

GOLD, SILVER, COPPER, LEAD, AND ZINC IN COLORADO

(MINE REPORT)

By CHAS. W. HENDERSON

SUMMARY OUTLINE

	Page		Page
Summary.....	159	Review by counties and districts—Contd.	
Premium on newly mined gold.....	159	Gunnison County.....	177
Calculation of value of metal production.....	160	Jackson County.....	178
Mine production by counties.....	162	Jefferson County.....	178
Mining industry.....	164	Lake County.....	178
Ore classification.....	165	Leadville district.....	178
Metallurgical industry.....	165	Other districts.....	179
Review by counties and districts.....	169	La Plata County.....	179
Adams County.....	172	Moffat County.....	180
Arapahoe County.....	172	Montezuma County.....	180
Boulder County.....	172	Montrose County.....	180
Chaffee County.....	173	Ouray County.....	180
Clear Creek County.....	173	Park County.....	181
Costilla County.....	174	Pitkin County.....	182
Custer County.....	174	Rio Grande County.....	182
Delta County.....	174	Routt County.....	182
Denver County.....	175	Saguache County.....	182
Dolores County.....	175	San Juan County.....	183
Douglas County.....	175	San Miguel County.....	183
Eagle County.....	175	Summit County.....	183
Elbert County.....	175	Teller County.....	184
El Paso County.....	176	Treatment rates, Golden Cycle mill.....	184
Golden Cycle mill.....	176	Cripple Creek ores.....	184
Fremont County.....	176	Miscellaneous ores and con- centrates.....	185
Garfield County.....	176		
Gilpin County.....	176		

The total output of gold, silver, copper, lead, and zinc from Colorado ores and gravels in 1933, in terms of recovered and estimated recoverable metals, was 242,827.70 fine ounces of gold, 2,186,140 fine ounces of silver, 9,667,000 pounds of copper, 4,803,000 pounds of lead, and 2,569,000 pounds of zinc. This output compares with a production in 1932 of 317,927.95 ounces of gold, 1,860,408 ounces of silver, 7,398,000 pounds of copper, 4,299,000 pounds of lead, and 218,000 pounds of zinc. There were 614 lode mines and 286 placers producing in 1933 and 478 lode mines and 335 placers in 1932, an increase of 136 lode mines but a decrease of 49 placers.

The total recorded output from Colorado ores and gravels from 1858 to 1933, inclusive, all in terms of recovered metals, has been 35,405,354 ounces of gold, 664,174,381 ounces of silver, 330,470,430 pounds of copper, 4,616,442,583 pounds of lead, and 2,232,912,985 pounds of zinc.

Premium on newly mined gold.—There were four epochs of gold prices for newly mined gold in the United States in 1933: (1) The period of the legal coinage value of \$20.671835, from January 1 to August 9 to all producers; (2) that of (a) \$20.671835 to the majority of producers and (b) the fluctuating world price as secured by export by some producers, to August 29; (3) the period of fluctuating world price as secured through the agency of the Federal Reserve banks, to October 25 (period of actual bank sales, from September 8 to November 1); and (4) the period of the Reconstruction Finance

Corporation arbitrarily fixed, gradually rising price (generally above the world price), from October 25 to December 31, 1933. For further details see chapter of this volume on Gold and Silver (pp. 25 to 52), by Chas. W. Henderson.

Following is a table on mine production of gold in Colorado, 1929-33, in terms of recovered metal; two values are given for 1933—(1) at legal coinage value (\$20.67+ per ounce) and (2) at average weighted price (\$25.56 per ounce).

Mine production of gold in Colorado, 1929-33, in terms of recovered metal

Year	Fine ounces	Value ¹	Year	Fine ounces	Value ¹
1929.....	213, 689. 69	\$4, 417, 358	1932.....	318, 927. 95	\$6, 572, 154
1930.....	218, 539. 82	4, 517, 619	1933.....	242, 827. 70	\$ 5, 019, 694
1931.....	233, 299. 75	4, 822, 734			\$ 6, 206, 676

¹ 1929-32: At legal value (\$20.67+ per ounce); 1933: At both legal coinage value (\$20.67+ per ounce) and average weighted price (\$25.56 per ounce).

² At legal coinage value (\$20.67+ per ounce).

³ At average weighted price (\$25.56 per ounce).

Calculation of value of metal production.—The value of metal production hereinafter reported has been calculated at the figures given in the table that follows. Gold is figured at the mint value for fine gold, that is, \$20.671835 an ounce. The silver price is the average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1929-33

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	<i>Per fine ounce</i>	<i>Per pound</i>	<i>Per pound</i>	<i>Per pound</i>		<i>Per fine ounce</i>	<i>Per pound</i>	<i>Per pound</i>	<i>Per pound</i>
1929.....	\$0. 533	\$0. 176	\$0. 063	\$0. 066	1932.....	\$0. 282	\$0. 063	\$0. 030	\$0. 030
1930.....	. 385	. 130	. 050	. 048	1933.....	. 350	. 064	. 037	. 042
1931.....	. 290	. 091	. 037	. 038					

Mine production of gold, silver, copper, lead, and zinc in Colorado, 1929-33, in terms of recovered metals

Year	Mines producing			Ore sold or treated (short tons)	Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer	Total		Fine ounces	Value	Fine ounces	Value
1929.....	290	13	303	1, 172, 193	213, 689. 69	\$4, 417, 358	4, 397, 377	\$2, 343, 80 2
1930.....	313	21	334	1, 335, 731	218, 539. 82	4, 517, 619	4, 382, 852	1, 687, 398
1931.....	340	195	535	1, 036, 562	233, 299. 75	4, 822, 734	2, 195, 914	636, 815
1932.....	478	335	813	935, 895	317, 927. 95	6, 572, 154	1, 860, 408	524, 635
1933.....	614	286	900	845, 495	242, 827. 70	5, 019, 694	2, 186, 140	765, 149

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1929.....	8, 905, 074	\$1, 567, 293	48, 889, 906	\$3, 080, 064	58, 861, 000	\$3, 884, 826	\$15, 293, 343
1930.....	10, 514, 000	1, 366, 820	44, 260, 000	2, 213, 000	72, 518, 060	3, 480, 864	13, 265, 701
1931.....	8, 165, 000	743, 015	13, 768, 000	509, 416	32, 373, 000	1, 230, 174	7, 942, 154
1932.....	7, 398, 000	466, 074	4, 299, 000	128, 970	218, 000	6, 540	7, 698, 373
1933.....	9, 667, 000	618, 688	4, 803, 000	177, 711	2, 569, 000	107, 898	6, 689, 140

Gold and silver produced at placer mines in Colorado, 1929-33, in fine ounces, in terms of recovered metals

Year	Sluicing and hydraulic		Dredging		Total	
	Gold	Silver	Gold	Silver	Gold	Silver
1929.....	355.72	60	1,862.27	488	2,217.99	548
1930.....	358.90	57	6,328.61	1,600	6,687.51	1,657
1931.....	777.32	121	266.90	69	1,044.22	190
1932.....	1,376.79	283	1,122.02	288	2,498.81	571
1933.....	2,511.55	549	2,813.96	711	5,325.51	1,260

Gold.—The production of gold in Colorado in 1933, in terms of recovered metal, was 242,827.70 fine ounces, a decrease from 1932 of 75,100.25 ounces. In 1933 the Cripple Creek district contributed 109,868.38 ounces (45.25 percent of the State total). Park County yielded 60,146.33 ounces (24.77 percent); San Juan, 23,473.87 ounces (9.67 percent); Lake, 10,727.20 ounces (4.42 percent); and Ouray, 9,255.25 ounces (3.81 percent). The largest increases in quantity were 4,453.16 ounces in Lake County, 1,908.20 ounces in Summit, 1,425.13 ounces in Eagle, and 536.96 ounces in Boulder. The largest decreases were 65,603.37 ounces in Park County, 11,726.97 ounces in Gilpin, 4,894.10 ounces in San Juan, and 3,223.03 in Ouray.

The yield of placer gold was 5,325.51 fine ounces, an increase of 2,826.70 ounces over 1932. Summit County produced 57 percent of the total placer gold, principally from the operation of two dredges—one by the Continental Dredging Co. and the other by the Tiger Placers Co., both of which ran only part of the year. The other counties producing placer gold in 1933 were Adams, Arapahoe, Boulder, Chaffee, Clear Creek, Costilla, Delta, Denver, Douglas, Eagle, Elbert, Fremont, Garfield, Gilpin, Gunnison, Jackson, Jefferson, Lake, La Plata, Moffat, Montezuma, Montrose, Ouray, Park, Pitkin, Rio Grande, Routt, San Juan, San Miguel, and Teller.

Silver.—The production of silver in Colorado in 1933, in terms of recovered metal, was 2,186,140 fine ounces, valued at \$765,149, an increase of 325,732 ounces in quantity and \$240,514 in value from 1932, after a decrease in 1932 of 335,506 ounces in quantity and \$112,180 in value from 1931. In 1933 Eagle County produced 67.89 percent of the State total, San Juan 17.82 percent, Pitkin 3.15 percent, Ouray 2.44 percent, Park 1.85 percent, and Lake 1.65 percent. The largest increases were 373,324 ounces in Eagle County, 22,867 ounces in Pitkin, and 19,223 ounces in Lake. The largest decreases were 101,553 ounces in San Juan County and 22,694 in Park.

Copper.—The production of recoverable copper in Colorado in 1933 was 9,667,000 pounds, valued at \$618,688, an increase of 2,269,000 pounds in quantity and \$152,614 in value from 1932. Eagle County produced 84.44 percent of the total copper output, San Juan 12.25 percent, and Ouray 1.67 percent; the combined output of the other counties producing copper was 1.64 percent of the State total in 1933. Production in Eagle County increased 2,543,000 pounds in quantity and \$168,372 in value from 1932. The largest decrease was 384,000 pounds in quantity and \$23,008 in value in San Juan County.

Lead.—The production of recoverable lead in Colorado in 1933, reckoned as lead in lead bullion and in leaded zinc oxide, was 4,803,000

pounds, valued at \$177,711, an increase of 504,000 pounds in quantity and \$48,741 in value from 1932. Park, San Juan, and Lake Counties, each of which produced more than 1,000,000 pounds, were the most important producing counties in 1933. Clear Creek and San Miguel Counties made increases in both quantity and value of output. Gunnison County, which produced no lead in 1932, yielded 163,000 pounds in 1933. Lead ore yielded 559,758 pounds of lead, lead-zinc ore 759,700 pounds, and dry and siliceous ore 3,417,425 pounds; a small output came from copper and copper-lead ores.

Zinc.—The zinc-bearing ores marketed from Colorado in 1933 contained 2,569,000 pounds of recoverable zinc, valued at \$107,898, an increase of 2,351,000 pounds in quantity and \$101,358 in value from 1932. Lake County led in zinc production in 1933 with 2,492,000 pounds (97 percent of the State total) compared with 126,000 pounds (57.8 percent) in 1932. Gunnison County, yielding 60,000 pounds, and San Miguel, yielding 17,000 pounds, were the only other counties in the State from which zinc was recovered from ores mined in 1933.

