

of the mountain 30 ft. wide, one halfway down 15 ft. wide, one nearly down 20 ft. wide, and one near the river 10 to 15 ft. wide. **Dev:** Short crosscut adit on 15-ft. vein. **Assays:** Reportedly \$0.28 to \$176.00 Au. **Ref:** 158.

Sturman and Herringa (1)

Loc: Secs. 8 and 17, (40-3E), near Lynden. **Elev:** 100 ft. **Prop:** Farm land. **Owner:** Thomas Herringa and Mr. Sturman. **Ore:** Iron. **Ore min:** Limonite (bog iron). **Deposit:** Typical of several bog deposits in the vicinity of Bellingham, Ferndale, and Lynden. The Sturman deposit covers an acre or so to an av. depth of 2 ft. The Herringa deposit may cover 5 acres and varies in thickness from 0 to 2 or 3 ft. **Assays:** 39.67% Fe, 19.43% SiO₂, 0.153% P, 0.013% S. **Ref:** 48, p. 22. 142, pp. 103-104. 158. 179, pp. 42-43.

Sumas Mountain (Hematite) (2)

Loc: Sec. 2, (39-4E) and sec. 35, (40-4E), on W. slope of Sumas Mtn. **Elev:** 700 to 1,600 ft. **Access:** ½ mi. by trail. **Prop:** 7 claims known as the Hematite group held under prospecting permits from the State. **Owner:** Yamate Trading Co., Ltd., San Francisco, Calif., acquired 20-yr. lease in 1952. Hematite Iron & Gold Mines Development Co., John Westin, et al. (1934). **Ore:** Iron. **Ore min:** Limonite, scattered grains of magnetite. **Deposit:** Ferruginous mudstone or low-grade limonite occurs as a blanket on altered peridotite and underlies a basal conglomerate of the Chuckanut formation. Exposures as much as 20 ft. thick extend 1,500 ft. or so up the W. side of Sumas Mtn. **Dev:** 60-ft. adit, open cuts. **Assays:** A picked sample gave on analysis 37.21% Fe, 20.83% SiO₂, 0.20% P, 0.008% S. **Ref:** 48, pp. 22-23. 58, p. 29. 142, pp. 105-107. 158. 179, pp. 53-55.

LEAD

Properties—Lead is a bluish-gray metal, which on fresh surfaces has a bright luster that soon tarnishes on exposure to air. It is one of the heaviest metals, is very soft and highly malleable, but has only slight tenacity and low ductility. It is a poor conductor of electricity. It is very plastic, tends to flow under very light loads, and may be extruded easily to form wire or tubes. Lead has an unusual and useful combination of properties in having a low melting point but high boiling point. It is chemically inert to common corrosive conditions, and is attacked upon very slowly by dilute acids. It forms two series of chemical compounds, in which it shows valences of 2 and 4. Other properties are given in the table on page 12.

Uses—Lead was probably one of the first metals to be won from its ores by smelting. In 1950 about 52 percent of all lead consumed went into three products—batteries (32 percent), cable coverings (11 percent), and tetraethyl lead for high-octane gasoline (9 percent). About 9 percent of the total consumption went into paint pigments. In the two last mentioned uses the lead is in the form of chemical compounds; other important uses of lead compounds are in dyes, insecticides, ceramic glazes, medicine, matches, oil refining, and gas production. Other uses of lead in the metallic form are for ammunition, calking metal, casting metal, sheet metal, sheet lead, lead plating, collapsible tubes, foil, weights, ballast, shot, and pipe and containers for corrosive liquids. Lead is a constituent of many alloys, antimony being the most common alloying metal, but common also are tin, arsenic, and calcium. Some of these alloys are used as solder, type metal, bearing metal, pewter, and terne metal.

Production—In 1951 there were 11 lead smelters in the country, 1 each in California, Colorado, Idaho, Illinois, Kansas, Missouri, Montana, New Jersey, and Texas, and 1 in Utah. An important factor in the lead market is secondary lead, the recovery of which has exceeded mine production of new lead each year for many years.

The first recorded production of lead in Washington was in 1898, and some lead has been mined each year since then, although the amount has varied greatly from year to year. The record was in 1952, when 11,744 short tons valued at \$3,781,568 was produced. The previous record was in 1950, with 10,334 tons, which ranked Wash-

ington ninth among the states in lead output, and amounted to 2.4 percent of the total United States production for that year. Lead accounted for 26 percent of the value of metallic ore produced in Washington in 1952. Total output from 1898 through 1952 was 124,766 short tons, valued at \$25,617,254. Some lead has been mined in each of 10 different counties, but of recent years most has been from the Metaline district in Pend Oreille County and the Bossburg and Northport districts in Stevens County. In 1950 these 3 districts produced respectively 7,445 tons, 2,640 tons, and 237 tons of lead and ranked 10th, 20th, and 41st among the lead-producing districts in the United States. The mine of the Pend Oreille Mines & Metals Co. was the leading lead producer in the state in 1952.

Prices—The price of lead has very closely paralleled that of zinc for at least the past 60 years, and the prices of the two metals have been close to the same figure at any given time. During the period 1897 through 1950, the yearly average prices of the two metals have been within 2½ cents of each other each year except for the years 1915, 1916, 1947, 1948, and 1949. The spread was greatest at 8.5 cents in 1915, and the average spread for the years 1947 to 1949 was 3.88 cents. During the 56 years preceding 1953 the lowest price reached was 3.18 cents per pound in 1932 and the highest was 21.5 cents in late 1948. From 1900 until World War I, lead prices averaged between 4 and 6 cents per pound. The yearly average price advanced to 8.71 cents in 1917, but by 1921 had fallen to 4.55 cents. It then rose to 9.02 cents by 1925, after which began a continued drop which ended at the low of 3.18 cents in 1932. The price rose to 6.01 cents by 1937, dropped a little in 1938, then rose again to 6.5 cents by 1942, where it was maintained by government regulation through 1945. When the ceiling price restriction was removed the yearly average price rose rapidly to 18.04 cents by 1948, and late in that year the all-time high quotation of 21.5 cents was reached. The following year the price was dropping, and the average for 1950 was 13.3 cents per pound. The 1951 average was back up to 17.3 cents, but by April 1953 the price had dropped back to 12.5 cents. By October 1954 the price was back to 15 cents, where it remained through June 1955.

Ore minerals—The principal ore of lead is the sulfide, galena, PbS, containing 86.6 percent lead. Two other fairly common ores of lead are the carbonate, cerussite, PbCO₃, containing 77.5 percent lead, and the sulfate, anglesite, PbSO₄, containing 68.3 percent lead. Galena is a primary mineral, but cerussite and anglesite are secondary, as are also the less common, yet well-known, pyromorphite, Pb₅P₃O₁₂Cl, and wulfenite, PbMoO₄, containing 76.4 and 56.4 percent lead, respectively. All these lead minerals have been found in Washington. The metal rarely occurs as the native element. In all, there are more than 150 minerals known in which lead is an essential constituent.

Geology—Lead minerals typically are associated with zinc and silver minerals, and they occur predominantly

in limestone and dolomite, generally as disseminated replacement deposits. Deposits of the less common vein type usually are in sedimentary or metamorphic rocks and are associated with intrusive igneous rocks, but most of the replacement deposits usually are of either (1) lead-zinc ores, with no copper, silver, or gold, in a gangue of calcite, dolomite, pyrite or marcasite, and sometimes barite or fluorite, or (2) lead-silver ores, with similar gangue minerals, sometimes containing small amounts of zinc and gold. The vein deposits of lead usually are more complex, mineralogically. The lead is associated with zinc, and the ore carries appreciable values in gold and silver. Chalcopyrite and pyrite are common in the ore, as are also minerals of antimony, arsenic, bismuth, and other copper and iron minerals.

OCCURRENCES

The maps showing the numbered lead occurrences are plates 12, 13, and 14, on pages 35, 37, and 39 in volume 2.

CHELAN COUNTY

Belcher (1)

Loc: Sec. 36, (35-14E), adjoins Marlin prospect on the SE. **Access:** About 3 mi. of trail from Stehekin road. **Ore:** Lead, gold. **Ore min:** Galena, pyrite. **Ref:** 67, p. 38.

Big Chief

Loc: Stehekin dist. **Owner:** Campbell Hill Co. (1901). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Vein 3 ft. wide. **Ref:** 13, p. 143. 67, p. 38.

Billy Jack (18)

Loc: SE¼ sec. 30, (35-16E), on SW. side of N. Fk. of Bridge Cr. near its head. **Access:** About 12 mi. of trail from road up Stehekin R. **Owner:** E. O. Blankenship, Stehekin, Wash. (1940). **Ore:** Lead, zinc. **Ore min:** Pyrite, pyrrotite, galena, sphalerite. **Dev:** 90 ft. of adit. **Ref:** 67, p. 38.

Black Warrior (6)

(see under copper)

Blewett

(see Peshastin under gold)

Cascade (24)

(see under gold)

Cascade Consolidated (7)

(see under silver)

Clagstone (19)

Loc: SW¼ sec. 30, (35-16E), on W. side of the N. Fk. of Bridge Cr. at its head. **Elev:** 5,200 ft. **Access:** About 12 mi. of trail from road at mouth of Bridge Cr. **Owner:** E. O. Blankenship and Guy Imas, Stehekin, Wash. (1940). **Ore:** Lead, silver, gold, zinc. **Ore min:** Arsenopyrite, pyrite, galena, sphalerite. **Deposit:** Narrow quartz veins cutting gneiss. **Dev:** 3 short adits and an open cut. **Ref:** 67, p. 39.

Daisy Dean (36)

(see under gold)

Davenport (8)

(see under copper)

Defender (21)

(see under copper)

Doubtful (9)

Loc: Sec. 31, (35-15E), S. of the Quien Sabe prospect and N. of the Falls prospect, Stehekin dist. **Ore:** Lead, silver, copper, gold. **Ore min:** Galena, chalcopyrite, pyrite, sphalerite, arsenopyrite. **Gangue:** Quartz. **Deposit:** A 16- to 20-in. vein in which is a 4-in. zone of sulfide minerals. Country rock is gneiss. **Dev:** 2 adits, 30 and 100 ft. long. **Assays:** 87.5 to 100 oz. Ag, 54% to 62% Pb, tr. Au. **Ref:** 13, p. 142. 63, p. 83. 67, p. 40. 158.

Ellen

(see Van Epps under antimony)

Falls (10)

Loc: Sec. 31, (35-15E), N. of the Rouse prospect. **Access:** About 2 mi. of trail from Stehekin road. **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, chalcopyrite, pyrite. **Gangue:** Quartz. **Deposit:** Vein 2 ft. wide. **Dev:** Open cut. **Ref:** 67, p. 40.

Franklin (11)

Loc: Sec. 30, (35-15E), N. of Quien Sabe prospect, Stehekin dist. **Owner:** Harry Frank, Tacoma, and Messrs. Rouse and Rouse, Sedro Woolley, Wash. (1902). **Ore:** Lead, silver. **Dev:** Small amount. **Assays:** 89 to 100 oz. Ag, 42% to 54% Pb, tr. Au. **Ref:** 13, p. 143. 67, p. 40.

Galena (Tiger, Kingman) (12)

Loc: Sec. 29, (35-15E), adjacent to Quien Sabe claim, Horseshoe Basin dist. **Access:** Road from Stehekin and short trail. **Prop:** 2 claims. **Owner:** Horseshoe Basin Mining & Development Co. (1949). Kenneth and Keith Kingman, Chelan, Wash., and E. W. Davis, Los Angeles, Calif. (1948). **Ore:** Lead, silver, zinc, gold, copper. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** Fracture zone in granodiorite, with 250 ft. exposed length, containing a sulfide ore lens 100 ft. long and av. 6 in. thick. **Dev:** Open cut 7 ft. deep. **Assays:** One sample showed 1.76% Pb, 8.55% Zn, 0.21% Cu, 0.005 oz. Au, 1.51 oz. Ag. **Prod:** 4 tons mined but not shipped (1949). **Ref:** 13, p. 143. 67, p. 40. 157.

Great Republic

Loc: Stehekin dist. **Owner:** Campbell Hill Co. (1901). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Vein 3 ft. wide. **Ref:** 13, p. 143. 67, p. 40.

Holden (30)

(see under copper)

Horseshoe Basin (13)

Loc: N½ sec. 29, (35-15E) and NE¼ sec. 32, (35-15E), Horseshoe Basin area. **Elev:** 6,600 ft. **Access:** Road and trail

from Stehekin at head of Lk. Chelan. **Prop:** 22 unpatented claims, 3 millsites. **Owner:** Horseshoe Basin Mining & Development Co., Bremerton, Wash. (1946—). **Ore:** Lead, zinc, copper, silver, gold. **Ore min:** Galena, sphalerite, chalcopyrite. **Deposit:** A persistent shear or fracture zone in granodiorite can be traced at least 1,000 ft. and possibly 5,000 ft. The exposed ore shoot is 330 ft. long and av. 3 ft. wide and is composed of quartz-sulfide vein and silicified wall rock. Very little mineralization in the fissure where exposed in the drift 375 ft. below the outcrop. **Dev:** 1,000-ft. crosscut adit, with about 1,000 ft. of drifts. **Improv:** Camp buildings, 7,000-ft. tram (1952). **Assays:** Samples from av. width of 2.9 ft. showed 4.7% Pb, 4.8% Zn, 9.8 oz. Ag, 0.062 oz. Au, 0.35% Cu, 1.78% As. **Ref:** 133, p. 35. 157. 158.

Howe Sound

(see Holden under copper)

Humbug (35)

Loc: T. 23 N., R. 15 E., in Solomon Cr. Gulch near the Silver Fiend prospect, Leavenworth dist. **Prop:** 1 claim. **Owner:** James Grieve, K. W. Dunlap, and August Sasse (1897). **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, tetrahedrite. **Gangue:** Quartz. **Deposit:** Wide vein. **Ref:** 67, p. 28.

Indiana

Loc: Stehekin dist. **Owner:** Campbell Hill Co. (1901). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Vein 2½ ft. wide. **Ref:** 13, p. 143. 67, p. 41.

Irene

(see Holden under copper)

Jefferson and Tennessee

Loc: On Bridge Cr., Stehekin dist. **Prop:** 2 claims. **Owner:** M. Bushman and W. I. Lyle (1897). **Ore:** Lead. **Ore min:** Galena. **Ref:** 63, p. 84. 67, p. 41.

