THE CHURCH MINE.

This mine adjoins on the north the old Springfield or Church Union Mine, which was worked to a perpendicular depth of sixteen hundred feet. It is situated in the Mud Springs Mining District, three miles southeast of the town of El Dorado, formerly known as Mud Springs. It lies on the mother lode, and the vein at this point has a course of about 15 degrees west of north, and the dip on the surface was westerly about 80 degrees for one hundred and fifty feet in depth. For the last one hundred and fifty feet the dip has, however, been easterly, at about an angle of 80 degrees with the horizon. The ore shoot is lenticular in shape, and has a width of fourteen feet, in its widest place, and a length of about seventy-five feet. There is another shoot that has not been explored. The dimensions of the claim are fifteen hundred by six hundred feet. The mine is opened by a tunnel two hundred and forty feet in length, reaching a vertical depth from the surface of eighty feet, at one hundred and forty feet from the mouth. It is connected with the surface by a shaft sixty-five feet deep. The mine is worked principally through a shaft three hundred and fifteen feet deep, and practically vertical. The hanging and foot-walls of the vein are black slate. The mine yields about twenty thousand gallons of water per day. The water is raised from the three hundred level to the two hundred, by a four-inch plunger pump; from the two hundred to the surface by a six-inch Cornish jackhead pump. The Richmann upright duplex compressor, and Richmann drills are used. Six hundred pounds of Safety Nitro, No. 2, powder are consumed monthly; and about one hundred pounds of three-quarter-inch Firth & Sons steel. The cost of mining is about $2 per ton. The surface tunnel, which required no timber, was driven for about $2 50 per foot. The work was done with single hand drills, and two to three feet of progress were made in twenty-four hours. The drift on the one hundred-foot level cost, including timbers, $3 50 per foot. The cost of sinking the shaft per foot, by last contract, was $12 50 for the labor, candles, powder, etc.; the timbers being extra. The size of the shaft, which is sunk through vein matter, is four by seven feet in the clear, timbered with eight by eight-inch spruce timbers. Sinking progressed at the rate of one and one half feet per day. Sawed lumber is delivered at a charge of $18 50 per thousand; round timbers, sixteen inches in diameter at the smaller end and fourteen feet long, are delivered for $2 25 each, and five-foot lagging for $75 per thousand. All timber has to be hauled about twenty-five miles.

The company built about one half mile of road and laid two thousand four hundred and fifty feet of eleven-inch pipe, constructed of No. 12 iron. The mine and mill being close together, there is no expense for transportation of ore, except the amount paid for carman, $2 per day, which represents about 12½ cents per ton. The ore is the ordinary rock of the mother lode, free milling gold ore, containing a little sulphurets. It is wet crushed in a stamp mill, amalgamated in the battery, and on outside plates. The mill is driven by a six-foot Pelton wheel, to which water, under four hundred and seventy-five-foot pressure, is applied through a three fourths-inch nozzle. The mill contains a rock breaker, ten stamps, weighing eight hundred and fifty pounds each, dropping six inches, eighty-five to ninety times per minute, crushing sixteen and one half tons in twenty-four hours, including ordinary stoppages. The shoes and dies are of iron, from the Placerville foundry, and cost 6 cents per pound, delivered. A set of these shoes weigh one thousand two hundred and fifty pounds, and the dies one thousand pounds, and last thirty-five days; consequently the wear is three

and nine tenths pounds of iron to a ton of ore crushed, equivalent to 23¼ cents, at this price for iron. About four inches of water* are used in the batteries, with what is required for the concentrators. Tinned iron, round punched, No. 0, corresponding to No. 40 mesh wire, is used for screens for the battery, and last, on the average, one week. The screens are slightly inclined from the perpendicular, and have a discharging surface of eight inches by forty-eight inches. The aprons are four by four feet, the width of the sluice fourteen inches, and the length is twelve feet to each battery. The inside plates, which are eight inches by forty-eight inches, are slightly convex on the coating surface, and are of copper, while electroplates are used on the aprons and sluices, having a grade of one and three fourths inches to the foot. Templeton or roller feeders are used. About 80 per cent of the recovery in free gold is made in the battery, and 20 per cent on the outside plates. Four thousand pounds of concentrations are recovered monthly. The loss of quicksilver has been less than two flasks in nearly two years' milling, or approximately nine tenths of a cent per ton. The mill is furnished with two Frue concentrators. About four tenths of one per cent of iron sulphurets are recovered and sold to Selby's Works at Vallejo Junction, at a cost of about $25 per ton for freight and treatment.

There are sixteen men employed in the mine, including the foreman, four men in the mill, and five on outside work, or a total of twenty-one men. In the mine the average wages are $2 50 per day; in the mill $3, on outside work $2 to $3. One half a cord of pine wood, costing $4 50 per cord, is used for steam purposes. The pump is run by four inches of water applied to a six-foot Pelton wheel, designed for the compressor; the water driving the wheel is afterwards utilized in the battery and on the concentrators. The water costs 20 cents per inch. At the hoisting works steam is used altogether. The boiler is an upright and the engine has an eight-inch cylinder and a twelve-inch stroke. At each one hundred feet from the surface a level is driven. At one hundred feet the drift north is forty-eight feet, and south one hundred and sixty. A cross drift from the shaft to the ledge is seventeen feet in length. At the two hundred-foot level the crosscut to the ledge is thirty-two feet, and the north drift sixty-eight feet, and the south drift sixteen. At the three hundred-foot level the crosscut to the ledge is thirteen feet in length, and the drifts are progressing north and south. All developments from the two hundred-foot level down to the present depth have been made during the past year, as well as some on the two hundred-foot level. A winze, being sunk to the three hundred level, has attained a depth of sixty-five feet. It is proposed to put ten stamps more in the mill and equip it with Challenge feeders, and two Frue vanners to each five stamps. It is also intended to introduce water power machinery at the hoisting works and sink a three-compartment shaft, six by sixteen feet in the clear.

The expense of milling: Labor, 73 cents; shoes and dies, 24 cents; water, 17 cents; quicksilver, screens, oil, and lights, 3 cents. Total, $1 17.

Altitude (aneroid reading)	1,200 feet.
Length of ore shoot	Two shoots: One 75 feet, other not explored.
Length of ore shaft on incline (practically vertical)	315 feet.
Depth of ore shaft vertically	315 feet.
Vertical depth reached in mine	315 feet.
Quantity of water raised in twenty-four hours	20,000 gallons.
Character of hanging-wall	Black slate.
Character of foot-wall	Black slate.
Kind of powder used	Safety Nitro, No. 2.
Quantity of powder used	600 pounds.

* The measurement of water allowed by the Park Canal Company, from which this water is purchased, is five inches above the top of a two-inch slot in an inch plank.