MINE PRODUCTION BY COUNTIES

Mine production of gold, silver, copper, lead, and zinc in Colorado in 1933, by counties, in terms of recovered metals

County	Mines producing			Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer	Total	Fine ounces	Value	Fine ounces	Value
Adams.....		2	2	4.69	\$97		
Arapahoe.....		1	1	1.84	38		
Boulder.....	185	4	189	4,402.51	91,008	11,926	\$4,174
Chaffee.....	9	14	23	369.10	7,630	1,872	655
Clear Creek.....	70	8	78	5,512.77	113,959	28,206	9,872
Costilla.....		2	2	16.45	340	2	1
Custer.....	1		1	2.61	54		
Delta.....	1	1	2	4.35	90	100	35
Denver.....		8	8	19.69	405	6	2
Dolores.....	3		3	39.52	817	4,820	1,687
Douglas.....		6	6	23.90	494		
Eagle.....	9	3	12	4,326.76	89,442	1,484,143	519,450
Elbert.....		1	1	10.79	223		
Fremont.....		2	2	11.95	247	2	1
Garfield.....		1	1	1.55	32		
Gilpin.....	69	50	119	4,152.27	85,835	8,366	2,928
Gunnison.....	21	9	30	319.76	6,610	7,135	2,497
Jackson.....		2	2	4.84	100		
Jefferson.....		6	6	353.67	7,311	51	18
Lake.....	31	14	45	10,727.20	221,751	35,989	12,596
La Plata.....	12	1	13	1,954.64	40,406	14,760	5,166
Moffat.....	1	9	10	23.85	493	3	1
Montezuma.....	1	1	2	171.83	3,552	129	45
Montrose.....		36	36	199.35	4,121	63	22
Ouray.....	9	4	13	9,255.25	191,323	53,323	18,663
Park.....	31	19	50	60,146.33	1,243,335	40,526	14,184
Pitkin.....	2	1	3	7.84	162	68,860	24,101
Rio Grande.....	2	1	3	188.81	3,903	28	10
Routt.....		2	2	8.37	173	3	1
Saguache.....	5		5	28.15	582	1,500	525
San Juan.....	12	5	17	23,473.87	485,248	389,642	136,375
San Miguel.....	22	11	33	3,685.69	76,190	23,560	8,246
Summit.....	14	55	69	3,509.22	72,542	3,420	1,197
Teller.....	104	7	111	109,868.38	2,271,181	7,705	2,697
Total, 1932.....	614	286	900	242,827.70	5,019,694	2,186,140	765,149
	478	335	813	317,927.95	6,572,154	1,860,408	524,635

GOLD, SILVER, COPPER, LEAD, AND ZINC IN COLORADO 163

Mine production of gold, silver, copper, lead, and zinc in Colorado in 1933, by counties, in terms of recovered metals—Continued

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Adams							\$97
Arapahoe							38
Boulder	4,000	\$256	26,000	\$962			96,400
Chaffee	300	19	16,000	592			8,896
Clear Creek	11,000	704	141,000	5,217			129,752
Costilla							341
Custer							54
Delta			400	15			140
Denver							407
Dolores	800	51	6,000	222			2,777
Douglas							494
Eagle	8,163,000	522,432	15,000	555			1,131,879
Elbert							223
Fremont							248
Garfield							32
Gilpin	12,500	800	84,000	3,108			92,671
Gunnison	1,300	83	163,000	6,031	60,000	\$2,520	17,741
Jackson							100
Jefferson							7,329
Lake	15,000	960	1,010,000	37,370	2,492,000	104,664	377,341
La Plata	200	13	9,700	359			45,944
Moffat	400	26					520
Montezuma							3,597
Montrose							4,143
Ouray	161,500	10,336	280,400	10,375			230,697
Park	82,000	5,248	1,319,300	48,814			1,311,581
Pitkin			178,000	6,586			30,849
Rio Grande			200	7			3,920
Routt							174
Saguache	3,000	192	68,000	2,516			3,815
San Juan	1,184,000	75,776	1,198,400	44,341			741,740
San Miguel	28,000	1,792	248,300	9,187	17,000	714	96,129
Summit			39,300	1,454			75,193
Teller							2,273,878
Total, 1932	9,667,000 7,398,000	618,688 466,074	4,803,000 4,299,000	177,711 128,970	2,569,000 218,000	107,898 6,540	6,689,140 7,698,373

Gold and silver produced at lode mines in Colorado in 1933, by counties, in terms of recovered metals

County	Ore sold or treated	Gold		Silver
		Short tons	Fine ounces	
Boulder	7,984	4,322.79		11,920
Chaffee	363	293.78		1,860
Clear Creek	14,449	5,462.99		28,200
Custer	3	2.61		
Delta	1	.19		100
Dolores	41	39.52		4,820
Eagle	91,258	4,308.23		1,484,140
Gilpin	48,471	3,567.08		8,220
Gunnison	736	256.34		7,120
Lake	18,356	10,420.99		35,920
La Plata	7,801	1,951.45		14,760
Moffat	2			3
Montezuma	21	169.65		129
Ouray	16,125	9,243.45		53,320
Park	62,643	59,899.81		40,480
Pitkin	3,677	.97		68,860
Rio Grande	27	186.39		28
Saguache	131	28.15		1,500
San Juan	199,612	23,462.36		389,640
San Miguel	23,613	3,596.44		23,520
Summit	711	473.64		2,640
Teller	349,470	109,815.36		7,700
Total, 1932	845,495 935,895	237,502.19 315,429.14		2,184,880 1,859,837

Gold and silver produced at placer mines in Colorado in 1933, by counties, in fine ounces

County	Sluicing and hydraulic		Dredging		Total	
	Gold	Silver	Gold	Silver	Gold	Silver
Adams.....	4.69	-----	-----	-----	4.69	-----
Arapahoe.....	1.84	-----	-----	-----	1.84	-----
Boulder.....	79.72	6	-----	-----	79.72	6
Chaffee.....	75.32	12	-----	-----	75.32	12
Clear Creek.....	49.78	6	-----	-----	49.78	6
Costilla.....	16.45	2	-----	-----	16.45	2
Delta.....	4.16	-----	-----	-----	4.16	-----
Denver.....	19.59	6	-----	-----	19.59	6
Douglas.....	23.90	-----	-----	-----	23.90	-----
Eagle.....	18.53	3	-----	-----	18.53	3
Elbert.....	10.79	-----	-----	-----	10.79	-----
Fremont.....	11.95	2	-----	-----	11.95	2
Garfield.....	1.55	-----	-----	-----	1.55	-----
Gilpin.....	585.19	146	-----	-----	585.19	146
Gunnison.....	63.42	15	-----	-----	63.42	15
Jackson.....	4.84	-----	-----	-----	4.84	-----
Jefferson.....	353.67	51	-----	-----	353.67	51
Lake.....	306.21	69	-----	-----	306.21	69
La Plata.....	3.19	-----	-----	-----	3.19	-----
Moffat.....	23.85	-----	-----	-----	23.85	-----
Montezuma.....	2.18	-----	-----	-----	2.18	-----
Montrose.....	199.35	63	-----	-----	199.35	63
Ouray.....	11.80	3	-----	-----	11.80	3
Park.....	246.52	46	-----	-----	246.52	46
Pitkin.....	6.87	-----	-----	-----	6.87	-----
Rio Grande.....	2.42	-----	-----	-----	2.42	-----
Routt.....	8.37	3	-----	-----	8.37	3
San Juan.....	11.51	2	-----	-----	11.51	2
San Miguel.....	89.25	40	-----	-----	89.25	40
Summit.....	221.62	69	2,813.96	711	3,035.58	780
Teller.....	53.02	5	-----	-----	53.02	5
Total, 1932.....	2,511.55	549	2,813.96	711	5,325.51	1,260
	1,376.79	283	1,122.02	288	2,498.81	571

MINING INDUSTRY

In 1933 the total ore, old tailings, etc., sold or treated in Colorado was 845,495 tons compared with 935,895 tons in 1932. The quantity of low-grade gold ore treated in Gilpin County was 231,944 tons less in 1933 than in 1932, but this large decrease was partly offset by increases in the quantity of material treated at new or remodeled mills in Boulder, Clear Creek, La Plata, Park, and San Miguel Counties; by increased shipments of mine and dump sulphotelluride gold ores from the Cripple Creek district to the Golden Cycle mill at Colorado Springs; and by increased shipments of ore to smelters from Eagle, Gunnison, and Lake Counties. Operating details in these and other counties and districts of the State are given in the following review by counties and districts.

ORE CLASSIFICATION

Ore sold or treated in Colorado in 1933, with content in terms of recovered metals

Source	Ore	Gold	Silver	Copper	Lead	Zinc
	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Dry gold ore.....	538, 162	205, 312. 25	190, 443	293, 030	2, 058, 875	16, 000
Dry gold and silver ore.....	199, 134	23, 710. 70	396, 733	1, 181, 208	1, 160, 350	
Dry silver ore.....	4, 604	6. 28	70, 803	1, 330	198, 200	
	741, 900	229, 029. 23	657, 979	1, 475, 568	3, 417, 425	16, 000
Copper ore.....	91, 133	3, 862. 60	1, 482, 975	8, 177, 020	18, 917	
Copper-lead ore.....	66	1. 10	984	2, 900	47, 200	
Lead ore.....	2, 604	4, 608. 44	40, 969	10, 672	559, 758	1, 000
Lead-zinc ore.....	9, 792	. 82	1, 973	840	759, 700	2, 552, 000
	103, 595	8, 472. 96	1, 526, 901	8, 191, 432	1, 385, 575	2, 553, 000
Total, lode mines.....	845, 495	237, 502. 19	2, 184, 880	9, 667, 000	4, 803, 000	2, 569, 000
Total, placers.....		5, 325. 51	1, 260			
	845, 495	242, 827. 70	2, 186, 140	9, 667, 000	4, 803, 000	2, 569, 000
Total, 1932.....	935, 895	317, 927. 95	1, 860, 408	7, 398, 000	4, 299, 000	218, 000

METALLURGIC INDUSTRY

Custom reduction plants operating in Colorado in 1933 were the lead bullion-lead copper matte smelter at Leadville, the Golden Cycle roast-amalgamation-cyanidation-flotation mill at Colorado Springs, the Chain O'Mines amalgamation-gravity concentration-selective flotation mill at Central City, the St. Joe flotation mill in Left Hand Canyon (Boulder County), the sampling plant at Boulder, the Watrous flotation mill at Silver Plume (Clear Creek County), the Clear Creek-Gilpin Ore Co. sampler at Idaho Springs (opened December 14), and the Smuggler-Union mill at Pandora (San Miguel County). Zinc-lead sulphide ore from Lake County was shipped to Coffeyville, Kans.; iron-copper-silver ore from Eagle County and small lots of gold ore from the San Juan region went to Utah smelters for reduction; and zinc-lead-silver ore from Gunnison and San Miguel Counties went to the selective flotation mill at Midvale, Utah.

Details of treatment of the total ore produced in the State in 1933 are shown in the following tables.

