Gold dredging in California

Warren Ronald Blomquist

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GOLD DEELGING IN CALIFORNIA

A Thesis
Presented to
the Graduate Faculty
University of the Pacific

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Warren Ronald Elomquist
March 1973
Lithograph of the "Phoenix" ascending the Sacramento River in 1850. The first attempt to dredge gold from rivers in California hit a snag a few miles north of Sacramento and sank. When refloated, she proved unsuccessful. (California State Library)
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INTRODUCTION

The principles of placer mining, no matter what the type, are the same. A device such as a pan, sluice, or a dredge is used in combination with water to extract the gold from the material in which it was deposited. Likewise, the motive for all types of placer mining was the same; to obtain the most gold with a minimum of costs.

Dredging is the most recent method used in California to mine placer deposits. The question of primary concern surrounding this seemingly profitable industry is: Why did gold dredging come to a grinding halt in 1968? Lesser concerns are: What impact did it have on the state in terms of economics and aesthetics? Is it possible that dredging for gold could possibly be renewed in the State?

When the gold rush began to California, virtually all gold that was taken, was mined in or very near to rivers and streams. As the supply there began to dwindle, miners were forced to move further and further from water supplies to profitably carry on operations. Antoine Chabot partially solved the plight of miners as he pioneered the basic principles of hydraulic mining in 1852. This was the initial move from mining as an individual or small group enterprise to that of big business. Hydraulicking proved profitable until it was brought to a halt by the Sawyer Decision of 1884 which required that debris from hydraulic mines could not be washed into navigable streams below. Costs of preventing such silting in most cases were prohibitive, particularly with such low-grade deposits, and the mines were closed.
It is not surprising that Californians began looking for other suitable methods of placer mining. What is interesting is that it took nearly forty years after the discovery of gold for the first successful gold dredge to become operational in California. Bucket-line dredges had been in use in New Zealand since 1870 and were returning fair profits. Why then did it take so long for mining interests here to adopt the idea of dredging? Most likely because large quantities of gold could be obtained by hydraulic mining. When that source was shut down by legislation, miners began to look elsewhere for a livelihood.

California's first dredge, the Phoenix, was fitted in 1850. The operation was unsuccessful and soon abandoned. It was not until 1898 that a really successful dredge was put into operation in the Oroville area. The "boom" in valley placer mining had begun, a surge that was to last for 70 years.

With the advent of such success, prospectors roamed the state looking for likely deposits to mine with this latest method. Although there was some dredging carried on in Southern California, the major fields lay between LaGrange on the south and the Oregon border on the north.

Two giant companies emerged from small beginnings in dredging, both of which today are of international significance. The Natomas Company began operations in the Folsom area and is today engaged in varied interests and a very active stock on the New York Exchange. Yuba Consolidated Gold Fields began operations in the Marysville area and today is a highly diversified company involved in several international projects.
Dredging activity and profits were greatly affected by the state of the national economy. If the economy was growing rapidly, dredging suffered because the costs of labor, materials, and land rose very rapidly and reduced profits. On the other hand, a depression such as that of the 1930's stimulated the industry as costs were drastically reduced. Also significant in the 1930's was the increase in the price of gold to $35 per ounce.

In 1942, gold dredging operations were suspended by the War Production Board for the duration of World War II. Operations were resumed in 1946 and flourished for several years, but by 1960, only four dredges were still being operated in the state with two companies in the field. Gold dredging was on its deathbed. In 1968, the last dredge ended operations at Hammonton near Marysville. Thus another romantic era in California history had come to a close leaving several questions to be answered. What brought about the demise of this localized industry? In its overall effects, was dredging beneficial or detrimental to the state? Should Californians have had enough aesthetic foresight to demand that the land be returned to its original state?

Dredging could have been carried on in California successfully, without environmental damage. Resoiling and leveling of the land could have been carried out at a minimal cost. Very little of the land dredged was good farmland and thus it was not necessary to cover the cobbles with a thick layer of topsoil. A thin layer would have covered the scars left by the mining operations and have provided a start for new grass and tree cover.

Many Californians were able to see that the damage done by dredging was not in the best interest of the State, but the people in
decision-making capacities, whether in the legislature or in mining itself, were more concerned with economics than with aesthetics. In their thinking California would never run short of scenic land so there was no reason for concern. This attitude has proven very short-sighted.

The end of dredge mining came as the price of gold failed to keep pace with rapidly rising costs after World War II. An added cost figured prominently at this time as conservationists were being heard for the first time. A series of laws were enacted by the counties calling for the restoration of dredged land, further increasing the operating costs. Californians had begun to see by hindsight that the damage of dredging was detrimental to the State in general. Counties now tried to rectify their mistake through legislation. Having seen the destruction of hydraulic mining, the people of California should have foreseen the environmental disaster of dredging and prevented it by legislation.

Overall, gold dredging was beneficial to California as it provided wealth for the State and jobs for many people, particularly during the hard times of the 1930's. It has also proven a valuable source of building materials needed by a developing society. California need not have suffered the one detrimental effect of the mining environmental damage, had the industry lived up to its obligation to society by restoring the land to its natural state.
Chapter 1

BRIEF HISTORY OF DREDGING

Very early in the prospecting for gold in California, the stream-beds of the Central Valley were considered a likely source of gold. The problem lay in finding a successful method to mine the channels themselves. In 1850, the Linda Company of Boston tried to capitalize on this source of gold and was regarded as among "the swash-bucklers of the capitalist tribes." A steamer, dredge, and outfit were sent around Cape Horn and for a time worked along the Sacramento River. In June 1850, the company sold out to a group of Californians headed by John Forsch packer, a nephew of John Sutter. Destination of the craft was Cusley's Bar near Oroville. To reduce expenses of the expedition, Walt Barton, captain of the craft, took on a cargo of wheat and a few passengers. Having steamed just a few miles north of Sacramento, the dredge hit a snag, the wheat shifted in the hold, and the first organized attempt at dredging in California settled to the bottom of the Sacramento River. Refloated, the dredge was put into service at Cusley's Bar but was soon abandoned as unsuccessful. California's first attempt at dredging for gold had ended in failure.1

A second attempt to dredge the Sacramento River was made in 1886. A. B. Bowens, later to become a prominent figure in the dredging industry,

developed an air pressure system for working the deposits found in river-bottoms. A tube was sunk vertically into the bottom of the river, into which air was pumped. Gravel was thereby forced through a second tube to the surface of the river. Early results were encouraging with some shovels of gravel "panning out" at $7. The project was soon abandoned though as the system developed leaks and was difficult to keep operational. Approximately $300,000 had been spent on the machinery with little or no return. 2

Hydraulic mining operations in the Sierra Nevada directly influenced dredging in two ways. First, hydraulicking washed millions of yards of debris from the hill sides of the mountains into the river valleys below. These tailings contained deposits of gold which would eventually be mined by the dredgers. Secondly, hydraulic operations developed the technology of extracting minute quantities of gold from large quantities of earth and rock. Dredging was simply a miniature hydraulic operation and once it became apparent that low-grade deposits could profitably be mined, much attention was turned to the Central Valley where hydraulic mining was made unprofitable by court order and legislation. 3

Hydraulic tailings were everywhere. Much debris had been deposited in the stream beds in the mountains, but much also had gotten into the navigable streams of the valley, covered valuable farmland, and shoaled waterways as far away as San Francisco Bay. Flooding was caused in some places by the 25-30 foot deep deposits. In some places


farmland was virtually covered and destroyed by the silt washed in at flood time. 4

Between 1870-74, the North Bloomfield Company washed an estimated 3,250,000 cubic yards of material, yielding about .9¢ per yard. Better times lay ahead as the period November 1876-October 1877 was to show. During that time, 1,591,730 yards of top gravel returned 3.8¢ per yard. The incentive to mine was there. Gold could be retrieved profitably in large operations from low-grade ore fields. 5

Litigation over the debris issue continued for 10-12 years. Opposition to the hydraulic operations was led by the Anti-Debris Association of the Sacramento Valley, an organization which would eventually oppose dredging for the same reason: despoliation of the valley by mining interests. 6 The argument virtually ended in 1883 with a United States Circuit Court ruling in the Woodruff vs North Bloomfield Mining Company, which perpetually restrained and enjoined the company from dumping debris into the Yuba River or any of its tributaries. The hydraulic mining industry in general was further hampered by the passage of the Caminetti Act in 1893 which stated that hydraulic mining per se was not outlawed, merely that restraints must be provided which would prevent the tailings from the mines from flowing into the navigable streams in the valley below. Though somewhat of a concession to mining interests, the law had no real effect as such breast works were so expensive to

5 Ibid., p. 25.
6 Ibid., p. 257.
build that a company could not afford to continue mining. 7

Shortly after the dispute over hydraulic mining ended, an
Orovilla area nurseryman, Wendell P. Hammon, became interested in mining
the placers along the Feather River. While digging a well on his ranch,
he had encountered gravels containing gold. When panned, a reasonable
amount of gold was recovered. Hammon sold his ranch and nursery interests
and went into partnership with C. S. Quimby who was operating a placer
mining operation near Orovilla with Chinese labor. Both men were inter­
ested in mechanizing the operation. Hammon had read of dredging on the
rivers of Australia and New Zealand and hoped to bring the process to the
United States. The partnership lasted for two years when Quimby, for
some unknown reason decided to sell out. On September 16, 1896, he
deeded land parcel #236 to Thomas Couch and F. T. Sutherland of Butte,
Montana, and these two men went into partnership with W. P. Hammon. On
that site, the first continuous-bucket line dredge in the United States
was built and operated. The venture was a profitable one, though only
moderately so. 8 Design and technology for the machinery was brought to
the United States by R. H. Postlethwaite from New Zealand. He brought
the design to Couch, a renowned mining engineer in Montana. People of
Orovilla were very skeptical that placer gold could be mined by a large
machine, but all skepticism was laid to rest when the dredge went into
operation on February 1, 1896. 9

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8Elden Parker, "Placer Mining on the Feather River," Diggins
9James Lenhoff, "Placer Mining in Orovilla," Diggins (Winter
That first dredge, the Archimedes, lasted less than a year as the river flooded the following winter and the dredge sank. However, the pattern of mining placers along the valley rivers had been set by the Yuba Consolidated Gold Fields Company. Risdon Iron Works of Marysville built a replacement for the Archimedes the following year. Risdon, as a result of early experience, became the world's leader in dredge construction the early years. Between 1897 and 1911, the company built 63 gold dredges which were shipped to all parts of the world.

Couch and Sutherland contracted with the Risdon Iron Works of Marysville to build their first dredge patterned after the New Zealand type dredge. The machine was designed to lift the gravel from the pond by way of a continuous bucket line traveling up a very heavily constructed ladder. The material was then dumped onto a large shaking screen which separated the gold-bearing matter from larger rocks and gravel. This larger material was then hauled by a conveyor belt to the stacking conveyor which would deposit it 70 feet from the stern of the craft and create the unsightly tailing piles which offended many Californians. Meanwhile, the gold-bearing material was passed over long sluicing tables containing riffles, behind which the gold was trapped. These tables were intended to be cleaned approximately three times a month. This design, with minor modifications, came to be known as the "California-type" dredge and was the backbone of the fleet of California gold ships which worked along the rivers of the valley for 70 years.10

Shortly after the dredge was ordered by Couch, help was secured from the Lewiston brothers of New York and the Feather River Exploration

Plate 1 - C. S. Quimby, owner of placer diggings where first dredging attempts were made. (California State Library)

Plate 2 - Archimedes, the first successful gold dredge to operate in California. Owner Wexell P. Hammon is in the foreground. (California State Library)
Company was formed. Nearly all of the stock in the company was owned by the Lewistons, Couch, Hammon, and Sutherland. Thomas Couch provided most of the technical advice for the organization, but it was Wendell P. Hammon who thought up the scheme and followed it to its successful conclusion in spite of many setbacks. 11

Frank T. Sutherland was an important figure in the early stages of the project. He knew little of dredging in New Zealand, but was a mining engineer who was familiar with the double-lift dredges which were successfully operating near Bannock, Montana. It was Sutherland who convinced Thomas Couch, influential in national mining circles, of the feasibility of the Oroville scheme. While Sutherland was conferring with Couch, Hammon was consulting W. H. Christie of Christie and Lowe, a mining engineering consulting firm. Christie was convinced that the sand and gravel of the Feather could be be successfully mined. With this professional advice, Thomas Couch was convinced to throw his reputation and "know-how" into making the plan operational. Without Couch's financial contacts with the Lewiston brothers, adequate financing would have been difficult to obtain. 12

Couch #1, as the dredge was named, was put into operation on February 1, 1898 and was headed for real financial success until the winter rains and floods of 1898 sank her. Unfortunately for the owners, she was located on a turbulent stream "in which it was difficult to hold


12 Lewis Aubury, Gold Dredging in California, California State Mining Bureau Bulletin #36 (Sacramento: State Printing Office, 1908) P. 4.
even a piling during the flood season." Being wooden, the first successful dredge in the state sank and was never recommissioned. 13

Inspite of a rather ignominiuous beginning, the Feather River Exploration Company was a quick, financial success, though not the only company dredging for gold in the Oroville area. There were several others as $62,263,000 worth of gold had been extracted from gravels of the area by 1902. Torrential rains had for centuries washed gold-bearing gravel into the Sacramento Valley near Oroville. It was now apparent that only the surface was being scratched. History subsequently bore out this estimation of recoverable gold. Butte County covered 1720 square miles of land between the Feather and Sacramento Rivers, all of which eventually proved to be gold-bearing to varying degrees. A major industry, other than agriculture was on its way for Oroville. 14

During the early period of development at Oroville, the double-lift type of gold dredge had been tried and abandoned by 1902. Though it had had success in Montana, the single-lift style seemed better suited to the type of digging found in California. Thus the single-lift gold dredge soon bore the designation, the "California-type" dredge. 15

Operation of gold dredges had been so successful in the Oroville region, that by 1904 there were eleven companies operating in the region. These firms had invested $2.5 million, and judging by the gold returns for 1902 of well over $62 million, they had returned a "fair" profit on their investment. In order to facilitate gold dredging operations

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13 Aubury, #57, op. cit., p. 52.
15 Aubury, #57, op. cit., p. 5.
throughout the state, a meeting was held in Oroville on May 11, 1904, to form a Dredge Miners Association. Newspaper accounts stated that the group hoped to further dredging operations throughout California, which had several more profitable fields to mine. Based upon later activities of the organization, it is apparent that one thing the association considered of prime importance was legislation. Legislation and a court order had put the hydraulic miners out of business. The Dredge Miners Association hoped to avoid a similar fate by lobbying actively in Sacramento.

Perhaps there had never been a mining operation that was so successful in so short a period of time. Placer mining in California had been kept alive through the 1850's and 1860's by surface claim operations. The slack in placer production from this source in the early 1870's was soon taken up by hydraulicking, which was forced out of business by legislation and court order. Gold dredging picked up and continued California placer gold production at a high level for another 70 years. Without it, placer production in the state would have slowed to a trickle by 1900.

Financial success by ownership and management usually leads to increasing demands by the third party, namely labor. In January 1910, the Railway Dredgerman Union at its Biennial Convention in Chicago demanded increased wages for its workers, some of whom worked the boats of the Sacramento Valley. Their demand was that all dredgemen pay be raised from $125 to $150 per month for all services rendered. Such skilled personnel as winchmen and dredg masters would receive like increases.

17 Lewis, #57, op. cit., p. 7.
18 San Francisco Call Bulletin, January 5, 1910, p.4, col. 2.
Economic success of the dredging companies spilled over into the neighboring communities. Dredge workers would spend their pay in the community which stimulated the local economy. In some cases, a whole new town would spring up as a result of mining operations. One such town was Natoma in eastern Sacramento County, located 1½ miles south of Folsom, a mining town in the early 1850's. Natoma began with the formation of Natomas Consolidated of California Company in 1908. The area was originally called Dredge, but with the construction of the Natomas machine shops, offices, and a retort house there, the place was renamed Natoma. A post office branch that had been located at Mimbis, three miles to the south, was also moved to the new community. Being a company town, the new site represented at $150,000 investment for Natomas which included: 30 new cottages; a boarding house; three lodging houses; company offices and machine shops; and the retort house. Near Marysville, a similar community developed called Hammonton, which was home base for operations of the Yuba Consolidated Gold Fields Company, a direct descendent of Feather River Exploration Company. 19

Other income also came into the hands of the local citizenry. Wendell Hammon paid William Leggett of Oroville $4600 per month in royalties to dredge the latter's land, which soon became common practice for those companies which had little capital at their disposal and couldn't afford to buy the land outright. New tax revenues from the mining companies flowed into Oroville and paid for such improvements as sidewalks and sewerage systems. A large percentage of the $500,000 annual payroll was

spent in the town, while 40 trains a day found their way to Oroville over
the rails of four separate railroads. 20

Some of the finest (highest paying) dredging land lay very near
Oroville and threatened its very existence. One story maintains, though
it cannot be substantiated, that someone offered to buy and move the city
for $10 million because the deposits below it were so rich. Though it
cannot be verified and the prospective buyer is unknown, the story is
widely circulated and believed. Even though the dredges did not move
into the city proper, they came very close. So close in fact, that they
did move to West End Street and nearly to Hill Street at 2nd Avenue. To
avoid further encroachment, the townspeople hurried through incorporation
of the community. 21

Aside from the Oroville, Yuba, and Folsom districts, by 1910 there
were three dredges operating in Calaveras County, one in Merced, one in
Shasta, two in Siskiyou, and one in Stanislaus, making a total of 63
dredges operating throughout the state. These, coupled with the three
large dredges under construction, represented an investment of $7,205,000.
Replacement of equipment also represented a big investment as the compa-
nies had already replaced 38 obsolete dredges which involved another
$1,790,000 invested in this type of mining. All 38 were dismantled, made
a part of newer dredges, or simply rotted away. 22

One such replacement was the "Natoma Eight", which was built in
1911 to replace the company's older #8 which had burned. Up to this time

21 J. C. Nisbet, "Gold Dredging in Oroville," Diggins, Vol. V,
No. 3. (Fall 1961) p. 8.
22 Aubury, #57, op. cit., p. 7.
dredges had wooden hulls and were susceptible to fire. The new boat cost $250,000 which paid for a machine 150 feet long, 58 feet wide, and was capable of digging to 55 feet below waterline. It was the most modern dredge of its time, with buckets of 15 cubic foot capacity that weighed 4200 pounds apiece. The entire digging ladder weighed in at 468 tons. Statistics of the boat are not so impressive in themselves, but rather in this mammoth machine's ability to separate 1/600,000 part of gold from the mass of rocks and gravel taken up. This was the forerunner of a newer and more efficient breed of dredges that were to come. The Natoma Eight could work 690 cubic yards of material per hour with a crew of only three men.23

Inspite of the small crew necessary to run a dredge, the work itself was hard. A dredgeman had to be around equipment that was heavy, and the work dirty with grease and muddy water. The pay was good, with the range of $2.50-$3.75 per day (8 hours). Many present-day safety regulations were not in effect and serious injury or death was always a distinct possibility. But the work got into the dredgeman's blood, and many found it difficult to leave the trade that they had pioneered and learned so well. When the mining fields of California could no longer support them, many moved to various parts of the world to work the dredgers. Charles Thurman went to Brazil; Archie Jones to Alaska; George Dyer to New Zealand and Siberia; various Nisbets to Siberia, South America, Alaska, and the Malay States; Billy Wells to Montana; Miles Lafferty to Colorado. There was a certain lure about the old gold boats.24

24Nisbet, op. cit., p. 8.
Plate 3 - Hulk of the original Natomas #8 which burned in 1910. Fire was a constant threat steel hulls were introduced. (California State Library)

Plate 4 - Natomas #8 launched in 1911 as a replacement for the original which burned. (California State Library)
Working "mother earth" up in this manner didn't go unnoticed, however. As early as 1909, earnest protests were being heard by legislators against those who "turned the earth upside down," and reduced the value of the land to a "negative minimum." There was even talk of passing legislation against the miners, though nothing specific was mentioned. Besides, rock from the tailings was being distributed throughout the north state to pave roads and make them passable, even in winter. How could someone condemn the dredgemen for ruining 25,000 acres to make life on the 5,175,000 acres next door possible? Dredging was having a distinct effect on the economy and life of northern California.  

