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Placer gold deposits in New Mexico

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Abstract

Thirty-six mining districts in New Mexico contain placer gold deposits. Production from these deposits began as early as 1828, resulting in the first gold rush in the western United States; however, minor production by Pueblo Indians and Spaniards probably occurred 200 or more years earlier. Most placer deposits were discovered by 1900, and almost all placer production occurred before 1902. It is estimated that 662,000 oz of gold were produced from New Mexico placer deposits between 1828 and 1991. The deposits typically are found in late Tertiary to Recent alluvial or eluvial deposits; alluvial fan deposits, bench or terrace deposits, river bars, stream concentrations, and residual placers that formed directly on top of lode deposits are known. New Mexico placer gold deposits are derived from Oligocene–Miocene Great Plains Margin deposits, Laramide vein deposits, and Proterozoic vein and replacement deposits in highly weathered and eroded terrains. The future potential will depend on discovery of large-volume, low-grade deposits. Also, new technologies minimizing water may stimulate activity because lack of water has hampered production in many districts.

Introduction

A placer deposit is any natural accumulation or concentration of a material in unconsolidated sediments of a stream, bench, or residual deposit. Four conditions are usually required to form placer gold deposits (Boyle, 1979, 1987). A source terrain must crop out, usually containing gold-bearing lode deposits or disseminated gold. The source terrain must be exposed to mechanical and chemical weathering for a fairly long time. The free gold is concentrated, typically by gravity and water. Finally, the deposit must be preserved.

Placer gold deposits are a result of the physical and chemical properties of gold. Gold is relatively heavy (specific gravity of 19.3) and is easily concentrated by gravity with the aid of water. Gold is resistant to corrosion and chemical oxidation and therefore can be transported long distances after being freed from the source rock. The bright color, luster, and softness enable easy identification by prospectors.

There are three types of placer gold deposits (Boyle, 1979, 1987): eluvial, alluvial, and aeolian. Eluvial deposits occur in weathered detritus at or near the outcrop of gold-bearing lode deposits. Alluvial deposits occur in the sands and gravels of streams, rivers, beaches, and deltas. Alluvial deposits are further subdivided into classes by Wells and Wootton (1932): hillside (valley slopes not in discrete channels), gulch or creek, bench or terrace, river-bar, gravel-plain, and buried placers. The aeolian deposits accumulate in windblown sand deposits and are relatively minor and unimportant. Most of the gold deposits in New Mexico are alluvial deposits, but some eluvial deposits are found in many districts. There are no known aeolian gold placer deposits in New Mexico.

This report presents a summary of continuing research on placer gold deposits in New Mexico. Johnson (1972) published one of the most comprehensive compilations of information on placer gold deposits in the state. This study updates the work by Johnson (1972) and North and McLemore (1986, 1988) and incorporates additional field observations and other data from published and unpublished reports.

Thirty-six mining districts containing placer gold deposits in New Mexico are located in Fig. 1 and are listed in Table 1 with year of discovery and production, if known. These districts are arranged in order of estimated total production from placer deposits.

History and production

The first known production of placer gold in New Mexico was in 1828 in the Ortiz Mountains in Santa Fe County (Old Placers district). This discovery resulted in the first gold rush in the western United States (Jones, 1904), predating the California gold rush by 20 years. Before 1828, Pueblo Indians and Spanish explorers engaged in some mining activities, especially for turquoise. Undoubtedly, some placer gold was recovered as well (Jones, 1904; Johnson, 1972). Placers along the Rio Grande valley were reportedly worked in 1600, but total production is unknown and presumed small (Johnson, 1972).

Placer gold deposits were an important source of gold in New Mexico before 1902, but placer production after 1902 has been minor (Table 1; Johnson, 1972). Most placer deposits in New Mexico were discovered by 1900. Early production from placer deposits is poorly documented, and total production can only be estimated. It is estimated that 662,000 oz of gold have been produced from placer deposits throughout New Mexico from 1828 to 1991 (updated from Johnson, 1972). This production is insignificant compared to larger placers found in Alaska, California, New Zealand, and South America that contain millions of ounces of gold. Only four districts here have yielded more than 100,000 oz of placer gold production: Elizabethtown–Baldy, Hillsboro, Old Placers, and New Placers. Currently only one district is yielding some minor production (White Oaks) although small exploration activities and recreational gold panning are occurring in most areas of the state. ☞