Mine production of metals in Colorado in 1933, by methods of recovery, in terms of recovered metals

Method of recovery	Material treated	Gold	Silver	Copper	Lead	Zinc
	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Ore amalgamated.....	407, 650	48, 527. 84	7, 674			
Concentrates, sands, and slimes cyanided.....	360, 743	92, 173. 84	25, 261			
Concentrates smelted.....	19, 580	74, 777. 22	586, 042	1, 456, 240	3, 341, 343	77, 000
Ore smelted.....	112, 539	22, 023. 29	1, 565, 903	8, 210, 760	1, 461, 657	2, 492, 000
Placer.....		5, 325. 51	1, 260			
		242, 827. 70	2, 186, 140	9, 667, 000	4, 803, 000	2, 569, 000
Total, 1932.....		317, 927. 95	1, 860, 408	7, 398, 000	4, 299, 000	218, 000

Ore treated by amalgamation, concentrates, sands, and slimes treated by cyanidation, and gold and silver contained in bullion and precipitates in Colorado in 1933

Process	Material treated	Gold in bullion	Silver in bullion	Quicksilver purchased	Sodium cyanide used
	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>
Amalgamation.....	407, 650	48, 527. 84	7, 674	3, 086	
Cyanidation.....	¹ 360, 743	92, 173. 84	25, 261		² 327, 680

¹ Includes 298,142 tons of sands and slimes from ore and concentrates known to have been first amalgamated and 62,601 tons of estimated tailings from ore first floated and other sands and slimes from iron concentrates first amalgamated.

² Reduced to equivalent of 96- to 98-percent strength. Actually 655,360 pounds of cyanamid of approximately 48- to 49-percent strength.

Mine production of metals from gold and silver mills in Colorado in 1933, by counties, in terms of recovered metals

County	Ore treated	Recovered in bullion		Concentrates and recovered metal					
		Gold	Silver	Concentrates produced	Gold	Silver	Copper	Lead	Zinc
	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Boulder.....	5, 167	3, 262. 76	9, 090	33	631. 03	635	2, 200	19, 000	
Chaffee.....	281	196. 48	1, 014						
Clear Creek.....	9, 568	2, 301. 83	5, 514	299	1, 472. 61	8, 665	2, 300	48, 561	
Custer.....	3	2. 61							
Dolores.....		9. 54	23						
Eagle.....	39	39. 13	163						
Gilpin.....	47, 909	2, 321. 75	1, 725	867	905. 33	4, 335	8, 200	47, 300	
Gunnison.....	327	87. 73	807	2	37. 80	39	100	1, 100	
Lake.....	289	346. 88	377						
La Plata.....	174	252. 90	683	3	57. 24	69	200	1, 700	
Montezuma.....	17	47. 27	73						
Ouray.....	14, 970	5, 461. 10	1, 731	1, 564	2, 220. 30	44, 049	160, 100	264, 200	
Park.....	7, 174	14, 340. 30	2, 694	490	9, 230. 11	9, 436	28, 200	278, 000	
Rio Grande.....	26	181. 59							
Saguache.....	2	40							
San Juan.....	2	172. 83	34						
San Miguel.....	23, 183	1, 707. 48	1, 123	1, 158	1, 492. 80	20, 190	22, 100	216, 200	
Summit.....	377	153. 74	184	142	80. 80	261			
Teller.....	349, 470	109, 815. 36	7, 700						
Total, 1932.....	458, 978 653, 317	140, 701. 68 177, 841. 99	32, 935 44, 401	4, 558 5, 968	16, 128. 02 18, 595. 18	87, 679 72, 376	223, 400 175, 100	876, 061 782, 500	84, 000

Mine production of metals from concentrating mills in Colorado in 1933, by counties, in terms of recovered metals

County	Ore treated	Concentrates and recovered metal					
		Concentrates produced	Gold	Silver	Copper	Lead	Zinc
	<i>Short tons</i>	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Boulder.....	2, 794	130	412. 70	2, 195	1, 800	7, 000	
Clear Creek.....	4, 448	394	780. 31	3, 834	4, 500	46, 500	
Gilpin.....	325	69	61. 80	235		6, 832	
Gunnison.....	157	118	82	1, 973	840	63, 000	60, 000
La Plata.....	7, 457	147	980. 81	10, 475		7, 650	
Ouray.....	700	34	3. 70	6, 887	400	15, 000	
Park.....	54, 690	4, 802	33, 272. 90	21, 215	38, 000	955, 000	
Pitkin.....	3, 600	232	. 57	62, 048		169, 400	
San Juan.....	199, 549	9, 056	23, 103. 31	388, 613	1, 183, 000	1, 171, 300	
San Miguel.....	258	40	32. 28	888	4, 300	23, 600	17, 000
Total, 1932.....	273, 978 205, 875	15, 022 10, 716	58, 649. 20 29, 997. 39	498, 363 557, 670	1, 232, 840 1, 566, 500	2, 465, 282 1, 503, 250	77, 000 8, 000

GOLD, SILVER, COPPER, LEAD, AND ZINC IN COLORADO 167

Gross metal content of concentrates produced from ores mined in Colorado in 1933, by classes of concentrates

Class of concentrates	Concentrates produced (dry weight)	Gross metal content				
		Gold	Silver	Copper (wet assay)	Lead (wet assay)	Zinc
	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Dry gold.....	1, 618	2, 965. 32	17, 754	14, 069	98, 432	133, 443
Copper.....	335	311. 37	4, 640	26, 802	12, 401	12, 401
Copper-lead.....	11, 157	35, 494. 30	443, 023	1, 716, 379	1, 933, 467	1, 839, 440
Lead.....	6, 391	36, 002. 56	120, 592	58, 875	1, 657, 978	600, 806
Zinc.....	79	3. 70	162	2, 421	3, 010	85, 476
	19, 580	74, 777. 25	586, 171	1, 818, 546	3, 705, 288	2, 671, 566
Total, 1932.....	16, 684	48, 620. 48	632, 403	2, 183, 276	2, 538, 481	2, 403, 639

Mine production of metals from Colorado concentrates in 1933, in terms of recovered metals

BY COUNTIES

	Concentrates	Gold	Silver	Copper	Lead	Zinc
	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Boulder.....	163	1, 043. 73	2, 830	4, 000	26, 000	-----
Clear Creek.....	693	2, 252. 92	12, 499	6, 800	95, 061	-----
Gilpin.....	936	967. 13	4, 570	8, 200	54, 132	-----
Gunnison.....	120	38. 62	2, 012	940	64, 100	60, 000
La Plata.....	150	1, 038. 05	10, 544	200	9, 350	-----
Ouray.....	1, 598	2, 224. 00	50, 936	160, 500	279, 200	-----
Park.....	5, 292	42, 503. 01	30, 651	66, 200	1, 233, 000	-----
Pitkin.....	232	. 57	62, 048	-----	169, 400	-----
San Juan.....	9, 056	23, 103. 31	388, 613	1, 183, 000	1, 171, 300	-----
San Miguel.....	1, 198	1, 525. 08	21, 078	26, 400	239, 800	17, 000
Summit.....	142	80. 80	261	-----	-----	-----
	19, 580	74, 777. 22	586, 042	1, 456, 240	3, 341, 343	77, 000
Total, 1932.....	16, 684	48, 592. 57	630, 046	1, 741, 600	2, 285, 750	92, 000

BY CLASSES OF CONCENTRATES

Dry gold.....	1, 618	2, 965. 32	17, 754	11, 600	87, 800	-----
Copper.....	335	311. 37	4, 640	22, 100	11, 000	-----
Copper-lead.....	11, 157	35, 494. 30	442, 894	1, 373, 800	1, 741, 461	-----
Lead.....	6, 391	36, 002. 53	120, 592	46, 441	1, 498, 237	1, 000
Zinc.....	79	3. 70	162	2, 299	2, 845	76, 000
	19, 580	74, 777. 22	586, 042	1, 456, 240	3, 341, 343	77, 000

Gross metal content of Colorado crude ore shipped to smelters in 1933, by classes of ore

Class of ore	Ore		Gross metal content				
			Gold	Silver	Copper	Lead	Zinc
	<i>Short tons</i>	<i>Percent</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Dry gold.....	8, 529	7. 53	13, 119. 94	34, 224	22, 237	143, 980	3, 552
Dry gold and silver.....	313	. 28	441. 60	5, 204	2, 897	439	3, 280
Dry silver.....	303	. 27	1. 90	1, 738	1, 165	15, 442	-----
Copper.....	91, 133	80. 98	3, 862. 60	1, 482, 976	8, 518, 545	32, 071	1, 819, 460
Copper-lead.....	66	. 06	1. 10	984	3, 449	52, 792	-----
Lead.....	2, 560	2. 27	4, 596. 29	40, 790	13, 234	619, 369	5, 931
Lead-zinc.....	9, 635	8. 56	-----	-----	-----	995, 327	8, 114, 108
	112, 539	100. 00	22, 023. 43	1, 565, 916	8, 561, 587	1, 850, 420	4, 946, 331
Total, 1932.....	76, 703	100. 00	88, 994. 60	1, 185, 390	6, 219, 978	2, 564, 251	2, 427, 788

Mine production of metals from Colorado crude ore shipped to smelters in 1933, in terms of recovered metals

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc
	<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Boulder.....	23	16.30				
Chaffee.....	82	97.30	846	300	16,000	
Clear Creek.....	433	908.24	10,187	4,200	45,939	
Delta.....	1	19	100		400	
Dolores.....	41	29.98	4,797	800	6,000	
Eagle.....	91,219	4,269.10	1,483,977	8,163,000	15,000	
Gilpin.....	237	278.20	1,925	4,300	29,868	
Gunnison.....	252	129.99	4,301	360	98,900	
Lake.....	18,067	10,074.11	35,543	15,000	1,010,000	2,492,000
La Plata.....	170	660.50	3,533		350	
Moffat.....	2		3	400		
Montezuma.....	4	122.38	56			
Ouray.....	455	1,558.35	653	1,000	1,200	
Park.....	779	3,056.50	7,135	15,800	86,300	
Pitkin.....	77	.40	6,812		8,600	
Rio Grande.....	1	4.80	28		200	
Saguache.....	129	27.75	1,500	3,000	68,000	
San Juan.....	61	186.22	993	1,000	27,100	
San Miguel.....	172	363.88	1,319	1,600	8,500	
Summit.....	334	239.10	2,195		39,300	
Total, 1932.....	112,539 76,703	22,023.29 88,994.58	1,565,903 1,185,390	8,210,760 5,656,400	1,461,657 2,013,250	2,492,000 126,000

BY CLASSES OF ORE

Dry gold.....	8,529	13,119.94	34,223	17,530	129,464	
Dry gold and silver.....	313	441.60	5,204	2,008	350	
Dry silver.....	303	1.90	1,738	930	13,800	
Copper.....	91,133	3,862.60	1,482,975	8,177,020	18,917	
Copper-lead.....	66	1.10	984	2,900	47,200	
Lead.....	2,560	4,596.15	40,779	10,372	555,226	
Total to copper and lead plants.....	102,904	22,023.29	1,565,903	8,210,760	764,957	
Lead-zinc.....	9,635				696,700	2,492,000
	112,539	22,023.29	1,565,903	8,210,760	1,461,657	2,492,000

REVIEW BY COUNTIES AND DISTRICTS

Mine production of gold, silver, copper, lead, and zinc in Colorado in 1933, by counties and districts, in terms of recovered metals