Keefer Brothers

(see under molybdenum)

King Solomon

(see Van Epps under antimony)

Kingman

(see Galena)

La Rica

(see Peshastin under gold)

Last Chance

(see under gold)

Logan (2)

Loc: N½ sec. 26, (35-14E), 600 ft. S. of Park Cr. Pass. **Access:** Trail from road up Stehekin R. **Ore:** Lead, zinc, copper, silver, gold. **Ore min:** Pyrrhotite, galena, sphalerite, pyrite, chalcopyrite. **Deposit:** Ore minerals in siliceous gangue along a slip zone in gneiss. **Dev:** A shaft and 4 adits, 25, 75, 150, 190 ft. long. **Ref:** 67, p. 41. 158.

Marlin (3)

(see under copper)

Maryland

Loc: Stehekin dist. **Owner:** Campbell Hill Co. (1901). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Vein 4 ft. wide. **Ref:** 13, p. 143. 67, p. 42.

Michigan

Loc: Stehekin dist. **Owner:** Campbell Hill Co. (1901). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Vein 2 ft. wide. **Ref:** 13, p. 143.

Nebraska (23)

(see under copper)

North Star (29)

Loc: Sec. 18, (31-16E), on summit near Lyman Lk. at head of Railroad Cr. **Access:** Trail from Holden. **Prop:** 8 claims. **Owner:** Cascade Range Mining Co. (1897). **Ore:** Silver, lead. **Deposit:** A 15- to 20-in. paystreak in granite. **Dev:** 2 adits, 25 and 35 ft. long. **Assays:** As high as 33% Pb and 140 oz. Ag. **Ref:** 63, p. 82. 67, p. 36.

Ohio

Loc: Stehekin dist. **Owner:** Campbell Hill Co. (1902). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Vein 3 ft. wide. **Ref:** 13, p. 143. 67, p. 42.

Ombompo (4)

(see under gold)

Orphan Boy (25)

(see under silver)

Panama No. 2 (14)

Loc: In upper Horseshoe Basin. **Access:** Road from Stehekin and about 1½ mi. of trail. **Ore:** Lead, gold, silver, zinc. **Ore min:** Galena, pyrite, sphalerite. **Gangue:** Quartz, fault gouge. **Deposit:** Ore occurs as post-fault mineralization in fault gouge. **Dev:** Short adit and open cut. **Ref:** 67, p. 42.

Peshastin (37)

(see under gold)

Quien Sabe (15)

Loc: Near center sec. 31, (35-15E), on E. side of Doubtful Lk. Basin, Stehekin dist. **Prop:** 2 patented claims: Quien Sabe, Quien Sabe No. 2. **Owner:** M. M. Kingman and Albert Pershall (1897). **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, arsenopyrite, chalcopyrite. **Gangue:** Quartz. **Deposit:** Said to be a 60-ft. vein. **Dev:** 250-ft. drift. **Assays:** Tr. to 0.1 oz. Au, 103 to 204 oz. Ag, 46% to 54% Pb. **Ref:** 12, p. 93. 13, p. 142. 63, p. 83. 67, p. 42. 104, 5/30/36, p. 26. 158.

Red Mountain (31)

(see under copper)

Roscoe Conkling

Loc: Stehekin dist. **Owner:** Campbell Hill Co. (1901). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Vein 2 ft. wide. **Ref:** 13, p. 143. 67, p. 43.

Rouse (16)

Loc: SW¼ sec. 31, (35-15E), on the small stream draining Doubtful Lk. **Access:** About 2 mi. of trail from the Stehekin road. **Prop:** 1 patented claim and millsite. **Owner:** Cascade Consolidated Mining & Smelting Co. (1910). **Ore:** Lead, gold, silver, copper. **Ore min:** Galena, chalcopyrite. **Deposit:** Quartz vein. **Ref:** 67, p. 43.

Royal

(see Red Mountain under copper)

Silver Fiend (33)

Loc: NW¼ sec. 10, (23-15E), in Solomon Cr. Gulch, Leavenworth dist. **Access:** 10 mi. of trail from mouth of Jack Cr. at end of Ice Ice Cr. road. **Prop:** 1 claim. **Owner:** James Grieve (1897). **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, tetrahedrite. **Gangue:** Quartz. **Deposit:** Wide vein. **Dev:** 15-ft. adit. **Ref:** 67, p. 29.

Silver Jack (20)

Loc: NW¼ sec. 30, (35-16E), at head of N. Fk. of Bridge Cr. **Access:** 13 mi. of trail from road at mouth of Bridge Cr. **Owner:** E. O. Blankenship, Stehekin, Wash. (1940). **Ore:** Lead,

zinc, gold. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** A pinching and swelling quartz vein 2 to 8 in. wide occurring along a fault in gneiss is heavily mineralized with sulfides. Vein traceable for 40 ft. **Dev:** Small open cut. **Ref:** 67, p. 43.

Silver King (26)
(see under copper)

Silver Trail (28)
(see under copper)

Snook and Ellen
(see Van Epps under antimony)

Spokane Boy and Girl (17)
(see under copper)

Summit (5)
Loc: NE¼ sec. 36, (35-14E), adjoins NW. corner of the Marlin claim. **Access:** About 3 mi. of trail from Stehekin road. **Prop:** 1 patented claim. **Owner:** Cascade Consolidated Mining & Smelting Co. (1910). **Ore:** Lead, gold. **Ore min:** Galena, pyrite. **Dev:** Shaft 45 ft. deep. **Ref:** 67, p. 43.

Sunday Morning (27)
(see under silver)

Tennessee
(see Jefferson and Tennessee)

Tiger
(see Galena)

Tiger (22)
(see under gold)

Van Epps (32)
(see under antimony)

White Star (34)
Loc: T. 23 N., R. 15 E., near Silver Fiend in Solomon Cr. Gulch. **Prop:** 1 claim. **Owner:** John Stewart (1897). **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, tetrahedrite. **Gangue:** Quartz. **Dev:** 20-ft. adit. **Ref:** 63, p. 62. 67, p. 29.

CLARK COUNTY

Silver Star (1)
(see under copper)

COWLITZ COUNTY

Green Mountain (1)
(see under gold)

FERRY COUNTY

Abe Lincoln (125)
(see under copper)

Ada
(see Laura S.)

Addie B (132)
(see under copper)

Addison (136)
(see under copper)

Admiral (53)
Loc: Near center sec. 28, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** Joseph Hartwell, Covada, Wash. (1913). **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 8-in. quartz vein in granodiorite. **Dev:** 30-ft. slope and 20-ft. shaft. **Ref:** 122, pp. 157-158. 158. 163, p. 76.

Advance (28)
(see under silver)

Ajax (54)

Loc: Sec. 27, (32-36E), Covada dist. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** Narrow quartz veins. **Ref:** 122, pp. 157-158.

American Granby
(see under copper)

Anchor
(see under silver)

Anderson (116)
Loc: Sec. 35, (31-33E), ¼ mi. up Iron Cr. W. of Iron Creek mine. **Access:** 4 mi. up Iron Cr. road from State Highway No. 4. **Prop:** 1 claim. **Owner:** Shamrock Silver-Lead Mines, Inc. (1937). **Ore:** Lead, silver. **Deposit:** A 1-ft. vein in limestone exposed for a distance of 150 ft. **Assays:** Said to av. 4% Pb, 15 oz. Ag. **Ref:** 129, p. 219.

Apex
(see Big Chief)

Apollo
(see California under gold)

Big Chief (Apex, Chief) (29)
Loc: Near center NE¼ sec. 35, (32-36E), Covada dist. **Prop:** 6 claims: Apex, Legal Tender, Carbonate Chief, Jennie C., Little Pet, Ripsaw. **Owner:** Modern Gold Dredging Co., Spokane, Wash., leasing from May Kummer, Seattle, Wash. (1951-1952). Apex Mining Co. (1909). Big Chief Mining Co. (1913-1918). **Ore:** Lead, zinc, molybdenum, tungsten, silver. **Ore min:** Galena, sphalerite, pyrite, arsenopyrite, molybdenite, scheelite, wolframite, pyrrhotite. **Deposit:** Quartz veins along bedding planes of a series of slate, quartzite, and argillite intruded by several aplite dikes. **Dev:** Several long crosscuts, several shafts and drifts. **Assays:** Owner's samples showed 0.6% to 2.2% WO₃. **Ref:** 46, p. 136. 112, 1918, p. 169. 122, pp. 164-165. 133, p. 32. 158. 163, pp. 83-84.

Big Joker
(see Messenger)

Big Lake (Cuba) (13)
Loc: Secs. 2 and 11, (34-36E), about ½ mi. W. of the Columbia R. **Elev:** 600 ft. above the river. **Access:** 10 mi. by road from railroad at Kettle Falls bridge. **Prop:** 12 unpatented claims. **Owner:** Big Lake Mining Co., Spokane, Wash. (1943-1951). Ferrry Mining Co. (1929-1937). **Ore:** Lead, zinc, silver, gold, copper. **Ore min:** Galena, pyrite, sphalerite, chalcopyrite. **Deposit:** Small irregular quartz veins in a shear zone in schistose grits and quartzite. Granite which cuts the metamorphics contains some pyrite. Shear zone said to have an av. width of 3 ft. **Dev:** 793-ft adit, 3 shafts, 20, 30, and 142 ft. deep. **Assays:** Nil to 15% Pb, nil to 3% Zn, 0.8 to 40.32 oz. Ag, 0.02 to 0.44 oz. Au. A 6-ft. chip sample from vein at winze showed 4.2% Pb, 2.5% Zn, 0.10% Cu, 0.16 oz. Au, 3.65 oz. Ag. **Ref:** 46, p. 119. 68, p. 6. 97, 1928, p. 699. 106, 12/19/29. 157. 158.

Black Hawk (30)
Loc: SW¼ sec. 26, (32-36E), 1¼ mi. N. of Covada post office. **Prop:** 1 claim. **Owner:** Mr. Kelley (1912). **Ore:** Lead, zinc, antimony, silver, gold. **Ore min:** Galena, sphalerite, stibnite, pyrite. **Deposit:** 3 quartz veins from 8 to 12 in. wide in granite. **Dev:** 60-ft. adit, 25-ft. open cut, 80-ft. adit. **Assays:** 12-in. vein assayed 0.03 oz. Au, 3.30 oz. Ag. **Ref:** 163, p. 64.

Black Tail (31)
Loc: Near center S½ sec. 36, (32-36E), ½ mi. NE. of Covada post office. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena. **Deposit:** Quartz vein in granodiorite up to 4 ft. wide. Nearby 4-in.

quartz stringer contains galena. **Dev:** 12-ft. shaft, several small cuts and pits. **Assays:** Av. sample from discovery shaft assayed tr. Au, 0.20 oz. Ag. **Ref:** 122, p. 169. 163, pp. 51-52.

Black Thorn (55)

Loc: Near center S. line sec. 27, (32-36E), 1½ mi. NW. of Covada post office. **Prop:** 1 claim. **Owner:** Black Thorn Mining Co. (1912). **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Deposit:** Quartz vein in granodiorite 3 in. to 1 ft. wide irregularly banded with galena and pyrite which together make up a small percentage of the whole. **Dev:** Adit 210 ft. in talus and 55 ft. in rock, also a 15-ft. adit. **Assays:** 0.04 oz. Au, 1.4 oz. Ag on sample from 15-ft. adit. **Ref:** 122, p. 160. 163, p. 70.

Blevins

(see Meadow Creek under copper)

Blue Bird (86)

Loc: NE¼SW¼ sec. 1, (31-36E), Covada dist. **Prop:** 1 claim. **Ore:** Lead, silver. **Ore min:** Pyrite, galena. **Gangue:** Quartz, silicified country rock. **Deposit:** Mineralized quartz stringers and silicified limestone near contact with granodiorite. **Dev:** 12-ft. shaft, short adit, discovery hole. **Assays:** Tr. Au, 1.0 oz. Ag. **Ref:** 122, p. 167. 163, pp. 48-49.

Blue Horse (8)

(see under silver)

Blue Jacket (9)

(see under silver)

Blue Jay (101)

Loc: Near center W. line sec. 30, (32-37E), Covada dist. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 3-in. quartz vein in which galena and pyrite are fairly abundant. **Dev:** Shallow pit. **Ref:** 122, p. 170.

Blue Mountain

(see Jennie under gold)

Boston & New York (4)

(see under silver)

Burlington and Delaware (119)

Loc: S½ sec. 15 and N½ sec. 22, (31-34E), 1 mi. E. of Ninemile Cr., Keller dist. **Prop:** 2 patented claims: Burlington No. 2, Delaware No. 2. **Owner:** E. F. Spicer, Colville, and L. G. Wrath, Spokane, Wash. (1941). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite, cerussite, limonite. **Deposit:** 5-ft. vein composed of porous quartz and limonite is traceable for ½ mi. The vein lies between limestone and black argillite. **Dev:** Adit said to be 270 ft. long. **Assays:** One assay shows \$25.16 Pb, \$16.35 Ag, \$1.24 Au. **Ref:** 46, p. 154. 58, p. 18. 122, p. 138. 158.

Butterfly (32)

Loc: Near center S. line sec. 36, (32-36E), ½ mi. E. of Covada post office. **Prop:** 1 claim. **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Deposit:** 4- to 12-in. quartz vein cutting granodiorite near contact with quartzite. Other veins nearby. **Dev:** 13-ft. shaft, 200-ft. adit, 12-ft. and 25-ft. open cuts. **Assays:** 0.01 oz. Au, 30 oz. Ag. on av. sample from discovery vein. **Ref:** 122, p. 167. 163, p. 52.

Cabin

(see Advance under silver)

California (7)

(see under gold)

Captain (Gold Cup) (56)

Loc: NW¼ sec. 27, (32-36E), Covada dist. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 6-ft. quartz-calcite vein in granodiorite. **Dev:** 40-ft. crosscut. **Ref:** 122, pp. 157-158. 163, pp. 74-75.

Chief

(see Big Chief)

Chief Barnaby (12)

(see under silver)

Churchill

Loc: E½SE¼ sec. 30, (37-34E), near head of Lambert Cr. **Elev:** 4,100 ft. **Prop:** Abandoned (1953). **Ore:** Lead. **Deposit:** Nodules of galena in slate. **Dev:** 2 adits about 70 ft. apart vertically, the upper is 500 ft. and the lower is 550 ft. long. **Ref:** 158.