Also in this issue

Coming soon

Pliocene microfossils from Monticello Point maar

Large exogyra from Dakota Sandstone

Lack of water has hampered production of placer gold deposits in New Mexico. The Big Ditch was built in 1869 near Elizabethtown to divert water from the Red River to the placers, a distance of 41 mi (Wells and Wootton, 1932; Bauer, 1990). Large-scale dredges have been operated with limited success in only a few districts: Elizabethtown–Baldy (1901–1903), Hillsboro (1935–1942), and Pinos Altos (1939–1941) (Johnson, 1972). Mining in most districts has been by small companies or individuals using minimal equipment, such as dry-washing jigs, picks, shovels, scrapers, rockers, sluices, and panning (Figs. 2, 3). In some areas, trenches, short adits, and shallow shafts were dug along the pay streaks (Wells and Wootton, 1932). Hydraulic mining methods were rarely employed because of the lack of water; however, hydraulic mining of placers in the Elizabethtown–Baldy district did occur (Johnson, 1972; Bauer, 1990). Various methods employing little or no water have been utilized periodically, but few if any of these operations were successful. These and other techniques of mining placer deposits are described by West (1971).

Geology

All known placer deposits in New Mexico occur in late Tertiary to Recent rocks and occur as alluvial-fan deposits, bench or terrace gravel deposits, river bars, stream deposits (alluvial deposits), or as residual placers formed directly on top of lode deposits typically derived from Proterozoic, Cretaceous, and Tertiary source rocks (eluvial deposits). During fluvial events, large volumes of sediment containing free gold and other particles are transported and deposited in relatively poorly sorted alluvial and stream deposits. The gold is concentrated by gravity in incised stream valleys and alluvial fans in deeply weathered highlands. Most placer gold deposits in New Mexico are found in streams or arroyos that drain gold-bearing lode deposits, typically as quartz veins. The lode deposits range in age from Proterozoic to Laramide to mid-Tertiary (Oligocene–Miocene) (Table 2). There are some alluvial deposits distal from any obvious source terrains (Table 2). Eluvial deposits are common in many districts; some of the larger deposits are in the Jicarilla district. Native gold and electrum occur with quartz, magnetite, ilmenite, amphiboles, pyroxenes, pyrite, zircon, garnet, rutile, and other minerals. The gold-bearing gravels at Pinos Altos have as much as 40% black sand containing 83% magnetite, 3% garnet, 2% hematite, and 0.45 oz/ton gold (Wells and Wootton, 1932). The ore typically occurs as narrow pay streaks, zones, or layers of fine-grained, disseminated gold, locally on top of basement rock, clay, or caliche lenses in gravel deposits. The best placer gold is found near the base of gravel deposits where the gold is trapped by natural processes such as riffles in the floor of the stream, fractures either in the bedrock or along bedding or foliation planes, and structures that are transverse to the stream flow. Gold is also concentrated above cemented gravels and clay layers in the gravel deposits, which constrain downward migration of gold particles. Most deposits are thin and less than 55 ft below the surface (Lindgren et al., 1910; Johnson, 1972), but thicker deposits occur in the Elizabethtown–Baldy district (as thick as 300 ft; Wells and Wootton, 1932) and in the Rio Grande valley district (as thick as 400 ft; Jones, 1904). Unfortunately, past development of most placers in New Mexico is undocumented,