County and district	Number of mines producing		Ore sold or treated	Gold			Silver			Copper	Lead	Zinc	Total value
	Lode	Placer		Lode	Placer	Total	Lode	Placer	Total				
			Short tons	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Pounds	Pounds	Pounds	
Adams County.....		2			4.69	4.69							\$97
Arapahoe County.....		1			1.84	1.84							38
Boulder County.....	185	4	7,984	4,322.79	79.72	4,402.51	11,920	6	11,926	4,000	26,000		96,400
Chaffee County:													
Arkansas River.....		4			7.84	7.84							162
Chalk Creek.....	4		254	187.69		187.69	1,860		1,860	300	16,000		5,142
Free Gold.....	1		3		.53	.53							11
Granite ¹	1	10	51	93.58	67.48	161.06		12	12				3,334
Riverside.....	1		16	7.37		7.37							152
Trout Creek.....	2		39	4.61		4.61							95
Clear Creek County:													
Alice.....	4		134	53.48		53.48	13		13				1,111
Argentine.....	1		31	28.80		28.80	284		284	1,000	2,700		858
Empire.....	8		797	345.68		345.68	118		118				7,187
Geneva Creek.....	1		6	1.30		1.30	185		185	400	317		130
Griffith.....	8		1,231	492.55		492.55	3,035		3,035		21,767		12,049
Idaho Springs.....	42	8	12,138	4,432.24	49.78	4,482.02	23,823	6	23,829	9,550	103,632		105,437
Montana.....	3		19	3.60		3.60	400		400		3,584		347
Trail Creek.....	3		93	105.34		105.34	342		342	50	9,000		2,633
Costilla County: Grayback		2			16.45	16.45		2	2				341
Custer County: Rosita Hills	1		3	2.61		2.61							54
Delta County.....	1		1	.19	4.16	4.35	100		100		400		140
Denver County.....		8			19.59	19.59		6	6				407
Dolores County: Pioneer	3		41	39.52		39.52	4,820		4,820	800	6,000		2,777
Douglas County.....		6			23.90	23.90							494
Eagle County:													
Burns.....		1			12.95	12.95		2	2				269
Gypsum.....		1			3.86	3.86		1	1				80
Red Cliff.....	9		91,258	4,308.23	1.72	4,309.95	1,484,140		1,484,140	8,163,000	15,000		1,131,530
Elbert County.....		1			10.79	10.79							223
Fremont County: Arkansas													
River.....		2			11.95	11.95		2	2				248
Garfield County.....		1			1.55	1.55							32

¹ The Granite district lies in both Chaffee and Lake Counties.

Mine production of gold, silver, copper, lead, and zinc in Colorado in 1933, by counties and districts, in terms of recovered metals—Continued

County and district	Number of mines producing		Ore sold or treated	Gold			Silver			Copper	Lead	Zinc	Total value
	Lode	Placer		Lode	Placer	Total	Lode	Placer	Total				
Gilpin County:			<i>Short tons</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Fine ounces</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	
Southern	52	40	47,437	3,282.43	529.66	3,812.09	7,869	143	8,012	12,500			\$85,515
Northern	16	10	1,034	284.65	55.53	340.18	351	3	354		84,000		7,156
Gunnison County:													
Cochetopa	2		58	25.35		25.35	1		1				524
Domingo	3		24	14.30		14.30	171		171		100		360
Elk Mountain	2	2	1	.24	2.03	2.27	116	2	118				89
Gold Brick	7		328	203.02		203.02	845		845	460	6,600		4,766
Rock Creek	2		14	3.46		3.46	1,078		1,078		300		459
Taylor Park		7			61.39	61.39		13	13				1,273
Tin Cup	3		9	6.81		6.81	332		332				257
Tomichi	2		302	3.16		3.16	4,577		4,577	840	156,000	60,000	10,013
Jackson County		2			4.84	4.84							100
Jefferson County		6			353.67	353.67		51	51				7,329
Lake County:													
California (Leadville)	27	10	18,298	10,344.70	153.13	10,497.83	35,507	24	35,531	15,000	1,009,700	2,492,000	372,427
Granite	2	3	47	61.99	11.94	73.93	66	2	68				1,552
St. Kevin	1		7	9.60		9.60	336		336		300		328
Twin Lakes	1	1	4	4.70	141.14	145.84	11	43	54				3,034
La Plata County: California	12	1	7,801	1,951.45	3.19	1,954.64	14,760		14,760	200	9,700		45,944
Moffat County:													
Douglas Mountain	1		2				3		3	400			27
Fourmile (Timberlake)		7			18.98	18.98							393
Lay	1				2.45	2.45							50
Round Bottom		1			2.42	2.42							50
Montezuma County	1	1	21	169.65	2.18	171.83	129		129				3,597
Montrose County:													
Naturita		34			197.08	197.08		62	62				4,096
Uncompahgre River		2			2.27	2.27		1	1				47
Ouray County:													
Sneffels	5	2	15,135	8,044.94	4.64	8,049.58	46,035	2	46,037	160,100	265,100		202,568
Uncompahgre	4	2	990	1,198.51	7.16	1,205.67	7,285	1	7,286	1,400	15,300		28,129
Park County:													
Alma Placers		4			83.71	83.71		19	19				1,738
Beaver Creek		2			5.04	5.04							104
Buckskin	5		116	78.77		78.77	220		220	1,000	1,800		1,836
Consolidated Montgomery	5		1,560	428.22		428.22	1,551		1,551	100	900		9,434
Fairplay		7			118.91	118.91		21					2,465
Hall Valley	1		129	17.85		17.85	3,580		3,580	11,500	2,600		2,454

Horseshoe	1		1				9		9		1,000		40
Mosquito	19		60,837	59,374.97		59,374.97	35,120		35,120	69,400	1,313,000		1,292,705
Tarryall		6			38.86	38.86		6					805
Pitkin County: Roaring Fork	2	1	3,677	.97	6.87	7.84	68,860		68,860		178,000		30,849
Rio Grande County: Summit-													
ville	2	1	27	186.39	2.42	188.81	28		28		200		3,920
Routt County: Hahns Peak		2			8.37	8.37		3	3				174
Saguache County:													
Kerber Creek	4		105	3.09		3.09	1,490		1,490	3,000	68,000		3,293
Vulcan	1		26	25.06		25.06	10		10				522
San Juan County:													
Animas	10	5	199,611	23,442.70	11.51	23,454.21	389,630	2	389,632	1,184,000	1,198,400		741,331
Eureka	2		1	19.66		19.66	10		10				409
San Miguel County:													
Iron Springs	8		400	218.57		218.57	548		548	300	4,300	1,000	4,930
Lower San Miguel		8			60.69	60.69		18	18				1,261
Mount Wilson	1		5	16.80		16.80	3		3				348
Upper San Miguel	13	3	23,208	3,361.07	28.56	3,389.63	22,969	22	22,991	27,700	244,000	16,000	89,590
Summit County:													
Breckenridge	7	54	540	382.05	3,033.86	3,415.91	1,395	780	2,175		26,300		72,347
Montezuma	2		12	1.70		1.70	938		938		5,000		548
Ten Mile	5	1	159	89.89	1.72	91.61	307		307		8,000		2,298
Teller County: Cripple Creek	104	7	349,470	109,815.36	53.02	109,868.38	7,700	5	7,705				2,273,878
Total Colorado	614	286	845,495	237,502.19	5,325.51	242,827.70	2,184,880	1,260	2,186,140	9,667,000	4,803,000	2,569,000	6,689,140

¹ The Granite district lies in both Chaffee and Lake Counties.

ADAMS COUNTY

No gold was recovered in 1933 by the Brannan, Carlson, and Gordon gravel plants on Clear Creek, which from 1922 to 1932, inclusive, recovered 1,116.54 fine ounces of gold and 165 ounces of silver from sluice boxes placed below waste flumes; but two small lots of placer gold reported to have been recovered on the Pompino and Russell ranches in Adams County were sold to the Denver Mint.

ARAPAHOE COUNTY

A small placer on the Old Curtis ranch in Arapahoe County in 1933 yielded 2 crude ounces of bullion, 0.945 fine in gold and 0.019 fine in silver.

BOULDER COUNTY

In 1933 Boulder County had more mines listed as producers than any other county in the State, but the majority produced only small lots of ore, ranging from less than $\frac{1}{2}$ ton to 25 tons, which were shipped direct to the Golden Cycle mill at Colorado Springs or to the Boulder Ore Sampling Works, the latter idle until June 1 when operation by the St. Joe Mining & Milling Co. began. During the last 4 months of the year the St. Joe Mining & Milling Co. also operated the St. Joe flotation mill on Left Hand Creek near Gold Hill on ores purchased and ores from company mines, including the Cold Spring group. The mill was reconditioned in 1933, and complete sampling equipment was installed. It has a rated capacity of 60 tons per 24 hours. Gold concentrates from the mill, containing some copper and lead, were shipped to the Leadville smelter, and other shipments of gold concentrates were made to the Golden Cycle mill at Colorado Springs. The company also shipped crude ore and concentrates purchased at the sampler at Boulder to the Golden Cycle mill.

The Black Swan flotation mill between Salina and Crisman was operated part of the year on ores from the Tambourine mine. At the Slide mines the Slide Mines, Inc., constructed a new mill building in 1933 and early in 1934 completed the installation of both gravity- and flotation-concentration equipment, including a Hadsel Mill. Remodeling of several old mills, including the Black Cloud at Salina, was begun late in 1933, but none of these operated during the year. Mines producing 1 car or more of ore included the Big Horn, Boulder County Tunnel, Dime, Fairfax, Fortune, Grand Republic group, Gray Eagle, Herold group, Hereafter, Horsfal, Ingram, John Jay, KeKeOnga, Keystone, Klondyke, Larson, Logan-Croesus group, Mack, Milan, Mogul, Monitor, Myrtle (dump), Poorman, Potosi-Caribou (mill), Richmond, St. Joe Mining & Milling Co. property, Silver Harp, Slide, Sunshine, Sure Shot, Tambourine, Wano, White Raven, and Wood Mountain group.

Placer gold was recovered by sluicing at the Beaver Creek, Crews, and one other placer and by a special machine consisting of a steam shovel, bucket elevator, portable screen with tailings stacker, and sluice boxes at the Colby placer.

CHAFFEE COUNTY

Arkansas River district (Nathrop, Buena Vista).—Four lots of placer gold recovered by small-scale operations on the Arkansas River were sold to the Denver Mint in 1933.

Chalk Creek district (Romley, St. Elmo).—A lessee operating small sections of the Mary Murphy mine above the fourth level extracted lead-silver-gold ore which was shipped to the Leadville smelter and gold-silver ore which was sold to the Golden Cycle mill. Experimental work was done in the 100-ton concentrating mill on the property of the Philip Carey Mining & Milling Co., and clean-up operations resulted in shipment of gold ore to the Leadville smelter and of a small lot of gold concentrates to the Golden Cycle mill. Small shipments of smelting ore were made to the Leadville smelter from two other mines in the district in 1933.

Free Gold district (1 mile north of Buena Vista).—The Connie L mine was the only producer of ore in the Free Gold district in 1933; the ore was sold to the Golden Cycle mill at Colorado Springs.

Granite district.—In 1933 shipments of gold ore were made from one lode mine in the Granite district to the Golden Cycle mill. Placer gold was recovered by sluicing at the Cache Creek, Davis-Rooney, Franklin, Lost Canon, Old Channel, Pay Day, and three other placers and by drift mining at the Mariposa placer.

Riverside district.—Gold ore was shipped from the Big Chief mine in the Riverside district to the Golden Cycle mill in 1933.

Trout Creek district.—At the Forgotten mine 35 tons of dump ore ground in a Huntington mill and amalgamated yielded amalgamation bullion, and a small lot of gold ore was shipped to the Leadville smelter from the Eastman group.