Success of inland dredging operations caused people to look elsewhere for gold profits. E. S. Hoyt of San Luis Obispo developed a suction dredge capable of lifting 80 tons of sand per hour from the bottom of the ocean through two gravel pumps. This sand and water mix was then run over riffle tables laced with quicksilver to attract the gold particles. If the property (sand) showed enough gold per ton to be worth 3¢ per ton, it was estimated that the dredge was capable of returning $137,000 in profits per year. Mr. Hoyt began experiments off Pt. Sal in 1904. Last records of his machine show up in 1908 and apparently the experiment was a failure, as were most dredging operations in Southern California.  

As an expanding, burgeoning industry, gold dredging had seen its "heyday" by 1920. The period of real expansion lay between 1904-1912,  


and by 1920, the declining price of gold had taken its toll with increasing costs in the industry. The number of companies remained about the same through the early '20's. Over 6,000 acres of land had been dredged in the Oroville area alone and by 1916, over $26 million had been taken out. Value of this gold ranged from $18-22.50 per ounce, depending upon its fineness.27 During the 1920's, most of the smaller companies dropped operations, with giants such as Natomas and Yuba Consolidated seeing diminishing profits. The industry was to receive new life in 1934 with the signing into law an increased price for gold. That increase, from $22.50 to $35 per ounce, caused renewed interest in dredging and pumped life back into a dying industry.

In the 1897-1937 period, mining companies spent over $60 million building dredges, several of which were to return over $1 million per year in profits. These dredges were classified by size into juniors and seniors: a junior being capable of handling 40,000 cubic yards per month; while seniors could handle 400,000 cubic yards per month. The amount of material in a deposit would determine what type of dredge could be used profitably. Dredgemen considered 5 million yards worthy of a junior, while it took at least 30 million cubic yards of workable ground to justify the working of a property by the larger type of dredge.28

Revival of dredging in the 1930's saw an innovation enter the scene, that of the "Doodle-bug", a small dredge capable of working small claims and being moved rather simply. Although it is not certain, the name has most likely been derived from a derogatory remark made by the

27M. Nisbet, op. cit., pp. 4-5.

owner of a "real" dredge, one capable of handling huge amounts of material, but incapable of working smaller, though profitable properties. The name stuck, and many of the pioneers in the industry sneered at the "Johnny-come-latelies." Most of the derision soon faded as profits of the "doodle-bugs" soared and dredgemen realized that they were missing a good investment. By 1937, all of the major mining interests had at least one "doodle-bug".

A type of small dredge emerged in 1933, when Horace Onyett introduced a small, floating, washing plant that was supplied material by a drag-line operating from the bank of the pond. The original operation was set up near Oroville and was followed shortly by a similar operation on Wyandotte Creek in Butte County. The Onyett plant was soon taken over by Lord and Bishop, a construction firm which quickly turned it into a paying proposition. In California alone, draglines produced $3,294,970 worth of gold in 1937.29

The idea for dragline dredges was originally discussed in correspondence between C. M. Romanowitz and D. H. Ferry as early as 1922. Sketches for Ferry's ideas were made at that time, but he did not follow up on the idea and it wasn't until nearly ten years later that the idea was capitalized upon by Onyett.30

Stimulating the movement of equipment into the gold-mining field was the fact that the construction industry and the road-building portion of it particularly, was suffering badly from the effects of the national depression. Contractors had large sums of money tied up in road-building


30 Ibid.
equipment, with few if any contracts being let to build roads. Thus their attention was turned to other uses of machinery such as "doodle-bugging." Inspite of the derision, these people with an investment of as little as $30,000 could open up small, but profitable deposits of gold by moving as much as 40,000 cubic yards of gravel per month. Many of these small pockets of gold were richer than those being worked by the senior dredges.31

One of the companies which had enjoyed the derisive mirth at the expense of the "doodle-buggers" was the Natomas Company which had been operating seven dredges on the American east of Sacramento throughout the 1930's. They now quit "pooh-poohing" the smaller methods long enough to investigate and invest in some of the junior dredges themselves. Even Yuba Consolidated, largest dredging operation in the state, designed a junior, though it was not a dragline, but rather a small-scale floating dredge that could be knocked down and moved easily. These two companies could now open up small deposits on the properties they already owned, but had been avoiding as unprofitable with the larger dredges.32

All dredges, whether large or small were operated on the profitless basis. The smaller dredges, though capable of working the smaller claim, had certain disadvantages: maximum depth that could be worked profitably was 20 feet; were not capable of digging hard gravel, compact or partly cemented gravel as well as the ladder dredge; bedrock had to be soft for a claim to be adequately cleaned of gold content. In most cases, the advantages outweighed the disadvantages. Such advantages were: less capital investment required; dragline dredges were much

31"Buckets of Gold," op. cit., p. 35. 32Ibid.
smaller and could float on very shallow ponds; smaller units could be moved to terraces above the river more easily. If necessary, water could be pumped easily; when a deposit was worked out, the rig could be moved easily, sometimes in as little time as a week with only the normal working crew doing the dismantling.33

Methods of operation fell into two basic categories, both of which had its supporters as the "only" method to effectively pick up the available gold. Some felt that the dragline should work upstream, swinging the bucket from side to side to take a swath that was approximately 100 feet wide. Others felt that the machine should work at a right angle to the course of the stream and then dump gravel downstream into the washing plant. The controversy will never be resolved. The effectiveness of either method was more dependent upon the care of the crew in handling the gravel than in the type of operation they were running.34

Technology of dredging, whether bucket-ladder or "doodle-bug" had international implications. Methods and machinery developed in the California gold fields was spread world-wide to such places as: South Africa, South America, Siberia, Malay States, and Korea. Of the 250 dredges operating throughout the world in 1937, most were of the California type. Why? Because this type of dredge was capable of handling virtually any type of gravel found in the riverbeds throughout the world. In gold dredging, the question is not how much the machinery costs, but rather


34 Ibid., p. 101.
how much gravel the plant can handle. Some of the California design were capable of handling more than 500 cubic yards of gravel per hour and thereby were able to repay the investment easily in a rich field with handsome profits to boot.35

Traditionally, dredging was a man’s work. There were two exceptions to this adage in the world. One, Mary E. Smith, lived and worked in Trinity County, California. Miss Smith’s father had been in the dredging business for a number of years when he died suddenly in 1932. Mary Smith, to the surprise of everyone, took over and continued to operate the business until 1938. Apparently she had the necessary skills as the company continued to earn substantial profits. In 1938, she tired of the work and leased the dredge to Tom and Charles Harris who had been with the company as dredgemaster and superintendent for a number of years. These men continued to operate the dredge until 1940 when available gravel in the area played out. The other woman was a Korean, who operated a Yuba-built, portable, six cubic foot dredge.36

Typical ebb and flow of success in dredging is characterized by gold dredging operations in the Merced River Valley. These began in 1907 and continued until 1952. No dredging was carried on between 1919 and 1930, a time of high wages and costs, with low prices for gold. Yosemite Mining and Dredging Company was the first to operate in the area when it began dredging a 400 acre parcel. This organization met with moderate success until it depleted the land in 1919.

35 "Buckets of Gold", op. cit., p. 16.
Most companies in dredging sooner or later ran afoul of disfavor with some of their neighbors. For Yosemite, the time came in July, 1915, when the Hind Ranch filed a suit in Merced County Superior Court against the company for damaging the ranch's riparian water rights. The judge ordered the case against the dredgers dismissed.37

The really rich era in the Merced Valley came between 1930 and 1942, after a lag caused by the high prices of World War I sent profits from gold plummeting during the 1920's. In 1930, Yuba Consolidated Gold Fields began its operations in the valley when it purchased the old Yosemite dredge and some newly-prospected land. Yuba had been very successful in its operations near Oroville and Marysville, along the Feather and Yuba Rivers. Now they sought to further their interests to the south. 1932 saw them buy a second dredge and they continued operations along the Merced until 1941.38

Snelling Gold Dredging Company began operations with a Yuba close-coupled bucket dredge in 1932. This investment was to be well rewarded as the depression had drastically reduced the costs of labor and operation, and when in 1934 the price of gold was raised to $35 per ounce, profits soared. This company preferred a royalty-lease of property to be dredged, rather than an outright purchase or lease. Under such a lease, the owner of the dredgeable property received a specified percentage of the profits returned by the dredge (usually 10 percent). Snelling bought a second dredge in 1935, which operated until 1949. The original machine operated

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38 Ibid.
until it was sold in 1952 to Yuba Manufacturing to be rebuilt.39

Two other companies were active in the Merced River region; the Merced Dredging Company, a Nevada corporation partially owned by Natomas of Folsom, and the San Joaquin Mining Company which was also a subsidiary of Natomas. Neither of these operations were reactivated after the war because the land they were working would not pay the war-inflated costs of operation.40

Primary in the closing of gold-dredging operations between 1942 and 1945 was War Production Board Order L-208, which required gold mines to cease operations as they were "non-essential" to the war effort and drained off materials and manpower needed in industries which were directly related to winning the war. Under terms of the order, non-essential meant any placer or lode mine and the effective date of the order was to be October 8, 1942. Not only was the mining operation per se interrupted, an end was required to "all prospecting, exploration work, and development work." This particular section was added by amendment on August 31, 1943.41

Operators of gold mines were to shut down their operations as soon as possible. In any event, no operator was to use any materials seven or more days after the order went into effect "to break any new ore." After 60 days had elapsed, the owner was not to expend any materials except those necessary to keep all machinery, buildings and equipment in repair. He was also allowed to do enough work to keep the mine accessible and safe to enter.42

39Ibid.
40Ibid.
42Ibid.
Any person who felt that the order had worked an undue hardship on him, could file a written appeal to the War Production Board in triplicate, giving the necessary information to explain his position. The Board would then rule upon the individual case and take action which seemed to be appropriate. This halted dredging for five years.43

With the end of World War II, gold dredging revived as had been expected. The rapidity with which it came back nearly astonished the United States Bureau of Mines. While many other forms of mining had remained stagnant, by September 1946, nearly one-half of all dredges operating before Order L-208 were back in operation, churning up the gravels of the Central Valley. In July 1946, 133,774 ounces of gold were mined. This was a 21% increase over the June figure. For another twelve years, gold-dredging was to remain the chief producer of gold in California.44

Not only were dredges operational before the war put back into service, but new ones were also added, particularly in northern California. It appeared that there were rich fields to be mined that had been only surface mined at one time or another. Mono County saw its first dredge in the spring of 1946 operated by the Sumner Dredging Company. The operation was a sizeable one, but soon failed. The field in which they were mining was Dogtown, a profitable surface mining area of the 1850's. The dredge, under the direction of J. H. Frazer of Oroville, operated only about a year before being moved further north.45

43Ibid.

44Sacramento Bee, September 20, 1946, p. 5, col. 5.

45Ibid.
Activity was also seen in the Lewiston area of Trinity County, where the Thompson Divide Company launched its second dredge on April 18, 1947. This even coincided with a stockholders' meeting and tour of the dredge site. Apparently Frazer wanted to impress the owners of the company with the size of the operation near Lewiston. The company also indicated that it would continue to prospect the Minersville-Trinity Center area as plans called for another dredge in that region within a year.46

The giants of the industry had not been sleeping during the revival of dredging. Yuba Consolidated had put seven boats back into operation: five on the Yuba River and two in Butte County. The returns from these dredges made them one of the largest producers of gold in the states. In addition to these properties, Yuba was prospecting on a 6,000-acre parcel of land near Quartzite, Arizona. The company also planned to re-activate its Callahan dredge. All dredges operating for Yuba had buckets of 18 cubic foot capacity, capable of handling 450,000 cubic yards of material per month.47

Much of the attention in the northern mountains of California was focused on the Trinity River and its tributaries, with three different companies working a variety of equipment there. Donna Lane Dredging Company was completing a dredge and washing plant near Helens. Thompson Divide Dredging, which was already working two dredges near Lewiston, was prospecting property along the Trinity, reported to contain 40 million cubic yards of gravel waiting to be picked free of gold.48

46Ibid, April 29, 1947, p. 16, col. 3.
Dredging these deep river canyons created some difficult problems for the operators. There was not enough room to maneuver easily and the gravel beds had a tendency to be very narrow. One problem faced was: How do you truck a 465-ton machine into a mountain canyon and outfit it? The dredging industry developed some of the best machine riggers to be found in the country. Even when the basic power to haul parts for a dredge into the back country was animate (horses or mules), they always managed to get the job done. The trucking of a 465-ton dredge from French Gulch to Ft. Jones and reassembling it was no small task. Since being reassembled, it has worked 2 million yards of riverbed before turning around at Hoopersville (ghost town) to head down the creek with approximately half the dredgeable land mined.49

When the dredgers swung back into action, so did their counterparts who had been complaining of the damage done to the natural beauty of California. Designers began coming out with "resoiling dredges" in 1946. With this type of dredge, the boulders would be dropped into the pond directly behind the boat instead of from a stacker which carried them far astern. The silt, when dumped from the rear of the boat would then cover the boulders and leave the terrain in much the same condition that it began, except for a few more contours. Wallberg Pump Company Inc. of Sacramento developed such a machine and advertised it in the California Mining Journal. There is no evidence to show that any such dredge was ever purchased for use in California, though some have been cited in Korea and Russia, where farmland is a real premium and they can't afford to leave the ground "turned upside down."50

Plate 5 - Lower section of the bucket ladder for the Coffee Creek dredge goes into the mountains under "horsepower." (California State Library)

Plate 6 - Coffee Creek dredge in operation. (California State Library)
Though there were no takers in California for this type of dredge, Yuba Industries and other manufacturers continued to produce dredges for California and the world market. The average dredge was not an assembly-line procedure. Of prime concern for the builder was how is the dredge going to be transported to its destination? If by air, all parts had to be broken down into its smallest components for shipping. If it could be floated up one of California’s rivers on barges and then shipped to its destination by rail, then the size of the parts to be shipped could be quite large. Air freight could cause real problems as a lower tumbler might measure 10 feet in diameter, 8 feet through the hubs, while weighing in at 16,000 pounds. By 1951, 25 percent of Yuba’s business was to supply replacement parts for many of the dredges working around the world, as well as those operating in California itself. Yuba Industries grew up with and was an outgrowth of the California mining industry. 51

One of Yuba’s largest creations was its own #18 which was completed in 1952. This machine was capable of digging 124 feet below water level and against a 50-foot bank. This would allow it to go 175 feet to bedrock, if necessary, to recover gold. The boat displaced 4,000 tons and could handle 10-12,000 cubic yards per day while working at maximum depth. If the ladder did not have to go that deep, it would dig as much as 15,000 cubic yards per day at 80-100 feet. Gold recovery was also better when not digging so deep because once the ladder went below a 45-degree angle to the surface of the pond, much material was

lost bringing it to the surface to be washed.52

The last dredge to be launched in California was also built by Yuba Manufacturing at a cost of $1,750,000. This boat was launched near Hammonton on February 27, 1953, by Yuba Consolidated Gold Fields, an offshoot of the Feather River Exploration Company which launched the first dredge on February 1, just 55 years before. H. A. Sawin, superintendent of construction for the company, noted that this would be the last dredge to be launched in California "under present conditions". These conditions included a $35 per ounce official price for gold, which had not been changed since 1934. Operating costs during the same time had skyrocketed. Replacement parts for dredges cost two to three times as much in 1953 as they did when the price of gold had been set. The profits in dredging for gold were rapidly dwindling. In all, Yuba Consolidated had built and used 20 dredges, six of them near Hammonton. This last boat was a hull that had been purchased from Natomas of Folsom and rebuilt to dig much deeper. Some of the fields being dredged near Hammonton were being gone over a second time as earlier machines had not been able to dig to bedrock.53

Work aboard a dredge could be exciting from time to time, as can be attested to by the four crewmen of Folsom #10 which was working near Mills and White Rock Roads, east of Sacramento. This dredge had been built to work the Mormon Island area of the American River in 1912. It was moved to the Mills Road site in 1922 where it had worked for nearly 30 years. All that work came to an end on November 3, 1952, as the rear


plates sprung a leak and the hull began filling with water. As the crewmen scrambled to shore, the craft capsized and sank in 50 feet of water. This type of excitement the average dredge crewman could do without. Natomas Company, owner of the dredge, decided not to try and refloat the 150 by 60 foot craft. 54

Controversy had been surrounding the dredging industry since its revival in 1946, some of which included the argument over rescilling. For stockholders of Natomas Company of Folsom, it became apparent by 1956 that the dredging era was breathing its last gasps. To diversify its interests the stockholders voted to buy 48% of American President Steamship Lines in a $15,618,000 stock transaction. President R. G. Smith considered this a good move as it appeared that gold mining was on a definite decline and probably would not return to its former status. 55 Smith's assessment of the situation proved to be correct, as the only companies to survive the end of dredging were Natomas and Yuba Consolidated, both of which had bought into other interests before the end in gold mining came.

Natomas had been diversified before with vast interests in land, agriculture, rock-crushing and water. The company had failed financially three different times and was on the brink of a fourth when the price hike for gold came in 1934, bailing the company out of trouble. By 1959, the company was in the steamship business and virtually out of mining, though Folsom #6 still toiled near Mather Air Force Base. She had been at it for 50 years and her time finally came in 1962 when she churned up her

54 Sacramento Bee, November 3, 1953, P. 21, col. 5.

55 Ibid, May 19, 1956, P. 1, col. 7.
last bucket of gravel. She now awaits the torch of the salvage worker and an era in Sacramento County was over.

In August, 1967, Yuba Consolidated announced that its last dredge, #21, would be shut down within a year as it was no longer economically feasible to carry on operations. On October 1, 1968, shutdown operations were begun on that boat. The end had come to "three score and ten years" of dredging operations in the state of California. Interest was still there as a permit had been granted to dredge the Feather River at Honcut Creek, though those operations have never begun. Apparently someone is still interested in the process enough to consider such a project.

Cecil Brophy summed up the sentiments of many dredgemen when he shut down the last dredge in 1968, "It's a sad day for me," said Brophy. As he put it, "The valuables just aren't there anymore." A romantic era had come to an end in California history.

Many who had not experienced the feeling of power that operating such a piece of machinery could bring probably would not echo the sentiments of Cecil Brophy, who had spent 50 years of his life extracting gold from the earth of California with a "four thousand ton gold pan." The gold dredge had left in its wake thousands of acres of eyestrain-producing rock piles. People might even castigate these men who had so little reverence for nature that they could treat her so, while driving over concrete roads that were often built with the very tailings from the infernal dredgers. Population expansion in California was born out of the desire for quick wealth. It is not surprising that while some quick wealth remained in

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56 Sacramento Union, November 29, 1959, p. 19, col. 4.
57 Romanowitz, op. cit., p. 155.
58 Oakland Tribune, October 2, 1968, p. 17, col. 1.
Plate 7 - Cecil Brophy, field manager for Yuba Consolidated Gold Fields, is pictured with the last dredge to be shut down in California, Yuba #21. To Brophy fell the task of shutting down the last dredge. (Mineral Information Service, Vol. 28, No. 5)
the ground, there would be men to seek it out. Many would take part in such despoliation of the landscape for a share of the wealth it held. Most would take the position that someone else would do it if they didn't.