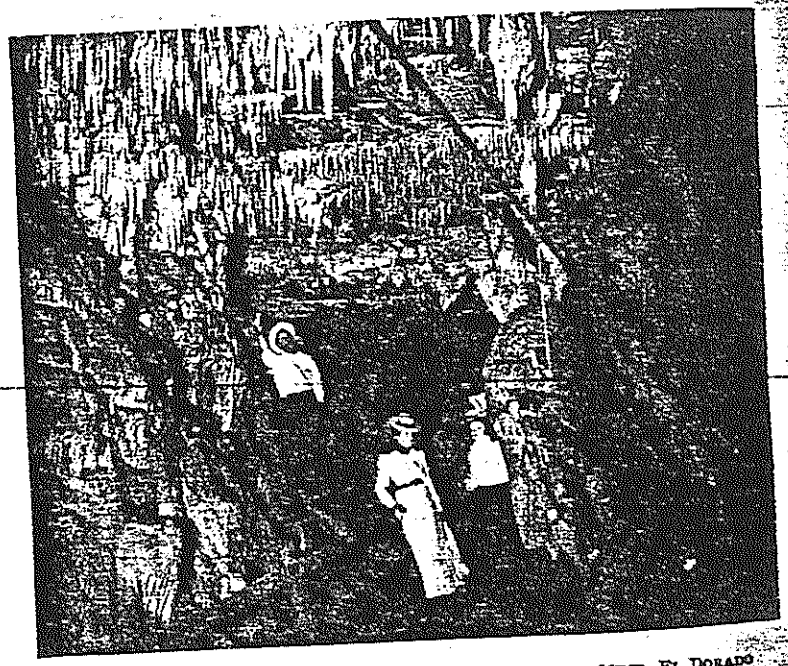
Cost of mining	$2 per ton.
Cost of tunnel	$2 50 to $3 50 per foot.
Cost of shaft (labor, powder, and tools)	$12 50 per foot.
Number of feet timbered	All.
Kind of timber	Square spruce.
Cost of timber	$18 50 per 1,000 feet.
Length of road built	½ mile.
Cost of transport of ore	12½ cents.
Character of ore	Free milling.
Character of works	Water power stamp mill.
Number of stamps	10
Weight of stamps	850 pounds.
Drop of stamps	6 inches.
Drops	85 to 90 per minute.
Duty of stamp	1 $\frac{65}{100}$ tons in twenty-four hours.
Kind of shoes and dies	Iron.
Size and character of screens	Tin: No. 1, round punched (corresponding to No. 40 wire).
Water used in battery	4 inches.
Dimensions of apron	4 by 4 feet.
Width of sluice	14 inches.
Length of sluice	12 feet.
Kind of feeder	Roller or Templeton.
Kind of concentrators	Frue.
Percentage of gold saved in battery	80
Percentage of gold saved on plates	20
Percentage of sulphurets saved	1/5
Value of sulphurets	$200 per ton.
Cost of milling	$1 17 per ton.
Cost of working sulphurets	$20 per ton and freight.
Number of men in mill	4
Number of men in mine	16
Number of men employed on outside work	5
Total number employed	25
Average wages in mine	$2 50 per day.
Average wages in mill	$3 per day.
Average wages paid outside work	$2, $3, $3 50 per day.
Wood used	½ cord per day.
Cost of wood	$4 50 per cord.
Quantity of water used in milling	4 miner's inches.
Head of water used for power	475 feet.
Water used for power	18 miner's inches.
Cost of water for milling	Free.
Cost of water for power. Mill, 14 inches at 20 cents, $2 80; pump, 4 inches at 20 cents, 80 cents.	

THE EL DORADO GOLD MINING AND MILLING COMPANY—THE SHAW MINE.

This mine is situated in the Mud Springs District, about three miles northwest of the town of El Dorado, at an altitude of about sixteen hundred and fifty feet. The course is a little west of north, magnetic, and the dip is easterly. The size of the claim is one thousand five hundred by six hundred feet; the shoots are not regular in length or width. The mine is worked by two tunnels and two shafts; the north tunnel, on the course of the vein, has a length of about one hundred feet; the east tunnel, more properly a crosscut through vein matter, has a length of about one hundred feet, also. One of the shafts is an incline about thirty-five feet deep, the other a perpendicular, about forty feet deep. The shafts are timbered with sawed pine, costing $18 per thousand. The company constructed about a mile of road, repaired the ditch, and laid several hundred feet of seven-inch pipe, conveying water to the mine and Huntington five-foot mill. The expense of water is 12½ cents per miner's inch. The mill is furnished with a Nichols pulverizer and Hendy feeder. The number of men in the mine is variable; in the mill, four men and a foreman. The average wages paid in the mine are $2 50 per day; in the mill, $3. A twelve-horse power engine is used at the perpendicular shaft, and about a cord of pine wood, costing $2 75 per cord, is consumed.

feet in width. On this deposit, less than one mile distant from the railroad depot, the Placerville Slate Company has uncovered a very fine body of pure slate, which is now being rapidly developed.

The quartz vein at Nashville was the first to be opened in El Dorado County (1851). The surface ore was very rich, and was worked for its free gold by the crude methods then in vogue. Early reports of the United States statistics show a yield from these old workings of $150,000. The first systematic work was begun in 1868. After



FLASH-LIGHT VIEW OF ALABASTER CAVE, NEAR ZANTGRAFF MINE, EL DORADO COUNTY, SHOWING STALACTITES OF CALCITE.

a period of three years, the mine paid for all of its development work, and plant costing $100,000, and paid $50,000 in dividends. The ore mined went from $3 to $15 per ton. Litigation closed the mine in 1871. In 1880, a patent was issued to Joshua Hendy, who, in 1882, developed the mine to the present 642-foot level. The ore taken from the last 100 feet of the shaft averaged $8.50 per ton. After opening up the lower levels, and taking out $45,000 in bullion, the financial condition of the owners caused them to suspend operations entirely. Nothing more was done with the property until 1894, when

lay idle until Hayward and Hobart purchased it. They operated it as the Springfield Mine until about 1887. They had a mill of fifteen 600-lb. stamps with a capacity of 26 tons a day. After an idleness of about 10 years, *Union Gold Mining Company* began work and a 30-stamp mill was built. In 1897, a production of $36,000 was reported, but thereafter only estimates of production were made public. These indicated that from 20,000 to 40,000 tons of ore was crushed annually, yielding from $5 to $7 a ton. In 1909, the last year for which any figures are at hand, 12,000 tons yielded a little over $5 a ton. The total production, although often claimed to be greater than from any other mine in the county is not definitely known.

Some of the old stopes partially checked by the last operators were found to be much smaller than indicated on a map which purported to show tonnages and gold content. It appears that both tonnages and gold production were less than claimed. For example, the Poundstone stopes, shown on the map as having a combined length of 400 ft. between the 500-ft. and 1300-ft. levels mostly north of the Springfield shaft, and claimed to have yielded $2,200,000 from 85,000 tons of ore, were found to have a length of only 100 ft.

The main veins, of which the Poundstone (East Gouge) vein has been the most important, follow the strike of the Mother Lode, north of northeast. They are linked by a series of lesser veins striking northeast. Of the latter, the Klondyke vein system is typical. This vein was found in 1898 by W. A. McCoy during the first forenoon after his employment by Harpending (then manager) to prospect for more ore. McCoy states this vein was only from 4 inches to 5 inches wide at the outcrop but of very good grade. It contained two ore shoots.

The Springfield 2-compartment vertical shaft had been sunk 1640 ft. by Hayward and Hobart. It was sunk to 1986 ft. vertical depth, with 3 compartments below 1600 ft., by Gold Fields American Development Co. This shaft is 320 ft. east of the East Gouge (Poundstone or hanging wall) vein, passing through it at 1200 ft. depth and cutting the west gouge (McCosmic) vein about 60 ft. above the 1600-ft. level. The veins steepen in the lowest workings and are claimed to join in the bottom. The shaft left the "hard slate" at 1975 ft. entering softer slate. The only work done on the deepest level, called 2000-ft. level, was a crosscut 28 ft. which showed 18 ft. of vein material with 4 in. to 6 in. of gouge on the footwall.