CLEAR CREEK COUNTY

Alice district (Yankee, Lincoln).—In 1933 the Reynolds stamp mill was used to treat small tonnages of ore from the Lalla, Ottawa, and Reynolds mines; the amalgamation bullion produced was shipped to the Denver Mint. Three tons of concentrates made from the Ottawa ore were shipped to the Leadville smelter. The output from the San Juan mine was 85 tons of gold ore, which was treated at the mine in a 5-ton stamp mill equipped with amalgamation plates and concentration tables; the concentrates were shipped to the Golden Cycle mill at Colorado Springs.

Argentine district.—The only production from mines in the Argentine district in 1933 was 31 tons of gold-silver ore shipped to the Leadville smelter by the Santiago Mines Co.

Empire district.—At the Golden Eagle mine 500 tons of gold ore were treated in a small stamp mill and yielded amalgamation bullion. Ore from this mine was also shipped to the Golden Cycle mill at Colorado Springs. Shipments of gold ore were made from the Conqueror mine to the Leadville smelter and to the Golden Cycle mill. Other producing mines in the district were the Badger, Forgotten, Gold Dirt-Empress Tunnel-Sprankel group, Mint, Pittsburg, and Twin Lode.

Geneva Creek (Collier Mountain) district.—Six tons of copper-silver-gold ore were shipped from the Silver Queen mine in the Geneva Creek district to the Leadville smelter in 1933.

Griffith district (Georgetown-Silver Plume).—The principal producer of metals in the Griffith district in 1933 was the Pulaski mine, from which ore was trucked $1\frac{1}{2}$ miles to the Watrous concentration-flotation mill for treatment. The mill was operated at a daily average of 30 tons for approximately 100 days during the year. The lead-gold-silver concentrates produced were shipped to the Leadville smelter. In addition, a small output was made from the Big Chief, Centennial, Commonwealth Tunnel, Eva D, Phoenix, Verdun, and one other mine in the district in 1933.

Idaho Springs district.—In 1933 the output of metals from the Idaho Springs district came chiefly from operations of the Lincoln, Mattie, and North American group of mines. During the year the mill at the Lincoln mine was remodeled by the Alma-Lincoln Mining Co., and milling of ores from the lower level of the Lincoln mine was begun on October 18 at full capacity of 50 tons per 24 hours and continued throughout the year, making gold-silver-lead-copper-[zinc] concentrates which were sold to the Leadville smelter.

Gold bullion and lead-gold-silver-[zinc] concentrates were produced at the Mattie amalgamation-concentration mill; also some crude ore was shipped direct from the mine to the Leadville smelter. At the North American group of mines the Engineers Mining Co., lessee on the properties connected with the Central (Big Five) adit, reopened the Belman, Edgar, and Fulton mines. Ores from the Belman and Fulton were treated in the washing plant built during the year near the entrance of the Central adit, and the pulp from the washer was sent to the Argo mill (leased and operated by the Galli Milling Co.). The products—amalgamation bullion and gold-silver-lead-copper concentrates—were shipped to the Denver Mint and the Leadville smelter, respectively. Other producers of 1 car or more of ore were the Barber-Elliott, Bismark, Shafter, Summit, West Gold, and Wheatland. Some placer gold was recovered from the bars of Clear Creek by small-scale methods.

Montana district (Lawson, Dumont).—Producing properties in the Montana district in 1933 were the Hiawatha, Jo Reynolds, and Princess of India group.

Trail Creek district.—One car of ore was shipped from the Freeland dump in 1933, and a small output was made from the New Era and Poorman mines.

COSTILLA COUNTY

Grayback district.—Hydraulic operations at the Trinchera ranch and sluicing at the Midnight claim in the Grayback district yielded the output of gold from Costilla County in 1933.

CUSTER COUNTY

Rosita Hills district.—The only production of metals in Custer County in 1933 came from a sample lot of gold ore shipped from the Hector mine in the Rosita Hills district to the Golden Cycle mill.

DELTA COUNTY

One ton of lead-silver ore was shipped from Hotchkiss to the Leadville smelter in 1933. Placer gold was recovered at the Ruby Wear claim on the Gunnison River.

DENVER COUNTY

Only a few people were engaged in panning and rocking within the bounds of the city and county of Denver in 1933. Some were thus engaged during the year on the Platte River and some of its tributaries, between its junction with Cherry Creek (in the heart of the city of Denver) and Englewood, Arapahoe County, and east and south on Cherry Creek in Denver, Arapahoe, Douglas, and Elbert Counties. Those who recovered any gold in these counties naturally gravitated to Denver to sell it to assayers, jewelers, dental-supply concerns, and the Denver Mint. The aggregate of the production of placer gold in Arapahoe, Denver, Douglas, and Elbert Counties is correct, but the separation as to counties naturally is partly estimated. The estimate for Denver County in 1933 is 19.59 fine ounces of gold and 6 ounces of silver.

DOLORES COUNTY

Pioneer district (Rico).—The only shipments of ore from Rico in 1933 were 41 tons of lead-silver-gold-copper-zinc ore by the Rico Enterprise Mining Co. to the International Smelting Co., Tooele, Utah, and a lot of less than one-half ton of gold ore from one other property to the Golden Cycle mill at Colorado Springs. One lot of amalgamation bullion reported to have come from the Covina mine was sold to the Denver Mint.

DOUGLAS COUNTY

Douglas County is credited with the production of 23.90 fine ounces of placer gold in 1933, principally from placers on Little Dry Creek.

EAGLE COUNTY

Burns district.—The Clipper placer, on the Colorado River about 1 mile above Burns, was worked by a hydraulic pump and sluices in 1933 and yielded placer bullion which, when melted at the Denver Mint, weighed 15.52 ounces and averaged 0.834 fine in gold and 0.155 fine in silver.

Gypsum district.—An operator in the Gypsum district made a shipment of placer bullion to the Denver Mint in 1933.

Red Cliff (Battle Mountain) district.—The 600-ton flotation mill of the Empire Zinc Co. (New Jersey Zinc Co.) at Gilman was not operated in 1933. Crude iron-silver-copper ore from the Eagle mine was shipped to the Leadville (Colo.) smelter and to the Garfield (Utah) smelter. Among other producing lode mines were the Alligator, Champion, Groundhog, Poorman, Potvin group (Copper King and Pine Martin), Star of the West, and Tiptop. A small lot of placer gold was recovered at the Jack Flats placer.

ELBERT COUNTY

The gold produced in Elbert County in 1933 came from a placer operation on the Crail ranch.

EL PASO COUNTY

The Golden Cycle mill ¹ at Colorado Springs, El Paso County, has treated for many years all the ores from the Cripple Creek district, Teller County. These ores are gold-[silver]-sulphotelluride ores—pyrite and tellurides, mainly calaverite, with siliceous gangue. In recent years much of the material has been dump ores containing as low as 0.1125 ounce gold (occasionally even lower) per ton. When built in 1907 the mill was a 1,200-ton roast-amalgamation-cyanidation mill. In 1927 a supplementary mill, comprising crushers, a ball mill, and a Dorr classifier, was installed to treat in an all-sliming cyanidation circuit, without preliminary roasting, gold pyrite ores and concentrates, siliceous silver ores, and miscellaneous ores from other parts of Colorado and from New Mexico. In 1929 crushers, ball mills, and Fahrenwald flotation machines were installed to treat any ores offered, including zincky ores. This addition to the plant began operating in November 1929, and zincky ores were purchased until November 1930. Very little straight silver ore has been treated since the Creede district closed in 1930. In 1933 the flotation plant was operated chiefly in treating low-grade sulphotelluride ores from Cripple Creek, but it also floated out graphitic or carbonaceous gangue material with the lead and copper from ore from the American and London mines of the Mosquito district, Park County, thus making high-grade gold-[silver-lead-copper] concentrates and eliminating carbon and copper—both cyanicides; the other product was iron concentrates, which were roasted and cyanided. The lead-copper concentrates receive preliminary cyanide treatment prior to shipment to the smelter. Crude ore and concentrates from other counties were also treated by flotation. The bulk of the ore received was from the Cripple Creek district and, with all the concentrates produced from the Cripple Creek ores, went through the regular process of roasting, amalgamation, and cyanidation. The tailings from all operations were cyanided.

FREMONT COUNTY

Arkansas River district.—At the Jay Hill placer group near Howard on the Arkansas River equipment consisting of a drag line, pumps, gasoline engines, hopper, and shaking riffle pans was used to recover placer gold in 1933. An operator using a cradle and sluice boxes on the Florence dump and in the Arkansas River one-half mile east of Florence produced the remainder of the gold sold from Fremont County during the year.

GARFIELD COUNTY

One lot of placer bullion shipped from Newcastle, Garfield County, to the Denver Mint in 1933 weighed 1.98 crude ounces and was 0.795¼ fine in gold and 0.199 fine in silver.

GILPIN COUNTY

Southern districts (Black Hawk, Central City, Nevadaville, Russell Gulch).—The largest production of metals in Gilpin County in 1933 came from the area known as "The Patch" at Nevadaville, mined

¹ Harner, L. S., *Milling Methods and Costs at the Golden Cycle Mill, Colorado Springs, Colo.*: Inf. Circ. 6739, Bureau of Mines, 1933, 18 pp.

by shrinkage stoping and glory holing. The ore is transported by aerial tram and trucks to the mill within the limits of Central City. The mine and amalgamation-gravity concentration-selective flotation mill were operated 69 days at a daily rate of 407 tons by the Chain O'Mines, Inc., from January to October, when all properties were leased to the Chain Syndicate which operated the property for 60 days at a daily rate of approximately 290 tons during the remainder of the year. The products of the mill were amalgamation bullion, shipped direct to the Denver Mint, and copper-[zinc]-lead-silver-gold concentrates, shipped to the Leadville smelter. Other mines producing 1 carload or more of ore were the Delmonico, Gettysburg, Homestake, Independence, Morning Star, Pay Me, Perrin, Pittsburg, Russell, Saratoga, and West Notaway.

The Eugene Mines, Inc., which was sluicing and drift mining on North Clear Creek at Black Hawk, was the principal producer of placer gold in the southern districts.

Individuals by panning and sluicing old tailings and stream gravel recovered small amounts of gold bullion which were sold chiefly to merchants at Central City.

Northern districts.—The Perigo 30-ton amalgamation-concentration mill in Gamble Gulch was operated only a few days in 1933. A lessee on the Baker lode of the Perigo group mined ore which yielded 20.82 fine ounces of gold, and a clean-up of the mill netted 29.84 fine ounces. Some production was made from the Lone Star, Mackey, Newport, Providence, We Got 'Em, and other lode mines.

Special placer equipment consisting of a drag-line power shovel, hopper, revolving screen, sluice boxes, and stacker belt, with gasoline engines as power, was installed at the Pactolus placer along South Boulder Creek by the Prommel Mining Co., and testing and sampling operations of the gravel yielded bullion which, after being melted at the Denver Mint, weighed 6.78 ounces and had a fineness of 0.883 in gold and 0.098 in silver. Other placers in the district were worked by sluicing and included the Bergstrom, Fontleroy, Fuller, Harvey, Perigo, and Security.

GUNNISON COUNTY

Cochetopa (Parlin) district.—Producing mines in the Cochetopa district in 1933 were the Lucky Strike and Maple Leaf. Gold ore from the Lucky Strike was shipped to the Midvale (Utah) smelter and to the Golden Cycle mill at Colorado Springs. The output from the Maple Leaf was in the form of amalgamation bullion resulting from 3 months' operation of the 25-ton mill (ball mill and plates) on the property.