In a brief 70 years, dredging had come, gone, and left its mark on the land. Many are not aware of the origin of the masses of rock piles along many of the rivers of the state. If they were, they would probably cringe at the thought of such depredation, yet they would have few qualms against investing in land development schemes to make money. The question remains: "Has the citizenry of California really learned an historical lesson in what poor use of natural resources can do?" It is doubtful.
Chapter 2

MAJOR DREDGING DISTRICTS OF CALIFORNIA

There were nine major gold-bearing fields in California which were suitable for dredging. The areas which produced the most gold lay at the foot of the Sierra Nevada mountains along the eastern edge of the great valley of the state. The only other area that produced enough of this type of placer mining worth mentioning is the valley of the Klamath River and its tributaries. Here there were several pockets which were mined by large bucket-ladder dredges and yielded good returns.

All areas dredged have similar characteristics. They lay at the foot of rather steep mountains, out of which flows a stream or river which carries large volumes of water during peak periods of flow. Deposits are found at the foot of the last major drop in elevation of the stream, where the rate of flow of water is suddenly reduced. Usually, the water at this point has just squeezed its way through a constriction of the streambed and fanned out to a wider streambed with slower water movement. Why are these areas deposition points for large amounts of placer gold?

Most of the dredge fields lie in the northern Sierra Nevada mountains and this is significant. During the tertiary period, millions of years ago, volcanic outbursts covered the streambeds of that time, trapping deposits of gold that were present. Some of these deposits probably dated back to the Eocene period. When the Sierra Nevada mountains were formed by faulting and uplift, new streams and rivers cut canyons and exposed that geological material which lay beneath the surface.
The importance of this canyon-cutting should not be overlooked as it provided a vast source of wealth, as well as the magnetic force which pulled thousands to the west coast.¹

The most important of placers was alluvial or stream placer. These are deposited by the action of running water and may be either ancient or more recent in nature. If they have gone through one or more erosions they will have a very high content of the heavier mineral, in this case, gold.² Such a phenomenon would account for the extremely rich, though small, deposits found at such places as Camanche and Oroville. As the water pushed its way downstream through rock-floored canyons, natural forces of rock grinding on rock would further reduce the rock masses being carried by the stream. This formed a primitive stamp mill, increasing the amounts of gold deposited along the path of the stream.

The most common method for placers to be preserved is by burial. Some such deposits lie many feet below the surface of the earth in the Central Valley.³ As the technology of dredging expanded, it allowed mining operations to go after these deeply-hidden deposits. It was for this very reason that the deeper-digging dredges of the 1930’s and post World War II eras were developed. Some of these machines could dig as much as 175 feet below the surface of the earth to reach bedrock if necessary. Some were used to re-dredge fields that had been worked by boats that could not operate that deep. The dredger’s goal was bedrock as this was where the richest deposits of gold lay.

³Ibid., p. 9.
Location of gold placers is not far from its origins, as evidenced by the area in between the Klamath and Sierra Nevada mountains of California.

Streams which passed through regions of metamorphic and intrusive igneous rocks threaded throughout by gold-bearing veins, were found by early miners to contain auriferous gravels. But the more recent streams which have had only barren lavas to pass over, as in the volcanic covered area between the Sierra and Klamath regions, have proved to be barren. 4

It is the old sub-surface source of gold then that contributed much to the accumulation of placers and determined where the heavy concentration of gold would be found by dredging operations. It also gives an indication why such rivers as the Feather and the American, which flow very rapidly during peak wet season, brought so much gold to the valley floor and deposited it where the rivers widened and slowed.

Gold deposition occurred in layers, with each succeeding layer covered by a layer of silt and gravels in the deltas at the edge of the mountains. The older, ancient placers may have undergone several recombinations and have a tendency to be finer in nature than those deposited in more recent times. 5 This factor made it imperative that dredging machinery be developed to dig deep enough to reach bedrock and break into these ancient placer deposits because they were very rich. When Yuba Consolidated Gold Fields built dredgers that could dig to 175 feet below the surface, they tapped some of these gold pockets which had been passed over in earlier operations. This also contributed to the fact that Yuba could profitably continue operations until 1968 in the face of rapidly rising costs. Inspite of this success, by the Fall of 1968 the management of Yuba Consolidated realized that the end had come.

4Ibid., p. 10. 5Ibid., p. 13.
In the words of dredging superintendent, Cecil Brophy, "The valuables just aren't there anymore." Geologists such as Olaf P. Jenkins state that the "valuables" were and are there, but the days of "easy-pickins" are over.

Brophy is undoubtedly aware of this fact, but spoke in terms of the dredger who knew that technology of the industry in 1968 was incapable of extracting the gold and still making a profit.

The richest gold fields for the dredges were also the most extensive in size. As noted on the table on page 39, these include: Oroville, which produced over $55 million in returns; Folsom (American River) which returned $125 million to its owners; and the largest of them all, though it was the last to be entered, Hammonton (Marysville). This was the last of the dredge fields to be closed and when it was, it had produced gold in excess of $130 million.

These three points of extensive dredging lie in Butte, Yuba and Sacramento counties, where swift rivers from the mountains have cut through layers of auriferous materials and carried them to the valley floor below, leaving the heavier materials behind in the mountains. In the early years of dredging, 1896-1912, these fields yielded 86% of all placer gold being taken in the Sierra Nevadas. For that period, total production in dollars came to $55,415,191.

Nearly all dredging in Butte County took place in the Oroville or Feather River district on land adjacent to the Feather River. This area, which contained 6450 acres had as its boundaries the city of Oroville on

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the north and from there stretched downriver for nine miles. In width it
ranges from one to several miles. Minor deposits in the area include
Honcut Creek, Wyman's Ravine and Butte Creek near Diamondville. Oroville
was the first field to be entered and the first that played out. Most
dredging in that area was abandoned by 1920. In that short time it
managed to return enough gold to pay the costs many times over, as approxi-
mately 1,964,000 ounces of gold were taken in the area. At the $35 per
ounce for gold price, Oroville dredges returned from 15-25 cents for every
yard of gravel they worked. Dredging came to a complete halt here in
1952. By 1906, the Folsom District had already returned gold to the
tune of $3,920,231. All dredging in Sacramento County was carried on
along the American River in what became known as the Folsom District,
after the city which bounded its northern edge. From Folsom, the area
ran nine miles south along the river to a place called Cornell, eleven
miles east of Sacramento on the Sacramento-Placerville Road. At places
the dredge field was seven miles wide. The area totaled 12,522 acres,
6,000 of which had proven to be dredgeable by 1910. All but 1326 acres,
comprising Mississippi, Sacramento, and American Bars, lay on the south
side of the river. In 1910, Natomas Consolidated of California owned all
but 431 acres of the land which was characterized by one viewer as a
"Rattlesnake farm." Eventually, over 6500 acres of this land was

8Lewis Aubury, "Gold Dredging in California," California State
9William E. Clark, Gold Districts of California, California Divisions
P. 104.
actually dredged by Matomas, an operation which turned over 1 billion cubic yards of earth. From this effort, $125 million worth of gold was recovered. (See Table 1, p. 39) In its best single year, the field returned a little over $2 million with 11 dredges working. That was 1916. Recovery of gold averaged 10-20 cents per cubic yard turned at the $35 price. 11

The richest dredge field of all lay at the junction of the Yuba and Feather Rivers. Here Hammon and Evans spent two years and nearly $100,000 in exploration. The site averaged five miles long by one mile wide. Here the effects of hydraulicizing on dredging are most vividly seen. Bedrock lay 60-70 feet below the surface. Much of the natural sedimentation was overlain by hydraulic tailings from such mines as You Bet, Red Dog, and the North Bloomfield operation. It is estimated that half a billion cubic yards of tailings were carried to the valley floor during high water periods. The tailings ranged from 10-40 feet deep in the Hammonton dredge field of Yuba Consolidated Gold Fields. These tailings contained some gold, but not in quantities sufficient to make them profitable to work. 12 The Hammonton field was the richest and the last to be closed. During the post World War II period, Yuba Manufacturing developed deep-digging dredges which were able to dig to 75 feet. These dredges covered previously worked areas, digging to bedrock where earlier boats had been unable to reach. In 1968, the closure of this field signalled the end of bucket ladder dredging as a form of mining in California. It was also the last major gold mine of either type, lode or placer, to be operated profitably in the state. It had produced over

$130 million in placer gold, with an estimated 4.8 million ounces of gold recovered. Dredgeable reserves in the area are estimated at 93 million cubic yards, but the present price of gold will not allow them to be worked profitably. There is a probable 235 million yards in addition to this that do bear gold, but lie deeper than can be reached with present equipment.\(^{13}\)

Wealth from gold dredging an area was determined by nature. The earth could give up no more gold than nature had endowed her with; no matter how sound the mining operation's technology. The machines were very efficient with losses estimated at two to three percent. Generally, the largest fields were richer in return, but some smaller areas such as the Trinity River were actually richer in the ratio of gold extracted to the amount of land dredged. No deposits were rich enough to be mined later than 1968.

\(^{13}\)Clark, op. cit., p. 62.
Table 1

Major Gold Dredging Fields of California

<table>
<thead>
<tr>
<th>District</th>
<th>Operator(s)</th>
<th>Dates</th>
<th>Approximate Gold Recovered (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butte Creek</td>
<td>Butte Creek</td>
<td>1902-20</td>
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<td>Lancha Plana</td>
<td>1930's</td>
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<tr>
<td></td>
<td>Pacific Gold</td>
<td>1945-49</td>
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<td></td>
<td>Yuba Consolidated Piedmont</td>
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<td>Camanche Lancha Plana</td>
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<td>Lancha-Plana</td>
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<td>Calaveras Gold</td>
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<td></td>
<td>El Oro</td>
<td>1908-25</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Isabel</td>
<td>1908-25</td>
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<tr>
<td></td>
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<td>1938-43</td>
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<td>Dates</td>
<td>Approximate Gold Recovered (millions)</td>
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<td>Gold Run</td>
<td>1906</td>
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<td>Indiana Gold</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Kentucky Ranch</td>
<td>1909</td>
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<td>Shasta Butte</td>
<td>1928</td>
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<tr>
<td>Snelling</td>
<td>Merced Dredging</td>
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<td></td>
<td>Snelling Gold</td>
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<td>Trinity River</td>
<td>NA</td>
<td>NA</td>
<td>$35</td>
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</tbody>
</table>

Figure 1

Major Gold Fields of California

EXPLANATION

- Tertiary channel
- Intervolcanic Tertiary channel
- Dredge field

Scale in miles

Chapter 3

CORPORATIONS IN GOLD DREDGING

In 1849, approximately 40,000 argonauts found their way to California in search of the mineral that would "make them rich quick." For most, their fortunes lay in other pursuits and mining would soon become big business. Few individuals could afford the hundreds of thousands or millions of dollars required to open a large lode or hydraulic mine. In the field of dredging, where a single dredge in later years could cost as much as a million dollars, there was little or no place for single ownership. The only exception to this was the Gardella Dredging Company of Oroville District, which operated a dipper dredge on the family farm from 1903-09. At that time, the dredge was moved from the forty-acre plot along the Feather River which had played out to another piece of property owned by the family along Honcut Creek.¹

Wealth, the same motivation that brought thousands of individuals to California, also brought the corporations. Corporations operated much in the same manner as individuals as they were simply a group of individuals which operated under a charter granted by a state and operated as a single person in carrying on business.² While operating as an individual, the corporation has all the rights of an individual in doing

business, plus the added ability of accumulating large sums of money for investment in land and machinery necessary for dredging gold.

As stated, the motivation behind gold mining in California in general was wealth. Corporations, obviously, did not differ from this pattern though they pursued wealth on a much grander scale. Goals of a corporation, according to John Kenneth Galbraith, depend upon the goals of the individuals who make up that organization. Whatever those individuals seek from the corporate structure, that structure will in turn seek from the society in general. "If men principally want money from a corporation, the corporation will be primarily concerned with extracting money from society." Accepting this interpretation of corporate goals leads to a basic understanding of the gold mining interests' methods of operation in California. With their drive to make money, few if any miners considered the impact of their actions upon the surrounding population or environment. The hydraulicers, for instance, were little concerned with the problems created for valley farmers by silting of the rivers caused by hydraulic mining. Dredgers followed a like course. Their primary objective was to accumulate gold from ground dredged, with no concern for what they left behind. They simply followed the philosophy of much of industry of the time that natural resources were there to be exploited, and because of the extensive natural wealth of this country, it was unnecessary to critically analyze the methods by which the wealth was stripped away. Individual owners sought wealth through the organization, therefore the primary purpose of the corporation was simply

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financial success. As these corporate undertakings were geared to the overall thrust to increase the standard of living of the country, government did not feel compelled to interfere.

Freedom from such intervention has been pointed out to be the basis for economic as well as political success. In fact, corporations have been granted the rights of individuals under the law by court interpretation of the fourteenth amendment. When this occurred, they "turned potential wealth, into usable wealth." In making such a conversion, little attention was paid to the methods used. While a court decision had provided the corporations with the rights of individuals, it could not require that the individuals who made up such large organizations accept the responsibility for waste and destruction. Thus such waste could be attributed to corporate anonymity and the stockholder could cash his dividend check with a clear conscience, knowing that he was not responsible for plundering the natural resources. In many cases, it is likely that he also felt that by stimulating the economy with investment he was "doing his duty" for the country. Any individual outside of the corporation who sought to stop wasteful practices, found himself face to face with a nondescript giant, the corporation.

Corporations also have the advantage of limited liability for its shareholders. Usually an individual's responsibility is limited to the amount of money invested in shares in the company. Personal holdings and wealth cannot be tapped to help cover debts incurred by the corporation. Possibly this has something to do with the investment in dredging by such

prominent families as the Armours and the Guggenheims. These investors were also motivated by the chance for good profits during the depression, when profits in business were difficult to come by.

When a group of persons formed a corporation, the state in which the charter was taken could be extremely important. Some states have actively entered into competition for corporation charters. Such competition has, in some cases, lifted virtually all restrictions and limitations on charter corporations in some states. In some cases, corporations have been allowed to engage in virtually any type of business anywhere they pleased. Thus a company would take out a charter in a state that was most advantageous, maintain "dummy" offices there and locate their real headquarters where they offered the most advantages in the corporate operation.

Powers granted in some states to Boards of Directors were not evident in other states and might offer stockholders fewer rights and less protection than other states. Delaware is the most popular state for incorporation because of its liberal laws regarding managers. Taxation is another consideration and includes such levies as: organization tax, annual franchise tax, stock transfer tax, property tax, and business license taxes.

In comparing Delaware to the industrially-active state of New York, it becomes apparent why dredging corporations would choose Delaware as its parent state over New York and many other states. To file for

5 Blodgett, op. cit., p. 131.
6 Ibid, p. 126.
organization the fee in Delaware was pegged at $15; for New York, $40. Once the franchise was actually located, it faced the prospect of an annual franchise tax. Only Delaware set a maximum on this tax at $25,000. New York, New Jersey, Illinois, all had no maximum stipulation on this form of taxation.

If a corporation were to go bankrupt, what would be the limit of its financial obligation? In Delaware, it would extend only to the unpaid portion of their subscription, while in New York the company would also be liable for the wages of employees. Thus if a company were to fail, being chartered in Delaware would benefit the incorporators. The Natomas Company itself failed three times between 1908 and 1928. Failure was a distinct possibility in a speculative business such as gold mining.

Under Delaware law, a corporation had no restrictions as to what type of business activity that it could engage in except it could not engage in banking and public utilities within the state of Delaware itself. When issuing stock for such a company, there was no minimum nor maximum dollar value required for the issue. Stocks could also be placed in any number of classifications.

Mokelumne Mining Company, which operated along the Mokelumne River in Calaveras County, was chartered in Delaware in 1901 and provides an example of selective "state of incorporation." The organization chose as its President and General Manager, David Pepper Jr. of Philadelphia, Pennsylvania. Though chartered in Delaware, the major offices were located in San Francisco, while the resident manager, William C. Calley,

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8 Gerstenberg, op. cit., p. 12. 9 Ibid.
lived in Wallace, Calaveras County. Indications point to the business structure of the company being basically eastern, and most likely the money was also. Most of the dredging companies, however, offered local citizens the opportunity to invest in the future bonanza. This was the only way in which most individuals could get involved in gold mining after 1900 because of the large amount of money required to set up either a lode or dredging operation.

Passage of the Resumption Act in 1875 insured that the corporate rush for gold recovery in California would continue. It stimulated the two most destructive forms of mining in the state: hydraulicking and dredging. The price of gold was pegged at $20 per ounce, which was to remain constant until the Gold Reserve Act of 1934 reduced backing for the dollar to 59% and the value of an ounce of gold shot upward to $35 per ounce.

As gold dredging developed in California, San Francisco became the location of the central offices for most companies. Many companies shared directors as well as executive staffs. Two of the most important companies to originate in this field were Natomas Company and Yuba Consolidated Gold Fields. Base of operations for Natomas was Folsom, located in the American River district; while Yuba Consolidated situated itself at Hamonton, near Marysville. Operations of the two ranged over most of the dredging fields in California.

Natomas began, not in mining operations as such, but rather as the Natomas Water and Ditch Company to supply miners working claims in

the area of Folsom. During the 1880's, the company moved into large agricultural operations, reclaiming much lowland along the Sacramento River, lands that were to grow to 90,000 acres by 1908. Of this, approximately 3500 acres lay in the Folsom district, most of which was to soon prove more valuable for gold mining than for "sod-busting." The company had now moved into the dredging field by consolidating four operations in the Folsom area and authorizing the sale of $25 million in stock and acquired a bonded indebtedness of $16 million.

Financial disaster struck the company twice, once in 1914 and again in 1928. Both times the company reorganized and reneged on its debts, but by 1934 its stockholders were well-rewarded for their patience. In that year, owners voted to split stock 10:1 expecting returns per share to show a comparative decrease. That decrease never came as the price of gold was increased and the profit per share was the same as 1933, and each stockholder had 10 times the number of shares. Natomas was no longer a financial cripple.

Gold remained the principal concern of the corporation until 1956. Leadership of the company sensed the end of prosperity in gold mining and decided to diversify the interests of the firm by purchasing 48% of American President Steamship Lines in 1956. The deal was completed with an exchange of 2,329,636 shares of Natomas capital stock for all assets of the steamship lines.

13 Ibid.
14 Ibid.
Gold dredging operations by Natomas were ended in 1962 with the shutdown of #6 dredge east of Kather Air Force Base. The company has remained an actively traded stock on the New York Stock Exchange since that time because of its diversification in agricultural lands and the shipping business.

Yuba Consolidated Gold Fields Company was an outgrowth of Yuba Construction Company which had been organized by Wendell P. Hammon and R. D. Evans of Boston, Massachusetts. The corporation was capitalized in 1905 at $12,500,000 and chartered in Maine. Hammon became the managing director and Newton Cleveland, general manager. Owning more than 3,000 acres on the Yuba River, the company built a town called Hammonton and based its operations there. More than 700 people lived there and were served by such amenities as a school, mail service, general store. Some of the most complete machine shops to be found outside of San Francisco were located there, capable of building a complete dredge. 16

Yuba, like Natomas, became aware in the 1950's that time was running out on gold dredging. They too began to diversify. Yuba Manufacturing is today one of the largest producers of dredges in the world. As late as 1960 they still had over 100 dredges which they had built, digging gold in various places around the world.

