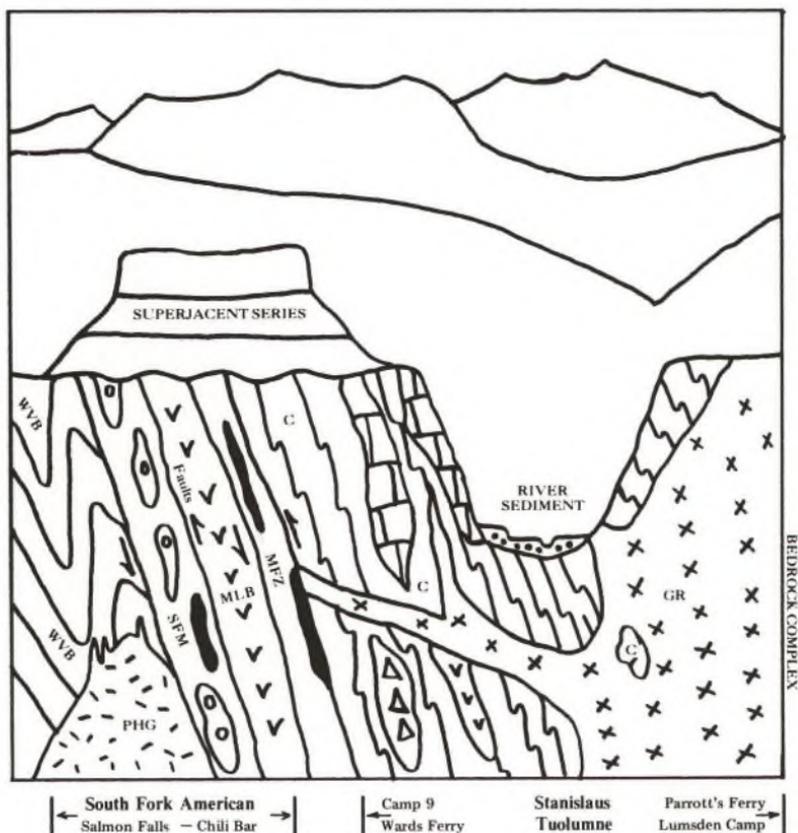


FIGURE 3: GEOLOGIC CROSS-SECTION OF THE SIERRA NEVADA FOOTHILLS



LEGEND:

WVB = Western Volcanic Belt

PHG = Pine Hill Gabbro

SFM = Sierra Foothills Melange,
Bear Mountains Ophiolite

MLB = Mother Lode Belt

MFZ = Melones Fault Zone

C = Calaveras Formation

GR = Granite of Sierra
Nevada Batholith

TABLE 1: COMMON MINERALS

COLOR	ROCK DESCRIPTION	
Light	Bands, commonly 2'' to 3'' thick	Pure white, harder than knife Speckled, visible square crystals
	Irregularly shaped masses or massive	White to gray, softer than knife, holes, sometimes streaked Speckled, visible crystals
	Many bands 1-2'' thick	White, gray or green, harder than knife, curved fractures
Green	Massive	Dark to light green, fine grained may have bulbous pillow structure
	Layered, or platy (foliated)	Light and dark green bands 1-2'' thick Light and dark green, shiny, sheared surfaces discontinuous
Dark	Platy	Light gray, softer than fingernail
	Massive or layered with chert	Softer than knife, black With pebbles of chert
	Platy (foliated)	Gray, shiny micas Black, dull shine, fine grained Black, visible crystals, quartz veins
	Massive	Speckled, black crystals, banded Black, visible crystals, very hard
	1-2'' bands	Black, fine-grained, some large crystals