Domingo (Goose Creek, White Earth) district (Madera, Powderhorn, Spencer, Vulcan).—Small lots of dry gold ore from the Dollar and Old Lott mines were shipped to the Leadville smelter in 1933, and 1 ton of lead ore from another property was shipped to the Midvale (Utah) smelter.

Elk Mountain district.—In 1933 a test shipment of silver ore from the Maxine lode was made to the Leadville smelter, and a lot of less than one-half ton (also silver ore) was shipped from the Silver Spruce mine to the Golden Cycle mill. A small production of placer gold was made from the Hayden-McCleod placer.

Gold Brick district (Ohio).—Producing mines in the Gold Brick district in 1933 were the Carter, Dodson, King Solomon, Lulu, Raymond group, Sunset, and Victory. The Carter mine and mill were operated during the last 11 days of December only; the mill is equipped for amalgamation and concentration, but 5 tons of concentrates produced were not shipped during the year. Lessees on the Raymond group shipped gold-silver-lead ore to the Midvale (Utah) smelter and to the Golden Cycle mill at Colorado Springs.

Rock Creek district.—Silver ore was shipped from the Black Queen mine to the Leadville smelter, and 1 ton of gold ore from another property in the district was shipped to the Midvale (Utah) smelter in 1933.

Taylor Park district.—Hydraulicking at one property and sluicing at miscellaneous small placers yielded the output of gold and silver from the Taylor Park district in 1933.

Tin Cup district.—The output of metals from the Tin Cup district in 1933 came from the Enterprise, Sevic, and Wahl mines, each of which shipped small lots of gold or gold-silver ore to the Golden Cycle mill.

Tomichi district.—Lead-zinc ore from the Morning Star mine and lead ore from the Eureka were shipped to the Midvale (Utah) smelter from the Tomichi district in 1933.

JACKSON COUNTY

Two small lots of placer gold, reported to have been mined in Jackson County, were sold to the Denver Mint in 1933.

JEFFERSON COUNTY

In 1933 the Humphreys Gold Corporation installed special placer equipment, consisting of two drag-line excavators, a trommel screening and sluicing plant, mill jig, Wilfley table, and arrastre, using gasoline engines for power, on Clear Creek 10 miles above Golden and operated about 100 days during the summer. Small sluicing and panning operations on Clear Creek 2 miles west of Arvada and near Golden also yielded placer bullion.

LAKE COUNTY

LEADVILLE DISTRICT

The Leadville district in 1933 produced 18,298 tons of ore yielding in terms of recovered metals, 10,344.70 fine ounces of gold, 35,507 fine ounces of silver, 15,000 pounds of copper, 1,009,700 pounds of lead, and 2,492,000 pounds of zinc compared with 4,339 tons of ore yielding 6,181.55 ounces of gold, 16,738 ounces of silver, 6,000 pounds of copper, 152,000 pounds of lead, and 126,000 pounds of zinc in 1932.

The A.V. lead bullion-lead copper matte smelter of the American Smelting & Refining Co. operated as a lead-bullion plant with subsidiary lead-copper matte during January, February, and one third of March; it was idle during April but ran one third of May, the whole of June and July, a few days in August, all of September and October, 12 days in November, and from December 11 to the

end of the year. The copper furnace installed in 1932 was not operated in 1933.

The Ibox Mining Co. was the largest producer of gold, silver, and copper in the district in 1933. The bulk of the lead and all of the zinc output came from shipments of lead-zinc ore to the pigment plant at Coffeyville, Kans., by the Rock Hill Mines Co., and from shipments by the Colorado Zinc-Lead Co. of middlings collected in mill ponds from former operation of the Colorado Zinc-Lead Co. mill. Other properties producing more than 1 carload each included the Adelaide, American smelter dump, Elva Elma, Lilian, Valley, New Monarch, New Vinnie, President, Tribune, and Venir. Active placers included the Arnold, Hector, Ideal, Jenny June, Robinson, Thomas Starr, and Wells & Moyer.

OTHER DISTRICTS

Granite district.—The Belle of Granite and Hattie Jane were the only producing lode mines in the Granite district in 1933. A small quantity of gold was produced by individual placers on the Arkansas River north of Granite.

St. Kevin district.—One lot of gold-silver ore was shipped from the St. Kevin district to the Leadville smelter in 1933.

Tennile (Climax, Fremont Pass) district.—In 1933 the Climax Molybdenum Co. mill at Climax on Fremont Pass, which started the year at 15,000 tons a month and continued at an increasing rate, reaching 100,000 tons a month in December, treated 692,985 tons of molybdenum ore yielding molybdenum sulphide concentrates containing 5,028,695 pounds of elemental molybdenum.

Molybdenum production at the Climax mill in Colorado, 1924-33

	Elemental molybdenum (pounds)		Elemental molybdenum (pounds)
1924 (idle first 7 months; operated last 5 months) ²	156, 935	1929	3, 529, 295
1925	821, 757	1930	3, 083, 000
1926	1, 057, 367	1931	2, 644, 399
1927	1, 858, 228	1932	1, 913, 395
1928	2, 957, 845	1933	5, 028, 695

Twin Lakes district.—Four tons of gold ore were shipped from a mine in the Twin Lakes district to the Leadville smelter in 1933. At the Derry Ranch placers the Mount Elbert Gold Dredging Co. recovered placer gold by power shovel, washing screen, and sluices.

LA PLATA COUNTY

The American Smelting & Refining Co. lead bullion-lead copper matte smelter at Durango, which was closed November 30, 1930, remained idle in 1933.

California (or La Plata) district (Hesperus, La Plata).—The May Day Milling Co. operated its 50-ton flotation mill, built at the May Day mine in 1932, at an average daily rate of 35 tons for 200 days during 1933. Gold-silver concentrates from the mill and crude ore from the mine were sold to the Leadville smelter. The La Plata

¹ Idle from April 1919 to Aug. 1, 1924.

200-ton flotation mill was operated very intermittently and at limited capacity on ore from the Gold King group. Other producing mines in the district in 1933 were the Bessie G, Last Chance, Little Animas, Lost Lode, May Rose, Monarch, Mountain Lily, Oro Fino, Tip Top, and Valley View Consolidated Mining Co. property.

MOFFAT COUNTY

Douglas Mountain district.—Two tons of copper ore were shipped from the Garfield-Bromide group in secs. 9 and 16, T. 7 N., R. 101 W. of the sixth principal meridian, to the Garfield (Utah) copper plant in 1933.

Fourmile (or Timberlake) district.—Six placer mines on Timberlake Gulch and Fourmile Creek several miles south of Baggs, Wyo., and one placer near Great Divide (presumably on the Timberlake watershed) were worked by sluices and yielded placer gold in 1933.

Lay district.—The Grant placer, 2 miles north of Jackrabbit Springs, was the only producer in the Lay district in 1933.

Round Bottom district.—A small amount of gold was recovered by sluicing at the Hoover placer, 12 miles southwest of Craig, in 1933.

MONTEZUMA COUNTY

The Red Arrow was the only producing lode mine in Montezuma County in 1933. The mine was discovered on June 3, 1933, on the west side of Gold Run Draw about 500 feet northwest of the junction with the East Mancos River, in sec. 11, T. 36 N., R. 12 W. When the discovery became generally known later in the year it attracted much attention because of the large number of gold nuggets found near the surface. Shipments of high-grade gold ore were made to the Golden Cycle mill and the Midvale (Utah) smelter in 1933. For a general description of the mine and local geology the reader is referred to a press notice, "The Red Arrow Gold Discovery in the La Plata Mountains, Colorado", released by the United States Geological Survey, February 28, 1934. A small lot of placer bullion mined in the county weighed 2.44 ounces after being melted at the Denver Mint and had a fineness of 0.904½ in gold and 0.086½ in silver.

MONTROSE COUNTY

Naturita district.—Many small placers, worked mostly by sluices on stream and bench gravel on the San Miguel River below Naturita, yielded all the gold and silver produced in the Naturita district in 1933.

Uncompahgre River district.—Operation of two small placers on the Uncompahgre River resulted in the recovery of a little gold in 1933.

OURAY COUNTY

Sneffels district.—The King Lease continued operation on the upper workings of the Camp Bird mine in 1933 and operated both the mine and the 75-ton amalgamation and flotation mill 365 days. The products consisted of amalgamation bullion and of concentrates which were classed as lead-copper with the principal value in gold but which also carried nearly 20 times as much silver as gold and a considerable quantity of zinc; the zinc naturally was not saved at the

Leadville smelter. Other producing lode mines in the district were the Atlas (mill clean-up), Governor, Revenue Tunnel, and Trust Ruby.

Uncompahgre district (Ouray).—Shipments of gold ore were made from the Schofield and Wanakah mines in the Uncompahgre district to the Leadville smelter in 1933, and a small production was made from other mines in the district.

PARK COUNTY

Alma Placers district.—Sluicing operations on the Platte River east of Alma yielded small lots of placer gold in 1933.

Beaver Creek district.—A small production of placer gold was made in 1933 from two placers on Beaver Creek.

Buckskin district (Alma).—Small lots of smelting ore were shipped to the Leadville smelter from the Loveland Mountain group, Summit Mining Co. property, and Wyandotte mine in 1933. Gold ore from the Excelsior, Loveland Mountain group, and Wyandotte was shipped to the Golden Cycle mill at Colorado Springs. Three lots of amalgamation bullion from the Alma Gold Corporation property were sold to the Denver Mint.

Consolidated Montgomery district (Alma).—The Magnolia 30-ton gravity- and flotation-concentration mill was operated about half the month of June, all of September, and the first 10 days of October, treating 1,500 tons of ore from the Magnolia mine; the resulting gold-silver concentrates were sold to the Golden Cycle mill. Other producing properties in the Magnolia district, all of which shipped small lots of smelting ore to the Leadville smelter, were the Chicago lode, Kansas, North Star Mining Co., and Pacific mine. Toward the end of the year the Alma Syndicate remodeled the mill at its Weber group, built a tramway from its Morning Star group, and milled several hundred tons of gold ore; the concentrates were not shipped until 1934.

Fairplay district.—Small panning and sluicing operations by individuals, principally on the Beaver Creek, Fairplay, and Snowstorm placers, yielded the gold and silver produced in the Fairplay district in 1933.

Hall Valley district (Webster).—Gold-silver ore was shipped to the Golden Cycle mill and copper-gold-silver-lead ore to the Garfield (Utah) smelter from the Missouri mine in 1933.

Horseshoe district.—One ton of lead ore from the Happy Boy mine was sold to the Leadville smelter in 1933.

Mosquito district (Alma).—The Mosquito district ranked second in the State in output of gold in 1933, after holding first place in 1932. The decrease in 1933 was due almost entirely to the decreased output of the American mine, which had yielded an extraordinary production of gold the preceding year. Shipments of crude ore from this mine to the Golden Cycle mill were discontinued July 1, and a new 100-ton flotation mill for the treatment of low-grade crude ore and dump material was built. Production from the mill was begun in September and continued for the remainder of the year, producing gold-silver-lead-copper concentrates which were sold to the Leadville smelter. The London Gold Mines Co., operating the London and London Extension mines, was the largest producer of gold, silver, copper, and lead in Park County in 1933. The company shipped high-grade gold ore containing silver, copper, and lead to

the Golden Cycle mill and lead concentrates with the principal value in gold to the Leadville smelter. The concentrates were made at the 125-ton flotation mill on the property. The "North London" mine, operated by the Fairplay Gold Mines, Inc., was an important producer of gold in 1933. The ore is transported about three-fourths mile by aerial tram from the mine to the "North London" 80-ton flotation mill for treatment, and concentrates made are shipped to the Leadville smelter. Other producers of more than 1 car of ore each were the London-Butte, Orphan Boy, and West London.