Clay (126)

(see under copper)

Cold Spring (16)

Loc: NE¼ sec. 23, NW¼ sec. 24, SW¼ sec. 13, (32-36E), Covada dist. **Elev:** 1,000 ft. **Prop:** 7 patented claims: Cold Spring, Fairview, Little Grouse, Anchor, F. & M., Mary, and one other. **Owner:** Glen L. and James Brink, Wenatchee, Wash. (1948). **Ore:** Lead, copper, zinc, molybdenum. **Ore min:** Molybdenite, pyrite, chalcopyrite, galena, sphalerite. **Deposit:** Narrow crooked quartz vein along contact of mica schist and biotite-feldspar porphyry. Also a mineralized silicified shear zone in the argillite 15 ft. wide. **Dev:** 300-ft. adit from which a 100-ft. drift has been driven. **Ref:** 46, p. 120. 122, p. 172. 158.

Colorado (111)

Loc: E½SE¼ sec. 2, (31-34E), 1,000 ft. W. of U. S. prospect, Keller dist. **Ore:** Lead. **Ore min:** Galena, pyrite, arsenopyrite, limonite. **Gangue:** Quartz. **Deposit:** Lens 5 ft. thick and 20 ft. in dia. enclosed in limestone (mined out). Ore on dump is galena and limonite in quartz gangue. Also disseminated ore minerals in limestone. **Dev:** Open cut and 80-ft. crosscut, 50-ft. drift, and 12-ft. shaft. **Ref:** 122, p. 138.

Colorado (33)

Loc: E½ sec. 26, (32-36E), 2 mi. N. of Covada post office. **Access:** Road. **Prop:** 10 patented claims: Colorado Nos. 1 and 2, Agnes, Hazel, Diamond, Ohio, Chance, Hawthorne, Yellow Quartz, Little Eohippus. **Owner:** Dr. J. R. Collard, Salem, Oreg. (1934-1941). M. H. O'Connell (1905-1934). **Ore:** Lead, silver, gold. **Ore min:** Galena, stibnite. **Deposit:** 4-ft. vein with 2 ft. of ore cutting quartzite and granodiorite. **Dev:** 3 adits totaling more than 300 ft. in length. 2 of the adits were caved at portal in 1938. **Assays:** Ore said to av. \$7.00 Pb, Ag, \$3.00 Au. An av. sample from one adit showed tr. Au, 0.60 oz. Ag. **Ref:** 158. 163, pp. 63-64.

Comstock (1)

(see under copper)

Consolidated Mines and Smelting Co., Ltd.

(see under copper)

Copper Prince

(see under silver)

Cuba

(see Big Lake)

Curlaw

Loc: Curlaw dist. **Prop:** 8 claims and a millsite. **Owner:** National Lead-Silver Mining Co. (1918). Phoenix Gold & Copper Mining & Milling Co. (1911-1918). **Ore:** Lead, silver, zinc. **Dev:** Main adit over 1,000 ft. long, with several hundred ft. of shorter adits and shafts at higher levels. **Ref:** 98, 1918, p. 1451; 1922, p. 1660. 112, p. 193. 116, no. 2, 1911, pp. 40-41.

Cyprus

(see under gold)

Dan Patch (17)

(see under silver)

Dead Shot (57)

Loc: Near SW. cor. sec. 27, (32-36E), 2 mi. NW. of Covada. **Prop:** 1 claim. **Owner:** Golden Treasure Mining Co. (1909-1913). **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 2 quartz veins in granodiorite, one has width of 1 ft. **Dev:** 20-ft. adit. **Ref:** 114, no. 5, 1909, p. 74. 122, pp. 157-158. 163, p. 77.

Delaware

(see Burlington and Delaware)

Dill (58)

Loc: SE¼ sec. 33, (32-36E), Covada dist. **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** 3- to 4-ft. vein sparsely mineralized. **Ref:** 46, p. 130. 122, p. 161.

Discovery (34)

Loc: Sec. 26, (32-36E), 1¼ mi. NW. of Covada post office. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 7-in. quartz vein in granodiorite. **Dev:** Open cut 10 ft. deep, 15 ft. long. **Ref:** 122, p. 162. 163, p. 65.

Drummond (35)

Loc: Near center S½ sec. 26, (32-36E), a little less than 1½ mi. N. of Covada post office. **Prop:** 1 claim. **Owner:** M. H. O'Connell, Covada, Wash. (1912). **Ore:** Lead, zinc, silver, gold. **Ore min:** Pyrite, galena, sphalerite. **Deposit:** 2-ft. quartz vein cutting granodiorite. Nearby is a second vein of well-mineralized crushed quartz. **Dev:** 10-ft. shaft, 95-ft. crosscut, open cuts. **Assays:** Crushed quartz vein assayed 0.02 oz. Au, 1.20 oz. Ag. **Ref:** 122, p. 162. 163, pp. 59-60.

Etta (59)

Loc: Near center SE¼ sec. 27, (32-36E), 1¼ mi. N. of Covada post office. **Prop:** 1 triangular claim. **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Deposit:** 14-in. quartz vein in granodiorite, and several other smaller veins. **Dev:** 60-ft. shaft, 35-ft. adit, 6-ft. shaft. **Assays:** Av. sample from 14-in. vein assayed tr. Au, 0.30 oz. Ag. **Ref:** 122, pp. 157-158. 163, pp. 68-69.

Frosty Meadow (115)

Loc: NE¼ sec. 20, (31-34E). **Ore:** Lead (?). **Ore min:** Limonite. **Gangue:** Limestone. **Deposit:** Limonite-stained limestone exposed for a width of 40 ft. and considerably greater length. May be surface capping of a lode similar to that at Salnave prospect. **Dev:** Open pit. **Ref:** 122, p. 139.

Galena (14)

(see under silver)

Gold Crown

(see under silver)

Gold Cup

(see Captain)

Gold Twenty (25)

(see under gold)

Golden Cord (137)

(see under silver)

Goldsmith (26)

Loc: Near center sec. 22, (32-36E), Covada dist. **Ore:** Lead, zinc. **Ore min:** Pyrite, sphalerite, galena. **Gangue:** Quartz, calcite. **Deposit:** 1- to 4-in. vein in granodiorite. **Dev:** 30-ft. shaft, short adit. **Ref:** 46, p. 128. 122, p. 159.

Good Ore (27)

(see under silver)

Grandview (81)

Loc: Sec. 3, (31-36E), 2 mi. W. of Covada post office. **Prop:** 1 claim. **Owner:** J. C. Seaman (1912). **Ore:** Lead, silver, gold, tellurium. **Ore min:** Galena, sylvanite. **Deposit:** 4-ft. quartz vein in quartzite and slate. **Dev:** 80-ft. shaft from which a 10-ft. drift has been driven. **Ref:** 163, p. 79.

Greasy Run (87)

Loc: Near NW. cor. sec. 1, (31-36E), at Covada post office. **Prop:** 1 claim. **Owner:** A. B. Nickens (1912). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Deposit:** 2 quartz veins in granodiorite, one 4 to 8 in. wide, the other 1 ft. wide. **Dev:** Two 30-ft. shafts and a 15-ft. open cut. **Assays:** Sample assayed tr. Au; 2.20 oz. Ag. **Ref:** 122, p. 167. 163, p. 50.

Great Eastern (18)

Loc: SE¼ sec. 23, (32-36E), Covada dist. **Ore:** Lead, silver. **Deposit:** Mineralization reported to be similar to Monarch. **Ref:** 122, p. 172.

Great Northern (123)

(see under silver)

Great Scott (19)

Loc: SW¼ sec. 13, (32-36E), 3½ mi. N. of Covada post office. **Prop:** 1 claim. **Owner:** Mr. Messenger (1912). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, sphalerite. **Deposit:** Quartz vein in quartzite. **Dev:** 2 shafts 8 to 9 ft. deep, several open cuts. **Assays:** Sample at discovery shaft assayed tr. Au, 0.20 oz. Ag. **Ref:** 122, pp. 174-175. 163, p. 72.

Gwin (15)

(see under silver)

Hall Creek

(see Gwin under silver)

Henneway (117)

Loc: Sec. 35, (31-33E). **Access:** 4 mi. up Iron Cr. road from State Highway No. 4. **Owner:** Tom Henneway (1913). **Ore:** Lead, zinc. **Ore min:** Sphalerite, galena, pyrite. **Gangue:** Silicified limestone. **Deposit:** Brecciated limestone silicified and sparsely mineralized with sphalerite, galena, pyrite. **Ref:** 122, p. 139.

Hines (109)

Loc: Near center SE¼ sec. 22, (32-33E). **Owner:** Frank Hines, Keller, Wash. (1913). **Ore:** Lead, gold. **Ore min:** Pyrite, galena. **Deposit:** 3-ft. pyrite-bearing quartz vein in argillite. Small bunches and irregular veinlets of galena in the argillite. **Dev:** 30-ft. inclined shaft. **Assays:** Pyrite-bearing quartz said to assay a few dollars in Au per ton. **Ref:** 122, p. 137.

Humboldt (128)

(see under copper)

I. X. L. (88)

Loc: Center sec. 1, (31-36E), ½ mi. SE. of Covada post office. **Prop:** 1 claim. **Owner:** James Hartwell (1912). **Ore:** Lead, gold, silver. **Ore min:** Pyrite, galena. **Deposit:** 3-ft. quartz vein in quartzite. **Dev:** 63-ft. adit and a shaft. **Assays:** Av. sample from discovery assayed 0.36 oz. Au, 0.24 oz. Ag. **Ref:** 122, p. 167. 163, p. 53.

Idora (89)

Loc: Near center E½ sec. 1, (31-36E), Covada dist. **Prop:** 1 claim. **Owner:** James Hartwell (1912). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 4-in. quartz vein in quartzite and a zone of silicified quartzite in which are galena-bearing quartz veinlets. **Dev:** 60-ft. crosscut and 9-ft. shaft. **Ref:** 58, p. 32. 122, p. 167. 163, p. 59.

Illinois (129)

(see under copper)

Imperial (60)

Loc: Near center sec. 27, (32-36E), a little over 2 mi. NW. of Covada post office. **Prop:** 1 claim. **Owner:** G. E. Terpening and Mr. Messenger. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 3-in quartz vein in granodiorite. **Dev:** 204-ft. crosscut. **Ref:** 122, pp. 157-158. 163, p. 74.

Iron Creek

(see Shamrock under nickel)

J. H. E. (20)

Loc: Near SE. cor. sec. 24, (32-36E), Covada dist. **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite. **Deposit:** Specimens said to have come from this prospect show fairly abundant galena and sphalerite. **Ref:** 122, p. 172.

Jaybird (102)

Loc: Near NW. cor. sec. 30, (32-37E), 3 mi. from Covada post office. **Prop:** 1 claim. **Owner:** Ira B. Gifford (1912). **Ore:** Lead, silver, gold. **Deposit:** 4-in. quartz vein. **Dev:** 20-ft. adit. **Ref:** 122, p. 172. 163, pp. 72-73.

Jennie (6)

(see under gold)

Joker (36)

Loc: Near S. line SW $\frac{1}{4}$ sec. 26, (32-36E), Covada dist. **Prop:** 1 claim, joins W. end of Black Hawk. **Ore:** Lead. **Deposit:** 8- to 12-in. quartz vein in granodiorite. **Dev:** 10-ft. shaft, 30-ft. open cut. **Assays:** Av. sample of vein at discovery shaft yielded neither Au nor Ag values. **Ref:** 122, p. 162. 163, p. 64.

Juliet (Little Tom) (61)

Loc: SE $\frac{1}{4}$ sec. 28, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** George T. Eves and Arthur Slaton, Impach, Wash. (1949). **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena, arsenopyrite, reportedly stibnite. **Deposit:** 2 intersecting quartz veins. **Dev:** 150-ft. crosscut, several old open cuts. **Assays:** 0.02 oz. Au, 3.40 oz. Ag. **Ref:** 122, pp. 157-158. 158. 163, p. 78.

Juno (10)

(see under silver)

Kentucky Bell (37)

Loc: SE $\frac{1}{4}$ sec. 36, (32-36E), nearly 1 mi. E. of Covada post office. **Prop:** 1 claim. **Owner:** J. C. Seaman (1912). **Ore:** Lead, zinc, silver, gold. **Ore min:** Pyrite, arsenopyrite, sphalerite, galena. **Gangue:** Quartz, silicified argillite. **Deposit:** A 5-ft. vein in argillite consisting of quartz and silicified argillite breccia is nearly barren of ore minerals. A 3-ft. parallel vein shows scant mineralization. **Dev:** 500-ft. crosscut, 30-ft. shaft, and open pits. **Ref:** 58, p. 36. 122, pp. 165-166. 163, pp. 55-56.

Keystone (62)

(see under silver)

King Fraction (63)

Loc: Sec. 27, (32-36E), Covada dist. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 1-ft. quartz vein in granodiorite. Small grains of galena and pyrite present in the quartz. **Dev:** 30-ft. shaft, open cuts. **Ref:** 122, pp. 157-158. 163, p. 67.

King Richard

(see Meadow Creek under copper)

King Solomon (90)

Loc: NW $\frac{1}{4}$ sec. 1, (31-36E), 1,000 ft. S. of Covada post office. **Prop:** 1 claim. **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** At least 3 quartz veins 4 to 12 in. wide in granodiorite.

Dev: Several shafts, adits, and open cuts. **Assays:** Av. sample from discovery vein assayed tr. Au, 7.80 oz. Ag. **Ref:** 122, p. 167. 163, pp. 49-50.

La Fleur

(see Comstock under copper)

Lakeview Fraction (38)

Loc: Near SW. cor. sec. 36, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** C. C. Rohlfs (1912). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Deposit:** 12-in. quartz vein in granodiorite with 8 in. of granodiorite in its center. **Dev:** 8-ft. open cut and smaller openings. **Assays:** Av. sample assayed tr. Au, 0.60 oz. Ag. **Ref:** 122, p. 167. 163, p. 47.

Lancaster (2)

(see under copper)

Laura S. (Ada) (82)

Loc: Sec. 3, (31-36E), 2 mi. W. of Covada post office. **Prop:** 1 claim. **Owner:** H. A. Pea and E. J. Sparling (1913). **Ore:** Lead, silver, gold, tellurium. **Ore min:** Galena, pyrite, sylvanite. **Deposit:** Quartz vein in quartzite. **Dev:** 40-ft. shaft. **Ref:** 163, p. 79.

Laurel (103)

Loc: NW $\frac{1}{4}$ sec. 30, (32-37E), Covada dist. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** Irregular quartz seam in limestone and quartzite. **Dev:** Small open cut. **Ref:** 122, p. 172. 163, p. 73.

Laurier

(see Talisman under copper)

Legal Tender (39)

Loc: Near center W. line sec. 36, (32-36E), $\frac{1}{2}$ mi. N. of Covada post office. **Prop:** 1 claim. **Owner:** A. M. Anderson (1912). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** 3-ft. vein of quartz and mineralized country rock. **Dev:** 8-ft. shaft. **Ref:** 46, p. 137. 163, p. 62.