Only three small ore shoots were found in the recent work. On the 1800-ft. level, a crosscut 56 ft. west to the McCosmic vein struck ore which proved to be 35 ft. long, 6 ft. thick and 120 ft. high. Two other smaller bodies, called the 810 and 1210 ore shoots were also stoped, and the ore was hauled by truck to the Montezuma Apex mill. A total of about 35,000 tons was crushed in 1936 and 1937. Some of this, from the small ore-shoots mentioned, was of satisfactory grade; the average yield in 1936 was sufficient to have permitted operation at a profit if enough ore had been found. Concentrate formed 2% to 3% of ore, and carried about 35% of the gold saved. A typical lot carried about 3 oz. gold and 1 oz. silver a ton. Bullion carried 822 parts gold and 178 parts silver in 1000.

Besides the 21,000 feet of workings run by previous operators, the last two companies did the following work:

On the 1600-ft. level, 275 ft. north, 600 ft. east and 50 ft. north (mostly by Montezuma Apex Mg. Co.), 75 ft. south. On 1800-ft. level a crosscut 56 ft. to McCosmic vein and some drifting and stoping on it. On 2000-ft. level, a crosscut 28 ft.

On the 1200-ft. level, a total of 1575 ft. of old workings was reclaimed. The old 1000-ft. level was opened for 175 ft. from Springfield shaft and a new 1000-ft. sub-level was run 125 ft. The 800-ft. level was re-opened for 1000 ft. north of Springfield shaft to a raise and thence to a connection with the North Shoot shaft.

The number of veins exploited in the old workings is indicated by the following list of stopes:

Poundstone stopes from 500 ft. to 1300 ft. in depth, mostly north of Springfield shaft. (See ante.)

Union Gold Mg. Co. stopes between 1000-ft. and 1300-ft. levels, south of Springfield shaft, from shaft on East Gouge vein; claimed output, 17,500 tons of $8 ore.

Big Cut and Mexican stopes, from veins of the same names, between 800-ft. level and surface; mostly near surface. North shoot shaft workings are 1150 ft. N. 15° E. of Springfield shaft. The Klondyke north shoot was worked from this.

Clement shaft is about 950 ft. north of Springfield shaft and here McCosmic stopes were claimed to have yielded 50,000 tons of $25 ore.

The Klondyke shaft on Klondyke vein about 375 ft. east of Clement shaft, opened the original Klondyke ore shoot which was worked 400 ft. deep, 60 ft. to 100 ft. long and 3 ft. thick. It is claimed to have yielded 10,000 tons of $20 ore.

The Poundstone vein has been explored for 1400 ft. on the strike; Clement vein 1000 ft. on strike and Klondyke vein 550 ft.

All equipment except the hoist has been removed from the Springfield shaft.

U. S. Grant (New Deal) Mine is on an agricultural patent owned by John Sellick and J. A. Sackett, lying north of Mt. Danaher Ranger Station, nine miles east of Placerville. It is leased to Sackett and W. B. Nicholls.

This old mine is said to have had a 10-stamp mill in the 1870's, but no record remains of the production, if any. There is an old shaft, depth unknown, but probably not over 100 ft. A crosscut adit reaches the vein in 100 ft. and from there drifts had been run northeast and northwest 400 ft. and south 200 ft. on the vein. Two ore shoots are claimed. The vein varies from 8 inches to 44 inches wide. Some recent mill tests yielded $7 a ton. The country rock is of the Calaveras formation.

A Brunius muller-mill was being used for crushing. It has two shoes of 2½-inch steel, 2 ft. by 2½ ft. and weighing 1200 lb. each. They are run at 27 strokes a minute through an eccentric with 30-inch stroke. These mullers work in a wooden box 6 ft. by 6 ft. and 4 ft. high, paved with thick blocks of Rocklin granite. It is claimed the mill will crush 6 tons in 8 hours to 32 mesh, discharging pulp at a height of three inches upon amalgamated plates. A small concentrator saves sulphides. An auto engine is used for power. There is a 6 in.

TABLE OF QUARTZ MINES AND PROSPECTS, EL DORADO COUNTY—Continued

Name of mine	Location			To whom assessed*	Area, acres	Bibliography
	Sec.	Twp.	Range			
Cedarberg	1 36	12 N. 13 N.	9 E. 9 E.	New El Dorado Gold Mining Co., c/o Grace E. Jennings	21	XII, p. 106; XIII, p. 137; XV, p. 282; Bull. 108, p. 45; MMR West of Rocky Mtns., 1873, p. 47; XXII, p. 413
Chaparral	26	11 N.	10 E.	Philip Stingle, Boston & Margaret Kelly, Kelsey	20	XV, p. 283; Bull. 108, p. 21
Cherokee Flat	24, 25	13 N.	9 E.	Chas. B. Davis & John Federwitz, Greenwood	18	
Chester	18	10 N.	11 E.			VIII, pp. 182-183; X, p. 173; XII, p. 106
China Hill	16	9 N.	10 E.	J. E. Fox, et al.	21	XII, p. 106; XIII, p. 137; XV, p. 283
Choller, Manzanita Queen & King	30, 31	10 N.	11 E.		62	See Griffith Cons.
Christian	28, 29	9 N.	13 E.	Cole Brothers	56	
Church	12	9 N.	10 E.	Seymour Hill, El Dorado; El Dorado Mining Company	80	VIII, pp. 191-193; X, p. 171; XII, p. 106; XIII, pp. 137-138; XV, p. 283; XVIII, p. 209; Bull. 18, p. 92; Bull. 108, pp. 21-22; XXII, p. 413
Cincinnati	3	11 N.	10 E.	W. J. and J. T. Davey, Garden Valley, et al.		XII, p. 106; XIII, p. 138; Bull. 108, p. 22
Cinnamon Bear	36	11 N.	10 E.			XI, p. 201; XII, p. 106
Climax	13	9 N.	10 E.	W. G. Busick & C. L. Pinney, E. H. Althoff	19	
Climax & Independence	14	11 N.	10 E.	W. A. Bell, c/o W. F. I. Bell, Kelsey	34	
Clyde	28	11 N.	9 E.	V. C. Sheehan, et al.	10	
Coe Hill	33	12 N.	10 E.	Ed Bathurst, Folsom		Bull. 108, pp. 22-23; XXII, p. 417
Collins & Bacchi	28	12 N.	10 E.		126	XV, p. 283
Columbia	18	10 N.	11 E.	Placerville Gold Mng. Co., c/o L. Weatherwax		
Conner Seam						Bull. 108, p. 45
Cousin Jack	29	9 N.	13 E.		20	XII, p. 107; XIII, p. 138; XV, p. 283
Cranes Gulch	15	12 N.	10 E.	Chas. E. Jerrett, et al., Georgetown	80	Bull. 108, p. 45
Crown Point Cons.	31	10 N.	11 E.	Charles T. Richards, et al., Placerville	40	XII, p. 107; XIII, p. 138; XV, p. 283; XX, p. 8; Bull. 108, p. 23
Crusader	12	9 N.	10 E.	Seymour Hill, El Dorado	60	XV, p. 284
Crystal	32, 33	9 N.	13 E.	Arthur S. Morey, et al.	31	XII, p. 107; XIII, p. 138; XV, p. 284
Crystal	18	9 N.	10 E.	Crystal Gold Mng. Co., c/o Wm. E. Kleinsorge, Sacramento	12	X, p. 175; XII, pp. 107-108; XIII, p. 138; XV, p. 284
Crystal	18	12 N.	9 E.	E. Terry, C. Ashley and C. Schulz, Cool	20	XIII, p. 138; XV, p. 284
Daily & Bishop	27	9 N.	13 E.	Bishop, et al., Grizzly Flat	40	XII, p. 108; XIII, p. 138; XIV, p. 284
Dalmatia	13	11 N.	10 E.	W. A. Bell, c/o W. F. I. Bell, Kelsey	102	VIII, p. 177; X, p. 174; XI, pp. 201-202; XII, p. 108; XIII, p. 139; XV, p. 284; Bull. 108, p. 23
Darling	33	12 N.	11 E.	P. G. Gilpin, 45 Crocker Bldg., San Francisco	20	XI, p. 202; XII, p. 108; XIII, p. 139; XV, p. 284
Davenport	34	12 N.	10 E.		320	Bull. 108, p. 21
Davidson	22, 27	10 N.	10 E.	Jerome Strickland, El Dorado, et al.	19	XII, p. 108; XIII, p. 139; XV, pp. 284-285
Day & Taylor	9	9 N.	13 E.	Grizzly Flat Mng. & Milling Company	20	
Defiance						XII, p. 108
Doncaster & Cleveland	11	11 N.	10 E.	E. E., A. C. and Jos. R. Maynard	7	
Donoso						XII, p. 108; XIII, p. 139
Drury						See Cedarberg