Tarryall district.—Hydraulicizing at the Fortune placer and sluicing operations at the Park Gulch, Illinois, and three other placers yielded the gold and silver sold from the Tarryall district in 1933.

PITKIN COUNTY

Roaring Fork district (Aspen).—Except for 6 tons of lead ore mined at the Carrie lease the lode-mine output of the Roaring Fork district in 1933 consisted of silver-lead ore from the Midnight mine, mostly milled at the Midnight 50-ton flotation mill which was operated continuously throughout the year. The resulting lead-silver concentrates and also crude smelting ore were shipped to the Leadville smelter. A zinc unit was added to the equipment of the mill during the year, and 30 tons of concentrates assaying 40 percent zinc were produced but not sold in 1933. A small quantity of gold, 0.952 fine, presumably placer and perhaps from the Independence district near Aspen, was deposited at the Denver Mint by a miner from Aspen.

RIO GRANDE COUNTY

Summitville district.—In 1933 the production from Rio Grande County came chiefly from shipments of gold ore from the Little Annie mine by the Summitville Mines Corporation to the Golden Cycle mill at Colorado Springs. The only other lode producer was the Marian Mining Co., which shipped 1 ton of lead-gold-silver ore to the Leadville smelter. One small lot of placer gold was shipped from Del Norte to the Denver Mint.

ROUTT COUNTY

Hahns Peak district.—No production was made from lode mines in Routt County in 1933. Small placer operations in the Hahns Peak district yielded a little gold, most of which was sold at a drug store in Steamboat Springs.

SAGUACHE COUNTY

Kerber Creek district (Bonanza).—Two shipments of lead ore were made in October 1933 from the Columbine mine to the Leadville smelter. Lead-copper-silver ore was shipped from the Rawley mines to the smelter, and a small production was made from two other properties.

Vulcan district.—Twenty-six tons of gold ore were shipped from the Continental mine in the Vulcan district to the Midvale (Utah) smelter in 1933.

SAN JUAN COUNTY

Animas district.—The Shenandoah-Dives mine continued as the chief producer of metals in San Juan County in 1933. Its output was 198,549 tons of gold-silver ore yielding 9,020 tons of gold-silver-copper-lead-[zinc] concentrates, sold to the Leadville smelter; the ore was milled at the company 550-ton combined flotation- and gravity-concentration mill. The zinc in the concentrates seldom reached the penalty point. Among other producers from lode mines in the Animas district were the Delano Extension, El Banco Mines Co., Iowa Tiger, Royal Charter, San Juan Queen, and White Quail mines. Panning and sluicing operations in the district yielded a small output of placer gold.

Eureka district (Eureka, Silverton).—The only production from the Eureka district in 1933 came from two small lots of gold ore shipped to the Golden Cycle mill at Colorado Springs.

SAN MIGUEL COUNTY

Iron Springs district (Ophir).—The Boot Jack mine was the principal producer of metals in the Iron Springs district in 1933. The ore was milled at a 6-stamp mill equipped with two amalgamating plates and a concentrating table. The amalgamation bullion was shipped to the Denver Mint, and the concentrates were sent to the Leadville smelter. Other producers in the district (all small) included the Carribeau, Crown Point, Hattie, Silver Tip, and Wealth of Ophir.

Lower San Miguel district (Sawpit, Vanadium).—The output from the Lower San Miguel district in 1933 all came from small placer mines along the San Miguel River and its tributaries.

Mount Wilson district.—Amalgamation bullion was recovered from ore in the Silver Pick mine and shipped to the Denver Mint in 1933.

Upper San Miguel district.—The Smuggler-Union mine was the principal producer of metals in the Upper San Miguel district in 1933. The 250-ton flotation mill, which had been under construction before September 15 by the Telluride Holding Corporation in the concrete mill building at Pandora built in 1920 by the now defunct Smuggler-Union Mining Co., was operated during the remainder of the year. The Gold Run Mining & Milling Co., operating its 500-ton mill built in 1933 for the treatment of an accumulation of tailings from old mills in the Upper San Miguel Basin, was the next largest producer in the district. Among the other producing lode mines were the Alta, Black Bear, Golden Eagle, La Junta, Laura, Liberty Bell, Lucky Strike, and Nellie. A small quantity of placer gold was recovered by individuals sluicing stream gravel and tailings below Telluride.

SUMMIT COUNTY

Breckenridge district.—The output of gold in Summit County in 1933 came principally from the operation of two dredges—one by the Continental Dredging Co. about 1½ miles north of Breckenridge in Blue River Valley and the other by the Tiger Placers Co., operating through the town of Breckenridge. The dredge of the Continental Dredging Co. is electrically driven and is equipped with 96 buckets, each with a capacity of 8½ cubic feet. It was operated from June 1 to August 1 and from September 4 to December 31. The Tiger

Placers Co. dredge is reported to have a capacity of 5,000 cubic yards a day and to be equipped with 85 buckets, each with a capacity of 9½ cubic feet. It was remodeled during the year and placed in operation on September 1. Placers worked by other methods, mostly sluicing, included the Beaver Head, Bemrose-Bostwick, Denver, Gold Run, Jerusalem, Louis D. Emile, Nigger, and Old Solid. Miscellaneous small lots of smelting ore were shipped from lode mines in the district to the Leadville smelter.

Montezuma district.—Production from the Montezuma district in 1933 was limited to a small lot of lead-silver ore from the Silver King mine and 8 tons of lead-gold-silver ore from another property to the Leadville smelter.

Ten Mile district (Frisco, Kokomo, Robinson).—Small shipments of smelting ore were made from the Boston, Excelsior, and two other properties in the Ten Mile district in 1933, and 1 shipment of gold ore was made from the Gold Ledge mine to the Golden Cycle mill. One placer in the district yielded a little gold.

TELLER COUNTY

Mine and dump siliceous sulphotelluride gold ores from the Cripple Creek district in 1933 aggregated in calculated recovered metals 109,815.36 fine ounces of gold and 7,700 fine ounces of silver compared with 109,346.95 ounces of gold and 7,656 ounces of silver in 1932. In these calculations account is taken of mill slags, clean-ups, and stolen specimen gold. Such accounting has been made in all previous reports of this series in Mineral Resources and Minerals Yearbook. Recovery of 53.02 fine ounces of gold and 5 fine ounces of silver was made by placer methods in the district in 1933.

In 1933 the Golden Cycle mill at Colorado Springs (operations described under El Paso County) continued to hold the exclusive market for Cripple Creek ores. The treatment rates for the Cripple Creek district and for miscellaneous ores from other districts, effective September 1, 1933, follow. These rates were continued into 1934.

Cripple Creek treatment rates, Golden Cycle mill effective Sept. 1, 1933 (in effect during 1934)

Ore up to and including \$4 gold per ton.....	\$1.95 plus \$0.60 freight.
Over \$4 and including \$5 gold per ton.....	\$1.95 plus \$0.75 freight.
Over \$5 and including \$8 gold per ton.....	\$2.50 plus \$1 freight.
Over \$8 and including \$10 gold per ton.....	\$4.40 (includes freight).
Over \$10 and including \$15 gold per ton.....	\$5.70 (includes freight).
Over \$15 and including \$20 gold per ton.....	\$7.00 (includes freight).
Over \$20 and including \$25 gold per ton.....	\$7.35 (includes freight).
Over \$25 and including \$30 gold per ton.....	\$7.90 (includes freight).
Over \$30 and including \$40 gold per ton.....	\$8.50 (includes freight).
Over \$40 and including \$100 gold per ton.....	\$9.60 (includes freight).
Over \$100 gold per ton.....	\$6.50 plus \$3.10 freight.

Freight rates on ores of value over \$100 per ton is \$3.10 plus 1 percent of value in excess of \$100 unless consignment be released to value not to exceed \$100 per ton.

An added charge of \$5 will be made for sampling all lots of ore containing less than 10 tons, dry weight, and an extra charge of \$2.50 per lot made for each lot, when more than one lot shipped in a car.

An added charge of 10 cents per ton made if ore is sacked. An added charge of 10 cents per ton will be made if ore is received frozen.

An added charge of 5 cents per ton will be made for each 1 percent moisture in excess of 10 percent.

BASIS OF PAYMENTS

Gold-bearing materials received at the Golden Cycle mill, Colorado City, Colo., until further notice, will be settled for on the basis of world gold prices, according to Treasury regulations. To obtain the world price, gold must be recovered from actual deposits in the United States or any places subject to its jurisdiction and be eligible under President Roosevelt's Executive order of August 29, 1933.

Settlement will be made in the following manner until further notice:

1. Provisional advance payment will be made according to the terms of the schedule under which material is shipped, which, in respect to the gold content, is predicated on the present mill price for gold of \$20.00 per troy ounce.

2. Final settlement will be made according to the terms of schedule under which the material is shipped, with the exception that an additional payment will be made for the gold content based upon the amount by which the realized price for gold shall exceed the mint price of \$20.67 per troy ounce as follows:

First 5 ounces gold per dry ton contained in product pay 90 percent of said excess price. Second 5 ounces of gold per dry ton contained in product pay 92½ percent of said excess price. All gold contained in product in excess of 10 ounces per dry ton pay 95 percent of said excess price.

In the event that in any calendar month the "realized price" shall be less than the "mill price" the price paid in respect to such gold content shall be the "realized price" less 8 percent.

The term "realized price" referred to above shall be the net average price per ounce realized by the buyer upon all sales of gold originating in mines of the United States made by it in this country or abroad during the calendar month of delivery of seller's product. The said net average price shall mean the gross average price less cost of delivery to place of sale from buyer's refinery, including cost of insurance, selling expenses paid to others, and such other direct expenses as packing costs, cables, etc.

The term "mill price" referred to above shall be understood to refer to the provisional advance payment of \$20.00 per troy ounce.

The term "mint price" referred to above shall be understood to refer to the present mint price of \$20.67 per troy ounce, and not to any other or different mint price at which gold may hereafter be purchased by the mint.

Treatment rates for miscellaneous ores and concentrates at the Golden Cycle mill, Colorado Springs, Sept. 1, 1933

Ore up to and including \$8 [calculated value] per ton.....	\$2. 50
Over \$8 and including \$10 [calculated value] per ton.....	\$3. 00
Over \$10 and including \$15 [calculated value] per ton.....	\$4. 00
Over \$15 and including \$20 [calculated value] per ton.....	\$4. 50
Over \$20 and including \$40 [calculated value] per ton.....	\$5. 50
Over \$40 [calculated value] per ton.....	\$6. 00

An added charge of \$5 will be made for sampling all lots of ore containing less than 10 tons, dry weight, and an extra charge of \$2.50 per lot made for each lot when more than one lot in a car.

An added charge of 10 cents per ton made if ore is sacked. An added charge of 10 cents per ton will be made if ore is received frozen.

An added charge of 5 cents per ton will be made for each 1 percent moisture in excess of 10 percent. Minimum deduction of 1 percent.

The above rates are exclusive of freight rates.

Freight charges must either be guaranteed or prepaid by shipper.

Ore containing nonsulphide copper in excess of 0.2 percent will not be accepted for treatment at this plant.