Little Jay (40)

Loc: Near SW. cor. sec. 26, (32-36E), 1 mi. NW. of Covada post office. **Prop:** 1 claim. **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Deposit:** 8-in. quartz vein in granodiorite. **Dev:** 10-ft. shaft and 10-ft. open cut. **Assays:** Av. sample from discovery shaft assayed tr. Au, 0.20 oz. Ag. **Ref:** 122, p. 162. 163, p. 65.

Little Tom

(see Juliet)

Lone Pine (41)

Loc: Near center sec. 35, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** Edward Sizemore (1912). **Ore:** Lead, zinc. **Deposit:** Quartz vein in quartzite. **Dev:** Open cut 10 ft. long, 8 ft. deep. **Ref:** 122, p. 164. 163, p. 62.

Longstreet (42)

(see under silver)

Lucky Boy

Loc: Covada area. **Ore:** Lead, silver. **Prod:** 1938, 1939. **Ref:** 58, p. 41. 97, 1939, p. 490; 1940, p. 477.

McJunkin (110)

(see under silver)

Mabel T. (114)

Loc: Near center SE $\frac{1}{4}$ sec. 10, (31-34E), S. of the trail, Keller dist. **Prop:** 3 patented claims. **Ore:** Lead, silver. **Ore min:** Galena. **Gangue:** Quartz, calcite. **Deposit:** Reportedly an ore body 1 ft. wide and 20 ft. long. Wall rock is limestone and carbonaceous argillite. **Dev:** 300-ft. adit. **Ref:** 122, p. 138.

Mayflower (91)

Loc: N $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 1, (31-36E), a few hundred ft. SW. of old Covada post office. **Prop:** 1 claim. **Owner:** C. C. Rohlfs (1912). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 18-in. quartz vein in granodiorite near contact with quartzite. **Assays:** Av. sample assayed tr. Au, 1.60 oz. Ag. **Ref:** 122, p. 167. 163, p. 47.

Meadow Creek (127)

(see under copper)

Messenger (Big Joker) (43)

Loc: SE $\frac{1}{4}$ sec. 36, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** Mr. Messenger (1912). **Ore:** Lead, silver. **Ore min:** Galena, pyrite. **Deposit:** Several mineralized quartz veins from 12 to 26 in. wide in granodiorite near its contact with other rock. **Dev:** 12-ft. shaft; pit 8 ft. deep, 10 ft. long, and 5 ft. wide; 25-ft. shaft; and 10-ft. shaft. **Prod:** 1934. **Ref:** 97, 1935, p. 352. 122, p. 169. 163, p. 55.

Meteor (64)

(see under silver)

Midnight

(see under silver)

Mineral Hill (124)

Loc: Near NE. cor. sec. 24, (30-32E). **Ore:** Lead (?). **Ore min:** Black unoxidized sulfides. **Gangue:** Quartz. **Deposit:** A 1-ft. vein composed of iron-stained porous quartz containing dark spots, apparently unoxidized sulfides. **Ref:** 122, p. 127.

Monarch (21)

Loc: SW $\frac{1}{4}$ sec. 14, (32-36E), Covada dist. **Ore:** Lead. **Ore min:** Galena. **Deposit:** 3-ft. quartz vein in granodiorite contains a little galena. **Ref:** 122, p. 172.

Mono (122)

(see under zinc)

Montana (65)

(see under silver)

Neglected (80)

Loc: S $\frac{1}{2}$ sec. 32, (32-36E), Covada dist. **Prop:** 1 claim of Reserve group. **Ore:** Lead. **Ore min:** Pyrite, galena. **Deposit:** 8-in. quartz vein in quartzite contains some pyrite and galena. **Dev:** 20-ft. shaft. **Assays:** Av. sample assayed no Au, tr. Ag. **Ref:** 122, p. 156. 158. 163, p. 76.

New York (66)

Loc: North central part sec. 33, (32-36E), 2 $\frac{1}{2}$ mi. NW. of Covada post office. **Prop:** 1 claim: New York. **Owner:** Charles Fish, Sprague, Wash. (1943). **Ore:** Lead, zinc, silver, gold. **Ore min:** Pyrrhotite, pyrite, sphalerite, galena, arsenopyrite, pyrrargyrite. **Deposit:** 12- to 16-in. quartz vein in granodiorite. **Dev:** 2 shafts, 40 and 60 ft. deep, open cut. **Assays:** Av. of 3 assays showed 10.3% Zn, 15.2% Pb, 7.8 oz. Ag, 0.07 oz. Au. Other selected samples show 0.02 oz. Au, 4 oz. Ag where pyrrhotite predominates. Where galena predominates Au is same but Ag only half. **Ref:** 122, p. 157. 158. 163, p. 78.

Nez Perce (84)

Loc: SW $\frac{1}{4}$ sec. 21, (31-36E). **Prop:** Several claims. **Ore:** Lead, zinc, copper. **Ore min:** Galena, sphalerite, pyrite, chalcocopyrite. **Deposit:** 6-in. quartz-calcite vein accompanied by 4 $\frac{1}{2}$ ft. of brecciated argillite. Vein contains liberal percentages of ore minerals. **Dev:** Short adit. **Ref:** 46, p. 138. 122, p. 177.

Ninemile Creek (92)

Loc: NW $\frac{1}{4}$ sec. 1, (31-34E). **Ore:** Lead (?). **Ore min:** Limonite. **Gangue:** Limestone. **Deposit:** Limonite-stained limestone 40 ft. in dia. may represent capping of a lode like that at Salnave prospect. **Dev:** Open pit. **Ref:** 122, p. 139.

North Star (133)

Loc: SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 30, (30-33E), Keller dist. **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** Fragments of quartz on dump indicate a vein at least 10 in. wide. Fragments are sparsely mineralized. **Dev:** Shaft. **Ref:** 46, p. 150. 122, p. 125.

Number Seven

(see under silver)

Ohio (44)

Loc: Near center sec. 26, (32-36E), 1 $\frac{1}{2}$ mi. NW. of Covada post office. **Prop:** 1 claim. **Owner:** M. H. O'Connell (1912). **Ore:** Lead, silver. **Ore min:** Galena, pyrite. **Deposit:** 4-in. quartz vein in granodiorite said to be a side vein parallel to the main vein. **Dev:** Adit 150 ft. under cover. **Ref:** 122, p. 162. 163, p. 59.

Oom Paul (67)

Loc: Near center SE $\frac{1}{4}$ sec. 27, (32-36E), 1 $\frac{1}{2}$ mi. NW. of Covada post office. **Prop:** 1 claim. **Owner:** S. L. Magee (1912). **Ore:** Lead, silver. **Ore min:** Galena, pyrite. **Deposit:** Quartz vein 4 to 12 in. wide in granodiorite. Sulfides constitute up to 50% of the vein in places. **Dev:** 60-ft. adit, 50-ft. shaft, 15-ft. open cut. **Assays:** Selected sample from discovery shaft assayed 69.5% Pb, 25.14 oz. Ag. **Ref:** 122, p. 161. 163, pp. 67-68.

Ophir (134)

Loc: Secs. 19, 20, 29, and 30, (30-33E), Keller dist. **Prop:** 6 claims: Ophir Nos. 1 to 6. **Owner:** E. D. Mortenson and Albert Eckel, Keller, Wash. (1952—). Orin A. Mortenson (1938). **Ore:** Lead, silver, gold, zinc. **Ref:** 133, p. 38. 158.

Oregon (112)

(see under silver)

Oregon

(see Illinois under copper)

Pacific Mutual

(see Addison under copper)

Panama (3)

(see under gold)

Patterson

(see Jennie under gold)

Paulsen (85)

Loc: Secs. 20 and 21, (31-36E). **Owner:** P. A. Paulsen (1913). **Ore:** Lead, zinc. **Ore min:** Pyrite, sphalerite, galena. **Deposit:** Reportedly quartz veins 4 to 8 ft. wide containing pyrite, galena, and sphalerite. **Ref:** 122, p. 176.

Pilgrim (93)

Loc: NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 1, (31-36E), Covada dist. **Prop:** 1 claim. **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Gangue:** Quartz. **Deposit:** Vein an extension of the Plymouth Rock vein. Wall rock quartzite and granodiorite. **Dev:** Discovery pit, several small open cuts. **Assays:** Av. sample showed tr. Au, 0.06 oz. Ag. **Ref:** 122, p. 167. 163, p. 48.

Plymouth Rock (94)

Loc: N $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 1, (31-36E), 1,500 ft. E. of Covada post office. **Prop:** 1 claim. **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** Irregular quartz vein as much as 2 $\frac{1}{2}$ ft. wide along contact between granodiorite and limestone. **Dev:** 150-ft. crosscut, from which a 125-ft. drift has been driven. **Assays:** 0.01 oz. Au, 15 oz. Ag, 6% Pb. **Ref:** 46, p. 135. 122, p. 165. 163, p. 48.

Polaris (45)

Loc: N $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 36, (32-36E), $\frac{3}{4}$ mi. E. of Covada post office. **Prop:** 1 claim. **Owner:** Henry Garrett and H. P. Stev-

enson (1912). **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Deposit:** 8-in. quartz vein in granodiorite. **Dev:** 20-ft. shaft, 100-ft. adit, 7-ft. shaft, several open cuts and pits. **Assays:** Av. sample assayed tr. Au, 0.20 oz. Ag. **Ref:** 122, p. 169. 163, p. 54.

Polepick (130)

(see under copper)

Poor Man's Hope (140)

Loc: Near NE. cor. sec. 1, (29-33E), Keller dist. **Prop:** 1 patented claim. **Ore:** Lead, zinc, copper, silver. **Ore min:** Galena, sphalerite, pyrite, chalcopryrite. **Gangue:** Quartz, calcite. **Deposit:** 20-in. quartz vein traceable for 100 ft. is sparsely mineralized. Wall rock is quartzite, schist, and argillite. **Dev:** 35-ft. shaft. **Ref:** 46, p. 156. 122, pp. 131-132.

Prescott (68)

Loc: NE $\frac{1}{4}$ sec. 33, (32-36E), Covada dist. **Ore:** Lead, zinc. **Ore min:** Pyrite, galena, sphalerite. **Deposit:** 3- to 4-ft. vein sparsely mineralized. **Ref:** 46, p. 130. 122, p. 161.

Quandary (95)

Loc: S $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 1, (31-36E), 1,500 ft. E. of Covada post office. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** Thin "layer" of quartz in quartzite. **Dev:** 20-ft. open cut. **Ref:** 122, p. 167. 163, p. 49.

Rattlesnake (104)

Loc: S $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 30, (32-37E), Covada dist. **Ore:** Lead, silver, gold, zinc. **Ore min:** Pyrite, galena, sphalerite. **Gangue:** Quartz. **Deposit:** 2-in. mineralized quartz vein in metamorphics and a shear zone containing several mineralized quartz veinlets. **Dev:** 200-ft. adit; 100 ft. in talus is lined with ice in summer. Discovery pit. **Ref:** 58, p. 57. 122, p. 170.

Red Chief (69)

Loc: W. center sec. 34, (32-36E), 2 mi. NW. of Covada post office. **Prop:** 1 claim. **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Gangue:** Quartz, breccia. **Deposit:** 4-ft. vein between granodiorite and schist. The vein, composed of quartz and brecciated wall rock, contains a little galena and pyrite. Part of the vein wholly in granodiorite. **Dev:** 20-ft. incline, 25-ft. adit, and 2 small shafts. **Ref:** 122, p. 161. 163, p. 78.

Ren Rice (22)

Loc: SW $\frac{1}{4}$ sec. 13, (32-36E), 3 $\frac{1}{2}$ mi. N. of Covada post office. **Prop:** 1 claim. **Owner:** L. G. Curry (1912). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, sphalerite. **Deposit:** 6-in. vein of quartz, somewhat crushed, cuts quartzite. **Dev:** 12-ft. shaft. **Assays:** Av. sample of vein assayed tr. Au, 0.30 oz. Ag. **Ref:** 122, pp. 174-175. 163, p. 71.

Reserve (79)

(see under silver)

Robert E. Lee (46)

(see under antimony)

Romulus (70)

Loc: Near SE. cor. sec. 28, (32-36E), Covada dist. **Owner:** George T. Eves and Arthur Slaton, Impach, Wash. (1949). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, pyrite, sphalerite. **Deposit:** 5-ft. lode in granodiorite composed of several closely spaced quartz veinlets separated by sericitized granodiorite. Scattered galena and pyrite. **Dev:** Inclined shaft 110 ft. deep, now caved, and several open cuts. **Ref:** 58, p. 59. 122, p. 160. 158.

Roulette (23)

Loc: SE $\frac{1}{4}$ sec. 23, (32-36E), Covada dist. **Ore:** Lead. **Deposit:** Mineralization reported to be similar to Monarch. **Ref:** 122, p. 172.

Rover Bonanza (135)

(see under silver)

Royal Ann (47)

Loc: S. center sec. 26, (32-36E), slightly more than 1 mi. N. of Covada post office. **Prop:** 3 claims: Royal Ann Nos. 1 to 3. **Owner:** C. C. Rohlfs (1912). **Ore:** Lead, silver, zinc, gold. **Ore min:** Galena, sphalerite, cerussite, pyrite. **Deposit:** 4 quartz veins from 6 to 16 in. wide in granodiorite. 2 veins well mineralized. **Dev:** 3 adits, 75, 110, and 72 ft. long; 2 shafts, 10 and 40 ft. deep; and a 25-ft. open cut. **Assays:** Av. sample from discovery shaft on Royal Ann No. 3 assayed 0.02 oz. Au, 3.20 oz. Ag. Av. sample from 2 parallel veins on Royal Ann No. 1 assayed 0.04 oz. Au, 12.50 oz. Ag. **Ref:** 46, pp. 131-132. 122, pp. 161-162. 163, pp. 60-61.

St. Patrick (71)

Loc: E $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 27, (32-36E), 1 $\frac{1}{2}$ mi. NW. of Covada post office. **Prop:** 1 claim. **Owner:** Mr. Kelly (1912). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Gangue:** Quartz, talc. **Deposit:** 2 veins in quartzite, one 3 ft. wide, the other 4 in. wide. **Dev:** 2 shafts, one 16 ft. deep, and 70-ft. adit. **Assays:** Av. sample from 4-in. vein assayed 0.03 oz. Au, 2.00 oz. Ag. **Ref:** 122, pp. 157-158. 163, p. 68.