Drury						See Cedarberg
Dunlap	11	12 N.	12 E.	Boutwell Dunlap Estate, San Francisco	160	
Dunn-Vandenburg	20	10 N.	11 E.	Thos. E. Dunn and W. W. Vandenburg	17	
Dyer	9, 16	9 N.	13 E.	Maggie Dyer, et al	5	
Eagle	7	12 N.	10 E.	A. B. Craig and wife	20	
Eagle	9	9 N.	13 E.	L. J. Kendrick, 3012 Shattuck Ave., Berkeley	48	VIII, p. 178; XIII, p. 139; XV, p. 285
Eagle King	4, 9	9 N.	13 E.	Mary Witmer, Ernest L. McAfee, et al	10	VIII, p. 178; XII, pp. 108-109; XIII, p. 139; XV, p. 285
East Mother Lode	31	10 N.	11 E.	E. E. Twitchell	16	
East Nashville	2	8 N.	10 E.	Joshua Hendy Iron Works, San Francisco	17	
Edner					160	XII, p. 108; XIII, pp. 139-140; XV, p. 285
El Dorado & McKinley	25, 26	13 N.	9 E.	Kesington Gold Mng. Co., c/o Cleveland Forbes, 809 Merchants Exchange Bldg., San Francisco	36	
Elf	33	11 N.	11 E.	Pioneer Hardware Store, Placerville	40	
Elliott						See Sir Raleigh Mine
Emma	21, 28	12 N.	10 E.	Chas. E. Hand, Placerville	19	X, p. 176; XIII, p. 140
Empress	12, 13	9 N.	10 E.	El Dorado Mining Company	20	
Epley & Mammoth	20	10 N.	11 E.	Placerville Gold Mng. Co., c/o L. Weatherwax, Placerville	26	VIII, pp. 186-87; X, p. 173; XIII, p. 109; See also Pacific
Equator		10 N.	11 E.			VIII, p. 190;, X. p. 172; XII, p. 109
Esperanza	28	12 N.	10 E.	Garden Valley Gold Mining Co., c/o Haswell Bros., St. Johns Chambers, Chester, England	43	X, p. 175; XII, p. 109; XIII, p. 140;, XV, p. 285; Bull. 108, pp. 23-24
Esperanza	7	12 N.	10 E.		20	
Estelle	6	10 N.	11 E.	Mary E. McLaren (trustee)	14	
	36	11 N.	10 E.			
Eureka	6	10 N.	11 E.	Placerville Gold Mining Co., c/o L. Weatherwax, Placerville	13	X, p. 175; XI, p. 203; XII, p. 109; XV, p.285
	36	11 N.	10 E.			
Eureka	4	9 N.	13 E.	H. S. Treat, c/o D. C. Treat, Mission Savings Bank, S. F.	10	
Eureka	2, 11	12 N.	10 E.		16	See Woodside Eureka
Fairweather and Fairweather No. Extension	12	12 N.	9 E.			See Spanish Group
Falls	1	9 N.	10 E.	Joseph Drechsler, Diamond Springs	16	XV, p. 285; Bull. 108, p. 24
Faraday	20	10 N.	11 E.	Placerville Gold Mining Co., c/o L. Weatherwax, Placerville		VIII, p. 186; X, p. 173; XII, p. 110; See also Pacific
Fiane	36	9 N.	10 E.	Philip A. and Laura C. Fiane	77	
Fisk						See Joseph Skinner Mine
Fine Gold	19	9 N.	12 E.	Alex J. Gray	40	
Frances Adams	25	11 N.	10 E.	Frank A. Losh	17	
Fort Yuma	29, 32	9 N.	10 E.	Jacob Baughman	29	XII, p. 110; XIII, p. 140
French	13	12 N.	9 E.	California Water & Mining Co.	18	XI, p. 204; XII, p. 110; XIII, p. 141; XV, p. 286, Bull. 108, p. 45
French Hill	36	13 N.	9 E.	Mrs. A. J. Johnson, Santa Monica and Mrs. E. S. Hadley, Sacramento	160	XII, p. 110; XIII, p. 141; Bull. 108, p. 47; XV, p. 286
Frog Pond & Marigold Cons	28	12 N.	10 E.	S. W. Collins and Mary Norris, Garden Valley	17	XV, p. 286
Gallagher	5	12 N.	10 E.	F. G. Johnson and Jesse P. Hinck	21	
Gamblin						XXXI, p. 23
Gardner Cons	6	10 N.	11 E.	Wm. H. and Emma L. Myers, Placerville	27	XV, p. 286
Garfield & Excelsior	5, 6	12 N.	10 E.		40	XII, p. 111; XIII, p. 141; XV, p. 286
Garibaldi Cons						XII, p. 111; XIII, p. 141

* To save space, frequently only one of several names is shown in this column.