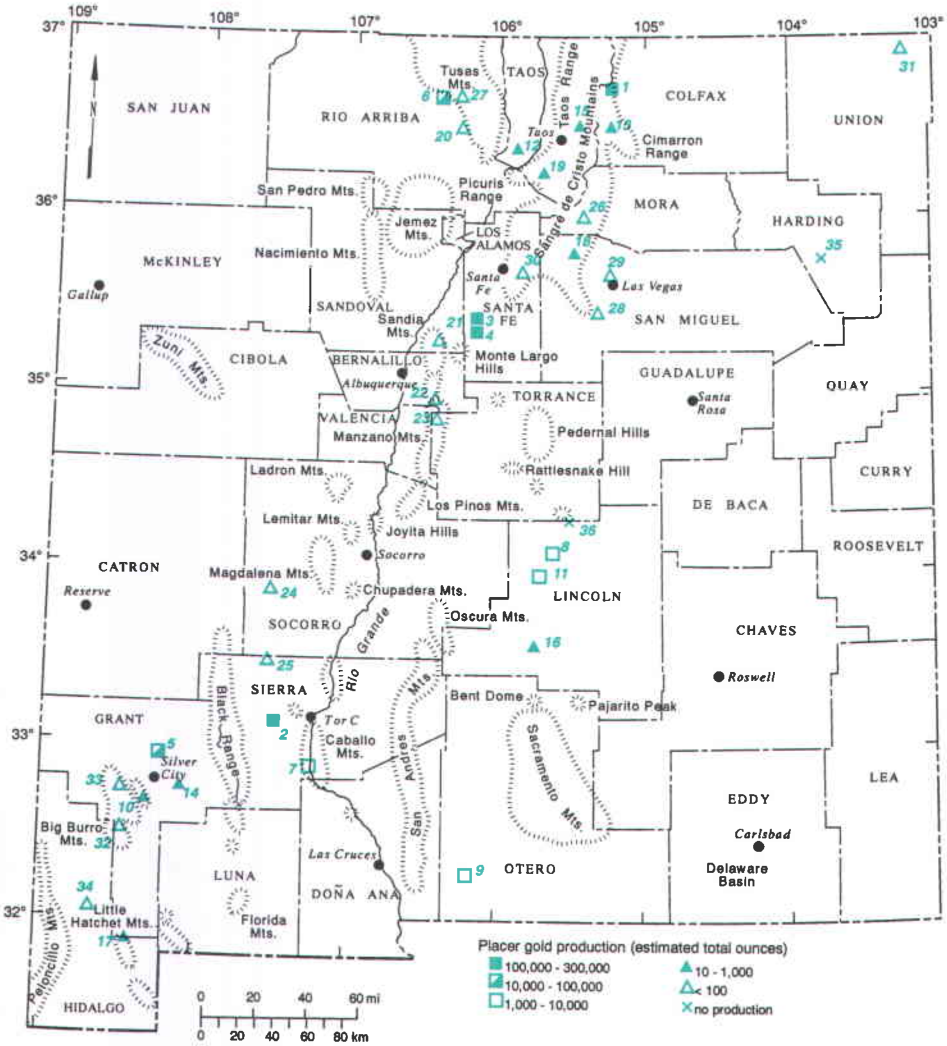

FIGURE 1—Placer gold deposits in New Mexico. Number refers to Table 1.

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TABLE 1—Placer production from New Mexico (modified from Johnson, 1972; North and McLemore, 1988). Map number refers to location in Fig. 1.