St. Paul (24)

Loc: Sec. 24, (32-36E), 2 mi. NE. of Covada post office. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 8-in. quartz vein in quartzite. Ore minerals scattered through the vein and about 1 ft. of the wall rock. **Dev:** 10-ft. shaft. **Ref:** 122, p. 172. 163, p. 73.

Salnave (120)

Loc: N $\frac{1}{2}$ sec. 16, (31-34E). W. of the main fork of the creek. **Prop:** 1 claim. **Owner:** George Salnave (1913). **Ore:** Lead. **Ore min:** Galena, pyrite. **Gangue:** Limestone. **Deposit:** Limestone mineralized appreciably to a width of 10 in. along contact with micaceous argillite. Brecciated by post-mineral movement. **Dev:** 120-ft. adit. **Ref:** 122, p. 139.

San Poil Monitor

(see Meadow Creek under copper)

Several (72)

Loc: S. center sec. 27, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** G. E. Terpening (1912). **Ore:** Lead, zinc, copper, silver, gold. **Ore min:** Sphalerite, galena, pyrite, chalcopryrite. **Gangue:** Quartz. **Deposit:** Surface vein av. 10 in. in width. Adit cuts 2 veins 2 to 4 in. wide banded with ore minerals. Granodiorite country rock. **Dev:** 200-ft. adit with drifts aggregating 150 ft., a shallow discovery shaft, and several open cuts. **Assays:** Av. sample from discovery shaft assayed tr. Au, 1.00 oz. Ag. **Ref:** 46, p. 129. 122, pp. 160-161. 163, p. 70.

Several Fraction (73)

Loc: Near center SE $\frac{1}{4}$ sec. 27, (32-36E), 1 $\frac{1}{4}$ mi. NW. of Covada post office. **Prop:** 1 claim. **Owner:** G. A. Mathews (1912). **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** 4-in. quartz vein in granodiorite. **Dev:** Two 6-ft. shafts and a 20-ft. shaft, several open cuts. **Ref:** 122, pp. 157-158. 163, p. 69.

Shamrock (118)

(see under nickel)

Shoo Fly (48)

Loc: Near center NE $\frac{1}{4}$ sec. 36, (32-36E), 1 mi. NE. of Covada post office. **Prop:** 1 claim. **Owner:** G. W. Sizemore (1912). **Ore:** Lead. **Ore min:** Galena, pyrite. **Gangue:** Quartz, aplite. **Deposit:** 1 $\frac{1}{2}$ - to 4-ft. vein of quartz and an 80-ft. zone of mineralized aplite near granodiorite-quartzite contact. **Dev:** 6-ft. shaft; 165-ft. adit extends into Shoo Fly from Polaris claim; 30-ft. open cut. **Ref:** 122, p. 169. 163, p. 66.

Silver Bell (105)

Loc: Near NE. cor. sec. 31, (32-37E), near end of a SE. spur of Rattlesnake Mtn., Covada dist. **Prop:** 1 claim. **Owner:** Lee Peone, Inchelium, Wash. (1941). **Ore:** Lead, zinc, gold, silver, copper. **Ore min:** Galena, sphalerite, pyrite. **Gangue:** Hornstone. **Deposit:** Hornstone that weathers rusty is irregularly mineralized. A width of at least 1 ft. shows a fair proportion of galena. **Dev:** Short adit, shaft, and crosscut. **Assays:** High-grade ore, \$50; milling grade ore, \$10 per ton. **Prod:** 29 tons 1940, 84 tons 1941. **Ref:** 46, pp. 121-122. 97, 1941, p. 473; 1942. 122, pp. 171-172.

Silver Crown No. 3 (96)

Loc: NE¼ sec. 1, (31-36E), 1 mi. E. of Covada. **Prop:** Small triangular claim. **Owner:** Mr. Howe (1910). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 6-in. quartz vein in quartzite carries considerable galena. **Dev:** 12-ft. shaft. **Assays:** Sample from shaft assayed 0.02 oz. Au, 0.60 oz. Ag. **Ref:** 122, p. 166. 163, p. 57.

Silver Dollar (97)

Loc: NE¼NE¼ sec. 1, (31-36E), Covada dist. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** Quartz vein in granodiorite. **Dev:** 8-ft. shaft. **Ref:** 122, p. 167. 163, p. 56.

Silver King (139)

(see under silver)

Silver Leaf (106)

(see under silver)

Silver Pick

(see under silver)

Silver Plume (98)

Loc: Near NE. cor. sec. 2, (31-36E), a few hundred ft. W. of Covada post office. **Elev:** 1,900 ft. **Prop:** 1 claim. **Owner:** G. W. Sizemore (or J. M. Anderson ?) (1912). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, pyrite. **Gangue:** Quartz. **Deposit:** 2 quartz veins in black siliceous argillite, one 20 in. wide, the other 4 in. wide, carry appreciable amounts of ore minerals. **Dev:** 160-ft. adit, other shallow openings. **Ref:** 46, p. 134. 122, pp. 164, 175-176. 163, pp. 50-51, 62.

Silver Queen (83)

Loc: Near W. line NW¼ sec. 3, (31-36E), Covada dist. **Prop:** 1 claim. **Owner:** Lee Peone, Inchelium, Wash. (1941). **Ore:** Lead, zinc, silver. **Ore min:** Pyrite, sphalerite, galena. **Deposit:** 1½-ft. quartz vein in schistose argillite contains appreciable quantities of ore minerals. **Dev:** 2 shafts. **Ref:** 46, pp. 121-122. 122, pp. 162-163.

Silver Spar (49)

Loc: Near SE. cor. sec. 35, (32-36E), 1,500 ft. N. of Covada post office. **Prop:** 1 claim. **Owner:** A. M. Anderson (1912). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite. **Deposit:** 12-in. quartz vein in quartzite. **Dev:** 12-ft. shaft. **Ref:** 122, p. 164. 163, p. 62.

Silver Tip (11)

(see under silver)

Snowstorm (White Swan) (74)

Loc: Near E. center sec. 28, (32-36E), 2½ mi. NW. of Covada post office. **Prop:** 1 claim. **Owner:** G. A. Mathews and G. W. Sizemore (1912). **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Deposit:** Narrow mineralized quartz vein in granodiorite. **Dev:** 10-ft. shaft, 15-ft. shaft, 600-ft. adit from which a 100-ft. drift has been driven. **Assays:** One sample assayed tr. Au, 0.30 oz. Ag. **Ref:** 122, pp. 157-158. 158. 163, p. 77.

Stemwinder

(see under silver)

Stray Dog (75)

(see under silver)

Summit (138)

(see under zinc)

Summit (50)

Loc: SE¼ sec. 36, (32-36E), E. of and parallel to Silver Dollar and Kentucky Bell claims, Covada dist. **Prop:** 1 claim. **Ore:** Lead, antimony, silver. **Ore min:** Galena, stibnite (?), pyrite. **Deposit:** Several quartz veins in quartzite; one is 6 in. wide. **Dev:** 3 shafts, 15, 20, and 25 ft. deep. **Ref:** 163, pp. 56-57.

Sunset (99)

Loc: W½NE¼ sec. 1, (31-36E), a little more than ½ mi. E. of Covada. **Prop:** 1 claim. **Owner:** T. B. Miller (1912). **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Deposit:** Small stringers of quartz in quartzite and granodiorite. **Dev:** 14-ft. shaft. **Assays:** Av. sample from discovery shaft assayed tr. Au, 0.30 oz. Ag. **Ref:** 122, p. 167. 163, p. 53.

Syndicate (76)

Loc: Near NE. cor. sec. 34, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** J. W. Bartlett (1912). **Syndicate Mining Co.** (1909). **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** Several small galena-bearing quartz veinlets in granodiorite. **Dev:** 800-ft. crosscut. **Ref:** 58, p. 67. 122, p. 158. 163, p. 71.

Talisman (5)

(see under copper)

Three Pines (51)

Loc: S½SE¼ sec. 36, (32-36E), ¾ mi. E. of Covada post office. **Prop:** 1 claim. **Ore:** Lead. **Ore min:** Galena. **Deposit:** 16-in. quartz vein in granodiorite. **Dev:** 10-ft. shaft. **Ref:** 122, p. 169. 163, p. 56.

Twin Pines (100)

Loc: SW¼ sec. 13, (31-36E), Covada dist. **Ore:** Lead. **Ore min:** Pyrite, galena. **Deposit:** 5-ft. vein consisting of alternate layers of crushed argillite and vein quartz that contains a little pyrite and galena. **Ref:** 122, p. 176.

U. S. (113)

Loc: Near center W½ sec. 1, (31-34E), Keller dist. **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite, arsenopyrite. **Deposit:** A 6- to 10-in. quartz vein along junction of schist and limestone. 2-in. layer on footwall is nearly pure galena. **Dev:** 50-ft. crosscut with a 30-ft. drift. **Assays:** 2-in. layer assayed 49.5% Pb, 59.96 oz. Ag, 0.04 oz. Au. **Ref:** 122, pp. 137-138.

Veda W.

(see under silver)

Vernie (77)

Loc: Center sec. 34, (32-36E), Covada dist. **Prop:** 1 claim. **Owner:** H. Garrett and W. A. Pea. **Ore:** Lead, zinc. **Ore min:** Pyrite, galena, sphalerite. **Deposit:** 4-ft. quartz vein in quartzite near contact with granodiorite. Vein impregnated with ore minerals in places. **Dev:** 50-ft. adit, 10-ft. shaft, 40-ft. shaft. **Ref:** 46, p. 130. 122, p. 161. 163, pp. 78-79.

Walla Walla (131)

(see under copper)

Wanda Mountain (121)

Loc: Near S. line SE¼ sec. 13, (30-32E). **Ore:** Lead. **Ore min:** Galena. **Gangue:** Granite, quartz porphyry. **Deposit:** Seams in quartz porphyry and granite cut by the porphyry contain small crystals of galena. **Ref:** 122, p. 127.

Welcome

(see Boston & New York under silver)

White Rose (78)

Loc: Near center W. line sec. 33, (32-36E), 3 mi. NW. of Covada. **Prop:** 1 claim. **Owner:** White Rose Mining Co. (1909). **Ore:** Lead, silver, zinc. **Ore min:** Pyrite, galena, sphalerite. **Gangue:** Quartz. **Deposit:** 2 parallel veins about 75 ft. apart cut granodiorite. Veins consist of crumbly iron-stained quartz cut by thin veinlets of ore minerals. One vein 2½ ft. wide, the other 3 ft. **Dev:** 2 shafts, one 60 ft. deep. **Assays:** Sample from ore pile on dump assayed 4.4% Pb, 3.12 oz. Ag. **Ref:** 122, p. 156. 158. 163, p. 75.

White Swan

(see Snowstorm)

White Tail (52)

Loc: Near center SW¼ sec. 36, (32-36E), ½ mi. NE. of Covada post office. **Prop:** 1 claim. **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 2 quartz veins in granodiorite, one 14 in. wide, the other smaller. **Dev:** 2 shafts, one 10 and one 8 ft. deep, open trenches. **Assays:** Sample from shaft 150 ft. W. of discovery shaft assayed 0.01 oz. Au, 1.20 oz. Ag. **Ref:** 122, p. 169. 163, p. 51.

Yellowstone (107)

Loc: Near center W½ sec. 30, (32-37E), Covada dist. **Ore:** Lead, zinc, silver. **Ore min:** Pyrite, galena, sphalerite. **Deposit:** 6- to 12-in. quartz vein in granodiorite carries fair proportions of ore minerals. **Dev:** 160-ft. adit. **Ref:** 122, p. 170.

Zearn (108)

Loc: Near center NE¼ sec. 31, (32-37E). **Ore:** Lead. **Ore min:** Pyrite, galena. **Gangue:** Quartzite, hornstone. **Deposit:** 1½-ft. lode of brecciated quartzite and hornstone with a considerable percentage of limonite and irregular grains and bunches of pyrite and galena. **Dev:** Small pit. **Ref:** 122, p. 171.

KING COUNTY**Aces Up (16)**

(see under silver)

Anderson (1)

(see under iron)

Apex (5)

(see under gold)

Baring

(see Anderson under iron)

Bear Basin (18)

(see under silver)

Bondholders Syndicate

(see Apex under gold)

Carmack (32)

(see under gold)

Cleopatra (17)

(see under silver)

Coney Basin (10)

(see under gold)

Copper Chief (29)

(see under copper)

Copper Plate

(see Seattle-Cascade under silver)

Damon and Pythias (6)

(see under gold)

Dawson (11)

Loc: NE¼ sec. 18, (25-11E), on a tributary to Miller R. **Access:** 5½ mi. by road to railroad at Berlin. **Ore:** Lead, zinc, silver, gold, copper. **Ore min:** Galena, sphalerite, chalcopryrite, arsenopyrite, pyrite. **Deposit:** Strong vein of heavy sulfides in 12-ft. leached zone. **Dev:** 600 ft. of drift. **Assays:** 0.4 to 4.06 oz. Au, 4.0 to 30.0 oz. Ag, 3.5% to 41.0% Pb, nil to 3.12% Cu. **Ref:** 147, p. 184.

Dutch Miller (28)

(see under copper)

Ellis (26)

Loc: N. side of Mt. Si, 3½ mi. from North Bend. **Ore:** Lead. **Ref:** 63, p. 42.

Galena Chief

Loc: Snoqualmie dist. **Prop:** 1 claim. **Owner:** R. L. Blackburn (1892). **Ore:** Lead. **Ore min:** Galena. **Gangue:** Quartz. **Assays:** \$18 to \$140 per ton. **Ref:** 13, p. 167.

Goat Mountain (23)

Loc: N½ sec. 31, (25-10E), on Sunday Cr., on W. side of Goat Mtn., 1 mi. S. of Sunday Lk., Buena Vista dist. **Elev:** 3,300 to 3,900 ft. **Prop:** 15 claims. **Owner:** Robert Prufer, North Bend, Wash., and George Wagner, Seattle, Wash. (1944-1952). **Ore:** Lead, copper, zinc, gold, silver, molybdenum. **Ore min:** Pyrite, chalcopryrite, arsenopyrite, galena, sphalerite, molybdenite. **Deposit:** A shear zone in granodiorite 35 ft. wide and traceable for about 600 ft. contains stringers of mineralized quartz, most of which are only a few in. wide. **Dev:** 8 open cuts. **Improv:** Cabin, blacksmith shop (1951). **Assays:** 17 asamples showed tr. to 0.16 oz. Au, 0.94 to 50.40 oz. Ag, 0.5% to 47.88% Zn, nil to 11.82% Pb, nil to 6.54% Cu. The av. is 0.08 oz. Au, 15.48 oz. Ag, 9.35% Zn, 7.08% Pb, 1.63% Cu. 6 samples showed nil to 3.24% Mo, and the av. was 0.81% Mo. **Ref:** 11-A, pp. 202-204. 158.