As they moved into other areas of interest, the company overextended itself by becoming a coast-to-coast firm and went bankrupt. Through careful reorganization it became solvent, though to the chagrin of many residents of Sutter and Butte counties who considered bankruptcy as a form

Plate 8 - Wendell P. Hammon, founder, and Newton Cleveland, general manager, of Yuba Consolidated Gold Fields stand on the lower tumbler of a company dredge. Dredge dates before 1910, as after that time round lower tum­ blers were used. (Mineral Information Service, Vol. 28, No. 5)
of retribution for having taken all of its earnings out of the area while leaving only the tailings behind.17

The corporations and syndicates operated for gold mining came and most went. Most certainly their activities were wasteful, but to judge them in light of ecological thinking of the 1970's can't be justified. These companies had merely taken business principles from other forms of industry and applied them to mining gold in the great valley of California. They are certainly no more guilty of exploiting natural resources of the country than other mining interests such as copper, iron, coal and others. Mining is not alone either, for the belief in overabundance has allowed people in this country to squander resources without fear of running short. Man has cut, hacked, killed and bulldozed his way from the Atlantic to the Pacific with the idea in mind that there will always be another forest to cut; another deposit of minerals to dig; or another species of animal to replace an extinct species. Though now it is relatively easy to see that such wanton exploitation can surely get us into trouble, hindsight is a far more sure science than is foresight. Had we the opportunity to invest in turning over a few million years of earth to uncover a fortune in gold, we most likely would have invested whatever we could. Perhaps the most unjust circumstance, however, is that much of the money invested came from people outside of the area in which dredging took place, thus sentencing local residents to look at unsightly rock piles for generations to come while the profits went elsewhere.

Most of the dredging firms had turned a profit and this spells success in business where success is determined on the basis of a balance

sheet. Labor was highly paid, as might be expected because it was highly-specialized and skilled. Contrary to the feelings of the local citizenry in many of the areas dredged, such operations contributed much to the local economy in which most residents were willing to share.

Gold dredging was big business. When the investment could no longer turn a profit due to high costs, the industry died and investments were funneled elsewhere.
Chapter 4

PROSPECTING

With the amount of money invested in equipment to dredge a site, no company could have a "dry hole" and survive. In the early days, dredges cost between $100,000 and $500,000, and consequently represented too large an investment to be used as a prospecting tool. To set up such a machine required as long as three months. Thus if a plot of land proved unprofitable, the dredge could take six months to move to a new site. To avoid such expensive delays, dredging operations devised scientific means to determine whether or not to move a dredge onto a property. Even with the crude methods of the first prospectors, a fairly accurate determination of gold content in a piece of land could be made.

Gold was deposited in river gravels at various levels, the richest being on an underlying layer of bedrock. Bedrock averaged thirty feet below the surface and by 1897 calculations showed that a dredge could handle a cubic yard of gravel for 5¢. Prospecting would have to show at least an average of 6¢ worth of gold per cubic yard of material existed in an area before a dredge could be moved in. Most operators would require at least a gold "show" of 10¢ per yard before beginning work.①

The geology of the areas dredged was rather interesting. Early operations worked the superficial layers of gold-bearing gravels and

really didn't get to the richest deposits directly over bedrock. The Sacramento River Valley was at one time a vast freshwater lake predating the time of volcanic activity in the Sierra Nevada mountains. Ancient rivers had deposited their gold in this vast lake. With the coming of volcanic action, river channels in the east of the valley were covered with debris and the valuable deposits of gold were buried. With uplift came further erosion and the deposits in the valley itself were covered. The lake eventually disappeared due to uplift and the gold deposits lay buried deep beneath the surface along the eastern edge of the valley. It is possible that this occurred several times as prospectors found several strata of gold-bearing material. Later results showed that dredgers were in fact not tapping the original deposits, but rather the upper layers of gravel. This is borne out by the fact that Yuba Consolidated could dredge the same land profitably twice, when it developed dredges capable of digging 175 feet to bedrock along the Yuba River.

Poor dredging techniques could result in large losses by the operator in two ways: one by hitting a few rich pockets of gold, moving a dredge onto the property and then finding out that the average "take" would not warrant the dredging of the property; the other by failure to hit significant deposits and abandoning the land even though it may hold real profits. Operators soon became aware of the pitfalls and went to great lengths to avoid making costly errors.

Generally, prospecting was done in California with a Keystone drill. In this operation, a casing would be hammered into the ground

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being tested. The core within the casing would then be drilled out. The casing would always be kept 3-4 inches ahead of the drill to keep other deposits from creeping into the sampling and "fouling-up" the calculation of actual gold content. The sampling was then run through a sluice to determine the amount of gold present. The overflow of the sluice was passed into a settling tank and the sediment was panned by hand to obtain any very fine gold that passed over the sluice.3

The preferred method of locating these holes was to plot the ground to be prospected carefully. The land was laid out and platted with holes at irregular intervals. Three holes would be joined in a triangle which was as close to equilateral as possible. Using the amount of gold recovered from the three holes and computing this against the size of the area bounded by the holes, the amount of gold in that specific area could be calculated. Depending upon the course of the ancient stream, the amount of gold found from hole to hole could vary considerably. The greater the number of holes drilled, the more accurate the prospecting operation.

The method had to be precise and structured for any haphazard methodology could result in drastic errors. Other factors included: the experience of the prospecting crew; whether or not the company had dredged the adjacent land; the experience of the company in dredging; and the efficiency of the equipment in recovering the gold.4


Most dredging companies ran their own prospecting crews as they found that they got better results and more accurate results if the crews were under the direct supervision of the company. The judgment of the
engineer on the job was extremely critical as the placers were not uniformly deposited. If the prospecting crew were working an area that "showed" a return of 25¢ per cubic yard, the gravel being worked would hold by weight, one part gold for every 6.5 million parts waste. A slight miscalculation by the mining engineer overseeing the operation could result in the dredging company suffering huge losses. The prospecting crew was better paid in general than the crews who ran the dredges because of the nature of their work.

Another consideration in maintaining their own crew was the fact that it would be a simple matter to "salt" a few of the drill holes on a piece of property and make it appear that it was extremely valuable land. It might be a real temptation for a member of a prospecting crew to do so if he were to share in the profits of the sale of the land to the dredging company. The crew was also sworn to secrecy so that neighbors of land to be prospected would not drive prices for the land being considered "sky-high".

The first use of a churn drill for prospecting was made by Mr. Downie of Yreka in 1898. The drill was purchased for the Boston and Idaho Company who were mining in the area. It was introduced to the dredging scene about a month later by R. G. Hanford of the Natomas Company near

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Folsom. The drills were manufactured by the Keystone Drill Company of Beaver Falls, Pennsylvania.

When a company began looking at a particular piece of property to be dredged, it was evaluated in terms of the following items which are listed in order of importance:

1. value, character and distribution of gold
2. physical characteristics of the formation
3. character and contour of bedrock
4. availability of water and problems inherent in stream operation
5. topography
6. power
7. labor
8. land acquisition
9. adverse climate
10. local and national regulations

If the evaluation of these items showed a likelihood of turning a profit, land was either bought or leased for royalties.

"Salting" a drill hole, though not very common, was a constant threat. To avoid a "salted" hole, some operators would lower two barren pannings into the hole and drop the heavy bit on top of it. To effectively add gold flake to the hole would require firing up the boiler to move the heavy bit. Such a commotion in the middle of the night was likely to attract attention. An interesting case was discovered in the Oroville area. Someone had become so adept at "salting" that he could mix gold with pipeclay and print initials on the inside of unused casings. When the casings were lowered into the drill hole for use, the clay would be scraped off and the "extra" gold became a part of the sample. Anyone spotting the symbols in the casing would believe them to be simply

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6 Gardner, op. cit., p. 646.
initials left at the shop during the processing of the casing. Such an incident greatly increased the value of the property to its owner if it went undetected by the prospecting crew. 8

Many owners of land along the rivers of the valley who had barely "eked" out an existence on marginal farming land, awoke one morning to find their lands wildly sought after. Some land went as high as $3,000 per acre; land that had previously barely been worth the taxes assessed against them. If sold prior to the discovery of gold, most of these areas would have gone for about $25 per acre. 9

Land was rapidly being "gobbled up" for dredging. By 1911, nearly 11,000 acres near Marysville, 12,000 acres near Folsom, and 6,000 acres near Oroville were being considered for dredging. Many acres had already been mined and prospecting was proceeding with all due haste. 10

Prospecting was the heartbeat of dredging, just as it was in any form of gold mining. A mining corporation could have the best business minds, best shop personnel and equipment, and the best machinery for recovery of the deposits, but without the ability to predict where the gold was and in what amounts, it was doomed to being a second-rate profit-maker or perhaps a total failure.

8 Weatherbe, op. cit., pp. 31-33.


10 San Francisco Call Bulletin, August 13, 1911, p. 45, col. 3.
Chapter 5

EFFICIENCY OF OPERATION

Efficiency was the key to handling large amounts of low-grade ore in order to make a profit from dredging. Outside factors had more effect on the gold mining industry than on other industries in that while costs of operation were rising, the dredger could not raise the price on his product. It was fixed by law. During the seventy years that gold dredging was practiced, costs in wages alone increased approximately 1000 percent, while the price of gold failed to even double. Other costs took startling jumps as well that were not being reflected in the rising price of the product. How then did the dredging industry survive? It was a frightfully efficient operation where the small profit margin was overshadowed by the huge amounts of gravel processed by the machines. Even considering the increase in costs, these were minimal when broken down on a per cubic yard basis. In some instances, dredges were operated more efficiently than hydraulic mines. Therein lay the success of the industry.

The operational factors in the industry can be broken down into three major categories: management, engineering, and field personnel. Management was responsible for obtaining the ground and equipment, hiring the needed personnel, and supervising the overall program. In hiring a placer engineer, management faced a crucial decision for the skill of the engineer determined the outcome of all other personnel's work. The engineer was responsible for designing a plan for the plot of ground to test
whether or not gold was present in sufficient quantities to warrant dredging. His was the responsibility also to keep all data secret to maintain land values at a reasonable level in the eyes of management. Field personnel were responsible for carrying out the decisions made by management and the placer engineer. The efficiency of this group in recovering gold from the ground worked either made or broke the operation. The machinery was no more capable of extracting gold than the men running it. 1

An incident occurred on a dredge in the Oroville area which points out the importance of the skill and care of the field personnel. A deck-hand or oiler was going ashore to dump a bucket which held the drippings from a gear assembly. As he was about to empty it on the ground to be dredged, the dredgemaster stopped him and suggested that he dump the crud behind the boat. Had that oil been poured in the path to be dredged, the oil would have coated the inside of the revolving trommel, reducing its ability to break down the gravels and much gold could be passed onto the stacker-conveyor and lost without having even gone over the gold tables. Other gold would have passed over the riffles of the sluices floating on a film of oil.

The theory behind the operation of a gold dredge is relatively simple, but is belied by the sheer size of the machine. The basic principle is the same as that used in panning, sluicing, or even hydraulicking. Gold is a heavy material which will settle to the bottom of a sluice with water passing through it. These sluices, or gold tables, are cleaned periodically.

A dredge may have been over 300 feet long, including the bucket ladder and stacker. The hull often measured 150 feet by 60 feet wide. A continuous chain of buckets are attached to a superstructure called a ladder in the bow of the boat. Such a bucket ladder might include eighty-five buckets, each capable of scooping up thirteen to eighteen cubic feet of material and carrying it up the ladder to the upper tumbler which turns the bucket over and starts it on its way back to the bottom of the pond to pick up another load of gravel. A modern dredge could operate at a speed that would dump nearly forty buckets each minute, depending on how hard the deposit being dug was.

As the bucket dumps, the gravel falls into a revolving drum, lined with holes, called the trommel. Up to 5000 gallons of water are sprayed on the material to break it up and separate the gold-bearing material from the rocks. The rocks too large to pass through the screen are then passed to the rear of the boat and picked up by the stacker-conveyor and dumped on the cobble piles behind the dredge. It is these piles which caused most opposition to gold dredging in California.

Material that was washed through the screen dropped onto the gold tables below. These tables were simply a series of sluices, with angles attached to create riffles approximately two and a half inches apart. The tables were laced with mercury which readily attracts the fine particles of gold and forms an amalgam behind the riffles. Periodically, more mercury is added to "beef-up" the ability of the riffles to attract gold. A clean-up operation is made every seven to ten days to take the gold-mercury amalgam from the tables. Such an operation can take as little as three hours to clean 5600 square feet of gold-saving tables. The amalgam is then taken to the retort house where it is boiled. Since
Plate 9 - Folsom #8, showing bucket ladder assembly, making a first cut across the face of a pond. (California State Library)

Plate 10 - Loaded buckets ascending ladder to be dumped into the trommel. (Mineral Information Service, Vol 28, No. 5)
the mercury boils at a lower temperature than gold, it vaporized first and is passed down a cooling tube to be condensed and reused. The remaining gold is then poured into molds, cooled, stored, and then sent to the mint in San Francisco. The product of this vast operation is now visible and can be held by a single man.

During this whole process, the winchmen (one per shift, three per day) are responsible for guiding the dredge with a series of levers in the control room, three stories above the deck of the dredge. The boat is anchored by means of a spud dropped into the mud at the rear of the boat. This seventy-ton steel bar is used at the pivot point by which the winch-man swings the dredge back and forth across the pond by taking up on the cable anchored on one side of the pond and playing out slack on the other. When the bucket ladder weighing up to 500 tons reaches the side of the pond, the ladder is lowered two to three feet and the process is repeated. When the bank has been scraped away to bedrock, the boat is "stepped-ahead" and the whole operation is repeated. In a normal twenty-four hour working day, ten to fifteen such moves are made as the machine rips endlessly into the terrain. In a year, a large dredge is capable of turning over two million cubic yards of earth.²

If the gravels being worked were too deep to be reached by the ladder, the level of the water in the pond was dropped to reach the gold pockets. This meant having a bank that was up to twenty-five feet above water-level. To avoid undermining the bank and having it cave in, which was not only dangerous, but also could dump gold behind the ladder, hydraulic monitors like those used in the Sierras were used to wash the

Plate 11 - Revolving trommel, exterior view.
(California State Library)

Plate 12 - Interior view of trommel showing the use of high pressure nozzles to break down gravels. (Mineral Information Service, Vol. 28, No. 5)
banks into the pond ahead of the digging ladder. When this technique was used, dredging had assumed all of the methods used in hydraulicking. Dredging had simply refined the techniques and had become a very sophisticated, compact form of hydraulicking.

It is very difficult to point out one factor as being the most important in the prospecting process as gold content could be overruled by such factors as the depth of bedrock; the presence of many large boulders; gravels so hard-cemented that they were nearly impossible to work; or rough surface conditions. The most important features were, however, that of sufficient gold content, the feasibility of economic operation, and the presence of enough ground to warrant the cost of equipping at least one dredge. Such decisions lay in the hands of the engineer in charge of prospecting and his report on how much gold was actually present. With later techniques it was possible to estimate gold content within plus or minus five percent, if the methods of drilling and panning were used carefully. Perhaps the greatest factor which affected drilling results was the presence of large amounts of muddy water while drilling and dredging. In an area which encompassed 224 acres of land, 113 acres had a thick layer of soil overlaying it, while the other 111 acres were only lightly covered. After the area had been dredged, those acres with much covering soil produced very muddy water during operations and returned 89 percent of the amount estimated by drilling. The land

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3D'Arcy Weatherbe, Dredging for Gold in California, 1st edition, (San Francisco: Mining and Scientific Press, 1907) p. 86.


5Daily, op. cit., p. 85.
Plate 13 - Gold-saving tables (sluices) aboard the Camanche Dredge. (California State Library)

Plate 14 - Winches used to control the movements of the Camanche dredge. (California State Library)
Plate 15 - Hydraulic monitor being used on Capital #4 to break down a high bank that is too dangerous to dredge. (Mineral Information Service, Vol. 28, No. 5)

Plate 16 - Bucket ladder on the new Folsom #8 being assembled. Each bucket weighs approximately 4200 pounds. (Courtesy of Mary Coulter)
relatively free from much soil returned 106% of estimated gold content. 6

California operators also showed a preference for close-connected buckets on their ladders, rather than the open-connected type being used in Australia and New Zealand. Tests showed that the close-connected variety made more dumps per minute, operated with less vibration, handled boulders equally well, and showed a 34.8 percent increase in yardage handled while reducing power requirements by 32 percent. 7 These tests were conducted by the Natomas Company by using the same dredge at the same location for a test period of a month with each type of ladder configuration. The tests confirmed what dredgemen had surmised for some time, that the close-connected style was more efficient in mining gold.

Tests were also conducted to try to determine how much gold, if any, was lost over the side. Material for examination was taken through perforations in the tail sluices. Approximately two cubic yards would accumulate by the end of the day. This material was then rocked and found to contain gold amalgam, but an accurate measurement was difficult to determine. 8 It is at this point that dredgers have recently come under fire from conservationists for increasing the amount of mercury contamination found in some of California's rivers and streams.

To trap some of the gold being lost overboard, vibrating jigs were installed at different points in the gold tables. These attracted considerable additional gold, but how much went uncaught was impossible

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7 Aubury, #57, op. cit., p. 41.

8 Ibid, p. 80.
to determine. Jigs did help to increase profits though, as they required no further expenditure of time or power.9

Human error in judgment in the operation of the winches contributed to some inefficiency. To overcome this, Natomas Company installed an automatic winch control on dredge number 6 which would improve the filling of the buckets. In fifteen weeks prior to the installation, the dredge averaged 366 cubic yards per hour. During a thirteen-week test period after installation, production rose to an average 434 cubic yards an hour. In the company's mind, the important factor was the reduction in cost of handling a yard of material from 4.66 cents per yard to 4.37 cents, which would result in a savings of $10,000 in a single year.10

When figuring the cost of operating a dredge, eleven variables had to be considered.11 These included:

1. cost of power
2. rate of wages
3. one or several dredges under management
4. whether company has own machine shop or not
5. hardness of ground
6. size of buckets
7. whether buckets are alternating or close-connected
8. whether belt or bucket conveyor used to stack
9. whether revolving or shaking screen used
10. whether sand pump used
11. age of the dredge

Electricity was most often used for power as it was constant and usually the cheapest. Power was a considerable expense as Yuba Consolidated


reported in 1967 that its electrical bill often went as high as $25,000 per month, with the average dredge using $6-8,000 per month.12

Wages also had to be considered. A dredge usually had a crew of nine, or three men per eight-hour shift. In addition, a dredgemaster was hired to oversee the operation and a shoreman employed to set anchor points and to clear debris which could force a shut-down. The prevailing wages in 1910 were: dredgemasters, $125-200 per month; winches, $3-4 per day; oilers or deckmen, $2.50-3 per shift of eight hours; shoremen or outside labor, $2-2.75 for a nine-hour shift. Feelings toward the Chinese laborers were also evident as they earned $1.50-1.75 for nine hours worked.13 Chinese and other low-paid labor were used primarily in manual labor clearing a path for the dredge by cutting trees, pulling stumps, and removing debris. Some Chinese were also employed as panners in prospecting, but they were paid approximately half the $3 per day paid to "white" panners.