Map no.	District	County	Year of discovery	Estimated prior to 1902 (oz)	Recorded 1902–1991 (oz)	Total estimated placer production (oz)	Total estimated lode production (oz)	Additional references
1	Elizabethtown-Baldy	Colfax	1866	225,000	25,167	251,000	220,400	McLemore and North (1987), Wells and Wootton (1932)
2	Hillsboro	Sierra	1877	104,000	15,559	120,000	45,000	Harley (1934)
3	Old Placers	Santa Fe	1828	100,000	1,558	>102,000	98,000	Elston (1967), Wells and Wootton (1932)
4	New Placers	Santa Fe	1839	96,759	3,011	>100,000	17,000	Elston (1967), Wells and Wootton (1932)
5	Pinos Altos	Grant	1860	38,842	5,995	50,000	100,000	Lasky and Wootton (1933), Paige (1910, 1912), Wells and Wootton (1932)
6	Hopewell	Rio Arriba	1880	15,000	121	16,000	8,000	
7	Pittsburg	Sierra	1901	none	7,089	8,000	0	
8	Jicarilla	Lincoln	1850	4,500	3,020	8,000	8,000	Segerstrom and Ryberg (1974), Baker (1986), McLemore et al. (1991)
9	Orogrande	Otero	1899	400	1,546	>2,000	14,500	Schmidt and Craddock (1964)
10	White Signal and Malone	Grant	1884	some	366	1,700	12,000	Richter and Lawrence (1983)
11	White Oaks	Lincoln	1879	unknown	885	1,000	162,000	Griswold (1959), McLemòre (1991)
12	Rio Grande valley	Taos	1600	unknown	16	<1,000	0	
13	Cimarroncito	Colfax	1898	some	none	<1,000	0	
14	Bayard	Grant	1900	some	128	<1,000	24,000	Lasky (1936)
15	Red River (Rio Hondo)	Taos	1826	unknown	120	<500	365	Roberts et al. (1990)
16	Nogal	Lincoln	1865	some	134	200	14,800	McLemore (1991), Wells and Wootton (1932)
17	Sylvanite	Hidalgo	1908	none	109	<200	2,400	Lasky (1947), Wells and Wootton (1932)
18	Willow Creek	San Miguel	1883	unknown	none	100	179,000	
19	Picuris	Taos	1908	unknown	65	100	15	Orris and Bliss (1985)
20	Rio Chama	Rio Arriba	1848	unknown	some	<100	0	
21	Placitas-Tejon	Sandoval, Bernalillo	1900	unknown	49	<100	50	Elston (1967)
22	Tijeras Canyon	Bernalillo	1881	unknown	none	<100	42	Elston (1967)
23	Hell Canyon	Torrence, Valencia	1900	unknown	none	<100	1	
24	Rosedale	Socorro	1904	none	15	15	27,750	
25	Chloride	Sierra	1883	none	2	2	2,500	
26	Mora River	Mora	1870	unknown	none	unknown	0	
27	El Rito	Rio Arriba	1933	unknown	none	unknown	0	Lasky and Wootton (1933)
28	Villanueva	San Miguel	before 1940	none	unknown	unknown	0	
29	Las Vegas	San Miguel	1883	unknown	none	unknown	0	
30	Santa Fe	Santa Fe	1933	unknown	none	unknown	0	
31	Folsom	Union	1940	unknown	none	unknown	0	Harley (1940)
32	Gold Hill	Grant, Hidalgo	1900	unknown	unknown	unknown	1,620	Richter and Lawrence (1983)
33	Burro Mountains	Grant	?	unknown	some	unknown	>50,000	
34	Lordsburg	Hidalgo	?	unknown	none	unknown	266,600	Northrop (1959)
35	Gallegos	Harding	?	none	none	none	0	Harley (1940)
36	Gallinas	Lincoln	?	none	none	none	6	Northrop (1959)
TOTAL ESTIMATED PLACER GOLD PRODUCTION			1828–1991	584,501	65,641	662,000		updated from Johnson (1972)

and the true extent of the deposits is unknown.

Most placers in New Mexico are low-grade, disseminated deposits consisting of fine gold. Small high-grade deposits do occur locally. Small streaks with samples as high as 3 oz/yd^3 are reported from the Pittsburg district, but the average grade is less than 0.03 oz/yd^3 (Harley, 1934). Early production from cemented-gravel deposits in the Hillsboro district assayed 0.10 oz/yd^3, but drilling and blasting was required (Heikes, 1913). Deposits at Old Placers typically contained 0.06 oz/yd^3 (Lindgren et al., 1910) and at New Placers 0.08 oz/yd^3 (Elston, 1967). Nuggets to 12 oz have been found at Elizabethtown–Baldy (Jones, 1904) and to 4 oz at Hopewell (Wells and Wootton, 1932). However, most placers in the state contain less than 0.05 oz/yd^3. The gold is typically very pure (greater than 900 fine).

Most economic placer deposits in the world are found near relatively older lode deposits in areas of subdued topography marked by broad, trenched valleys and rounded, deeply weathered hills (Boyle, 1979, 1987). Most of the larger placer deposits in New Mexico are in similar terrains. The Old and New Placers districts and the Hillsboro district are in relatively subdued topography consisting of rounded, deeply weathered hills. Large, economic deposits worldwide are rare in v-shaped valleys, especially in glaciated terrains. A number of placer gold deposits in New Mexico occur in deeply weathered, rugged mountains where erosion and weathering are extensive and rapid (i.e. Elizabethtown–Baldy, Pinos Altos).

Many of the largest gold-producing districts in New Mexico contain some placer deposits (Table 3). Four of the five major placer deposits are in the top ten gold-producing districts. However, three major districts in southwest New Mexico have no reported placer gold deposits (Table 3): ☞

TABLE 2—Location of placer gold deposits in New Mexico (from Johnson, 1972, and other references listed in Table 1) and age of adjacent lode gold deposits (from North and McLemore, 1986, 1988; McLemore, in press).