Guye (30)

(see under iron)

Hawkeye

(see under gold)

Ingersoll

Loc: Snoqualmie dist. **Prop:** 1 claim. **Owner:** R. L. Blackburn. **Ore:** Lead. **Ore min:** Galena. **Gangue:** Quartz. **Assays:** \$18 to \$140 per ton. **Ref:** 13, p. 167.

Jack Pot (24)

(see under zinc)

Katie

Loc: Miller R. dist. **Ore:** Lead, copper. **Ref:** 63, p. 38.

King and Kinney (12)

(see under copper)

Kinney

(see King and Kinney under copper)

Last Chance (8)

(see under gold)

Lennox (22)

(see under gold)

Lone Star (9)

(see under gold)

Lost Lode (25)

(see under molybdenum)

Lynn (13)

(see under copper)

Mohawk (4)

Loc: Sec. 27, (26-10E), on Money Cr. **Ore:** Lead, zinc. **Ref:** 158.

Mt. Logan

(see Guye under iron)

Mount Phelps (20)

(see under zinc)

Mount Si (27)

Loc: N. side of Mt. Si, 3½ mi. from North Bend, Snoqualmie dist. **Prop:** 2 claims. **Owner:** Fred Ellis and Albert Kelly. **Ore:** Lead. **Ore min:** Galena. **Deposit:** 16-in. streak of sulfides. **Dev:** 70-ft. adit. **Assays:** As high as \$20. **Ref:** 63, p. 41.

Neptune (7)

(see under gold)

Philippi Lake (21)

Loc: Sec. 5, (25-10E), Buena Vista dist. **Owner:** Philippi Lake Mining Co., Seattle, Wash. (1951). **Ore:** Lead, zinc. **Ref:** 150, p. 38.

Pythias

(see Damon and Pythias under gold)

Salmon Creek (2)

(see under gold)

Seattle-Cascade (14)

(see under silver)

Seven-Twenty

Loc: Snoqualmie dist. **Prop:** 1 claim. **Owner:** R. L. Blackburn (1892). **Ore:** Lead. **Ore min:** Galena. **Gangue:** Quartz. **Assays:** \$18 to \$140 per ton. **Ref:** 13, p. 167.

Silver Dollar and Copper Plate

(see Seattle-Cascade under silver)

Silver Star (19)

(see under silver)

Sockless Jerry

(see Last Chance under gold)

Solomon (31)

(see under gold)

Summit

(see Guye under iron)

Three S Gulch (15)

(see under zinc)

Treasury Lead (3)

Loc: Sec. 10, (26-10E), about 1 mi. S. of Baring, on Index Cr. **Prop:** 80 acres patented land. **Owner:** William R. Anderson, Baring, Wash. (1943). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite. **Deposit:** Small fractures in granodiorite mineralized in spots with galena and sphalerite. **Dev:** 80-ft. adit, several open cuts. **Ref:** 157.

Triple S

(see Seattle-Cascade under silver)

Triune

(see under gold)

KITTITAS COUNTY

Brown Bear

(see under gold)

Camp Creek (6)

(see under silver)

Cascade

(see under gold)

Cascade Mining (2)

(see under copper)

Esther and Louisa (4)

(see under silver)

Good Luck (3)

Loc: Sec. 27, (23-12E), on Gold Cr. near Snoqualmie Pass. **Ore:** Lead, silver. **Ref:** 58, p. 26. 63, p. 61.

Granite King (1)

(see under silver)

Grizzly Bear

(see under gold)

Majestic

(see under gold)

Mildred

(see under copper)

Ruby King

(see under gold)

Silver Dump (5)

(see under silver)

Standard

(see under gold)

Twin

(see under gold)

LEWIS COUNTY

Eliza (3)

Loc: On Mineral Cr. **Owner:** Mineral Creek Mining Co. (1897). **Ore:** Lead. **Ore min:** Galena. **Dev:** 100-ft. adit. **Ref:** 63, p. 116.

Goldie (4)

Loc: On Mineral Cr. **Owner:** Mineral Creek Mining Co. (1897). **Ore:** Lead. **Ore min:** Galena. **Ref:** 63, p. 116.

Mineral Creek (1)

(see under zinc)

Waterfall (2)

(see under gold)

LINCOLN COUNTY

Crystal (1)

Loc: 1,100 ft. SE. of the W. ¼ cor. sec. 21, (28-36E). **Elev:** 1,610 ft. **Access:** ¼ mi. N. of State Highway No. 22 on a poor road. **Owner:** Crystal City Mining Co., Spokane, Wash. (1955—). Crystal Mining Co. (1902). New Crystal Mining Co. (1918-1922). Lincoln Mining & Milling Co. (1934). W. F. Pierce, Miles, Wash. (1940-1944). **Ore:** Lead, silver, copper, tungsten. **Ore min:** Galena, pyrrhotite, chalcopyrite, pyrite, sphalerite, native silver. **Gangue:** Tremolite, kaolin. **Deposit:** Small replacement bodies in dolomite near its contact with granite. Chalcopyrite and pyrite also disseminated in the wall rock near the ore bodies. **Dev:** 200-ft. adit, 3 shafts, 150 ft. of drifts. **Assays:** \$40 Ag, Pb. **Ref:** 7-A, p. 9. 11, p. 27. 88, p. 22. 98, 1920-1926. 112, p. 193. 158.

Egypt (4)

Loc: At foot of Pitney Butte. **Owner:** Charles Grutt, Davenport, Wash. (1897). **Ore:** Lead. **Ore min:** Galena. **Dev:** 120-ft. crosscut. **Ref:** 63, pp. 115-116.

Elkhorn (7)

Loc: 1 mi. S. of Iron Crown property in Mill Canyon about 10 mi. SE. of Pitney Butte. **Owner:** C. L. Young, W. K. Snyder, C. G. Snyder, G. E. Brown, J. T. Young (1897). **Ore:** Lead. **Ore min:** Galena. **Dev:** 40-ft. crosscut. **Ref:** 63, p. 116.

Fouress (5)

(see under zinc)

John L. (2)

Loc: Near the site of Fort Spokane. **Owner:** Col. William Ridpath (1897). **Ore:** Lead. **Ore min:** Galena. **Dev:** 125-ft. shaft, an adit. **Assays:** A sample shipment netted \$135. **Ref:** 158.

Lincoln (3)

(see under copper)

Pitney Butte

(see Fouress under zinc)

Silver Queen

(see under silver)

Valley View (6)

(see under zinc)

OKANOGAN COUNTY

Alta

(see Chilson)

American Rand

(see Spokane under gold)

Anchor (125)

(see under silver)

Andy O.

(see Andy O'Neil under silver)

Andy O'Neil (118)

(see under silver)

Anna (123)

(see under silver)

Antimony Queen (15)

(see under antimony)

Apache (126)

(see under silver)

Apex (92)

(see under copper)

Arizona

(see Horn Silver under silver)

Arlington (84)

(see under silver)

Atkins (99)

Loc: Near SW. cor. sec. 12, (34-31E), Park City dist. **Prop:** Several claims. **Owner:** W. A. Atkins (1913). **Ore:** Lead, silver, zinc. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** 3-ft. quartz vein bedded between schist and argillite contains a 1-ft. layer irregularly banded with ore minerals. **Dev:** Shaft said to be 40 ft. deep. **Assays:** Picked sample from 1-ft. band assayed 2 oz. Ag, tr. Au. Contained est. 20% of galena and sphalerite together. **Ref:** 46, p. 180. 122, p. 102.

Ben Harrison

(see Apex under copper)

Billy Goat (3)

(see under copper)

Black Warrior

(see under gold)

Blue Grouse (75)

(see also Peacock under silver)

Loc: NE¼ sec. 30, (35-25E), Conconully dist. **Prop:** 1 claim of Peacock mine group. **Owner:** Peacock Mountain Mining & Milling Co. (1924). **Ore:** Lead, copper, silver. **Ore min:** Galena, malachite. **Gangue:** Quartz. **Deposit:** Vein in schist and gneiss consists of sheared quartz and country rock 10 ft. wide. Vein sparsely mineralized and traceable only a short distance. **Dev:** Shallow tunnel. **Ref:** 58, p. 9. 75, pp. 29, 31. 98, 1925, p. 1827. 112, p. 197.

Bolinger (16)

(see under gold)

Bridgeport

(see under silver)

Brunswick

Loc: On Mineral Hill, Conconully dist. **Prop:** 1 claim. **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** 20-in. quartz vein carrying galena. **Dev:** 120-ft. drift. **Assays:** Av. assay of ore on dump gave 45% Pb, 225 oz. Ag. **Ref:** 12, pp. 60-61. 13, p. 97.

Buckeye (50)

(see under copper)

Bunker Hill

(see Silver King)

Butcher Boy (93)

(see under gold)

Caaba

(see Kaaba)

Cabin (127)

Loc: Near NE. cor. sec. 27, (31-30E), about 2 mi. W. of Nespelem. **Owner:** Great Metals Mining & Milling Co. (1915-1926). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, sphalerite, pyrite. **Deposit:** Mineralized quartz veinlets from less than 1 to 4 in. wide along fracture zones in altered granite. Granite sparsely mineralized. **Dev:** 200-ft. shaft, 15-ft. crosscut. **Ref:** 46, p. 197. 58, p. 11. 98, 1922-1926. 112, p. 181. 122, pp. 77-78. 129, pp. 211-212.

California (19)

(see under copper)

Carl Frederick (54)

(see under silver)

Carlquist (89)

(see under antimony)

Carr (4)

(see under copper)

Castle Creek (101)

(see also Mountain Boy, Snowshoe, Summit)

Loc: Secs. 1, 11, and 12, (33-31E), Park City dist. **Prop:** 3 claims: Summit, Mountain Boy, Snowshoe. **Owner:** Tweedmont Mining & Milling Co. (1921). Colville Mining & Smelting Co. (1907). Park City Mining Co. (1908). Castle Creek Mining Co. (1914-1918). **Ore:** Lead, silver, gold, copper, zinc. **Ore min:** Galena, sphalerite, chalcocopyrite, pyrite, marcasite, tetrahedrite. **Deposit:** Lenticular quartz masses containing scattered patches of ore in a series of metamorphic rocks intruded by granitic dikes. **Prod:** 1906, 1918, 1920. **Ref:** 7, pp. 205-207. 58, p. 12. 97, 1919, p. 494; 1921, p. 427. 98, 1925, p. 1808. 112, p. 172. 116, no. 12, 1907, p. 16. 122, p. 93. 129, p. 189.

Catherine (20)
(see under silver)

Central
(see Park and Central)

Central (Trinidad) (55)
(see under silver)

Chicago (47)
(see under gold)

Chief Sunshine (57)
(see under silver)

Chilson (Alta)

Loc: S. of Palmer Mtn. on Chilson's Hill. **Prop:** 4 claims: Alta, Santa Anna, Jumbo, Sampson. **Owner:** George Yancey and the Chilson brothers (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 6-ft. vein. **Dev:** 25-ft. shaft, 15-ft. shaft. **Assays:** 42% to 60% Pb, 87 to 90 oz. Ag, tr. Au. **Ref:** 13, p. 123.

Cleopatra
(see under gold)

Continental
(see Mazama Queen under gold)

Copper King (61)

Loc: Near center sec. 31, (36-25E), adjoins Salmon River group on NW. **Access:** N. of Conconully by road. **Prop:** 1 claim. **Ore:** Lead, silver, copper, zinc. **Ore min:** Galena, sphalerite, chalcopryrite, pyrite. **Deposit:** 7-ft. quartz vein contains a mineralized zone 3 ft. wide. Quartz is honeycombed at surface but carries sulfides at depths of a few feet. **Dev:** 2 drifts, 100 ft. and 50 ft. long on N. and S. sides of a small gulch. **Assays:** Said to run about \$38 Ag, Pb, Cu. **Ref:** 46, p. 213. 75, p. 26.

Copper Zone
(see under copper)

Cornwall (6)

Loc: Sec. 24, (37-17E), 1½ mi. S. of Harts Pass. **Access:** Trail from Harts Pass. **Prop:** 1 claim. **Owner:** Charles Willman, Winthrop, Wash. (1951). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite. **Deposit:** Narrow vein. **Dev:** Short adit. **Ref:** 158.

Crescent
(see Triune under gold)

Crystal Butte (96)
(see under gold)

Curlew (21)
(see under gold)

Daisy (7)
(see under gold)

Delate (91)
(see under copper)

Denver City
(see Leadville under gold)

Dixie Queen
(see Antimony Queen under antimony)

Double Eagle
(see Dry Bone)

Dry Bone (Duke of Windsor, Double Eagle)

Loc: Park City dist. **Access:** Road. **Prop:** 4 claims: Dry Bone Silver Lode Nos. 1 to 3, Dry Bone Silver Lode Annex. **Owner:** Duke of Windsor Mines Corp. (1941). **Ore:** Lead, zinc, silver, gold. **Ore min:** Said to be chromite on the property.

Deposit: Said to be a "contact" vein intersected by a fissure vein. Vein said to have an est. length of 4,500 ft. and an av. width of 8 ft. **Dev:** 130-ft. adit; 2 shafts, 60 and 80 ft. deep. **Assays:** Said to run 14% Pb, 10% Zn, 27 to 93 oz. Ag, \$3 Au. **Ref:** 46, p. 191. 158.

Duke of Windsor
(see Dry Bone)

Eagle (22)

Loc: NE¼ sec. 23, (40-25E), Nighthawk dist. **Prop:** 1 claim. **Owner:** Eagle Mining Co. (1892). **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** 12-ft. quartz vein. **Dev:** 110-ft. adit. **Assays:** 10% to 12% Pb, 18 to 310 oz. Ag. **Ref:** 12, p. 67. 13, p. 109.

Eloise (23)
(see under silver)

Empire (39)
(see under gold)

Esther (62)

Loc: SW¼NE¼ sec. 31, (36-25E), NE. of the Copper King property. **Elev:** 3,250 ft. **Access:** N. of Conconully by road. **Prop:** 1 claim. **Ore:** Lead, copper, zinc, silver. **Ore min:** Galena, chalcopryrite, sphalerite, pyrite. **Deposit:** Quartz vein 1 to 3 ft. wide in mica schist. Sparsely mineralized. **Dev:** 74-ft. adit. **Ref:** 46, p. 202. 58, p. 20. 75, p. 26.