Considering the number of variables involved, some dredges were very efficient. During its first twelve months in operation, Folsom Development Company's number one dredge turned in a commendable record, averaging 8397 cubic yards per day at a cost of 2 1/4 cents per yard. Natomas' number six in its first year of operation, averaged a phenomenal twenty-two hours and forty-five minutes of running time a day, seven days a week. This means it operated ninety-five percent of the time including eight hours required every ten days for cleanup.14

12 Sacramento Bee, August 27, 1967, Section B-5.
13 Aubury, #57, op. cit., p. 83.
14 Aubury, #57, op. cit., p. 197.
Snelling Dredging Company, operating along the Merced River was a small operator compared to Natomas, but it also had a good record of operational time on its two dredges. The work schedule called for 363 days a year, with Christmas and the Fourth of July off. Work days were twenty-four hours long. During 1935, number one dredge operated 89.9 percent of the time while number two attained a ninety-one percent efficiency. "Down" time was reduced in several ways. Newer equipment was used that required less time for the replacement of parts (bolted bucket lips took four hours to replace while riveted would require three days to complete the job). Each dredge had a crew of fourteen, so that unlike the bigger operations, each man had one day off a week. Cleanup of the gold tables required only one eight-hour shift and was done once every ten days. With this type of operation, Snelling managed to find gold at the rate of 10 cents per yard, while holding costs to 6 cents per yard. The real financial break came for dredgemen in the depletion allowance on income tax. This could be figured at 15 percent of the gross take, but could not exceed 50 percent of the net income.15

Doodle-bugging, which had come into use in 1934, was an extensive dredging method in the latter stages of the dredging era. The primary reasons behind the use of smaller equipment was the increased portability and the ability to reach rich, small pockets of gold and work them at a profit. The initial cost of the equipment was less: $30-40,000 as compared to upwards of a million dollars for the type of dredge being turned

out in the '30's. Their major disadvantage was their actual cost of
operation was 20-25 percent higher than the floating dredges.16

Some operators of the dragline dredges depended upon portability
and luck to find gold. They would take a chance on deposits being present,
if not, they would break the dredge down and move on. Such "seat-of-the-
Pants" mining operations did not last long and careful prospecting soon
became as important to the small firm as to either Yuba or Natomas.
Financial survival depended upon working only that ground which held gold
in significant quantities.17

According to Bureau of Mines statistics, operations using the
doodlebug principle during 1934-38 period recovered 357,783 ounces of
gold valued at $12,521,957. Production by this method was on the increase.
Figures for 1938 show that 28,300,000 cubic yards of material were handled
with approximately $1,500,000 being paid out in wages and a like amount
going for supplies and power. During that year, figures show that
"doodling" accounted for 25 percent of the state's production of placer
gold, and 10.7 percent of all gold produced, including the quartz produc-
tion to Nevada and Amador counties. "Doodlebugs" had proven their worth
and were in the mining scene to stay.18

An article in a San Francisco newspaper in 1934 indicates that
the Natomas Company seriously thought of getting out of the dredging
business early in the 1930's. With the change in the price of gold in

16 Leroy A. Palmer, "Doodlebug Makes Good: The Success Story of a
New Type of Gold Dredger," California, Magazines of the Pacific, Vol. 27,
No. 2 (April, 1940) pp. 26-27.

17 Charles W. Kerrill, "Dragline Dredges, A New Way to Mine Placer

18 Palmer, op. cit., p. 27.
Table 2
Analysis of Time Lost on the Lewiston Dredge *

Total Working Hours - 3,115
Hours Shut Down - 438

<table>
<thead>
<tr>
<th>Cause of Delay</th>
<th>% of time shutdown</th>
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<td>Bowlders (sic)</td>
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<td>Clean-up</td>
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<td>Ladder</td>
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* Analysis covers the first six months of 1932.

Taken from Lewis Requa, "A Description of the Property and Operations of the Lewiston Dredge, Lewiston, California." Bureau of Mines Information Circular #6660 (1932) p. 9.
1934, their plans had been changed drastically as they were opened bids for a new dredge. Such a dredge would increase the capacity of the company's gravel handling ability by 4 million cubic yards per year. The machine was to work a newly-purchased parcel of 660 acres, enough land to keep it busy for 15-20 years. Mechanical improvements had been made in equipment that allowed land which could not previously be dredged profitably to be opened to mining. The cost to process a cubic yard of material had dropped to 4.37 cents per cubic yard in 1934, primarily due to reduced wages.19

The dredging industry had appeared to be sinking in its own pond until the gold price hike in 1934. Operators had just not been able to make a big enough profit margin to remain in business. Improvement in the dredge industry also stimulated the local economies which provided support for dredging. Yuba Consolidated began to plan a new deep-digging dredge which could go to 110 feet and carry a 30-foot bank for an effective range of 140 feet. Preparation for the dredge alone required 160 full-time employees, strengthening economic conditions in Hamonton and Marysville.20

Just as dredging's star rose in the 1930's, it became a falling star in 1942 with the institution of Order L-208 by the War Production Board, suspending all non-essential mining activities. Gold dredging stagnated until 1946. With the end of the war, dredging made a surprisingly rapid comeback. As the economy was spurred by post-war consumerism, inflation set in that would soon curtail much of the activity by driving costs and wages higher. There was to be no increase in the price of gold

19 San Francisco Chronicle, April 30, 1934, p. 2M.
20 Ibid., p. 3M.
to overcome the increased costs of the industry. The cost to operate a
dredge was the lowest of any type of mining. While the cost of labor on
all dredges increased during the period 1930-60, the amount of increase
depended upon the size of the dredge. The larger the dredge, the less
the change. In 1930 on a thirteen and a half cubic foot dredge, labor
costs averaged 42 percent, while on an 18-footer, it was 28 percent.
Increased wages by 1960 brought the figures to 65 percent and 43 percent
respectively. 21

While labor costs on the dredges themselves increased costs,
related industry costs were also rising rapidly. The average wage of a
production worker in manufacturing in 1913 was 23 cents per hour. By
1928 it had increased to 56 cents; and by 1957 it was nearly four times
the 1928 rate at $2.07 per hour. 22

At the same time, the price of iron and steel, the basic ingre-
dients in a dredge, were also increasing rapidly. According to the Bureau
of Labor Statistics, the wholesale price index on metal and metal products
in 1913 was 51.4 and by 1928, 64.5. When dredging made its comeback after
the war, it was approximately 9 points higher at 73.9. This figure sky-
rocketed until in 1957 it had reached 151.2. 23

Translated into percentages, these figures would mean that while
the price of the product had increased 169 percent between 1913 and 1917.

21 Charles W. Romanowitz, Gold Placer Mining: Placer Evaluation
22 U.S. Bureau of the Census, "Hours and Earnings for Production
States, Colonial Times to 1957, Series D, 626-34 (Washington: U.S.
23 Ibid., p. 117.
wages in related industries supplying dredging had gone up 940 percent and the price of metal 234 percent. Such increasing costs had simply taken the profit out of the industry by 1960. Only two companies managed to survive beyond that time: Natomas until 1962, and Yuba Consolidated until 1968.

The real boon to the dredging industry came obviously with the increase in gold prices in 1934. Had it not been for this increase, the industry would have been dead by World War II. The War Production Board would not have been forced to shut them down "for the duration." The efficiency with which gold was dredged after the war could not keep pace with rising costs and the unchanging price of gold. Gold dredging simply became another chapter in the history of mining in the state.
Chapter 6

GOLD PRODUCTION AND DREDGING BY-PRODUCTS

Gold production was a very significant factor in the history of California, providing the original impetus to attract thousands to the west coast. Just as it had brought many people, gold remained a major factor in the mining economy of the state into the 1950's. It has to be considered a major factor nationally as well when it becomes apparent that California has produced 52.8 percent of all gold recovered in the United States since 1792. Between the years 1849-1906, gold production in the state averaged $25 million per year. The really big years of production came in the early 1850's and dropped below $40 million per year by 1862. Most gold came from surface placer mining. The next period of big production came in 1937-41, in which the $40 million was exceeded each year. This high production can be attributed to one factor: the increase in the price of gold which brought increased dredging activity within the state.

Ralph Paine, writing in 1907, describes the gold hunters this way:

But the gold seekers, as has been their habit always, think not of the morrow. They will devour until no more remains and then will move to richer fields, leaving wreckage in their wake.


Hydraulic mining in California was killed by process of law for the reasons mentioned. But your gold miner, whether he toils at rocker or ground sluice, or from his offices in New York and San Francisco urges his $60,000 dredger to strain for greater output reekons not with the future. His viewpoint is somewhat akin to that of the lumberman of Washington and Oregon who sweeps through the primeval forest like a whirlwind and leaves a vast wreckage behind him. Wealth is in the present tense and "the sooner the quicker," is the motto of such enterprising Americans as these.

The gold dredger may be right. Perhaps the gold is worth more than the land ever will be. This is for the future to decide.3

There is no doubt that the gold was worth far more than the land from which it was dredged in a strictly monetary sense. Paine is driving at a deeper point here in that dredging companies left wanton destruction in their wake simply to produce large amounts of gold and wealth for a few greedy individuals. Gold production was what it was all about.

Where did these mining operations seek the deposits that held so much wealth? All were located on the Eastern edge of the Great Valley or in small mountain valleys of northern California. Conditions which led to large deposits of gold along rivers are pictorially described in the diagram on page seventy-nine. When a river showed the characteristics shown there, the area would be prospected to determine whether or not such deposits actually existed and the abundance of gold present. If they did, the area would be mined. Just how much gold was produced by this method? In excess of $385 million, the exact amount being difficult to obtain due to the great number of companies operating in the field.

One important difference existed between dredging and hard-rock mining in that dredgers could determine in advance how much gold was

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Figure 2

Points of Likely Gold Deposition in a River Channel

Diagram to illustrate the course of a river, indicating where gold particles are most likely to become concentrated.

Taken from Spurr, United States Geological Survey, 18th Annual Report (Washington: Government Printing Office, 1898)
present in the gravel, how long it would take to get it, and the cost and approximate monetary return. Such advantages made dredging a far less speculative business than other forms of gold mining. Gross mismanagement was about the only way that a company could fail, providing it followed accepted practices of prospecting and evaluation of the ground to be dredged.

By 1902-03, investors were already beginning to realize profits from the capital they had risked. According to the United States Mint in San Francisco, gold dredges had produced $1,475,749 worth of gold in 1903, to exceed 1902's production by $400,000. With fifteen dredges operating, the American River district near Folsom produced $3,922,000 of the shiny metal in the first ten years. To do this, the dredges had handled 37 million yards of gravel and covered 1018 acres with cobble piles.

In 1904, a small dredge field was opened near Jenny Lind, northeast of Stockton. It was a small operation encompassing 300 acres with gravel averaging thirty-three feet deep, which was overlain in most areas by hydraulic tailings. The company must not have had strong financial backing because it paid a royalty on the land to be dredged, rather than buying it outright. Outright purchase was preferred, because it was the cheaper method to acquire dredging rights to land. A mining man from Stockton reported that the dredge was recovering $12-20,000 per month in

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5 Ibid, p. 207.


7 Ibid, p. 207.
gold, which resulted in the family who owned the property receiving a
10 percent royalty of approximately $2,000 per month. The property in
this case remained in the hands of the owners after dredging, though not
of such value. The company had purchased rights which should keep the
dredge operating in the area for approximately 20 years.8

Even with the increased production by dredges in 1904, quartz
still shouldered most of the load in maintaining California among the
leading states in gold production by turning out $14,654,510 as opposed
to the $5,336,173 extracted by placer operations of all types. Dredging
at this time still did not account for half of the placer gold as it
produced a total of $2,185,812.9 The significant factor here is the
rapid growth rate in the production of gold by dredging from a negligible
amount in 1893, $18,847, to over $2 million just six years later. By
1911 the rate had more than tripled to $7,666,461.10 Gold was being
unearthed at the rate of 50 cents per ton of material worked.

By 1905 dredging had surpassed the production of placer gold by
all other methods: drift, surface, and hydraulicking. Small hydraulic
operations were still in existence, but were under the strict supervision
of the California Debris Commission which enforced the ban on dumping
tailings into California's waterways. In the year 1908, 79 percent of
all placer gold mined was the result of dredging.11

8San Francisco Chronicle, December 30, 1904, p. 10, col. 4.
9Yale, op. cit., p. 423.
11Aubury, #57, op. cit., p. 8.
Projections in 1908 stated that there was 25,000 acres of
dredgeable land in the state. If this land held gravels at an average
depth of nine feet and yielded 15 cents per yard, California’s economy
would receive a $163,000,000 boost. The land was judged at the time to
have a value of $40 per acre in agriculture and thus if all 25,000 acres
were to be dredged, only $1 million worth of land would be taken from
production. The estimates on the depth of gravels and the yield per
yard were too low, as the state grossed in excess of $400 million from
the churnings of these machines.

As the totals for 1909 were tabulated, the sixty dredges in Cali-
ifornia had produced more than $7 million in revenues. All dredges were
operating along the Feather, Yuba, and American Rivers. The twelve which
were operating in the Marysville area returned an average of $6,000 per
weekly clean-up, resulting in one gold bar being shipped to the mint
which "weighed-in" at 625 ounces. At the going rate of $18.50 per ounce,
that bar alone was worth $11,552.

Lewis Aubury, State Mineralogist, concluded in 1910 that if the
Present rate of growth in dredging continued and lode production maintained
its current levels, by 1912 California would reassume the lead in gold
Production for the United States. Dredging continued its phenomenal
growth and California did reassume its role as the number one producer of
gold.

12 Aubury, op. cit., P. 52.
13 Charles S. Aiken, "Farming for Gold," Sunset, Vol. 23 (July-
December 1909) p. 652.
14 Aubury, op. cit., p. XIII.
Improvements in machinery kept pace with the rapidly-increasing
gold production. Such improvements and enlargement of equipment made the
"California-type" dredge the model after which other countries patterned
their's. In fact, some dredges that were running out of land to dredge,
or whose hulls were deteriorating, were being dismantled and sent to
dredge rivers in South Africa and South America.

By the beginning of World War I, dredging had gone through its
"golden era." With the onset of the high-flying economy of the 1920's,
the industry faced a steadily deteriorating situation that was not to be
remedied until 1934. In fact, many operators were going out of business.

President Roosevelt's signature on the act raising the price of gold
resulted in a real bonanza which was reflected in the following production
figures. In 1932, all California mining produced 569,167 ounces of gold
valued at $11,765,726, while in 1937 these figures had jumped to 1,174,578
and $41,110,230 respectively.

When a dredge such as Yuba Consolidated's number seventeen had
worked its allotted ground, it was put up for sale or dismantled and
scraped. The operations of the company had declined steadily since 1912
when it had twelve dredges working. Only three were still operating in
1932 and number seventeen had suffered shut-down in 1926. Apparently only
marginal ground remained and no mining engineer could extract gold from
ground where it did not exist. No new ground was available.

The "wand" of the federal government brought Yuba number seventeen
back to life in 1934 when gold prices were raised to $35 per ounce.

15Ibid.

16Charles W. Merrill, "Dragline Dredges, A New Way to Mine Placer
Marginal land that could not previously be worked, now offered profitable digging. Another active period of gold dredging was underway.

Yuba Consolidated held a large piece of marginal land near Hammondton which had already been worked. Earlier equipment had not been able to dig to bedrock, so the land would be reworked by dredges capable of digging to 150 feet by using a 110-foot digging capacity and then carrying a 40-foot bank. To do this, number seventeen was rebuilt to such specifications in Yuba's shops and recommissioned July 16, 1934. She was now 510 feet long from the tip of her bucket ladder to the end of her stecker. The hull itself was 233 feet long and 68 feet wide.17

With the increase in the price of gold, the government not only was willing to buy all the gold available, but also it would finance the building of new dredges in areas where prospecting had shown the gravels to contain sufficient gold to bring a profit. Several new fields had been opened under the direction of the Reconstruction Finance Corporation. This investment was hardly a gamble, as a paying field would cover the cost of a dredge within a year or two.

The state mineralogist had estimated a few years before that there were 7 billion cubic yards of dredgeable material in California. If these produced gold at the rate of 15 cents per cubic yard, which is not high by California standards, gravel beds in California would yield approximately $2 billion in placer gold. These deposits were located primarily along the American, Bear, Feather, Mokelumne, Consumnes, Calaveras, Stanislaus and Yuba Rivers. Outside of the Mother Lode, large enough deposits to

warrant dredging were found along the Klamath, the Trinity and the upper reaches of the Sacramento River. Since the discovery of gold at Sutter’s Mill at Coloma in 1848, $1,930,000 in gold had been taken in California by 1937. If estimates were accurate, California had yet to reach the midway point in gold production.18

The introduction of “doodlers” to the dredging fields swelled gold production in the 1930’s. In 1938 alone they mined a total of 141,154 ounces of gold worth $4,940,340 from lands that five years previous had been considered worthless for dredging. This was the highpoint for gold production by the small operators of the state.19

In the 1930’s, gold production picked up in the northern mountain areas of the state. Gold mining in the area had been defunct since the court’s decision to disallow hydraulic digging as a legitimate form of gold mining in 1884. Between 1938-42, six dredging companies had resurrected gold mining in the area and had turned out 140,000 ounces of placer gold valued at $4,900,000. These deposits had also returned marketable quantities of platinum.20

During its sixty years of dredging activity, the Natomas Company managed to get $90 million worth of valuables out of 900 million cubic yards of earth. This was a very common return in dredging of 10 cents per cubic yard. The low price of gold and the high price of production

18 "Buckets of Gold," op. cit., Pg. 51.
forced Natomas out of the dredging field in 1962. 21 Richest of the dredge fields in terms of the amount of gold produced for the number of acres mined was Oroville. This area had traditionally been an excellent surface gold field. At Bidwell Bar, on the North Fork of the Feather River, from 1849 to 1897 $5 million in gold was taken by hand mining. Total gold production within five miles of Oroville totaled $62,263,000, including the Chinese Lava Bed Mine begun in 1871. 22

For dredging, 1897 was the mystical year, for it was that year that the Archimedes was commissioned to begin scratching the gravels of the Oroville for gold and found what it was looking for. Gold bearing sand and gravel in the Oroville area ranged from twenty to forty feet deep and rested on a false bedrock of volcanic ash. This yielded 3–35 cents per cubic yard. There are records of higher yields, but the average ran about 15 cents per yard, or about 50 percent higher than the field at Natomas and 25 percent higher than Yuba's at Hammonton. Land values varied, but averaged about $1,000 per acre with a high of about $3,000.

By 1916, $26 million in gold had been taken out. Oroville gold was extremely fine and averaged $18–22.50 per ounce which was very high. Some platinum was recovered as were buckets full of buckshot from hunters who used the area for recreation. 23

The largest, most efficient, and profitable dredge site in California was that owned by Yuba Consolidated at Hammonton, near

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21 Sacramento Union, May 10, 1964, Section C, p. 4.
Marysville. 1,081,000,000 yards of earth were dredged at an operating cost of 6.3 cents per yard. Gross return for the project was $138 million or 12.75 cents per cubic yard. During its span of sixty-five years, the company used sixty-five dredges to accomplish the feat, comparable only to Pato Consolidated Gold Dredge Ltd. in Colombia, South America, a subsidiary of the International Mining Corporation. In 1968, Yuba Consolidated turned its attention completely to the manufacture of steel products. 24

By 1965, California gold production was rapidly slipping to insignificance. In that year, gold production for the state slipped to 63,000 ounces to place it sixth in the nation. Of this amount, 54,000 ounces had been contributed by the Yuba Consolidated field. When dredge number twenty one was shut down, California slipped to the bottom of the list of gold producers, an unlikely spot for "The Golden State" which had produced a record "take" in 1852 of 3,932,631 ounces of gold worth $81,294,700. 25

**BY-PRODUCTS OF GOLD DREDGING**

As the dredgers chewed their way through the land, some very unlikely by-products were turned up. Minerals found in the process included: silver, lead, and platinum as osium, which later sold for $380 per ounce. No records are readily available which give statistics on how much of these materials was recovered, but they reached marketable

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proportions as reports from throughout the north state indicate that gold producers were also selling small quantities of these other minerals.\textsuperscript{26} Natomas began an experiment in 1911 that could have had commercial value if gumwood could have replaced some of the more popular hardwoods in furniture. Probably due to its lack of grain, it did not receive much popular support. Natomas had set about to offset some of the criticism it was receiving for destroying the landscape of the area. It leveled some land and planted a eucalyptus grove, which the company hoped to harvest for a profit. The wood never came into common usage, but the company did prove that eucalyptus trees thrived on dredged land, cobbles and all. Nine-inch starts were set out one year. By the following year they had reached 8 feet in height. A year later, some had already reached 19 feet and continued to grow very rapidly, apparently liking the conditions. The crop was never harvested.\textsuperscript{27} The experiment did have a useful application, however, as the property now borders Lake Natoma and is owned by the state of California, and a recreation area is planned there.