District	Approximate location of placer gold deposits		Approximate age of lode gold deposits
Elizabethtown-Baldy	T27N R16-18E	Moreno River valley, flanks of Baldy Mountain, Ute and Ponil Creeks	Oligocene-Miocene
Hillsboro	T15-16S R6-7W	Animas Hills, Dutch Gulch, Rio Percha	Laramide
Old Placers	T12-13N R7-8E	Ortiz Mountains, Cunningham Canyon, Dolores Gulch, Arroyo Viejo	Oligocene-Miocene
New Placers	T12N R2E	San Pedro Mountains, Tuerto Creek	Oligocene-Miocene
Pinos Altos	T16-17S R13-14W	Bear Creek, Rich Gulch, Whiskey Gulch, Santo Domingo Gulch, near Mountain Keg mine	Laramide
Hopewell	T28-29N R6-7E	Tusas Mountains, Placer Creek (Eureka Creek)	Proterozoic
Pittsburg	T14,16,17S R4W	Trujillo Gulch, Apache Canyon, Union Gulch, Palomas Gap	Proterozoic
Jicarilla	T5S R12E	Ancho, Warner, Spring, and Rico Gulches	Oligocene-Miocene
Orogrande	T22S R8E	Jarilla Mountains	Laramide
White Signal, Malone	T20S R16, 14W	Gold Gulch, Gold Lake	Laramide
White Oaks	T6S R11E	Baxter and White Oaks Gulches	Oligocene-Miocene
Rio Grande valley	—	Red River to Cabresto Creek	unknown
Cimarroncito	T26N R18E	Urraca Creek	Oligocene-Miocene
Bayard	T17-18S R12-13W	drainages near Bayard	Laramide
Red River	T28-29N R14-15E, T26-27N R13E	Bitter Creek, Comanche Creek, Placer Creek, Red River, Gold Hill, Lucero Creek, Arroyo Hondo	Precambrian, mid-Tertiary
Nogal	T9-10S R11-12E	Dry Gulch	Oligocene-Miocene
Sylvanite	T28S R16W	drainages from west side of Little Hatchet Mountains	Laramide
Willow Creek	T18N R12-13E	Willow Creek, Pecos River	Proterozoic
Picuris	T24N R11E	Picuris Mountains, Rio Grande	Proterozoic
Rio Chama	T23N R5-6E	near Abiquiu	unknown
Placitas-Tejon	T13N R5E	Las Huertas Creek, Tejon Canyon	Proterozoic, Paleozoic to Mesozoic
Tijeras Canyon	T10N R4-6E	Tijeras Canyon	Proterozoic
Hell Canyon	T8N R3-5E	Hell Canyon, near Milagras claims	Proterozoic
Rosedale	T6S R5-6W	near Rosedale mines	Miocene
Chloride	T10-11S R9W	Lookout Mountain in Black Range	Miocene
Mora River	T21N R15E	Mora River area, Rio La Casa, Lujan Creek	Proterozoic
El Rito	T25N R7E	Chama Basin, El Rito Creek, Arroyo Seco	unknown
Villanueva	T12N R15E	Pecos River between Villanueva and Sena	unknown
Las Vegas	T16N R16E	Las Vegas	Proterozoic?
Santa Fe	T17N R11E	Santa Fe River	Proterozoic?
Folsom	T31N R31E	Cimarron River, northeast of Folsom	mid-Tertiary
Gold Hill	T21S R16W	Gold Hill Canyon (Foster)	Proterozoic, Laramide
Burro Mountains	—	unspecified streams and dry washes	various
Lordsburg	T23S R18, 19W	arroyos draining known mines	Laramide
Gallegos	—	near Ute Creek	none
Gallinas	—	unspecified streams and dry washes	Oligocene–Miocene

TABLE 3—Major gold-producing districts in New Mexico (updated from North and McLemore, 1986, 1988). *Major placer production (>50,000 oz), +no known placer deposits.