Eureka (102)

Loc: SE¼NE¼ sec. 12, (33-31E), Park City dist. **Access:** 1 mi. by trail from Park City road. **Prop:** 1 claim: Eureka, part of Mountain Boy group. **Ore:** Lead, silver, copper. **Ore min:** Galena, pyrite, chalcopryrite. **Gangue:** Quartz, talc. **Deposit:** Mineralized shear zone in granite. One lens of quartz and ore minerals in the zone is 18 in. thick at center and 10 ft. or more in dia. **Dev:** 200-ft. adit. **Assays:** A selected sample of as nearly pure galena as could be found assayed 41.4% Pb, 150.6 oz. Ag. **Ref:** 122, p. 95.

Eureka (32)

Loc: Secs. 17 and 18, (40-26E), Nighthawk dist. **Prop:** 2 claims: Ellamaham, San Francisco, Kelley, California, Pontiac, Utica, California Cross Course, Big Tyee. **Owner:** John McDonald and H. F. Smith (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Quartz veins 3 to 7 ft. wide. One is traceable on surface for 1,500 ft. **Dev:** 120-ft. shaft, 110-ft. shaft, 50-ft. shaft, 10-ft. shaft, 30-ft. shaft, and two 20-ft. shafts. **Assays:** Av. of 8 assays shows 7.15% Pb, 17.71 oz. Ag, tr. Au. **Ref:** 12, p. 66. 13, p. 108.

Eureka (58)

Loc: On W. slope of Mineral Hill, SE. extension of the Lone Star vein, Conconully dist. **Owner:** Richard Malone and George Gubser (1892). **Ore:** Lead, silver, copper. **Ore min:** Galena, chalcopryrite, pyrite. **Deposit:** 4-ft. quartz vein. **Dev:** 65-ft. shaft. **Assays:** Ore from shaft assayed 13% Pb, 80 oz. Ag. **Ref:** 12, p. 61. 13, p. 96.

Evening (119)
(see under silver)

Fairview

Loc: Northern extension of the Poorman prospect, Conconully dist. **Owner:** Thomas Donan et al. (1890). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Deposit:** 4-ft. quartz vein. **Dev:** 100-ft. adit. **Assays:** Old assays show tr. Au, 31 to 40 oz. Ag, 18% to 33% Pb. **Ref:** 12, p. 53. 13, p. 84.

Favorite (24)

Loc: Sec. 13, (40-25E), on E. side of the valley a short distance S. of the Nighthawk property. **Owner:** Favorite Gold

& Copper Mining Co. (1907-1926). **Ore:** Lead, silver, copper, gold. **Deposit:** Country rock is a light-gray granite. **Dev:** 850-ft. adit. **Ref:** 33, 1907, p. 559. 58, p. 21. 98, 1918-1926. 154, p. 90.

Ferris R. Ford

(see Wolframite under tungsten)

First Thought (76)

(see under silver)

Fluorspar

(see Tonasket under copper)

Four Metals (25)

Loc: Secs. 22 and 23, (40-25E), on S. slope of Little Chopaka Mtn., on Similkameen R. **Elev:** 1,800 ft. **Access:** 1 mi. by road from railroad at Nighthawk. **Prop:** 11 claims, including: Silver Queen, Shamrock, Mary, Chopaka, Daniels, Alice, Ollie. **Owner:** Border Lord Mining Corp., Seattle, Wash., has 50-yr. lease (1952) from James Stack, Oroville, Wash., and John Hancock, Okanogan, Wash. (1938-1952). **Four Metals Mining Co.** (1919-1922). **Ore:** Lead, silver, copper, zinc, tungsten. **Ore min:** Galena, chalcopyrite, pyrite, sphalerite, scheelite, bornite, molybdenite. **Gangue:** Quartz, garnet, epidote. **Deposit:** Mineralized quartz veins from a fraction of an inch to 12 ft. wide (av. 4 or 5 ft. wide) exposed for length of several thousand ft. and depth of 250 ft. in granodiorite, limestone, quartzite, argillite. Sulfides are in bands throughout the vein. Scheelite is concentrated in vein near its walls. **Dev:** 2 shafts, 110 and 150 ft. deep; 3 adits, 340, 235, and 140 ft. long; and several open cuts. **Assays:** Est. to av. \$8 Pb, Zn, Cu, Ag. Portions of vein 1½ to 2 ft. thick and 10 ft. long est. to carry 2% WO. **Prod:** 20 or more cars of high-grade ore and concentrates in period 1918-1921, 600 tons milled in 1939. **Ref:** 37, p. 34. 97, 1919, 1921, 1922, 1940. 98, 1922-1926. 129, pp. 233-236. 141, p. 22. 158.

Frankie Boy (60)

(see under silver)

General Miles (111)

Loc: N½ sec. 13, (33-31E). **Ore:** Lead, silver. **Ore min:** Argentiferous galena. **Deposit:** Geologic relations of the veins similar to those of the Mountain Boy group. **Ref:** 122, p. 96.

Gold Crown

(see Spokane under gold)

Gold Hill (41)

(see under gold)

Golden Zone (18)

(see under gold)

Goodenuff (117)

(see under silver)

Gould & Curry (128)

Loc: Near N. ¼ cor. sec. 27, (31-30E), on SE. spur of Mineral Hill. **Access:** 3 mi. W. of Nespelem, road for at least 2 mi. **Ore:** Lead, silver, gold. **Ore min:** Galena, sphalerite, pyrite. **Gangue:** Quartz. **Deposit:** 3- to 15-in. lode in granite. Lode largely quartz but 50% sulfides in places. Wall rock is sericitized 1 ft. on each side of vein and is slightly mineralized. **Dev:** 40-ft. adit and 130-ft. adit with short crosscuts aggregate 200 ft. **Assays:** Sample somewhat richer in Pb than av. from 50-ton ore pile on dump showed \$0.40 Au, 30.18 oz. Ag, 20% Pb. **Ref:** 46, pp. 195-196. 122, pp. 76-77.

Grand Summit

(see Palmer Summit under gold)

Grandview

(see Leadville under gold)

Great Divide (120)

(see under silver)

Great Metals

(see Anchor under silver)

Great Western (115)

Loc: NE¼ sec. 4, (31-30E), 5 mi. NW. of Nespelem. **Access:** A short distance N. of the Nespelem-Omak road. **Prop:** 3 claims. **Owner:** Mr. Ecklund, Nespelem, Wash. (1938). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite, magnetite. **Gangue:** Rhodonite, vesuvianite, epidote, garnet. **Deposit:** Small body of sedimentary rock surrounded and metamorphosed by granite. **Dev:** Shaft more than 40 ft. deep from which levels are said to have been run. **Assays:** Sorted ore on dump roughly est. to contain 6% of sphalerite and galena together. **Ref:** 46, pp. 198-199. 88, p. 34. 122, pp. 81-82.

Grover Cleveland

Loc: On Mineral Hill, Conconully dist. **Ore:** Lead, silver, copper. **Ore min:** Galena. **Deposit:** 4-ft. vein of galena ore. **Dev:** 2 shafts, 30 ft. and 50 ft. deep. **Assays:** Av. assays from bottom of the 2 shafts were 50 oz. Ag, 60% Pb, 5% Cu. **Ref:** 12, p. 60. 13, p. 97.

Grubscher

(see Gubser)

Gubser (Grubscher) (63)

Loc: Near SW. cor. sec. 31, (36-25E), on W. side of Salmon Cr. 1½ mi. from Conconully. **Elev:** 2,400 ft. **Owner:** Sunny Peak Mining Co., Spokane, Wash. (1948—). Lone Star Consolidated Mining Co. (1929). American Mines & Smelter Corp. (1929). **Ore:** Lead, zinc, copper, tungsten, gold, silver. **Ore min:** Pyrite, galena, sphalerite, chalcopyrite, scheelite. **Gangue:** Quartz. **Deposit:** 2 shear zones cut by the tunnel, one at 370 ft. from the portal, another at 670 ft. Sparsely mineralized quartz veins in the shear zones are from 8 in. to 2 ft. wide. **Dev:** 900-ft. adit and two 50-ft. drifts. **Ref:** 37, p. 44. 69, p. 15. 106, 12/3/28, p. 19; 8/2/29. 158.

Hanford (103)

Loc: Near SW. cor. SE¼ sec. 12, (33-31E), Park City dist. **Owner:** Judge Hanford (1913). **Ore:** Lead, silver. **Ore min:** Galena, pyrite. **Deposit:** Porous iron-stained quartz vein 2 or 3 ft. wide in argillite carries some ore minerals. **Dev:** Inclined shaft. **Assays:** Picked sample from dump showing 30% or more galena assayed 25.9% Pb, 20.48 oz. Ag. **Ref:** 122, p. 96.

Hanks (2)

(see under copper)

Hargrove

(see Silver King)

Hatfield

(see Wolframite under tungsten)

Heath (12)

Loc: Center S½ sec. 18, (33-22E), near Rattlesnake property. **Ore:** Lead. **Ore min:** Pyrite, arsenopyrite, galena. **Deposit:** Quartz vein 0 to 6 in. wide in a 6- to 24-in. band of gouge in altered volcanic rock. **Ref:** 158.

Hercules (112)

Loc: NE¼ sec. 14, (33-31E), Park City dist. **Elev:** 3,600 ft. **Prop:** 1 of 4 patented claims in the Ramore group. **Owner:** Ramore Mining Co. (1908-1919). Park City Mining Co. (1908-1918). **Ore:** Lead, silver, copper, zinc. **Ore min:** Galena, sphalerite, chalcopyrite, pyrite, pyrrhotite, tetrahedrite. **Gangue:**

Quartz, fluorite. **Deposit:** 5-ft. shear zone along contact of granite and metamorphic series. Ore minerals disseminated in the zone. **Dev:** 430-ft. adit, 180-ft. drift. **Prod:** No large shipments reported. **Ref:** 7, pp. 207-208. 33, 1908, p. 1103. 98, 1918, p. 119. 112, p. 198. 114, no. 5, 1909, pp. 74-75. 122, p. 98.

Hiawatha (43)

(see under gold)

Hidden Treasure (Sunshine) (17)

(see under gold)

Hilo

(see St. Paul under silver)

Homestake (64)

Loc: SW $\frac{1}{4}$ sec. 31, (36-25E), a few hundred ft. SW. of Salmon River property. **Elev:** 2,800 ft. **Access:** N. of Conconully by road. **Prop:** 1 patented claim. **Owner:** Salmon River Mining & Smelting Co. (1902-1915). **Ore:** Lead, silver, gold. **Ore min:** Galena, arsenopyrite. **Deposit:** 11-ft. quartz vein. **Dev:** 175-ft. adit, 42-ft. crosscut, 29-ft. shaft. **Assays:** 18 to 56 oz. Ag, 32% to 36% Pb, tr. to 2 oz. Au. 100 tons of ore sold prior to 1902 returned \$1,500 in Ag and Pb. **Prod:** Attempts to concentrate ore in an old mill on Salmon Cr. failed. 400 tons of ore produced prior to 1902. **Ref:** 12, p. 56. 13, p. 90. 63, p. 93. 75, pp. 26-27. 88, p. 33.

Horn Silver (35)

(see under silver)

Idaho

(see under silver)

Independence

(see under silver)

Independent (113)

Loc: Near center N $\frac{1}{2}$ sec. 23, (33-31E), Park City dist. **Owner:** J. B. Cook (1953). **Ore:** Lead, zinc, silver. **Ore min:** Pyrite, galena, sphalerite. **Gangue:** Quartz, sheared argillite. **Deposit:** 5-ft. shear zone in argillite silicified and sparsely mineralized. Granite crops out not far from workings. Sulfides occur as disseminations and bunches up to 2 ft. in dia. **Dev:** 60-ft. adit and large open pit or glory hole. **Assays:** Representative sample of one of larger bunches assayed 1.32 oz. Ag. **Ref:** 122, pp. 99-100.

John Judge

(see Leadville under gold)

Josie

(see Hiawatha under gold)

Julia (38)

Loc: SW $\frac{1}{4}$ sec. 26, (40-25E), on E. side of Similkameen R., Nighthawk dist. **Owner:** John McDonald and H. F. Smith (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 7-ft. quartz vein in mica schist. **Dev:** 150-ft. shaft, 118-ft. adit. **Assays:** Samples from dump assayed \$100 to \$150 per ton. **Ref:** 12, p. 66. 13, p. 107. 63, p. 101.

Jupiter

(see Tip Top under copper)

Jupiter

Loc: Conconully dist. **Owner:** Viola Copper-Gold Mining Co. (1906-1918). **Ore:** Lead. **Ref:** 33, 1907, p. 1145; 1908, p. 1401. 98, 1918, p. 145. 105, no. 6, 1906, p. 469.

Kaaba (Caaba, Kaaba-Texas) (26)

Loc: Secs. 13, 14, and 23, (40-25E). **Elev:** 1,500 ft. **Access:** 1 mi. S. of Nighthawk on macadam road. **Prop:** 27 claims, 7 of which are patented. Also 3 patented lots. **Owner:** Kaaba

Silver-Lead Mines, Inc. (1948-1951). Mines Operating Co. (1918). Kaaba Mines Co. (1921-1926). General Metals Co., Ltd. (1929-1931). Kaaba-Texas Mining Co. (1938-1947). **Ore:** Lead, silver, zinc, copper, gold, tungsten. **Ore min:** Galena, chalcopryrite, sphalerite, molybdenite, pyrite, scheelite, marcasite. **Gangue:** Quartz, calcite, gouge. **Deposit:** Persistent but low-grade quartz vein av. 10 ft. in width along a lamprophyre-granite contact. Ore minerals banded along footwall and bunched on hanging wall. **Dev:** Inclined shaft 300 ft. long with 1,100 ft. of drifts on 4 levels, over half on 3rd level. **Improv:** 150-ton flotation mill (1952). **Assays:** Ore milled from 1943 to 1946 av. \$4.03 gross. Av. assay is 1.2% Pb, 0.5% Zn, 0.1% Cu, 2.25 oz. Ag. **Prod:** 1915, 1918, 1920, 1929. 95,045 tons of ore milled from 1943 to 1949, 1950. **Ref:** 12, p. 66. 13, p. 108. 37, pp. 34-35. 46, pp. 216-219. 54, p. 2. 63, p. 101. 68, p. 11. 97, 1915, 1918, 1920, 1929, 1944-1949. 98, 1920-1926. 106, 7/2/31; 7/21/32. 108, 6/42, p. 28. 112, p. 192. 129, pp. 228-231. 154, p. 93. 158.