Obviously, the most likely by-products of dredging to a highly-developed society are sand, gravel, and crushed rock used in building. The attempt to crush tailings and make a usable product of them was initiated in 1905 by R. G. Hanford, Vice-President and General Manager of the Natomas Company. Natomas was first into the field because of the foresight of Hanford. Folsom Rock Company was built with an experimental investment of $50,000, but before the experiment paid off, $150,000 had been sunk into the project. Initial success of the operation was great.

\textsuperscript{26}Sacramento Bee, August 27, 1967, Section B. p. 5, cols. 1-3.

\textsuperscript{27}Aubury, #57, p. 241.
enough to warrant the building of rock crushing plant number two in Fair Oaks in July 1909. This plant remains in operation today.28

Difficulty was encountered early in the project in building the crushing equipment strong enough to stand up under the extreme pressures required to crush the cobbles. Once this problem was mastered, the plant was capable of turning out 1,500 tons of crushed stone of various sizes a day. Railroads were persuaded to try it and results were so favorable that soon the Southern Pacific was hauling it for ballast to all locations that made such a haul economically feasible.

In 1907, the Sacramento-Folsom road became the first paved road in the north state. This 22-mile experiment was so successful, that crushed rock was soon highly prized for road building in heavily-traveled areas.29 This experiment had such an impact that San Joaquin County included $1,890,000 in its budget for 1908 for road paving on 238 miles of the county's roads. Without dredger tailings, such materials would probably not have been economically available for some time.30

The economic value of dredge tailings depended upon their location. If they were within a reasonable hauling distance of cities, there was a ready market for them.31 Supplies such as La Grange were not tapped for nearly 50 years, while some areas of the extreme north state have yet to be used. By 1910, the value of the tailings had become so great because of the rock-crushing technology, that the tailings had become a "co-product

28Ibid., pp. 224-25.
30Ibid.
31Aubury, op. cit., pp. 236-37.
rather than a by-product." Just how big was this side-industry? In 1911, Natomas owned two plants capable of producing 1,500 tons of rock per day. Rocks being handled varied in size from small pebbles to boulders up to 20 inches in diameter. During 1910, the company shipped 15,713 railroad cars of crushed rock and gravel. This equaled a trainload of 50 cars, six days a week for the entire year.

Two of the most "glamorous" projects using tailings were the Don Pedro and Oroville Dams. In the La Grange area, 16.4 million cubic yards of the material have disappeared into the earth-fill dam. An area that had been for many years the target of ecologists and conservationists has been leveled and will eventually be turned into a park and fishing area. The seemingly useless tailings of the dredging operation had proven useful. It seems a bit ironic, that the Don Pedro Dam project begun September 5, 1938, would inundate the town of Jacksonville. The town was named for Alden Jackson who discovered gold there in 1849 and created a brief boom. Dredging had taken over in the area in the 1930's seeking gold too deep to be uncovered by the 49ers. The miners and the dredgers have gone and so soon will be the town that started it all.

To the north lay Oroville with its fields of tailings, and what had been the richest dredge field of all. Work in the area had stopped in 1950 as the Gold Hill Dredge Company shut down operations, awaiting an

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32. Ibid.
increase in the price of gold. Aggregate in the area was producing an income of $10-30,000 per acre, which was comparable to the "take" in gold. The tailings left in this area were to serve as the 730 foot high wall to hold back 3.5 million acre feet of water in the Feather River canyon. The project, begun in 1961, required 80 million cubic yards of fill material to complete the dam. The dam was a response to the Yuba City-Marysville flood of 1955 and its completion should avert such a disaster in the future, as well as supply water for the needs of land to the South.

Gold brought thousands to California and its production was a sizeable industry for 117 years. Whether the gold or its by-products will contribute more to the wealth of the state remains to be seen. It appears at this time that the value of the rocks and sand will far overshadow the profits of dredging itself. In terms of the business ethic of the day: the gold dredger was no more exploitative than the lumberman; other forms of mining; or meat-packing. Each robbed man, nature, or both for profit. Dredging was simply applying the accepted profit-loss business principles of the day to a different industry, much to the chagrin of conservationists and the local citizenry where dredge fields were located. There have been benefits from the by-products of dredging. Generally, however, the dredging industry attitude was, "The public be damned, we'll do what we want with our own land."

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37 Sacramento Bee, September 17, 1959, p. 6, col. 1.
Chapter 7

DEBRIS AND RECLAMATION OF DREDGED LAND

When Californians heard the decision in *Woodruff vs North Bloomfield Mining Company* (1883) enjoining that company from dumping hydraulic tailings into waterways of the state, residents generally breathed a sigh of relief. Tailings from those mines had caused extensive damage in the valleys below and now the problem, if not entirely alleviated, would become far more manageable. The villains of the valley had been defeated. Was the problem of silting really that large, and just how was it related to dredging?

In the California Debris Commission report of 1895, hydraulic mining's effect on agricultural lands and navigable waterways to tidal areas was investigated. Results of the silting had caused the channels of the waterways to build up much more rapidly than their banks so that the channels virtually disappeared. When the flood waters of winter came, these streams spread over large areas of the valley, often covering them with sand and gravel several feet deep, destroying their value as agricultural lands. The amount of debris reaching the streams and rivers reached gigantic proportions. In 1914, a study gave the following estimates: for the mountain belt, 170 million cubic yards; piedmont, 478 million yards; valley region, 100 million yards; for a total of 748 million cubic yards of debris. The problem was a sizeable one, particularly in view of the fact that this figure is 3½ times the volumes of the cut taken for the Panama Canal.
Estimated damages to agriculture were likewise very large. In all areas of the north state, 39,214 acres were destroyed and 13,955 acres damaged. Monetary loss for agricultural purposes was set at $3,254,035. If the costs of erecting and maintaining levees to protect surrounding agricultural areas are considered, the total costs rise to $5,552,025.¹

According to reports of the California Debris Commission, the Yuba River rose fifteen feet between 1849 and 1881. By 1905, it had risen another three feet to eighteen feet. Depth of the fill ranged from a low of seven and a half feet at Marysville, to a high of eighty-four at Smartsville.² The Yuba was the worst of the rivers in terms of debris for it drained such key mines as Malakoff Diggins, Red Dog, and You Bet. The same problems were created to a lesser extent on other rivers however. The Sacramento River between the Feather and the American, raised an average of ten feet and narrowed the channel by one-third. In the area between Gray's Bend and Hayes Landing, five miles north of Sacramento, there was virtually no fall to the river which normally had a fall of six inches per mile. This sand barrier acted as a dam and threatened large tracts of Yolo County land with flooding. Edwards Woodruff, who successfully sued the North Bloomfield Mining Company, was paying 6 percent per year

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in levee tax to protect his Rock Farm from the water. That farm was constantly threatened by flood waters dammed up by tailings dumped into the river by hydraulic operations upstream.

By their very nature, rivers are the recipient of thousands of tons of silt a year from the erosion process. How does this compare to the amount of additional debris introduced by hydraulic mining operations? In the Mississippi River Basin, including the Missouri, Platte, and Ohio Rivers, the buildup of wash is one foot every 4640 years as shown by Humphrey and Abbott of the Mississippi River Commission. State Mining Engineer Hall fixes the natural and mining fill in the Feather River and its tributaries at 1.6 million and 9.7 million cubic yards respectively. The riverbed rose as much as forty-five feet in some locations. By comparing the Mississippi and the Sacramento Rivers, it becomes apparent that the valley dwellers had a legitimate complaint against the hydraulic mining operations as they were being carried on. The figures comparing the natural and mining debris in the Feather would further tend to incriminate the hydraulic mining methods.

In its decision of 1881 in the case of the Black Diamond Coal Mining Company, the Supreme Court negated the contention of the coal company that it had a right to carry on its mining operations no matter what damage resulted. The court declared that "mining was not paramount" and was subject to controls of its neighbors and the effect it had upon their land.


4Ibid., p. 11.
and livelihood. This was a precedent-setting case for Californians also, for it could be applied to such operations as the North Bloomfield Company. Miners could now be held accountable for their actions and the results of those actions. In 1883, with the decision favorable to Edwards Woodruff in his suit against North Bloomfield Mining Company, hydraulic mining came to an abrupt halt in the state. With this background in mind, we approach the connection between hydraulic mining and dredging.

Dredging used the same principles and techniques as did hydraulic mining. Only the size of the operation was different. The dredger was a far more compact plant, making it far easier to control. Despite this fact, it did not go unnoticed by the public in California, which regarded it very suspiciously and even with outright contempt. Dredging was not even ten years old when the Anti-Debris League, which had retired after the Woodruff decision, began to stir. Having been successful, it assumed that its protection of the agricultural interests of the valley was no longer needed. It had not reckoned that a new, more efficient means of mining and denspoiling the valley was being devised and perfected.

Once realizing that dredging was equal to the destruction of hydraulic mining, an Anti-Dredge Convention was called for July 21, 1909, in Sacramento to discuss problems that were being created by the dredging of the rivers of the valley. Mayor Clinton White of Sacramento had invited 177 delegates from Antioch, San Francisco, Oakland, Los Pios, Biggs, Mills and Sacramento. The purpose of the convention was to draw up a course of action against dredging if necessary. Of primary concern was the debris left behind and that which was allowed to pass into the river system and

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5 Ibid., pp. 32-33.
cause further problems by silting and pollution. A new fight was shaping up. This time the question would be far more esthetic than in the case of hydraulic tailings. Ultimately the case would be determined by economics rather than by the opposition of the Anti-Debris League.

Agitation by agricultural interests was apparent by 1910. Had the anti-dredging convention thoroughly checked out the situation along the Yuba and American Rivers, they would have found that dredges represented no threat to the quality of the water, nor to the waterway itself. They were in fact, impounding much sand and keeping it from passing into the stream.

On the Feather River, early operations had left tailings in the channel which caused flooding in the adjacent lowlands during flood times. By 1910, all dredges were working inland and created no problem for the waterways themselves. The pollution problem of dredging was not really as serious as most of the solids stirred up by dredging were impounded and settled out of the water in a settling pond. In Croxville, where more "colored water" was apparent than elsewhere, an analysis of the suspended material showed that "clear" water contained 8.854 grams of solids in solution as compared to the worst reading in murky water of 2020.612 grams per gallon, or approximately 3½ percent. Here a real problem did exist, but it was not widespread.

Anti-pollution forces won a major victory in July of 1910 with a Superior Court decision from Judge Post, forbidding North American Consolidated Mining Company or its successors from dumping tailings, sand,


gravel, boulders, or other debris into the Yuba River, Slate Creek, or Little Slate Creek. This order applied to all future companies and was regarded as a major victory for anti-dredging forces.\(^8\)

In Trinity County, a unique situation developed which was not covered by previous court decision or legislation, as there was little or no agriculture in the area and the stream is non-navigable. This situation came to light nearly twenty years later when resort owners in Humboldt County began complaining that stream pollution was interfering with their trade during the tourist season. The controversy was finally carried to the legislature where a compromise bill was enacted which stated that during the three months of summer, starting July 15 each year, sediment in the stream was not to exceed fifty parts per million parts of water by weight. The water sample was to be taken at a point one mile below the Trinity-Humboldt County line. Even though restrictive, mining operations were able to continue during the summer months.\(^9\) The real problem for anti-dredge forces was that the pollution caused by dredging operations was more visual than actually measurable in streams. To further complicate their position, much of the land being turned over by the dredges was marginal farmland, hardly good for pastureage. The battle continued for over 40 years before counties began passing local ordinances that would put an end to the unsightly cobble piles by demanding that any new land introduced to dredging be resoled, restoring it to as near its original state as was possible.

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\(^8\)San Francisco Call Bulletin, July 17, 1910, p. 32, col. 2.

AGRICULTURE QUESTION

The question as to whether or not the land could be returned to agricultural use was a burning one. It was the point around which the opponents of dredging rallied, making it an emotional argument which the public could not completely ignore. Their point being that if the land could not be returned to full productivity, it should not be dredged.

Mining interests viewed it in another light. They took the position taken by most of industry during the years of industrialization that the public was being done a large favor by this added stimulus to the economy. State Mineralogist, Lewis Aubury, best sums up their position in 1908 with the following statement:

The question of reclaiming these lands for agriculture after they shall have been dredged is hardly worth discussing at present; but, in the course of time, as farming lands become more valuable, they could be leveled with scrapers run by electric power and then covered with soil hydraulicked in the foothills and run down by flume. In the meantime, however, a large proportion of the rocks will disintegrate and so make soil.10

To the mining man, the question of agricultural land was one about which he was not particularly concerned. To him, he was increasing the value of the land's productive capacity in terms of dollars and was unconcerned whether or not it would grow vegetables or fruit when he finished with it.

As productive agricultural land, much of the area dredged was of little or no value. Much of it was unfarmed, even as pastureage. Prices for such land varied from $15 to $35 per acre around Crosville and $50 to $60 per acre in the Folsom area. Yet, in the Crosville area, some land

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10 Lewis Aubury, Gold Dredging in California, California State Mining Bureau Bulletin #36, (Sacramento: State Printing Office, 1908) p. 17.
brought as much as $3,000 per acre, with the average of $100 per acre for the entire Oroville tract. 11

Operations in this area would mean an annual payroll in excess of $1 million, supporting two or three thousand people. Over $2 million was invested in shops and repair facilities, much of which was spent in wages and accrued to the local community’s economy. Once production of gold began, the wealth of the nation would be spurred on by the collecting of more than $60 million in gold to be added to the gold reserves. 12 For these reasons, it seemed logical that the local community would benefit greatly from the introduction of dredging to their area. The dredgemen were more to be praised than censured for their actions in the eyes of many local residents.

If this condition at Oroville were projected for the entire north state dredging areas, the economic projections would be similar. If from the 25,000 acres of dreggeable land available, the average yard of earth produced 15½ in returns and the ore lay an average of 9 yards deep, the return to the state in gold would be approximately $163,350,000. 13 These estimates proved to be very conservative as the Hammondton field of Yuba Consolidated nearly produced that amount of gold by itself. The returns were there and the land apparently was not that productive agriculturally, so dredging moved onto the land to reap its rewards.

Farming and conservation interests were sarcastic of the actions of the dredgemen and branded them as "cynical". An editorial in the Pacific Free Press discussed the plans of some companies to reclaim the land that they had turned upside down. The plan called for the leveling

11 Ibid. 12 Ibid. 13 Ibid.
of the land and allowing the top to be covered with a layer of cobbles to prevent the escape of moisture and the growth of weeds. Trees would then be planted. The heat stored by the rocks during the day would be dissipated into the air at night, increasing the growth of trees and fruit and decreasing the chance of frost damage. To this point, the orchardist could see the project as feasible as there were some orchards and vineyards which had been planted under such conditions and were doing quite well. The real hangup as the agriculturalist saw it was the care of the trees once they reached the bearing stage. How was the fruit going to be picked and hauled? By air? For certainly these rituals would be difficult to perform on the cobble-covered earth. The editorialist also suggested that "pruning, spraying, and other orchard operations could also be accomplished from above."\(^{14}\) In the case of spraying, the writer actually proposed a very common method used today, that of using the airplane. Obviously, the other operations would not be so easy to accomplish from the air. The idea of cobble-strewn orchards did not prove out, but this is more likely due to the poor quality of the soil rather than the interference of the rocks themselves.

In the Oroville area, dredged land was good for little else. In the Oroville field, only about 400 of the 6,000 acres dredged was ever farmed and it is doubtful if any more than 1,000 acres could be farmed even with irrigation. Much had been made by the Anti-Debris elements of the farmland that was being destroyed, but most of the vineyards of the area were infested with phyloxera. J. H. Leggett was considering pulling

out his entire 150-acre vineyard because of the almost-always fatal disease. Of the orchards in the area, most produced a crop every second or third year. In addition to the poor productive capacity of the area, most of the farms were heavily mortgaged and the movement of dredges through the area hardly hurt the farmers.15

On the Yuba River, the question of destroying land was a different one as most of the dredge field here consisted of river bars covered by hydraulic tailings which were subject to periodic inundation. In this area, the dredges were actually hired by the State of California to erect embankments of tailings to protect the surrounding area from overflow. The work was directed by the Army Corps of Engineers. Generally the land in the area was extremely poor and probably produced better crops if needed after reclamation than was possible before dredging, as some of the original topsoil would be brought to the surface to be mixed with the sand and gravel of the hydraulic tailings.16

Land in the Folsom region was similar to that in Groville. Much of it had been worked previously by surface placer mining operations and was unfit for agriculture. Of the 6,000 acres, barely 2,000 were ever planted to vineyards. When the vineyards themselves were dredged, the Natomas company was planting an average of two acres elsewhere for every acre destroyed in dredging. Most of this planting was taking place on Natomas land being reclaimed along the Sacramento River north of Sacramento.17

15 Aubury, #57, op. cit., pp. 241-42.
16 Ibid., pp. 242-44.
17 Ibid., pp. 241-42.
Of the smaller dredge fields, little if any land was intensively farmed. In Placer County, along the Bear River, some land had been used for grazing. Most of the land was overlain by hydraulic tailings and was virtually useless for agriculture. In Calaveras County, 250 acres had been sold to a farmer on the condition that the land would be leveled, the cobbles removed, and the ground suitable for planting when turned over to him. The cobbles were sold to a rock-crushing company.

In Merced and Stanislaus Counties, the ground was of little value for farming although some was fair grazing land. In the counties to the north, Siskiyou and Shasta, the land dredged was found in small mountain valleys and was of no consequential value other than mining and recreation.\(^\text{18}\) Even when tempered with the fact that the evaluation of the land was done by the State Mineralogist, it becomes apparent that the land was not very good farmland at the time that it was dredged.

With the lull that came to dredging during the 1920's and early 30's, the issue of land use was not a hotly-contested one. When the price of gold was raised in 1934, conservationists and dredgers were again at loggerheads. Newer techniques were being developed that could be used if the dredge men were forced by either public clamor or legislative action into resoiling the land that they dredged. If the oversize rocks were dropped closer to the rear of the boat, they would be much easier to cover with sludge and fines and thus would not leave the "topped" appearance that characterized dredged areas.\(^\text{19}\)

\(^{18}\text{Ibid., p. 245.}\)

This would create certain problems such as how to carry a high bank when working very deep deposits as found along the Yuba. Here the cobbles would pile up and prevent the boat from having a freeswing to operate across the face of the cut and might make the mining of such deep deposits impossible. When the dredgers were ultimately faced with the resoiling issue, the profit had dropped out of the operation and dredging was abandoned; such practices were never adopted for use in California.

If dredgeable land were really valuable for farming, why did the farmer sell? Simple: the profit motive. The land was marginal and he could sell his poor land and invest in good farmland if he wished, or simply take the money and run. An Oroville man was going to sell his orange orchard as it was tough making ends meet. When he found out the land was valuable for dredging, he changed the asking price from $100 per acre to $2,000. The difference between the old price and the new represented an increased profit of $22,800. Another farmer in the same area sold his olive orchard for a sum that he could not have hoped to attain by working the land for a lifetime.20

When approached by dredgemen seeking to work his property, James H. Leggett sold some acreages outright, while selling only the mineral rights to other land. After this land had been dredged, it was leveled for planting. On the land Leggett planted grapes, oranges, almonds, and figs. These were doing quite well. "Fruit," Leggett said, "is sweeter and ripens earlier." He also reported that this land required only 5 percent of the water needed on regular land to sustain trees. This may be due in part to the fact that the water table was quite high as they found grapevines that

had grown 6-12 foot roots to reach a permanent water supply. The land he replanted to tree crops was most likely not marginal farming land before it was dredged. Leggett undoubtedly had reasons for selling some land outright, while selling only the mineral rights to other areas. Farming of such areas was possible, but in most cases not likely, for the value of the ground did not warrant it. The land had already been productive in gold, and in the thinking of the day it was not necessary to be productive in two ways. More land was always available.