TABLE OF PLACER MINES AND PROSPECTS, EL DORADO COUNTY—Continued

Name of mine	Location			To whom assessed*	Area, acres	Bibliography
	Sec.	Twp.	Range			
Pacific Channel	34	11 N.	13 E.	John E. Sexton, Palisade, Nevada. Local agent: T. G. Patton, Placerville		
Payne	28	9 N.	13 E.	Cole Brothers, Pleasant Valley	40	Pre. Rep. 8, p. 30; XVII, pp. 428-429; XXII, p. 440
Pebble Hill	13	10 N.	11 E.	Nicola Fossati, Smith's Flat & Placerville Gold Mng. Co., Placerville	57	XII, p. 120; XIII, p. 153; XV, p. 302
Pioneer	6	10 N.	12 E.	Charles Schaeppi	31	
Plattsburg					22	XIII, p. 154
Potts & Maginess	21	10 N.	12 E.	Estate of S. H. Maginess, Mrs. W. E. Beck, et al., Placerville	100	XV, p. 302
Quail	9	8 N.	13 E.	John R. Labor	40	
Rau & Patterson	34	13 N.	10 E.	M. F., D. M., J. D. and P. C. Flynn; Mrs. Kate Smith; Geo. C. Rau c/o J. Wesley Rau, et al.	60	
Rising Hope	15	10 N.	11 E.	Schuyler N. Warren, 51 Exchange Place, New York	228	XV, p. 303; XVII, p. 429; XXII, p. 440
Rivera	16	10 N.	11 E.	J. Q. Wrenn Estate, c/o L. J. Anderson, Placerville	63	XV, p. 303
Rocky Bar	25	9 N.	12 E.	Thomas A. Murray Estate, et al., Cole Station		XXII, p. 440
Rocky Point	6	12 N.	9 E.	Howard W. Davis	43	
Roundout				Richards and Fairchild		XVII, pp. 429-430; XXII, p. 438
Sailor Slide	3	12 N.	10 E.	Charles F. Hickman, Swift Bldg., Columbus, Ohio	35	
	34	13 N.	10 E.		300	XII, p. 122; XIII, p. 156
Santa Rosa		18 N.	11 E.	John L. Schenck and John R. McKee		
Slug Gulch	26	9 N.	12 E.	Stanley F. Triplett	92	X, p. 180; XII, p. 123; XIII, p. 157; XV, p. 303
Stewart	20	10 N.	11 E.	Mary Witmer	11	
Table Rock	30	11 N.	11 E.			XII, pp. 124-125; XIII, p. 159
Texas Hill				Toll House Mine, c/o S. Chamerlain, 846 Mills Bldg., San Francisco	134	X, p. 179; XIII, p. 159; XV, p. 303; See also Hook & Ladder
Toll House	10	10 N.	11 E.		40	XIII, p. 159; XV, p. 303
Try Again	15	10 N.	11 E.			
Two Channel	15, 22	13 N.	11 E.			
	34	13 N.	11 E.			
	8, 9	13 N.	11 E.	Century Mining Co., 43 N. First St., San Jose	1955	XIII, p. 160
	10	13 N.	11 E.			
Union	3	10 N.	11 E.			
	33	11 N.	11 E.		78	XV, p. 303
Union Wisconsin River	20	10 N.	8 E.	Nellie Miller and Agnes Gray, c/o V. Gray		
Unity	3, 4	10 N.	11 E.		178	XII, pp. 125-126; XIII, p. 161
Uno		8 N.	12 E.		40	XIII, p. 161
Volcanoville	5, 8	8 N.	13 E.	Leslie C. Baughman, et al	67	
Wabash Deep Channel	26	13 N.	10 E.	E. W. Claresse, Georgetown	160	XVII, p. 430
W. W						XII, pp. 126-127; XIII, p. 161
Zimmerman						See Pacific Channel Mine

* To save space, frequently only one of several names is shown in this column.

LIMESTONE AND LIME

Next to gold, the most important mineral product of the county is limestone. The deposits are mostly in the form of upright lenses and have been classified as part of the Calaveras (Carboniferous) formation. They are usually enclosed in amphibolite schist which shows schistosity striking northwest to north, and dipping 70° to 85° northeast. The bodies of limestone conform in greatest length and depth with these directions. The largest outcrops extend north from near Cool into Placer County. Other deposits already opened are found at intervals going southward. Development has been confined to those lying within reasonable distance of the main-line of the Southern Pacific (Ogden Route) or its Placerville branch. Farther east are found other deposits, notably the marble at Indian Diggings, which remain undeveloped because of their distance from the railroad.

Four companies mentioned hereunder produced 159,134 tons of 'industrial' limestone in 1936, which was over ½ of all that produced in the state; besides which, two of the plants burned considerable lime.

Auburn Chemical Lime Co. Since 1930 this company has been operating the quarry, crushing plant and lime-kilns formerly worked by *Newcastle Lime Company* and *Farmer Lime Company*, and many years ago by *Holmes Lime Company*. T. L. Chamberlain, Auburn, is president of the company.

The property is in the NW¼ sec. 15, T. 11 N., R. 8 E., 7 miles by road southeast of Newcastle. The limestone deposit was in the form of a large, upright lens of good grade, colored gray. It is

Plant of Auburn Chemical Lime Co., near Rattlesnake Bar.

Union Mine.—It is 3½ miles southeast of El Dorado. It was formerly known as the Springfield, and was operated by Alvinza Hayward to a depth of 1700 feet. Within the past two years the mine has been operated by a company, and a 30-stamp mill built. On another group of mines in the vicinity a new shaft was being sunk in March, 1900, and though less than 100 feet in depth, a 20-stamp mill was being erected. These properties are under the management of A. Harpending, and were the only ones visited during the season where inspection was denied and information refused. It was currently reported that a large amount of gold was being taken out, but I was unable to confirm this report. There are 45 men employed at these two mines.——A. Harpending of El Dorado, superintendent.

Church Mine.—It is located 8 miles south of Placerville, and 2½ miles from El Dorado. Three veins occur in the slates; they are well defined, and have hard walls and a gouge on both foot and hanging walls. The two veins mostly developed are of variable thickness, laminated, and carrying considerable sulphurets. There is also an east vein, known as the Union, which is being worked near the south end of the property on the adjoining Union Mine. Surface prospects on this lead in various places give a result of from $2.35 to $26 per ton. The vein worked by the former company was termed the Kidney vein, and has been worked to a depth of 1350 feet, taking out the best of the ore and leaving the low-grade ores. This vein averages 5½ feet in width, and the rock taken from it milled from $28 to $30 per ton. The prospective value of the mine is based on the value of the west vein, first discovered on the 350-foot level while sinking the shaft on the Kidney vein. There were milled from this ledge 3000 tons of ore taken from the various levels from the 350-foot to the 1200-foot level, which returned $2.50 per ton free gold and about 2 per cent sulphurets, worth $67 per ton; the tailings, owing to a lack of facilities in the mill, averaged $1.27. This vein in many places is from 14 to 20 feet wide, averaging 8 to 10 feet. The main shaft is 1200 feet deep vertically, with a 40-foot sump, and has three compartments. Stations are cut at each level. The mine is equipped with a water-power hoist, and is provided with 3000 feet of steel cable. The compressor has a capacity of five 3-inch drills. The pumping plant, consisting of plunger and jack-head pumps, has a capacity of 150,000 gallons per day, which is about double the amount of water the mine makes. The mill has ten 950-pound stamps, four Frue concentrators, clean-up barrel, pans, etc. The machinery is run by water power taken from a reservoir owned by the company; at the mill there is a head of 485 feet.——Church Mine Development Company of San Francisco, owners. John Ross, Jr., of Sutter Creek, superintendent.

Griffith Mine.—It is half a mile southeast of Diamond Springs and half a mile from the Larkin Mine. Since the last report, this mine, at

that time a mere prospect, has been elaborately equipped with hoist, mill, etc., and an expensive electric power plant, by a Scotch syndicate. After a few months of active operation, the mine was closed down and nothing has since been done there. It is locally reported that it did not pay.——Griffith Mining Company of Glasgow, Scotland, owners. G. P. Gow of Stent, agent.

Larkin Mine.—One-half mile east of Diamond Springs. The great dolomitic vein passes through this property, in addition to which there are several other, though less prominent, veins. It is upon one of the latter, which occurs in the hanging-wall slates of the dolomitic vein, that operations are at present being conducted. This vein is accompanied by a small dike of diabase, and possesses the usual characteristics of veins in slate. The dolomitic vein is 80 feet in width, and is altered more or less to talc schist. The dolomite here appears to contain iron carbonate, and is properly ankerite rather than dolomite. The ankerite vein is also cut by dikes, a feature not observed elsewhere, and the foot-wall portion, for a width of several feet, is impregnated with quartz and pyrite, but no exploration had at the time of my visit been conducted on this mineral zone. There are several small veins in the amphibolite schist of the foot-wall, but these, too, remain unexplored. This mine has a 10-stamp mill, the stamps weighing 1000 pounds, dropping 110 times a minute. A No. 1 punched tin screen is employed. The discharge is 9 inches high, and the capacity of the mill under these conditions is said to be a little in excess of 3 tons per stamp per day of twenty-four hours. The ore contains 1½ per cent of pyrites. These have been shipped to Selby's, but experiments with the cyanide process have demonstrated that the gold can be extracted from the sulphides by this means without preliminary roasting or other treatment. Of the gold obtained by amalgamation, about 55 per cent is recovered in the battery.