	NAME	ORIGIN
	Quartz veins	Plutonic Igneous
	Granite	Plutonic Igneous
	Marble	Metamorphic-sedi- mentary, originally limestone
	Granite	
	Chert, metachert	Sedimentary, Meta- morphic-sedimentary
	Greenstone	Metamorphic ocean floor lava flow
	Greenschist	Metamorphic volcanic ash deposit in ocean
	Serpentinite	Metamorphic plutonic, iron-rich mantle rock
	Talc schist	Metamorphic plutonic, iron-rich rock
	Mudstone	Sedimentary
	Argillate	Metamorphic sedimentary
	Schist	Metamorphic sedimentary
	Slate	Metamorphic sedimentary
	Amphibolite	Metamorphic sedimentary
	Gabbro	Plutonic igneous
	Proxenite	Plutonic igneous
	Basalt	Volcanic dikes

TABLE 2: SUMMARY OF THE GEOLOGIC HISTORY

	GEOLOGIC AGE	GEOLOGIC EVENTS
CENOZOIC (Mammals)	Quaternary Holocene (to present day) Pleistocene (2my to 10,000 y)	River erosion and deposition Present river canyons formed, Glaciation to 4000'
	Tertiary (65-2my)	Renewed uplift and erosion, present canyons started (9my) Rivers flowed across a plain depositing gravel (50 my) Volcanos erupted ash and mudflows (25my), Lava flows down river channels (9my)
	Cretaceous (136-65my)	Granite formed in High Sierra, (90my), Long period of erosion of Bedrock Complex, low-relief plain formed
MESOZOIC (Middle life, Dinosaurs)	Jurassic (190-136my)	Nevadan Mountain Building folding, faulting and metamorphism within and west of Melones Fault Zone (136my) Granite intruded (140my)
		Volcanic arc formed along continent margin and ocean basin, volcanic sediments deposited in basin (160-150my) Construction of oceanic crust-Ophiolite (162my)
		Broad fault zone shears ocean floor rocks in subduction zone along the continental margin (190-162my)
	Triassic (225-190my)	Sonoman Mountain Building Granite intruded (200my)
PALEOZOIC (Dawn of life)	Late Paleozoic Permian Pennsylvanian Mississippian (345-225my)	Sediment deposition and submarine landsliding on deep ocean floor Ocean crust formed at mid-ocean ridge (300my)

CENTRAL SIERRA NEVADA FOOTHILLS

ROCK UNITS AND STRUCTURES

River sand, gravel and boulders

Glacial deposits in High Sierra,
river deposits in Foothills

Tilting of Superjacent Series, uplift
on faults, East side of Sierra

Superjacent Series, Auriferous gravels
volcanic ash and lava flows

Tuolumne Meadows granites, gold
quartz veins formed

Metamorphism and deformation of
Mother Lode, Western Volcanic belts,
and all older rocks, Melones and
Bear Mountains Faults active

Yosemite granites

Mother Lode Belt, Western Volcanic
Belt

Parrots Ferry and Sonora granite (160my)

Pine Hill Gabbro intrusion, basalt
dikes

Sierra Foothills Melange

Bear Mountains Ophiolite metamor-
phosed (190my)

Folds, foliation and metamorphism
in Calaveras Formation

Lee Vining Granites

Calaveras Formation

Bear Mountains Ophiolite

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Friends of the River: Who We Are

Friends of the River is an organization of people concerned about proposals such as the three just described. Since 1974 we've been taking an active part in the water use debate in California; organizing districts, publishing information, lobbying, working to promote water and energy conservation; and always speaking up for the value of streams left undammed, undiverted — unplumbed.

Among political lobby groups, we've taken an old fashioned grassroots approach. We're a people organization, and we work on a people-to-people basis.

Friends of the River Foundation, the publisher of this volume, is our associated, educational and publications arm.

If you would like to find out more about Friends of the River, or if you would like to join (\$15 covers a year's membership, with subscription to our bi-monthly newsletter *HEADWATERS*), please fill out the form below, or send your name and address, to: *Friends of the River, 401 San Miguel Way, Sacramento, CA 95819.*

I would like to join FOR. Here's my check for \$15. to cover six issues of *HEADWATERS* and a year's membership.

Please send me the latest copy of *HEADWATERS* and some additional descriptive material about your organization.

Name _____

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