In terms of agriculture, most of the land in California that was dredged, was of little or no value. Though this was the argument that was most often used in opposition to gold dredging in the valley, actual opposition centered around the aesthetic value of the land's appearance. Certainly dredging did nothing to enhance the appearance of the countryside. The cobble piles remain in most areas, and even on Sailor Bar of the American River where dredging ended sixty years ago, little vegetation has actually returned. A few cottonwoods and scrub oaks dot the barren landscape, but little else is able to grow to hide the scars.

One question will remain unanswered, as only those who actively opposed dredging could answer it on an individual basis. Would they dredge their own land if they had any, and the opportunity presented itself? The questions would have particular significance if they were struggling to make ends meet on marginal land and dredging suddenly offered them the chance to become wealthy and solve their financial crisis. Only the most ardent crusader against this method of mining could resist the temptation.

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When dredging swung into full action, shortly after the turn of the century, land was plentiful in the state. In most people’s estimation land was unlimited. As early as 1908, State Mineralogist, Lewis Aubury, recognized that if a productive land crisis did hit the state, the land that was dredged would certainly be reclaimed. But he saw no real reason for concern because of the small amount of land involved. Land areas of the state total 156,637 square miles or 100,183,680 acres, and even if the total 25,000 dredgeable acres in the state had been dredged, it would still represent only .03 of 1 percent of the land area of the state. If it were compared to the 1950-59 average acreage of land under cultivation of 8½ million acres, it would still represent a little under 3 percent of the agricultural land in the state.

In terms of thinking at the turn of the century, this amount of land really was of no consequence. Few people foresaw the population growth that would put the state well over 20 million by 1970. Even with the apparent need for productive land within the state today, we still see thousands of acres a year turned over to subdivisions. It is doubtful that the dredgeman exploited the land any more than the subdivider.

Overabundance has bred a contempt for conservation throughout the history of this nation. A very small percentage of people actively oppose the "throw-away" concept of living because it is so inconvenient. That same overabundance of new land allowed for exploitation of that land in many forms. Gold dredging was one of the culprits.


Chapter 8

LITIGATION INVOLVING DREDGING

In the early stages of gold dredging in California, opposition had been more vocal than active. Little, if any, court action is noted, though organizations such as the Anti-Debris League sought legislation that would close down dredging operations throughout the state. By the late 1930's, this position was changing as increased operations brought renewed vigor from its opponents. Now local governments had been convinced of the evils of dredging and began passing ordinances against dredging, unless the land was resoiled after the passing of the dredger. With this change came increased courtroom activity initiated by the proponents, as well as the opponents of dredging. The two major issues were: dirty water (stream pollution), and resoiling.

The first publicized suit came out of Merced County and was dropped five years after it was filed because of a lack of prosecution. Apparently the plaintiff did not have a strong case. Kate Jorgenson went into Merced County Superior Court and charged the Snelling Dredging Company had crossed the Merced River with its dredge, causing much debris and milky water to flow into her canal, destroying her crops and rendering her cattle unfit for use for three years. She also charged that the stone piles left caused the course of the river to change, lessening the value of her canal and water rights.¹ Though her allegations may have been

true, she found it would be difficult to document them in a court of law and allowed the suit to drop.

Another canal case faced Snelling Dredging on September 22, 1938, when Leonard S. Spears filed a suit claiming that the dredge was cutting across his canal causing the banks to collapse. In doing this they were interfering with his ditch rights, water, and water rights and that they intended to continue to do so. As a result, the company was ordered by the Superior Court: to pay $200 to the plaintiff, construct a new ditch on land that had clear title, and to build a road along the ditch. In the future they were warned not to interfere with the water rights of Spears. In return, the company was allowed to dredge the ditch itself. ²

Not only was Snelling being sued from time to time, but sued one of its neighbors on one occasion. In a suit filed February 24, 1949, the company complained that "Rosalind Stivers and others" were "squatters" on land that had been deeded to the dredging firm by the Yosemite Valley Railroad Company. However, a clause had been written into the original deed that if the railroad abandoned its right of way, ownership of the land would revert to its original holders. The court upheld the original deed and ownership of an undivided three-fourths of the property was given to the Stivers.³ Thus the Snelling Company lost two of the three cases it faced in court.

After World War II had ended and War Production Board's Order L-208 shutting down non-essential mining activities was rescinded, dredging revived at a phenomenal rate. This surprised virtually everyone.

²Ibid., p. 10. ³Ibid.
Opposition to the industry grew just as readily, only this time much of the opposition came from local governmental agencies, namely the county boards of supervisors in the several counties being dredged. In late 1945, Merced County adopted a new ordinance requiring that all land dredged be leveled and resoiled after the operations were completed. The Merced Dredging Company challenged the ordinance in court.

Federal Judge, W. C. Mathes of Los Angeles, was brought in to hear the case as an impartial outsider. The court agreed to try the constitutionality of the ordinance in the Spring if it decided not to dismiss the dredging company's complaint. Walter A. Stammer, special counsel for the county, argued the case for the defense. He declared that the ordinance called for no "new conditions to be created, simply that the old be restored." In many cases, the land had no agricultural value so there would be no resoiling required. By leveling the cobblepiles, the area would be free from ponds where mosquitoes bred in large numbers. He also stated that the dredging company did not deny that the appearance and agricultural values of the land were destroyed. Judge Mathes stated that the court's position was simply to determine whether or not the ordinance accomplished its stated purpose. Constitutionality of the police powers being used would be heard at a later date.

When opening the dredging company's argument, attorney Robert Searls stated that the ordinance, if allowed to stand, would effectively prohibit dredging in Merced County. Searls contended that there were only 2,000 acres of dredgeable land remaining in the county and that Merced Dredging was interested in only 400 of them. To block further profits of the company would be "unconstitutional and confiscatory." Agriculturally, he argued, the land was of little or no value to
posterity. He stated that all the ordinance could possibly accomplish was the formation of more rock piles. Traditionally, the courts held that the owner of the property had the right to choose whether he wished to use the land for agriculture or for its minerals. Merced Dredging owned most of the land it intended to dredge.

If the ordinance were to be upheld, Searls contended, the company would be forced to halt operations. By having to resoil, the company would lose $1,127 of a gross income of $3,350 per acre dredged. Such a loss would make dredging unprofitable and operations would cease.4

When the decision was handed down, the dredging company had managed to stay alive. Judge Mathes declared that a resoiling ordinance could not be based solely upon aesthetic values, but had to be based on the land's being made valueless for agriculture and tax purposes. Since this was not the case, Merced Dredging had won the first encounter with resoiling.5

To the north, another dredging company was soon to face court action because of its operation. Residents of the small farming community of Durham held a mass public meeting at the Durham Elementary School on March 28, 1947, to consider asking for an injunction against the Lancha Plana Gold Dredging Company which was operating in Butte Creek. The residents claimed that a flood hazard was being created by the impeded flow of the creek. Ralph Baxter, chairman of the group, stated that the company was enjoined in 1913 for operations in the same area.6 On April 5,

the group decided to officially seek a court injunction against the firm. Even though the community itself would not be threatened by flood waters, the area is intensively farmed for almonds which cannot stand an overabundance of water. A flood could prove catastrophic to the farming interests of the area.

Harrison Smitherum of the State Department of Water Resources stated, after an inspection of the area in question, that the sand and gravel from the operation would eventually clog the stream's flow, while Chico's Rod and Gun Club had found that salmon spawning activities in the creek had been severely curtailed. Company officials were asked how long the dredging would continue and they replied that it would take at least another 19 months to complete the job. All parties involved in the dispute agreed to meet again on April 15. At that time, the situation was solved when the Lancha Plana Company agreed to move its dredge out of the stream channel itself to prevent further damage to the channel, as well as irrigation water and wildlife.

In the meantime, Butte County's supervisors were working on an ordinance to ban further dredging in the county without resoiling the ground worked. Meeting in June, they had nearly reached the final product. Though they would like to have had the law apply to lands owned previous to their decision to be resoiled, Deputy District Attorney, R. A. Leonard, reminded the body that such a law could not be passed simply to preserve the aesthetics of an area. Such an operation, as determined in the Merced decision, had to injure the agricultural or tax

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7Sacramento Bee, April 5, 1947, p. 19, col. 5.
value of the land to be halted. The supervisors solved their dilemma by simply agreeing to exempt property owned by the dredgers prior to the passage of the law.9

Soon after the ordinance passed, the dredgers responded with a suit filed against the county and its supervisors. Yuba Consolidated and Gold Hills Dredging Companies asked that the federal district court enjoin the county from putting the ordinance into effect. If the injunction was denied, they asked for $1.5 million in damages to cover the $1 million invested by Yuba and the $500,000 that Gold Hills stood to lose if the law was upheld. The companies asked that the ordinance be declared "unconstitutional and confiscatory" as in the case in Merced. They claimed that their companies' operations were not affected with the public interest and the ordinance was "an unreasonable exercise of police power in that it imposes impossible conditions upon the dredge operators." This claim included the stripping and resoiling of land to be dredged.

Also, the companies charged that the agricultural value of the land was less than its value for dredging. Thus enforcement of the ordinance would force the companies to cease operations, and this they saw as unjust since they were operating on private property.10 Judge Dal Lammon ruled in favor of the dredge operators when he declared that enforcement of the ordinance did in fact represent an "unfair use of police power."

Butte County was also brought into federal court on a suit by the Reconstruction Finance Corporation asking for a permanent restraining

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9Sacramento Bee, June 26, 1947, p. 15, col. 4.
order as well as $140,000 in damages. The RFC had taken over Oroville Dredging Company to whom it had loaned $181,000 in 1939 in an attempt to bail the company out of financial difficulty. In its argument, the federal authorities stated that the ordinance purported to regulate an industry that does not affect the "public morals, health, safety, or welfare and therefore is invalid." The suit also contended that the county was exercising "unreasonable police powers" as it placed impossible conditions on the dredge industry. If the ordinance were allowed to stand, the RFC claimed, the agency would lose the loan money balance which it had loaned in 1939 on the basis of the dredgable land held by Oroville Dredging. It had projected at that time that the loan could be paid back without the necessity of resoiling or leveling. Loan repayment would be impossible under the new conditions and the taxpayers would be short-changed.\(^{11}\)

In December 1947, part of the Butte County ordinance became a "dead" issue when Federal Judge Dal Lammon ruled that the county was in fact "exercising unfair police power" in demanding that lands owned previous to the passage of the ordinance be resoiled. This portion of the ordinance he ruled was therefore unconstitutional. Companies affected by the decision were Gold Hills Dredging, Yuba Consolidated and the Reconstruction Finance Corporation. This decision did not throw out the provision of the law which required any land acquired after April 14, 1947, to be resoiled. It also applied only to land on the Feather River between Oroville and Biggs as no other land was included in this specific decision. Butte County District Attorney R. A. Leonard stated on hearing the judge's

\(^{11}\) *Sacramento Bee*, October 2, 1947, p. 10, col. 4.
position, that the decision would very likely go unappealed as the cost of such an appeal would exceed its chance of success.12

This temporary order of the court was followed in September 1948 by a permanent restraining order from Judge Lammon against the enforcement of the resoiling ordinance. The dredging companies were now free to operate at will on the land they owned prior to April 1947. In his decision, Judge Lammon reiterated his position of December, calling the stopping of established business an "unfair exercise of police power." He cited the fact that one of the firms had been operating in the area for more than nine years, and that the total value of the land held by the three companies exceeded $900,000. Experts had testified that it would cost $2030-3096 per acre to resoil compared to profits of Gold Hills in 1947 of $115 per acre and $765 per acre for Yuba Consolidated. Enforcement of the ordinance would deny the firms the right to mine their own property.

In his concluding statement, the judge commended the Board of Supervisors for their concern and attempts to preserve natural resources of the county. This law was regarded as the most stringent conservation law passed since hydraulic mining was stopped in 1893. In conclusion, Lammon stated that the prohibition of dredging on agricultural land could be enforced as long as it did not interfere with established business.13

With this permanent order, Butte County decided to drop its fight to preserve agricultural lands from dredging. It did not appear profitable for the county to maintain its position in the face of two courtroom

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13Sacramento Bee, September 14, 1948, p. 8, col. 1.
losses. The decision in the Merced case which held the same position also must have influenced their decision, for the decisions in both cases maintained the same position. The counties had lost their fight to end dredging, or at least the visual blight caused by the mining. But economics would soon end the industry that couldn't be legislated out of existence.

Butte County had one last controversy over dredging procedures before the industry folded up there. Aero Development Company had been granted a permit to dredge marginal lands in August of 1953, but not without heated debate. The county's permit stated that no resoiling was necessary since the land was of such poor agricultural value. No problems resulted from the resoiling issue, but rather from the failure of the company to live up to the provisions of the permit, when it allowed water to run across Honcut Road at Fine Gold Gulch. The permit was revoked and a $2500 bond was levied to put the road back into good condition.

By the time that county governments became concerned over the despoilation of land by dredging, the industry had been operating in some areas for nearly 50 years. They found that when they went into court against such "established business," they were unsuccessful. No law could be made retroactive and be enforced against land that the dredging interests held prior to the passage of such ordinances. When it became apparent that this was going to be the position of the courts, the counties really dropped the fight over previously-owned lands.

14 Sacramento Bee, October 1, 1948, p. 10, col. 3.
15 Sacramento Bee, December 25, 1953, p. 17, col. 3.
The ordinances did have their effect. Ultimately, when the dredge industry looked toward opening new mining areas, resoiling became an economic consideration. With rising costs of labor and materials in the 1950's, no new lands were acquired because whatever the profit margin was, it would be wiped out by the necessity of resoiling. The ordinances speeded up the death of an already dying industry.
Chapter 9

DESIGNING LEGISLATION TO REGULATE DREDGING

At issue in the controversy as to how dredging should be regulated was whether such regulation was the function of the county or the state. There had been agitation as early as 1904 for the passage of a law that would effectively control gold dredging in all areas of the state. The debate continued for nearly two years, with the counties ultimately passing the ordinances for control.

As early as November 19, 1904, a meeting was held in Marysville to discuss the problems of agriculture and dredging from a landowner's viewpoint. The chief concern at this time was the gravel, sand, and silt passing into the river channels and threatening to clog them. During times of high water, this would threaten the many acres of fertile farm-land that lined the riverways. There appeared to be no antipathy for the miners, but there was evidence of concern as many of the farmers remembered agriculture's experiences with hydraulicking. \(^1\) No distinct action or legislation came out of that meeting, but the concern for maintaining their land was clearly demonstrated by the farmers.

From the 1880's, the memories of the high water caused by the buildup of hydraulic tailings haunted them. Hydraulic mining had been made possible by the absence of laws, and the valley dwellers hoped to avoid a repeat performance. Hydraulickers had made their own laws

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\(^1\) San Francisco Chronicle, November 20, 1904, p. 25, col. 3.
concerning the use of water, water rights, diversion of water, and movement of natural channels to fit their own purposes. Such laws were enforced by a "popularly-elected judiciary" who made them fundamental to territory and state. Ownership of property through which the water passed was the sole determiner of how the water could be used, and with this right of determination came the "right" to obstruct navigable rivers and fill up tidal bays with the debris from the mines.

The necessities of hydraulic mining dictated such freedom of action or the method could not have been used. This departure would not have been tolerated in other areas which followed "the laws and traditions of old civilized communities," such as New York. New York would hardly have allowed such mining practices to take place on the upper reaches of the Hudson River, while the navigable portion of the river and its harbor were filled with silt. Rights of other residents along the waterway would have to be observed.² Agricultural interests of the valley could not forget the wanton destruction caused in the valley by the tailings sent down from the hydraulic mines. Failure of the state to enact any laws at all governing the hydraulicicking allowed its destruction to continue from 1856 until 1884 virtually unchecked.

With its decision in the Woodruff vs North Bloomfield Mining Company (1884), the U.S. Circuit Court perpetually enjoined and restrained the company from:

...discharging and dumping into the Yuba River or any of its forks, ravines, or branches, or any stream tributary to the river, any tailings, boulders, cobblestones, gravel, sand

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clay, debris, or refuse matter from the tracts of mineral lands
of mines, and also from allowing others to use the water supply
of their mines for washing such materials into rivers or streams.3

The courts had taken action where the legislative bodies of the state had
failed to act.

Nearly ten years later, the California Legislature took action in
relation to hydraulicking by passing the Caminetti Act of 1893. Under
provisions of the bill, hydraulic mines could be operated in the state,
but were under the strict supervision of the California Debris Commission.
All debris from the mining operations had to be impounded and not allowed
to enter navigable waterways, nor injure the lands of other persons. Pro-
visions of the law were found in the California Civil Code, Sections 1424
and 1425. Major lobbying for the law had been carried by the valley-based
Anti-Debris Association.4 Though mining operations could continue after
the court decision on the basis of the Caminetti Act, hydraulicking died
because the costs inherent in impounding and caring for their debris took
the profit out of the method.

Hydraulicking had created an emotional response from those who
were affected by the operations, either directly or indirectly. Its demise
signaled a need for a new method of mining low-grade gold deposits profit-
ably. A logical answer was found in dredging. Just as hydraulic mining
had been an emotional issue, dredging would soon become one.

During its tenure, dredging "suffered" from much misinformation,
as illustrated by a letter-to-the-editor in a San Francisco newspaper in

3 Charles G. Yale, "Mining Debris Legislation," California Mines
and Minerals. (San Francisco: California Miners' Association, 1899) p. 256.

4 Ibid., p. 258.
1935. A Mr. J. F. Campbell of Modesto wrote against the destruction of valuable land by dredgers and the subsequent loss in tax revenues from the land. Mr. Campbell states that he had been informed that 100,000 acres of land along the American River had been dredged, and called for support of resoiling laws being discussed in various legislative bodies. Not only in terms of taxes, but aesthetically, many people were upset by the signs of dredging along many of California's rivers and sought legislation to have it regulated.

Early regulation of gold dredging, oddly enough, came from the laws instituted to keep the hydraulic mining in line. Some of the early dredges were built and operated within the rivers themselves. Due to the urgings of the Anti-Debris Association, this practice was soon curtailed as the Caminiti Law was brought into effect against the dredgers. Under this pressure, mining interests began digging ponds away from the rivers and assembling their gold-digging craft there. Water for the pond either came from subterranean sources, or was piped or ditched in. The pond held the debris from the operation from moving into the river and upsetting the neighbors. Sometimes the water in the pond would become so soupy that a settling pond would be dug nearby to settle out the solids while fresh water was brought into the digging pond to keep the operation going.

If a company found it necessary to operate within a stream itself for the purpose of crossing, state laws found in the State Resources Code

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covered such operations. If an owner wanted to move his dredge across a stream and the cost of building settling ponds in the stream would be unduly heavy, he would have to notify any water district operating a domestic system, whose water quality would be affected, at least seven days before any such crossing. Upon the expiration of this notice, the dredge operator would have forty-eight hours to move the machinery across the affected stream. Failure to follow these provisions would constitute a misdemeanor and could be declared a public nuisance. The superior court of the county in which the incident took place had jurisdiction in the matter.7

The first law to directly regulate dredging came out of Merced County on September 13, 1945, when the Board of Supervisors passed Ordinance #253 which required that the sand be replaced over the rock and then covered with three feet of topsoil. When Judge Mathes issued an injunction against the county in 1946, the Board of Supervisors passed Ordinance #263 stating that there could be exceptions to resoiling providing the supervisors agreed to it.8 This allowed the county to regulate any new lands that might be considered for dredging while allowing those lands already contracted for by the dredgers to be worked without forcing a court fight. A legislative body had finally taken a stand on the issue, though they lost the court struggle over the constitutionality of such enforcement.