An ingenious experiment has been tried by the superintendent with a view to prevent scouring of the inside copper plates. This consists of a cast-iron plate having the shape of a segment of a cylinder to fit the copper plate. It is ½ inch in thickness, with slots ½ inch in width and 20 inches in length. Within these slots the amalgam accumulates and remains. Concentration is accomplished on a single Wilfley table. A vertical shaft has been sunk 600 feet, and a cage is in use. There are 35 men employed.——Larkin Mining Company of San Francisco, owners. G. B. Jacobs of Diamond Springs, superintendent.

Selby Mine.—It is 1 mile east of Diamond Springs, near the Larkin Mine. Idle.

Marguerite Mine.—It is 1 mile east of Diamond Springs, near the Larkin Mine. Idle.

Sliger Mine, a mile west of Spanish Dry Diggings, was found in 1864 and is claimed to have made a production of about $225,000 to a depth of 300 ft., though no definite record of this remains.

It had been lying idle a long time when it was reopened in 1922 by *Sliger Gold Mining Company.* The operations from then until July, 1934, by this company and its successor, *Middle Fork Gold Mining Company,* were described in Bulletin 108. The latter company continued work until May 10, 1937, when the mine was closed pending financing of further development work. Over 80,000 tons of good ore was produced and milled in four years, 1932 to 1935 inclusive.

On August 31, 1937, *Mountain Copper Company, Ltd.,* took over the lease on the mine. They sank the shaft 350 ft., reaching a depth of 1350 ft. About 500 ft. of drifting and 1500 ft. of diamond drilling was done. Early in 1938 this company gave up its option.

In June, 1938, *Middle Fork Gold Mining Company* resumed work with a crew of 40 men. C. W. Plumb is superintendent. Electric power has since been supplied, the crew has been increased to 65 men and production at the rate of 100 tons a day has been reported.

The mine is at a fault contact with black slate on the footwall and ankerite and serpentine, followed by a gabbro dike on the hanging wall, all enclosed in amphibolite schist. On the 350-ft. and 500-ft. levels, the only ones examined by the writer, crosscuts were run through ankerite or similar mixed carbonate rock. The principal orebody seen was on the footwall side and is highly silicified, with some carbonates, and is thickly impregnated with fine disseminated crystals of sulphide, mostly pyrite. It had no definite wall but merged into low grade rock. Two classes of ore, called black slate or schist ore and grey schist ore were distinguished. Superficially the appearance was that of a replacement of a fine-grained rock. The width of ore here varied from 14 inches to 19 ft. Most of the gold is in the sulphides which make up 3.7% of the ore. On the 600-ft. level the ore was reported to be 32 ft. wide.

L. C. Raymond, geologist for Mountain Copper Company, believes that the ore-forming solutions rose along different favorable bands in the slate series to the thrust fault zone, where they spread out forming orebodies. The occurrence of several ore shoots at different levels along the fault zone in such a case would give the appearance of post-mineral faulting, although actually the only post-mineral faults were small horizontal offsets.

The stamp-mill first used was replaced by 2 ball-mills, flotation and gravity concentration. Two-stage crushing with Blake and Symonds crushers is used ahead of the ball-mills, which work in closed circuit with Dorr rake classifiers. From the mill, pulp passes over a Deister Overstrom concentrator which saves 75% to 80% of the gold in a high grade concentrator. The table tailing is sent to a conditioner and is treated by flotation in 6 Kraut rougher cells and 2 cleaner cells. Concentrate hauled by truck to Selby smelter.

Solari Tunnel Mine. First located as part of the Ventura Mine in Sec. 20, T. 10 N., R. 12 E., but in 1935 leased to Paul Alexander and Flavel Atkinsen, who were extending an adit then 351 ft. long. They were prospecting for the extension of the bench gravel found in the Black Gold.

Tiedemann, Kenna et al. Mines (*Two Channel Mine*) lie eight miles northeast of Georgetown. They were worked both by drift mining and hydraulicking in the 1890's and were described in Report XIII of the State Mineralogist, 1895-1896. Under the name of Two Channel Mine, production was reported until 1902. The holdings extend 3¼ miles southeast from Mount Gregory to and including the Tiedemann Mine in sec. 34, T. 13 N., R. 11 E. Two channels were found, called white and blue channels which were believed to be upstream portions of similar channels on the Forest Hill divide in Placer County. The former operators worked hydraulic pits on the Tiedemann, where the bank was 20 ft. high, with 10 ft. of gravel, and they also ran adits for drift mining. On the Kentucky Flat, a hydraulic pit was opened on the white channel, with a bank 25 ft. high of which from two ft. to six ft. was gravel, and drift mining was also carried on through an adit. On the Kenna and Morgan both channels were worked—the white channel by hydraulicking and blue channel by drift mining through an adit with breasts 60 ft. wide and 3½ ft. high. This blue gravel was cemented and was crushed in a 10-stamp mill.

In 1902, the following workings were reported at the various mines then held by *Two Channel Mining Company:*

Amelia, sec. 9, T. 13 N., R. 11 E. Adit 600 ft.
Kenna & Morgan, sec. 15, T. 13 N., R. 11 E. Adit 1500 ft. Breast 100 to 200 ft.
Kentucky Flat, sec. 22, T. 13 N., R. 11 E. Adit 625 ft. Shaft 80 ft. Breast 100 ft.
Novis, sec. 9, T. 13 N., R. 11 E. Adit 600 ft.
Tiedemann, sec. 34, T. 13 N., R. 11 E. Adit 1000 ft.

There were also hydraulic pits with areas of two acres or more each on the Tiedemann and Kentucky Flat, and some smaller ones. No reports appeared on the properties after 1902 and they had been idle for years when work was started on the *Tiedemann Mine* by *Century Mining Company* in 1932, under lease covering most of the holdings of the old company. The south end of the Tiedemann has since been prospected and mined through two main adits each 300 ft. long, with side drifts. They report a white quartz channel 1000 ft. wide, with gravel up to 14 ft. thick. Substantial production was made, judging by a suit brought against the company early in 1934 for royalties and rent alleged due.

The *Kentucky Flat* mine was worked in 1933 by C. B. Wooster.

Union (*Springfield*) *Mine.* Since Bulletin 108 of this division was published, the work started by *Gold Fields American Development Company* has been suspended, the mine was turned over to *Montezuma Apex Mining Company,* and turned back to the owners in April, 1937. During their lease, the latter company mined some ore which was hauled to their mill on the Montezuma mine and gave good returns.

The Springfield property lies in the Mariposa slates of the Mother Lode 2½ miles south of east of El Dorado. It was the center of a rich and populous placer-mining district of early days called Aurum City. Prof. Silliman, a noted mining authority of that time, was attracted by the rich ore first worked in arrastres here and induced friends to finance quartz mining. A pay-shoot north of the Union shaft is said to have yielded $450,000 from 15,000 tons of ore mined before 1868, but in spite of this the project failed and the property

a year, through 12 boxes, slat riffles; the water, which is taken from the Cole ditch, costs from $1 50 to $2 per twelve hours. The tailings are dumped into the Middle Fork of the Cosumnes River. J. H. Bradley, of Placerville, owner; H. C. Roberts, of Grizzly Flat, lessee.

Cedarberg Mine (Quartz).—This property is situated 2½ miles N. of Greenwood, and is 1,500 by 600 ft., through which runs a 2 ft. vein between slate walls having a N. and S. course, and an easterly dip at an angle of 45°. A shaft has been sunk 300 ft. deep on the vein. E. W. Hulford, of Oakland, owner.