TRUCK SHIPMENTS AND SHIPMENTS LESS THAN 10 TONS

When umpiring is done, shipper must pay umpire expense.

Further: When values are less than 3.00 ounces gold per ton of ore, provisional advance payment will be made at \$19.50 per ounce.

BASIS OF PAYMENTS

Miscellaneous ores:

Gold: No payment for gold when under 0.02 ounce per ton; \$19.50 per ounce when 0.02 ounce per ton up to and including 0.50 ounce per ton; \$20.00 per ounce when settlement value exceeds 0.50 ounce per ton.

Silver: No payment for silver when under 1.0 ounce per ton. Market quotation date immediately preceding date of settlement, excluding fraction of cents, unless ore exceeds 100 ounces silver per ton, in which event $2\frac{1}{2}$ cents per ounce additional will be charged for ounces in excess of 100 ounces.

Silver contents:

Pay 50 percent on ore containing 1 ounce and including 5 ounces.

Pay 65 percent on ore over 5 ounces and including 10 ounces.

Pay 75 percent on ore over 10 ounces and including 20 ounces.

Pay 85 percent on ore over 20 ounces and including 50 ounces.

Pay 90 percent on ore over 50 ounces and including 100 ounces.

Pay 95 percent on ore over 100 ounces.

Sulphide lead: No payment when sulphide lead content is under 3.0 percent.

Wet assay less 1.0 percent; pay for 80 percent of remainder at New York quotation less $2\frac{1}{2}$ cents per pound. Market quotation date immediately preceding date of settlement used as basis of payment.

No payment for nonsulphide lead content.

Sulphide copper: Wet assay less 1.0 percent; pay for 80 percent of remainder at New York quotation less 9 cents per pound. When copper quoted over 15 cents per pound, deduct 25 percent of excess. Market quotation date immediately preceding date of settlement used as basis of payment.

No payment for nonsulphide copper content.

Concentrates: Payment for gold and silver values only.

Gold: \$19.00 per ounce when settlement value is 2.0 ounces or under; \$19.50 per ounce when settlement value exceeds 2.0 ounces.

Silver: Subject to payment as above. No payment or penalties made other than as specified above.

All new shippers should send a 5-pound sample of ore, charges prepaid, for testing before billing shipments.

To insure prompt settlements, shippers should authorize settlements on mill assays, or compare assays promptly by telephone, telegraph, or letter to mill office, giving mill lot numbers. In the absence of such information within a reasonable length of time, settlements will be made on mill assays.

Rates subject to change at the option of mill manager.

WHEREAS, by reason of the existing uncertainty in respect to the gold standard as a basis for the currency of this country and the currencies of other countries, and the possibility of changes in the monetary policy of the Government of the United States and of other governments in relation to gold, gold may cease to be purchased freely for treasury or central bank purposes, or may be purchased in smaller quantities and at different prices, with the result that the market price of gold may cease to be determined in accordance with the price established by governmental purchases, and may be greater or less than the said mint price heretofore fixed in the United States, and may be a fluctuating price; and

WHEREAS, at the present time, in consequence of the Executive order of the President dated August 29, 1933, the market price of gold recovered from natural deposits in the United States or any place subject to the jurisdiction thereof will, so long as such Executive order remains in effect, vary from time to time:

The price specified in the foregoing provisions of "basis of payments" is hereinafter called the "schedule price." The term "mint price" as used herein shall be understood to refer to the present mint price of \$20.67 per ounce, and not to any other or different price at which gold may hereafter be purchased at the mint.

From and after the date hereof, payment in respect to the gold content of the seller's product shall be determined with reference to the relation between the mint price and a sum equivalent to the net average price per ounce realized by the buyer upon all sales of gold originating in mines of the United States made by it in this country or abroad during the month of delivery of seller's product. The said net average price shall mean the gross average price, less cost of delivery to place of sale from buyer's refinery, including cost of insurance, selling expenses paid to others, and such other direct expenses as packing costs and cables.

The sum equivalent to the said net average price is hereinafter called the "realized price."

Whenever in any calendar month the realized price shall be equal to said mint price (i.e., not less than \$20.67 and not more than \$20.68 per ounce), the price paid in respect to said gold content shall be the schedule price.

Whenever in any calendar month the realized price shall exceed the mint price, the amount paid in respect to such gold content shall be the sum of the mint price plus an additional payment based on the excess price as follows:

First 5 ounces gold per dry ton contained in product pay 90 percent of said excess price. Second 5 ounces gold per dry ton contained in product pay 92½ percent of said excess price. All gold contained in product in excess of 10 ounces per dry ton pay 95 percent of said excess price.

Whenever in any calendar month the realized price shall be less than the schedule price, the price paid in respect to said gold content shall be the realized price less 8 percent.

Settlement on the basis of the realized price as above provided shall be made as soon as practicable after the 15th and 30th of each month. Provisional advance payment will be made on the date following agreement upon assays of the schedule price so long and during such periods as the Treasury of the United States shall regularly purchase gold as tendered in the manner heretofore followed and to pay therefor the fixed price of \$20.67 per ounce. If and so long as the Treasury of the United States shall discontinue or decline regularly to purchase gold as aforesaid and to pay therefor the said fixed price of \$20.67 per ounce, or shall purchase gold at some other or different price, provisional advance payment will be made in such an amount as the mill shall determine. Adjustment of over or under payments provisionally made in advance will be made at the time of settlement on the basis of realized price by payment of the difference by the buyer or seller as the case may be.

MINES REVIEW

Production from mines and dumps in the Cripple Creek district revived considerably during the last 4 months of 1933, resulting in increased shipments to the Golden Cycle mill. Among the large producers were mines of the United Gold Mines Co., an operating and holding company for property scattered throughout the district. The following tables are taken from the company's annual report, dated February 15, 1934.

Total production of property—United Gold Mines Co.

	Net tons	Gross value
Ore mined before consolidation.....	26, 310	\$456, 806. 19
Production under operations of the United Gold Mines Co.....	1, 083, 591	12, 160, 120. 95
Total to Dec. 31, 1933.....	1, 109, 901	12, 616, 927. 14

Production of the United Gold Mines Co.—Company ore in 1933

Mine	Net tons	Gross value	Company ore cash receipts	Average gross value per ton	Number of cars shipped
Vindicator.....	4, 035	\$11, 737. 75	\$2, 419. 98	\$2. 921	133
Rose Nicol.....	5, 388	75, 265. 72	49, 117. 95	13. 969	150
	9, 423	87, 003. 47	51, 537. 93	8. 124	283

Production of the United Gold Mines Co.—Lessee ore in 1933

Group	Net tons	Gross value	Royalties received	Tax	Lessees' receipts	Average gross value per ton	Number of cars
Deadwood group:							
Miscellaneous lessee.....	7,785	\$49,164.60	\$4,082.40	\$482.22	\$19,613.51	\$6.315	245
Findlay.....	2,966	11,626.68	430.80	113.42	3,393.28	3.919	104
Shurtloff.....	222	2,207.88	111.74	22.06	983.67	9.948	9
Vindicator.....	28,294	184,996.76	37,119.41	1,802.80	54,455.86	6.538	860
Theresa.....	8,697	74,574.54	17,442.27	741.99	22,927.33	8.575	1 285
Rose Nicol.....	5,527	57,878.51	13,822.46	578.76	20,012.21	10.472	179
Londonderry.....	1,330	6,660.71	166.44	46.63	1,635.69	5.008	47
Isabella.....	96	453.30	8.79		129.55	4.736	4
Solomon.....	1,087	9,862.41	721.00	97.01	4,123.97	9.074	35
Hardwood.....	617	3,246.90	166.65	30.46	938.96	5.264	19
W.P.H.....	1,803	12,757.53	655.16	125.04	5,205.67	7.726	54
Bonanza.....	110	1,691.18	171.78	16.92	806.85	15.351	4
	58,534	415,121.00	74,898.90	4,057.31	134,226.55	7.092	1,845

¹ And 8 sacks.

The annual report of the Cresson Consolidated Gold Mining & Milling Co. for the 12 months ended December 31, 1933 (dated Feb. 15, 1934) says:

During the 12 months 63,136 dry tons of ore were shipped on company account of a gross value of \$516,192.17, averaging \$8.15 per ton; the returns, less transportation and treatment of \$223,472.26, were \$292,719.91, giving the ore a net value of \$4.63 per ton. The company received as additional income the sum of \$5,324.52 interest on bank deposits, and \$161,395.25 net royalty on 29,816 tons lessee ore, making a total of \$459,439.68, with total expenses of \$296,757.62, resulting in a net gain from operations of \$162,682.06.

	<i>Development</i>	<i>Feet</i>	<i>Feet</i>
Drifts and crosscuts:			
Company.....		5,447	
Lessees.....		2,572	
			8,019
Raises and winzes:			
Company.....		1,192	
Lessees.....		2,074	
			3,266
Total.....			11,285

This is 2,300 feet more than reported in 1932.

The total cost per ton on ore shipped was 47 cents less than 1932, notwithstanding an increase in taxes from 6 to 19 cents per ton.

The mine and surface equipment has been kept up in good condition.

The mine has more ore development than at last annual report. The raised price of gold has been of much benefit on the low-grade ore of the Cresson.

Production of the Cresson Consolidated Gold Mining & Milling Co., Colorado, 1903 to December 31, 1933

Period	Dry short tons	Gross value	Freight and treatment	Net value
1903 to Dec. 31, 1932.....	2,029,346	\$34,352,047.65	\$10,448,460.53	\$23,903,587.12
1933:				
Company ore.....	63,136	516,192.17	223,472.26	292,719.91
Lessee ore.....	29,816	463,544.13	154,981.36	308,562.77
1903 to Dec. 31, 1933.....	2,122,298	35,331,783.95	10,826,914.15	24,504,869.80

Production of the Cresson Consolidated Gold Mining & Milling Co., Colorado, 1903 to December 31, 1933—Continued

Period	Royalties received by company	Amount paid lessees	Average gross value per ton	Average net value per ton	Dividends
1903 to Dec. 31, 1932.....	-----	-----	\$16.92	\$11.78	\$12,405,672.50
1933:					
Company ore.....	-----	-----	8.15	4.63	} 48,800.00
Lessee ore.....	\$161,354.63	\$147,208.14	15.54	10.40	
1903 to Dec. 31, 1933.....	-----	-----	16.65	11.54	12,454,472.50

The Granite Gold Mining Co. operated its mines to October 6, 1933, when the property was sold to the Colorado International Mining Corporation which continued production throughout the year. Other important producers were the Atlas Gold Mines Co. (Midget-Bonanza King), Acacia Gold Mining Co. (Morning Star and North and South Burns), Buckeye Mines & Milling Co., Commonwealth Gold, Inc., Dr. Jack Pot Mining Co., Economic mill dump, Elkton Co. group, Empire Lee Mining Co., Forest Queen, Free Coinage Gold Mining Co., Hildreth Frost properties, International Gold Producers, Inc. (Logan), Jerry Johnson Gold Mining Co., LeClair Consolidated Mines Co. (Mary McKinney), Mexican Gold & Silver Mining Co. (Gold Pinnacle), New Gold Dollar Mining Co., New El Paso Mines, Inc., Portland Gold Mining Co., Queen Gold Mining Co., Raven Apex, School Section 16, Smith Moffat Mines Co., Stratton-Cripple Creek Mining & Development Co., and Strong Mining Co.