District	County	Estimated gold production (oz)	Type of deposits
+Santa Rita	Grant	>475,000	porphyry copper
*Elizabethtown-Baldy	Colfax	471,400	Great Plains Margin, placer
*Old Placers	Santa Fe	450,000	Great Plains Margin, placer
+Mogollon	Catron	365,000	volcanic-epithermal
*Hillsboro	Sierra	270,000	Laramide vein, placer
Lordsburg	Hidalgo	266,600	Laramide vein, minor placer
Willow Creek	San Miguel	179,000	Proterozoic massive sulfide, minor placer
White Oaks	Lincoln	163,500	Great Plains Margin, placer
+Steeple Rock	Grant	151,000	volcanic-epithermal
*Pinos Altos	Grant	150,000	Laramide vein, carbonate-hosted, placer

Santa Rita, Mogollon, and Steeple Rock. Santa Rita is a porphyry copper deposit, and the gold production is a byproduct of copper mining. The gold is finely disseminated in the low-grade copper deposit and not readily available to form placer deposits. The Steeple Rock and Mogollon districts are Oligocene to Miocene volcanic-epithermal deposits in rugged, eroded terrains without any evidence of placer gold accumulations. Actually, very few volcanic-epithermal deposits are associated with placer gold deposits (North and McLemore, 1986; McLemore, in press). Placer gold deposits in New Mexico are associated with most Great Plains Margin deposits (Oligocene to Miocene) and with numerous Laramide vein and Proterozoic vein and replacement deposits (Table 2).

FIGURE 2—The gold pan continues to be an excellent quantitative device to assess the potential of a placer deposit. Then as now, the finer points of the art are best passed on to the novice by a seasoned professional. Postcard with 1898 copyright, courtesy of R. W. Eveleth.

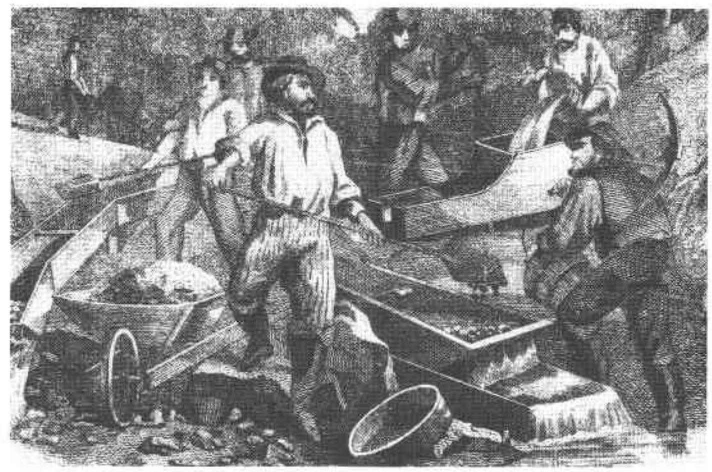

FIGURE 3—The prospector opened up the American West and recovered many an ounce of gold using nothing more complex than the sluicebox, long tom, and rocker. Steel engraving from an 1867 stock certificate, courtesy of R. W. Eveleth.

Economic potential

The economic potential of placer deposits in New Mexico is limited. Doubtless most economic placers in the state have been worked, especially placer deposits near the surface. Many streams in New Mexico contain at least traces of gold and offer areas for recreational panning. The future potential will depend upon the discovery of large-volume, low-grade deposits, using geophysical techniques, drilling, and trenching. Lack of water has hampered production in many districts, and new technology minimizing water may stimulate activity. Only two districts have reported reserves: Jicarilla with 5.4 million yd^3 of 0.043 oz Au/yd^3 in 1974 (Segerstrom and Ryberg, 1974) and Pittsburg with 2 million yd^3 of 0.01 oz Au/yd^3 in 1936 (Howard, 1967). However, exploration in the 1980s failed to locate any gold reserves in the Jicarilla district (Baker, 1986). Mining is occurring intermittently in White Oaks, Pittsburg, and Jicarilla districts. Furthermore, several sand and gravel operators periodically extract minor quantities of placer gold from their quarries. Very few sedimentary deposits containing fluvial sandstone, such as the Gila or Santa Fe Groups, have been examined for potential paleoplacer deposits. Most streams draining mining districts in New Mexico probably contain minor quantities of gold that can be panned by the more persistent and resilient gold-panner.

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