Cement Hill Mine (Drift).—It is 4 miles from Georgetown. A prospect bedrock tunnel is being run to strike a gravel channel supposed to run E. and W. The tunnel, which is in slate, has reached a length of 550 ft.; at 150 ft. connection was made with the surface, 60 ft. above, through an air shaft. The ridge is lava capped.

Central Mine (Quartz).—See Inez Mine.

Chester Mine (Quartz).—Southerly extension of the Rose. See our VIIIth Report, p. 182.

Chili Ravine Mine (Drift).—Idle. See our VIIIth and Xth Reports, pp. 194, 179.

China Hill Mines (Quartz).—They are a mile N.E. of the Big Cañon Mine. A vast amount of work has been done here, chiefly in the form of surface cuts, though there are several tunnels and shafts. The gold is found in "pockets" in a N. and S. vein inclosed in hornblende porphyry.

Church (El Dorado) Mine (Quartz).—This property was described in our VIIIth and Xth Reports, pp. 191 and 171, and is situated in T. 10 N., R. 11 E., 3 miles S. of El Dorado; it is 1,500 by 600 ft., and is one of the deepest mines in the county. The present working shaft is a three-compartment, using skips; the workings extend from the 400 to the 1,000 ft. level. The plant contains a compressor for four Ingersoll drills, with an 8 in. Cornish pump, with two jackheads and two plungers. The ore from the present workings carries 2¼ per cent of sulphurets, assaying $140 per ton.

A new 10-stamp mill has been built; stamps 900 lbs. in weight, 3½ in. stems, 14 ft. long, giving 102 drops, of 5 in., per minute; discharge 7½ in. through a No. 40 mesh sheet-tin screen, with a duty of 2 tons per stamp in twenty-four hours. The plates consist of an 8 in. piece inside the battery; an apron 5 ft. by 5 ft., and 16 ft. of sluice plates 16 in. wide. The plates are scraped every day, and the battery cleaned up once a month; 75 per cent of the amalgam is taken from the latter. The gold is worth $17 per ounce. The mill is provided with three Frue and one Johnson concentrator and a Dodge rockbreaker and Challenge self-feeders. The entire plant is operated by water power under a 400 ft. pressure, furnished from the Crawford ditch. Church Gold Mining Company, owners; J. Richards, of El Dorado, Superintendent.

Church Union (Springfield) Mine (Quartz).—See our VIth Report (Part II), p. 43. Idle.

Cincinnati Mine (Quartz).—It is 2½ miles S. of Placerville, in T. 10 N., R. 11 E. The claim is 1,300 by 600 ft. and the vein is supposed to be the same as the Epley, on the opposite side of Weber Creek. M. Miller and D. J. Knighton, of Diamond Springs, owners.

Cinnamon Bear Mine (Quartz).—Two miles N. of Placerville. Idle.

Collins & Patterson Claim (Placer).—This prospect is situated on the porphyry seam belt 2 miles N.E. of Georgetown, on Cañon Creek. Two men are sinking a shaft. Collins & Patterson, of Georgetown, owners.

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supplied ... employed. J. T. Smith, of Greenwood, owner.

Cement Hill Mine (Drift).—It is 4 miles N. of Georgetown, at 2,700' elevation. The claim contains a lava-capped ancient channel, partially developed. Since our last Report a second tunnel, now 600' in, has been started to strike the channel 50' deeper than the upper 750' tunnel, which was too high. Two men are employed. Abraham Dow, of Georgetown, owner.

Central Mine (Quartz).—It is 5 miles S. of El Dorado. One of the oldest locations on the Mother Lode. Partly developed by tunnels and shafts. — Rix, of San Francisco, owner.

Channel Bend (*Gray Eagle Bar*) *Mine* (Drift).—It is 10 miles N.E. from Georgetown, at 1,175' elevation on the banks of the American River, 3 miles E. of Volcanoville, and consists of two claims known as the *Barnes* and the *McCall*. These two claims follow along the two arms of a bend in the former channel of the river, and the present company are exploiting the ground in the bend of the curve, behind the previously worked ground, having the appearance of a back channel. The ground is worked through a shaft 136' deep, all in gravel, and which is connected through an intermediate drift and an upraise with an adit. The width of the gravel has not been determined; drifts from 200' to 300' have been run from the shaft, about 8' or 10' above the bedrock. Along this level the percentage of large bowlders is very great. The hoist is run by 10 inches of water from the Daggett ditch through 1,500' of flume and 1,000' of 6" pipe under 800' pressure, on a 3' Pelton wheel; the same water is used for washing the gravel for prospecting purposes. The sluices are 300' long. The mine makes from 8 to 10 miner's inches of water, which is also used for washing. Twelve men are employed. An incorporated company, of No. 39 Sutter Street, San Francisco, owner; G. W. Miller, of Georgetown, superintendent.

China Hill Mines (Quartz).—See our XIIth Report, p. 106. They are 3 miles S.W. from El Dorado. ~~—Johnston, owner.~~

Church (*El Dorado*) *Mine* (Quartz).—See our VIIIth, Xth, and XIIth Reports, pp. 191, 171, and 106. It is 2 miles S.E. of El Dorado, at 1,180' elevation, and comprises three claims, two of which are 1,650'x 600', and parallel, and the third, 1,500'x 600'. The vein strikes N. and S., dips 80° E., but changes the angle of the dip with depth. The three-compartment working shaft is 1,200' deep, passing through the vein near the 400' level, and requiring 300' cross-cut in the bottom to the vein. The quartz makes in kidneys; sometimes these are 250' in length; they carry 1½% of sulphurets of good grade, while the vein matter outside of the kidneys carries a larger percentage of sulphurets of lower grade; a black gouge, from 3" to 12" thick, accompanies the vein. Forty feet to the west of this vein is a parallel vein, 8' wide, to which, on several of the levels, cross-cuts have been extended, but the quartz is of too low grade to permit of its being worked to a profit with the present milling capacity. The plant comprises a hoist, a 35 H.P. compressor running four Ingersoll drills, two jackhead and two plunger pumps above and three pumps

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below, a 10-stamp mill, with stamps of 950 lbs. each, and four Frue vanners; all driven by 100 miner's inches of water from the Diamond Ridge Ditch Co., and applied under 465′ pressure through 3,250′ of 15″ and 11″ pipe on a 6′ Dodds wheel for the compressor, two Peltons for hoist and pumps, and a 6′ Pelton for the mill. The present ore-supply is obtained from below the 1,000′ level. Thirty men are employed. Church Gold Mining Co., of San Francisco, owner; James Richards, of El Dorado, superintendent.

Cincinnati Mine (Quartz).—It is 2½ miles S. of Placerville, at 1,750′ elevation. Idle. M. Miller and D. J. Knighton, of Diamond Springs, owners.

Claghorn (*Growers*) *Mine* (Drift).—It is on Cedar Creek, 2 miles S. of Fairplay, at 2,910′ elevation, and is an ancient channel running N.E. and S.W., over a granite bedrock. There is a tunnel running on the rim 200′, where the pay-gravel is only 18″ deep, covered by a layer of cemented sand, which furnishes a good roof; there are no large bowlders. The gold is both coarse and fine. The main channel has not yet been reached. The washing of the gravel is done in a bedrock cut with the help of one box, with water from the Empire (Plymouth) ditch. Two men are at work. Capt. G. S. Claghorn, of Fairplay, owner.

Confederate Mine (Drift).—It is 2½ miles S.W. from Fairplay, at 2,725′ elevation, and comprises 40 acres. A tunnel has been driven 250′ through granite bedrock and cemented sand, and the bedrock still pitches away. A second tunnel, run 200′ on the course of the channel and partly in the bedrock, shows some cemented gravel and granitic sand, but gives no definite results as to the course or width of the channel. Two men are at work. D. M. Dunn and A. F. Gillespie, of Fairplay, owners.