Approximately five months after passage of the Merced ordinance, a group of statewide leaders representing legislators, county officials, farm


and sportsmen's groups met in Sacramento to coordinate efforts to stop the dredging of farmland in California. Senator E. H. Dillinger of El Dorado County, an outspoken critic of dredging, was elected the temporary chairman of the group. He considered putting the issue on the ballot in a general election, but decided to await the outcome of the constitutionality test of the Merced ordinance. According to Senator Dillinger, the purpose of the group was not to destroy dredging, but rather to stop the ruination of good farmland by insisting that the good soil be replaced over the rock and sand. Two alternatives lay open to the group: to support the counties who had already formulated ordinances, or to encourage individuals to seek resoling clauses whenever contracting for dredging. The meeting broke up with no official position being taken other than to await the Merced decision and to meet again.9

By this time, Butte County was seriously considering the adoption of a resoling ordinance. It was similar to the Merced county law, but called for a panel of five men to sit and decide whether the proposed land to be dredged was marginal or good farmland that had to be returned to its original state.10

When meeting again on the issue in May, the Butte Board of Supervisors decided to postpone a decision until the September meeting. An opponent of the ordinance, Assemblyman Seth Millington of Gridley, proposed that if the county really wanted to protect posterity they would appropriate $250,000 and buy the land along the Yuba and Feather Rivers at mining prices. This way everyone could share the cost, not just the

9Sacramento Bee, February 21, 1946, p. 8, col. 1.
farmer who would be unable to sell to mining interests. Farmers were getting approximately $700 in royalties per acre, whereas crops would bring in about $50; the farmers had a right to earn a profit from their land. Perhaps Millington put his finger on the pulse of the "to dredge or not to dredge" question best of all when he stated that opponents of dredging had no dredgeable land. When considering much of the land that was to be dredged, it was marginal or poorer which didn't make for very wealthy farmers for the most part. When gold dredging became a possibility, then a reality for some, they financially made out better than their more prosperous neighbors.

On July 11, 1946, the conference on the feasibility of a state-wide dredging law reconvened with representatives from the legislature, farming, and mining interests in attendance. Agriculture took the position that even marginal lands must be kept fertile, for some day new dams and irrigation would make them productive. A. F. Knorp, attorney for the dredgers, stated that there were approximately 15,000 acres of dredgeable land left in the state and of that figure, nearly 85 percent had very little, if any, agricultural value. Herbert Sawin, who represented a mining equipment manufacturing firm in San Francisco, told the committee that there is less arable land being used in California than is going unused. Only a few hundred acres of really good land have been destroyed by dredging, while those same dredgers have produced over $500 million in gold since the turn of the century.

12Sacramento Bee, July 12, 1946, p. 4, col. 3.
While discussing the Trinity County ordinance, the miners pointed out that they could live with such an ordinance provided they weren’t forced to resoil any land they had already contracted. Such a position was not surprising, for the dredgers had contracted enough land to keep operating several years without having to seek new land. Therefore, most of the resoiling ordinances would have no effect.

Opposition to the statewide legislation also came from the California Supervisors’ Association. Their position was that a statewide law requiring resoiling would be unnecessary duplication of laws already on the books in many counties. As an alternative, the group suggested that a model county ordinance be worked out with the help of Senator Dillinger who introduced the resoiling measure in the state legislature in 1945. The idea was accepted and a meeting was held the following day to draft a model ordinance.

When the committee met, it adopted an ordinance similar to that contested in Merced County which called for the resoiling of any land of agricultural value. An exemption would be granted for marginal or non-agricultural lands that were being considered for dredging. Bonds to insure the resoiling would have to be posted, not to exceed $10,000. This proposition met the approval of agricultural groups, including the state Grange, the district attorneys of the counties, but lacked the support of the mining interests. The question that still held the key to their support was, “Will presently contracted land have to be resoiled?” Robert Searls, an attorney representing the dredging companies, stated that he

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14Ibid, August 24, 1946, p. 4, col. 4.
would sue any county which tried to enforce such a provision. Searls had been successful in fighting that provision in the Merced ordinance, getting it declared unconstitutional as an "unjust use of police power."

The dredgers remained adamant in their position that they should be able to work their own private property any way they saw fit.

After being worked out by this committee of interested parties, the measure came up for consideration before the legislature's Interim Committee on Natural Resources, which passed it with a majority. There were three dissenting votes, one of them being Assemblyman Seth Millington of Gridley, who had fought the issue in Butte County. He still maintained the position that the dredge operators should not be forced to resoil any land on which the resoiling would cost more than the value of the land for agriculture.

Senator Dillinger, who had been fighting to have a state law passed which would regulate dredging, saw it as a beginning, stating: "This agreement marks the turning point in a long and bitter fight. We cannot consider the matter closed by any means. The public must be kept alert."

And alert it was! There was growing public opposition to the destruction of land by dredging. Getting the matter discussed on the state level was getting public attention, even if no specific regulating laws were passed. Senator Dillinger warned against complacency and urged all counties to adopt the measure at once and enforce it so that future generations could not say, "Why didn't they do something about it?"

Having had success in the Interim Committee, Senator Dillinger reintroduced his bill for the leveling and resoiling of dredged land at

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15Ibid, September 6, 1946, p. 4, col. 3.
the opening of the 1947 legislative session. Basic criteria of the bill followed the guidelines put forth in the Merced County ordinance. To check constituents' feelings on such a law, the senator had sent out questionnaires to residents of El Dorado County during the recess of the 1946 session. El Dorado County was facing expanding dredging operations along both the south fork of the American and the Consumes Rivers. The Consumes land was prime river bottom land that had been intensively farmed. Out of 52 responses, all favored such legislation, which prompted the senator to challenge allegations by the mining industry that a majority of people were against required resoiling. He also asked anyone who was in disagreement with his findings to take an independent poll of any section of the state and the results would be the same. He suggested that Montgomery Street in San Francisco might be left out of such a poll as he alleged that "It is only the gold diggers of Montgomery Street who want to line their pockets with gold and leave the piles behind for posterity." With California's centennial coming up, Dillinger questioned whether it made sense to invite the world and then to hold the celebration amongst the rockpiles. Certainly the investment interests had a great deal at stake in the issue. Returns from dredging had been averaging twice the costs of dredging, making for a good investment and there was much money to be lost if resoiling were to be enforced. The dredgers were used to having a free rein in running their operations with no outside interference.

Sentiments against the dredgers were running high. Senator Millinger reported more support for this legislation than for any bill he

16 Ibid, January 6, 1947, P. 4, col. 7.
had offered. On April 14, 1947, the Butte County Board of Supervisors passed a resoiling ordinance which was similar to Merced's, but which included land that had been previously contracted in its provisions. Seth Millington claimed that Merced had made a general exemption of such lands. Butte District Attorney, Jack McPherson, called Merced officials to determine what position they had taken on the issue. They claimed that all the land exempted was marginal for farming and thus did not come under the auspices of the ordinance. Apparently Merced County had avoided the issue over previously-contracted lands, which was logical in view of the court case they had lost in 1946 on the issue. Butte County was going to have to make the decision on its own.

While Butte County was determining the interpretation to be used on its newly-passed ordinance, the State Senate Natural Resources Committee set a hearing on Senator Dillinger's S. B. 973 on resoiling for May 5. The committee scuttled the bill by voting 7-0 for tabling the measure. Resoiling was a dead issue at the state level until further hearings could be held. These were scheduled for the Fall. Apparently the committee had been more impressed by the dredgers' plea that dredging was a "dying industry" than the opposition's position that acre after acre of land was being turned into rock piles.

Moral support for the dredgers was lent by the reelection of Senator Thomas McCormack as President of the Katomax Company. Also telling was the fact that seven of the eleven counties which had encountered dredging had already passed local ordinances to regulate

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\textsuperscript{18} Ibid.

\textsuperscript{19} Ibid, April 15, 1947, p. 11, col. 4.
the industry. The attempt to regulate the dredging industry on a state-wide basis had again been stalled for six months. The industry did realize by this time that its profitable days were passing rapidly and were fighting to make those last days as financially rewarding as possible.

As the legislature struggled to deal with the resoiling issue, Butte County moved into the execution phase of its ordinance. An advisory committee was named to determine the agricultural value of any land upon which dredgers sought a permit to dredge. The committee consisted of: the county consulting engineer, county horticultural commissioner, the county assessor, and two individuals to be named by the dredge industry. The county farm advisor was to meet with the group in an advisory capacity only as he would need special permission of the University of California to become a voting member of the panel.

A good soil map of the county existed, and all lands of the county would be plotted with value determined. Land which was deemed to have only medium value would only have to be leveled and not be resoiled. Determination of the value of the land had to be made before the county could issue a permit to dredge the property. Here again, the miners contended that land contracted previous to the passage of the ordinance in April was not regulated by the law. The two major firms working in the area challenged the ordinance in court and won the case before Judge Lammon who stated that such a use of police power would be unjust and unconstitutional.

In Siskiyou County the battle lines were being drawn in the summer of 1947 over the issue. Here the mining interests were opposed by the

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recreation interests. Under the law, any land that was to be mined by any method required a permit from the Board of Supervisors who would decide what type of follow-up work, if any, was needed. The dredge operators and mine owners were opposed to any institution of a Merced-type law for the county. They contended that the topography of the two regions was so dissimilar that the law would be of no use in the county. Merced was primarily an agricultural region, while the major economic factors in Siskiyou were mining and timber. There was little, if any, agricultural land to be considered. Seventy-five percent of the river frontage was owned by mining interests and for those owners, "rugged individualism" was the recurring theme. According to George Noonan, "You are taking in a lot of territory when you tell a man what to do with his own land." At the close of the heated two-hour session, the dredgers agreed to level tailings for vacationers and fishermen to reach the water and unanimously agreed to level and resoil agricultural lands.22

Legislative hearings on Dillinger's Bill reopened in October, before the Assembly Interim Committee on Soil Conservation in Chico. Dillinger still sought the resoiling of all fertile land, stating that no one was trying to drive the dredgers out of business, they simply wanted some of the dollars in gold taken out of the earth to be used to restore the land to its previous condition. He contended that the return in gold per acre ranged between $3-11.000 and that resoiling would cost $75-200 per acre. The Senator charged that the dredgers had been "ruthless and arrogant" and had held a "public be damned" attitude for

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over thirty years. No conclusive action was taken by the committee and the bill died.

Though resoiling was reintroduced by Howard Cramer as A. B. 102 in 1949, it appeared to be in trouble from the start. Von T. Ellsworth of the California Farm Bureau testified that the language of the bill was mild compared to the restraints that should be placed on the dredgers "for the good of society." He did agree that land unfit for agriculture should be exempted. Apparently the chief challenge to such a measure was voiced by Assemblyman Randal Dickey of Alameda County. He felt that such a law would be superfluous since the counties already had the power to regulate the industry through ordinances. He felt that the state should maintain a hands-off policy since the counties had sufficient power to regulate. Since it could not muster enough support, it died. After these hearings in early 1949, statewide regulation truly became a dead issue as there were no more hearings. County regulation made the position of proponents of the measure too weak to pass it.

Land values in the minds of dredging companies were responsive to the law of supply and demand. Butte County, which had wrestled for some time with the problems of dredging, faced a new situation in March of 1949. The county had a practice of reassessing land that was about to be dredged at $1500 per acre. After the dredge had completed its work, the land was reassessed at $5 per acre, more or less its agricultural value. When the county tried to buy some of the low-value land for a garbage dump, it found that the dredging companies thought it was worth

23 Ibid, October 2, 1947, p. 10, col. 3.
more than $5 per acre, in fact more like $125 per acre. The Board of Supervisors passed a resolution proposing that the land be reassessed at the higher value. 25

Back into the headlines came the resoiling issue on the statewide level in 1951. Assemblyman Everett Burkhhalter of Los Angeles County introduced A. B. 2376 to halt the movement of dredgers without resoiling. In 1949, the theory had been adopted that the counties had sufficient powers of regulation, therefore, no state law was needed. Burkhhalter contended that the counties had failed to act and effectively deal with the destruction, therefore, a state law was required. Albert F. Knorp, representing the California Chapter of the American Mining Congress, disagreed, stating that only Sacramento County of the eleven counties affected by dredging did not have an ordinance. The reason that Sacramento had not passed such a law was that they had a "gentlemen's agreement" with the dredging companies that no new lands would be opened to dredging. If they were, the county would pass a law to regulate them. In the other counties, local ordinances had proven effective in dealing with the resoiling issue. 26 The bill failed, the issue died permanently at the state level.

As the state effort to legislate against the dredgers failed, how can the effects of resoiling ordinances best be assessed? Were the dredges driven out of existence by county ordinances? If the ordinances had any real effect, it was simply to speed the demise of the dredgers. Rising costs in labor, materials and operating expenses actually put the

dredges out of action. Ordinances only helped it along by a couple of years.27

It would appear that the battle over resoiling was waged to soothe the public's conscience over the defacing of the land. There is no evidence of major resoiling projects, other than the one at Jenny Lind where 250 acres were contracted to be returned, resoiled for farming purposes. Had the dredging industry been able to overcome the rising costs with no increase in the price paid for gold, the issue might have come to a real showdown in which the land in question couldn't be conveniently declared marginal with no resoiling needed. The federal court decisions over enforcing ordinances on previously-contracted land greatly weakened the power of the counties to act. If "dredging hadn't died," and new lands were opened for dredging, no doubt public opinion would have forced resoiling on such properties. As it was, the industry died down before the ordinances could really be given a test.

27Crews, op. cit., p. 10.
Chapter 10

CONCLUSION

Gold dredging was a big business which died a natural death. Neither legislation nor public opinion killed it, rather it had gotten into difficulty in the profit-loss column. Dredging had managed to keep placer mining alive in California seventy years after court order and legislation closed the hydraulic mines of the Sierra Nevada. By 1956 it became apparent to those in the industry that the days of the huge machines churning up profits were numbered.

With the crush of people rushing into the mountains of California, during the Gold Rush, better means of extricating the wealth found in placers were constantly being improvised. In the first three years, operations were notably small, seldom finding more than three individuals combining their efforts. Most miners worked as individuals, and surface placer mining had yet to become big business. All this began to change at American Hill, north of Nevada City, and at Yankee Jim's in Placer County, when in 1852 hydraulic mining operations were opened there. A successful method had been found to handle large amounts of gravel which would necessitate investment of thousands of dollars. By 1864, the rush for surface placers by individuals was over and mining corporations were formed to seek out deposits which often lay buried several hundred feet deep.

Hydraulic mining provided nearly all of the placer gold taken in the state between 1864 and 1884. The Court's decision in Woodruff vs
North Bloomfield Mining Company (1854) brought hydraulic operations to an abrupt halt, as the mines were no longer free to dump their debris into the waterways which lay below them. Even with the passage of the Caminetti Act of 1893, which allowed hydraulic mining to continue, provided dams were built to impound the silt and gravel washed away, failed to bring the industry back. Proven to be costly, the dams were never built and hydraulic mining never revived.

Interest in mining placer gold had never waned as the lure of quick wealth was always present. With the hydraulic mines shut down, Wendell P. Hammon, a valley orchardist, became interested in gold dredging as it was practiced in the rivers of Australia and New Zealand. Enlisting the aid of Thomas Couch, a noted Montana mining engineer, he built the first successful dredge in California. The Archimedes was launched in 1897 and proved an instant success, though she was lost in the floods of the next winter. Gold dredging had been born, an industry that was to survive for over seventy years, adding approximately $600 million to the economy of the state.

At this point, gold mining was strictly big business, with such large companies as Natomas Company and Yuba Consolidated Gold Fields developing into international corporations. Only one instance is known where a single individual developed his own gold dredging company. Laurence Gardella of Oroville bought a used dipper dredge to work the family's ranch along the Feather River in the years 1903-09. At that time, the dredge was moved to land holdings along Honcut Creek. Gardella was an exception because of the amount of money necessary to begin dredging. At the turn of the century, a continuous-bucket dredge cost approximately $250,000. By the 1930's, the larger machines could cost
over $1 million, an expense that few individuals were willing or able to risk.

Such mining operations did not differ much from other business operations of the day that were involved in seeking out natural resources. Little, if any, attention was paid to conservation. There would always be another field to mine, another forest to cut, as the natural resources of this country were inexhaustible. Conservation, or restoration of the land to its former state, did not concern the large corporations involved. They were too busy strengthening the economy of the country to notice the destruction left in the wake of their operations. Conservation efforts just weren't profitable.

Dredging left approximately 25,000 acres of rock piles in the north state. There was no concern for posterity as it had to view the havoc created with nature. Land in the state was unlimited and it did not matter if irreparable damage was done to a few acres, besides, the land was privately-owned and according to "frontier ethic" a man had a right to do with his land as he pleased. The basic question that can be answered only on an individual basis is, "Would I have allowed my land to be dredged if the opportunity presented itself?" Most likely, the temptation to make a few quick bucks and move on would be a strong one, particularly if that farmland wasn't producing very well and one was always in debt. The dredging companies depended upon this feeling in dealing with the landowners, purchased the land, and destroyed it for years to come. Overabundance has bred contempt for natural resources in this country as we blithely dig, hack, and chop our way through the countryside. No memorial is a greater reminder of man's greed than the cobble piles left by the dredgers.
The profits were there, so the machines worked un molested by the public or governmental agencies. Attempts to regulate the industry were too little and too late. Resisting became the big issue in 1946-47, but more smoke than heat was created. In the Merced decision of 1946, Judge Mathes declared that it would be an unconstitutional use of police power to force dredging companies to resoil land that they already owned or had option to dredge. A similar decision was handed down by Judge Lammon in Butte County. The issue became: not whether the county had such powers over new land to be dredged, but whether or not dredging would actually be extended to new lands. History shows that not all of the land that the companies held in 1946 was dredged, so resoiling really had little effect on the industry.

At the state level, Senator E. H. Dillinger of El Dorado County led the fight for statewide legislation to control the miners. Though the fight carried over two years, 1947-48, little was accomplished. Even most of the counties opposed state laws, feeling that it would simply be a duplication of county ordinances which were already ineffective; other than to perhaps prevent new lands from being opened up to dredging. Seven of the eleven counties in which dredging was going on already had passed ordinances to inhibit the industry from moving onto other land.

In reality, legislation and public opinion had little influence on the demise of the dredging industry. Rising costs for labor and materials were cutting into the profit margin so rapidly, that only a major increase in the price of gold could have saved the industry. The market value of gold had not increased since 1934, while some costs had risen 1000 percent. Even the volumes handled by dredgers could not
overcome such increases. By 1968, dredging was only a memory for the
state and its people. For many it is a bad memory, particularly as they
drive past the memorials left by the huge dredges. Most of the dredged
land will eventually be reclaimed as aggregate for concrete, crushed rock
for railroad ballast, or as the base for new roads. As those reminiscents
disappear, will the state have learned to control such exploitative
enterprises? If not, the people of California can hardly complain, for
the passing of dredging has given them a brief look at what can happen
without adequate planning and concern. It has been said that "Hindsight
is 20/20." It is foresight that is so much more difficult to master.
Lessons learned from the dredging era must be passed on so that the
natural resources can be used in the best public interest. If this
happens, the Natomas Companies and the Yuba Consolidateds have actually
improved California's future.
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