Cousin Jack Mine (Quartz).—See our XIIth Report, p. 107. It is 5 miles S.W. of Grizzly Flat, at 2,800′ elevation. The vein courses N. and S. Idle. Mrs. M. Jeffrey, of Grizzly Flat, owner.

Crown Point (*Bald Eagle*) *Mine* (Quartz).—See our XIIth Report, p. 107. It is 1½ miles S.E. of Diamond Springs. James Richards et al., of Diamond Springs, owners.

Crystal Mine (Quartz).—See our XIIth Report, p. 107. It is on the Middle Fork of the Cosumnes River, 5 miles S. of Grizzly Flat. Idle. L. L. Alexander, of Omo Ranch, owner.

Crystal Mine (Quartz).—See our XIIth Report, p. 107. It is 3½ miles S. of Shingle Springs, at about 1,800′ elevation. Idle. G. Phelps et al., of Shingle Springs, owner.

Crystal Mine (Quartz).—It is ½ mile N. of Cool, at 1,900′ elevation. The vein courses N. and S. and dips 15° W. It shows stringers of quartz in quartz-porphyry, with limestone belt on the east. The quartz is milk white, with groups of crystals, and carries some copper sulphurets. The developments consist of a 25′ perpendicular shaft, from which an incline, 60′ in length, is sunk on the pitch of the vein, showing three stringers of quartz. There is another incline, 60′ long, from the surface; none of the works penetrate more than 70′, perpendicular depth. Two men are usually employed. E. Terry, C. Ashley, and C. Schulz, of Cool, owners.

Dailey & Bishop Mine (Quartz).—It is on Clear Creek, 2½ miles S. of Grizzly Flat, at 3,475′ elevation, and comprises two full claims on a vein striking E. of N., dipping 75° E., in a slate formation, and varying

The same operators have a lease on the *Davenport* property containing 320 acres immediately south. The amphibolite schist traverses this land which contains a deposit similar to that at the Hart Mine (which see, *post*, under Seam Mines). In previous operations a series of open cuts and a crosscut 280 ft. long had been run. In the crosscut Russell Wilson reports that a width of 30 ft. gives assays high enough to permit mining at present. A width of 5 ft. was stoped 90 ft. long by 40 ft. high and is said to have yielded a fair return. A shaft was being sunk to further prospect the deposit in 1934.

Blue Lead claim joins the Big Four on the south and the Isabel on the east. At an early date, previous to 1867, this claim was opened to a depth of 250 ft. and an unknown amount of drifting was done. A 20-stamp mill was erected and a total outlay of $250,000 was said to have been made. The large dump indicates that the work must have been done entirely in the black Mariposa slate, with a large proportion of waste compared to the amount of ore handled. Although the workings yielded some fine specimens, it is said operations did not pay, and work had ceased before 1868.

Chaparral or Golden Queen claim, two miles southwest of Kelsey, was discovered in 1872 by Willets. From then until 1875 the property had a mill and was a small producer of ore reported to have yielded from $7 to $15 a ton. By 1875 the shaft, which had been sunk on the middle vein, was 150 ft. deep. The company then operating the mine was also trying to work the Gopher-Boulder mine but evidently lacked funds to carry on any new development. After taking out such ore as was available, they quit both properties. In 1901, the Golden Queen Mining Company was formed, but apparently did very little work on the mine. The shaft finally reached 200 ft. in depth.

The west vein on this claim has been only slightly prospected. Where it was mined, the middle vein was reported two to four feet wide. In depth, the footwall is said to be slate and hanging wall diorite; but workings have been inaccessible for years. It has been estimated that a lower adit 820 ft. long would tap the ore 195 ft. below the bottom of the old shaft. This distance might possibly be shortened because of the southward rake of the ore-shoot.

Church Mine (El Dorado or *Church Union)* was worked as a quartz mine first in 1886 and was 500 ft. deep in 1887. The ore-shoot was rich but not long, and the period of principal operations was about 13 years. Records of the company, like those of so many others, are said to have been destroyed in the San Francisco fire in 1906.

The principal work and production was from the middle or 'kidney' vein. In July, 1890, the ore is stated to have averaged $8 to $9 a ton in the 10-stamp mill; in August, $13; and in September, better than that, exclusive of sulphides. In 1894, a new 10-stamp mill was built which had a duty of 20 tons in 24 hours. The mine is in the Mariposa clay-slate.

The following notes are from a statement made to the writer by James Richards, who was superintendent of the mine for many years. There are no maps nor other exact details available.

"The main shaft was vertical and was 1200 ft. deep, in the footwall below 400-ft. level. There was a poor place in the mine between

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350 and 500 ft., where the ledge cut out and we had only the gouge, then ore came in again. The vein below this averaged six feet wide, with the rich ore in the middle. The 600-ft. and 1200-ft. levels were run clear to the property line. The crosscut from shaft to vein on the 1200-ft. level was 670 ft. long and from this level we sank a winze on the vein to the 1400-ft. level. The ore milled down as far as the 1300-ft. level had averaged $17 a ton. At 1300-ft. the gouge came in, five to six feet wide; the ledge became so soft and broken that it could be shoveled. It carried about $4 a ton here. On the 1400-ft. level, we drifted 80 ft. The ground ran and swelled over night so that it could not be held with tight lagging. There was gouge on both walls.

"There was a great deal of $2 to $3 rock in the mine that should have been mixed with the rich ore to give a mill feed worth $6 to $7 a ton."

Sulphides formed 1½% to 2¼% of ore and assayed up to $140 a ton. The quartz made in lenses or kidneys up to 250 ft. long, but the best ore was said to be a chimney about 75 ft. long. To a depth of 300 ft., the mine made about 20,000 gallons of water in 24 hours, and later made 75,000 gallons daily when opened to 1350 ft.

It is the opinion of the present owner that the orebodies in both the Church mine and the Union or Springfield, were formed at the points where a side vein called the Klondike left the main lode wall and returned to it.

The east vein was worked in the Union (Springfield) mine just south of the Church. From different levels in the Church, prospecting was done on the west vein by running crosscuts during the operations described above. The mine was unwatered in 1900–1901 with the idea of checking up on the reported results of that previous work. There is no information regarding what was found, but work was not continued. The west vein, however, is known to be quite low grade.

Bibliography: Cal. State Min. Bur. VIII, p. 191; X, p. 171; XII, p. 106; XIII, p. 137.

Cincinnati Mine, four miles north of Kelsey, covers a stringer lead deposit in a decomposed dike in the Mariposa slate; it is not certain that the open cut from which the last rock was milled previous to time of visit in March, 1932, had reached the hanging wall, though a width of 10 feet had been cut. Older open cuts and shallow shafts extend south along the vein probably 600 ft. to the property line.

No record remains of the results of earlier work. In 1917 the claim was equipped with a light 5-stamp mill and the first clean-up early in 1918 is reported to have given an average return of $3.82 a ton by amalgamation alone. Later tests have given better results but no recent production has been reported.

Coe Hill Mine (*Gold Star* or *Bathurst*) is a mile south of Garden Valley. Shallow shafts have been sunk on several veins. Late in 1921, A. Tetrault and associates milled 50 tons from a dump and from an adit, which is reported to have plated $7 a ton. In 1925, F. Bathurst, the owner, reported production of some $6 ore, and the next year a smaller lot of much higher grade, containing over an ounce of gold per ton. Since then, there has been no record of production.