Kaaba-Texas

(see Kaaba)

Kankakee (121)

(see under copper)

Kansas (77)

(see under copper)

Key (65)

(see under silver)

Kimberly (46)

Loc: Sec. 11, (39-26E), Wannacut Lk. dist., $\frac{1}{2}$ mi. S. of the old post office at Golden. **Owner:** Walter A. Hart, Oroville, Wash. (1952). Kimberly Mining Co. (1915). **Ore:** Lead, silver, gold, copper, zinc. **Ore min:** Abundant galena, sphalerite, pyrite, chalcopryrite. **Deposit:** Quartz vein along contact of altered diorite and slate. Ore occurs as lenses in the vein as much as 40 to 50 ft. long and 1 to 5 ft. wide. **Dev:** 140-ft. inclined shaft with drifts on the 60-, 80-, and 100-ft. levels. **Assays:** Better ore said to assay 10% to 20% Pb, \$6 to \$15 Au, 60 to 70 oz. Ag. **Prod:** Has produced. **Ref:** 54, pp. 3, 22. 154, pp. 96-97. 158.

King Solomon

Loc: Okanogan County. **Ore:** Lead. **Prod:** 1924. **Ref:** 97, 1924, p. 293.

Lady of the Lake (73)

(see under silver)

Lakeview

(see Prize)

Last Chance (78)

(see under silver)

Lead Horse (5)

Loc: Sec. 16, (38-20E), on S. side of Billy Goat Peak. **Elev:** 6,000 ft. **Access:** 3 mi. by trail from Eightmile Cr. road. **Prop:** 1 claim. **Owner:** Fred Floyd, Twisp, Wash. (1952). Mr. Kenney (1943). **Ore:** Lead, copper. **Ore min:** Galena, cerussite, anglesite, malachite. **Gangue:** Barite. **Deposit:** A bleached zone in altered volcanic rock extends intermittently for 1,500 ft. 2 faults along the W. end of the zone are 6 to 8 in. wide and contain a few irregular masses of galena. **Dev:** Open cut. **Ref:** 158.

Leadville (51)

(see under gold)

Leonora (79)

Loc: Sec. 30, (35-25E), on S. slope of Peacock Hill, Conconully dist. **Prop:** 1 claim. **Owner:** J. T. McDonald and J. C.

Robinson, Ellensburg, Wash. (1892). **Ore:** Lead, silver. **Ore min:** Galena, stephanite, pyrite. **Deposit:** 5-ft. vein with a 4-in. paystreak. **Dev:** 80-ft. shaft, surface trenching. **Assays:** Old assays show 17% to 25% Pb, as much as 350 oz. Ag. **Ref:** 12, p. 53. 13, p. 82.

Little Chopaka (Six Eagles) (27)

Loc: NE¼ sec. 23, (40-25E), on W. side of Similkameen Valley, 1 mi. S. of Nighthawk. **Prop:** 11 unpatented claims. **Owner:** Hope Mining Co. (1919). Little Chopaka Mining Co. **Ore:** Lead, silver, gold. **Ore min:** Pyrite, chalcocopyrite, sphalerite, galena. **Gangue:** Quartz, sericite. **Deposit:** 1- to 3-ft. quartz vein occupies a fault zone in granite. **Dev:** 2,000-ft. adit, 200-ft. shaft. **Assays:** Ore said to assay \$5 Au, Ag, Pb. **Ref:** 154, pp. 90-91.

Lone Pine (33)

(see under silver)

Lone Star (Star) (59)

(see also Gubser under lead, and Mineral Hill under silver)

Loc: NE¼ sec. 36, (36-24E), on W. side of Salmon Cr. **Access:** 1½ mi. N. of Conconully by road. **Prop:** Comprised of Jumbo, Golden Crown, Lone Star, Gubser, Mineral Hill properties (1929-1935). **Owner:** Chris Bernhart, Wallace, Idaho (1943-1947). Leased by T. D. French, Conconully, Wash. (1945). Syndicate Development Co. (1915). American Mines & Smelter Corp. (1929). Lone Star Consolidated Mining Co. (1929). British American Mines & Smelter Corp. (1935). Lone Star Mining & Development Co. (1931-1935). **Ore:** Lead, copper, gold, silver, zinc. **Ore min:** Chalcocopyrite, pyrite, galena, stephanite. **Deposit:** Sparsely mineralized quartz veins 18 in. to 20 ft. wide in granite. **Dev:** Adit consisting of 125 ft. of crosscut and 290 ft. of drift. Also 185-ft. crosscut with 100 ft. of drifts, 375-ft. inclined shaft. **Assays:** 7 old assays show 30% to 65% Pb, 39.6 to 140 oz. Ag, 0.1 to 1.6 oz. Au. 7 samples from a 1½-ft. to 10-ft. width assayed in 1943 showed tr. to 0.005 oz. Au, 1.85 to 7.35 oz. Ag, 0.1% to 1.1% Zn, 0.1% to 0.6% Pb, and 0.01% WO₃. **Prod:** Reportedly shipped a carload of ore in 1913. Produced 1943. **Ref:** 12, p. 55. 13, p. 89. 50, p. 7. 63, p. 93. 75, p. 27. 97, 1913, p. 798. 104, 11/15/35, p. 23. 105, no. 26, 1913, p. 1007. 106, 12/3/28, p. 19; 8/2/29; 5/21/31; 6/18/31. 130, p. 63. 157.

Maquae

(see under gold)

Marguerite (80)

(see under copper)

Mazama Queen (8)

(see under gold)

Mineral Hill (Washington Consolidated, Seven Devils)

(66)

(see under silver)

Minnehaha (67)

(see under silver)

Mohawk

Loc: Sec. 31, (36-25E), on Mineral Hill N. of the Grover Cleveland property, Conconully dist. **Prop:** 1 claim. **Owner:** Conconully Mines, Inc., Yakima, Wash. (1954—). Henry Lawrence et al. (1892). **Ore:** Lead, silver, copper. **Ore min:** Galena, chalcocopyrite, pyrite. **Deposit:** Quartz vein 1½ to 3 ft. wide. **Dev:** 200-ft. adit, 50-ft. adit. **Assays:** Av. assays along the vein show 5% to 7% Pb, 3.10% to 3.12% Cu, 62 to 65 oz. Ag. **Ref:** 12, p. 60. 13, p. 96. 63, p. 94.

Molson

(see Poland China under gold)

Monitor (68)

Loc: Near NW. cor. sec. 31, (36-25E), on E. side of Salmon Cr. N. of Key property, Conconully dist. **Elev:** 5,500 ft. **Owner:** Robert Hargrove, Conconully, Wash. (1892). **Ore:** Lead, silver, copper, zinc. **Ore min:** Galena, sphalerite, chalcocopyrite, pyrite. **Gangue:** Quartz. **Deposit:** Vein in schist av. 2 ft. in width. Sparsely mineralized. **Dev:** 200-ft. adit, 50-ft. shaft. **Assays:** 30 to 35 oz. Ag, 17% to 18% Pb. **Ref:** 13, p. 94. 46, p. 208. 75, p. 27.

Monterey (95)

(see under copper)

Montgomery

(see Tonasket under copper)

Mother Lode

(see Crystal Butte under gold)

Mountain Boy (104)

(see also Castle Creek, Snowshoe, Summit, Three L's)

Loc: NW¼NW¼ sec. 12, (33-31E), on NW slope of Old Glory Mtn. **Elev:** 3,920 ft. **Access:** 1 mi. NE. of Park City by road. **Prop:** 1 claim: Mountain Boy, one of Mountain Boy group. **Owner:** Castle Creek Mining Co. (1918-1922). Colville Mining & Smelting Co. (1907). Park City Mining Co. (1908-1918). Tweedmont Mining & Milling Co. (1921). **Ore:** Lead, silver. **Ore min:** Galena, sphalerite, chalcocopyrite, pyrite, tetrahedrite. **Gangue:** Quartz, calcite. **Deposit:** Mineralized quartz lenses ½ in. to 18 in. wide and 2 in. to 30 ft. long along planes of schistosity in shale and limestone. **Dev:** 4 adits, 2 on ore. One adit 155 ft. long. **Assays:** 4 or 5 carloads of ore shipped said to av. \$60 per ton, presumably Ag, Pb. **Prod:** 4 or 5 carloads reported. **Ref:** 7, p. 207. 33, 1908, p. 1103. 46, pp. 183-185. 97, 1907, p. 474; 1921, p. 427. 98, 1918-1925. 105, 1/5/07, p. 11. 116, no. 12, 1907, p. 16. 122, pp. 94-95. 129, pp. 189, 192.

Multnomah (116)

(see under copper)

Myrtle

(see St. Paul under silver)

Nevada (81)

(see under silver)

New Deal

(see Antimony Queen under antimony)

Nighthawk (28)

Loc: Sec. 13, (40-25E) and sec. 18, (40-26E), on E. wall of Similkameen Valley, a few hundred yd. S. of the post office at Nighthawk. **Prop:** 65 unpatented claims. **Owner:** Nighthawk Mines, Inc., Chelan Wash. (1941). Nighthawk Mining Co. (1907-1909). Chloride Queen Mining Co. (1932-1934). **Ore:** Lead, silver. **Ore min:** Pyrite, galena. **Gangue:** Quartz. **Deposit:** Irregular mineralized bodies of quartz occur along the margins of a brecciated zone in granite. The zone is 100 ft. wide at one place. **Dev:** 1,770-ft. adit and several minor underground workings. **Prod:** Has produced. **Ref:** 58, p. 48. 114, no. 5, 1909. 154, pp. 89-90. 158.

Number One (30)

Loc: Sec. 23, (40-25E), on S. face of Little Chopaka Mtn. W. of the Little Chopaka group, 1½ mi. S. of Nighthawk. **Prop:** Group of claims. **Ore:** Lead, silver, gold, copper. **Ore min:** Galena. **Deposit:** Quartz vein 3 to 12 ft. wide occupies a fault zone along the contact of granite with slate and conglomerate. **Dev:** 200-ft. adit; several shafts, deepest one (60 ft.) connects with the adit. **Assays:** Av. assay somewhat less than \$10 per ton. Ag content may increase to water table. **Ref:** 154, pp. 91-92.

- Okanogan Belle (69)**
(see under silver)
- Okanogan Free Gold (36)**
(see under gold)
- Olentangy (90)**
(see under gold)
- Opal**
(see under gold)
- Oversight (129)**
Loc: Near center N. line sec. 27, (31-30E), ½ mi. E. of Gould & Curry prospect, Nespelem dist. **Ore:** Lead, silver, gold. **Ore min:** Ore on dump very similar to that of Gould & Curry. **Deposit:** Vein said to be similar to Gould & Curry prospect. **Dev:** 40-ft. shaft, inaccessible 1913. **Ref:** 58, p. 52. 122, p. 78.
- Overtop**
(see Poland China under gold)
- Owasco**
(see Okanogan Free Gold under gold)
- Palmer Mountain Tunnel (42)**
(see under gold)
- Palmer Summit (48)**
(see under gold)
- Park and Central (105)**
Loc: Near SE¼ sec. 12, (33-31E), Park City dist. **Prop:** Several patented claims. **Ore:** Lead, silver. **Ore min:** Argenterous galena. **Deposit:** Geologic relations of the veins similar to those of the Mountain Boy group. **Ref:** 114, no. 5, 1909. 122, p. 96.
- Peacock (74)**
(see under silver)
- Peoria (14)**
(see under gold)
- Phil Sheridan**
(see Sheridan under silver)
- Pinnacle (52)**
(see under gold)
- Pittsburg (122)**
(see under silver)
- Poland China (88)**
(see under gold)
- Poorman (106)**
(see under zinc)
- Poorman**
Loc: Between Ruby and Peacock Mtns. Western extension of the Idaho claim. **Owner:** Thomas Donan, John Clunan, W. H. Singleton, and H. W. Fairweather (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Deposit:** 4-ft. quartz vein with a 3-in. paystreak. **Dev:** 75 ft. of workings. **Assays:** 6 assays show tr. Au, 31 to 40 oz. Ag, 18% to 33% Pb. **Ref:** 12, p. 53. 13, p. 84.
- Premier**
(see under gold)
- Prize (Lakeview) (37)**
Loc: Near NW. cor. sec. 36, (40-25E), on E. side of the valley. **Elev:** 3,200 ft. **Access:** 3 mi. S. of Nighthawk. **Prop:** 12 unpatented claims. **Owner:** Prize Mining Co. (1905-1906). **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, pyrite, chalcopryrite, malachite, azurite, limonite. **Gangue:** Quartz. **Deposit:** 15-in. vein enclosed in greenstone and schist is com-
- posed of quartz and intermixed fragments of country rock. **Dev:** 2 adits. **Prod:** 1906, 1913. **Ref:** 97, 1905, p. 336; 1906, p. 367; 1913. 114, no. 5, 1909. 154, pp. 93-94. 159, p. 136.
- Pyrargyrite**
(see Ruby under silver)
- Rainbow (49)**
(see under gold)
- Ramore (114)**
Loc: Near center sec. 14, (33-31E), 1,600 ft. NE. of Hercules mine, Park City dist. **Elev:** 3,950 ft. **Prop:** 1 patented claim of 4 in the Ramore group. **Owner:** Ramore Mining Co. (1909-1918). **Ore:** Lead, silver, gold, copper, zinc. **Ore min:** Sphalerite, galena, pyrite, chalcopryrite, pyrrhotite, tetrahedrite. **Gangue:** Quartz, fluorite, calcite. **Deposit:** 10-ft. ore body along contact of granite and metamorphics. Chiefly quartz in which sulfides are disseminated. **Dev:** A 440-ft. adit from which have been driven a 600-ft. crosscut, several short crosscuts, a drift, and 45-ft. winze. **Assays:** 4 assays show 2.7% to 9.6% Pb, 13 to 59 oz. Ag, 0.05 to 0.07 oz. Au. **Prod:** No large shipments of ore reported. **Ref:** 7, pp. 207, 208-209. 46, pp. 188-190. 105, 1/21/05, p. 46. 112, p. 198. 114, no. 5, 1909, pp. 74-75. 122, p. 99.
- Rattlesnake (13)**
(see under gold)
- Reedy**
(see Antimony Queen under antimony)
- Republic (82)**
(see also Peacock under silver)
Loc: NE¼ sec. 30, (35-25E), near summit of E. ridge of Peacock Mtn., Conconully dist. **Elev:** 4,050 ft. **Prop:** 1 claim of Peacock mine group. **Owner:** Peacock Mountain Mining & Milling Co. (1924). **Ore:** Lead, silver, copper. **Ore min:** Pyrite, galena, malchite. **Gangue:** Quartz. **Deposit:** Quartz vein 2 to 20 ft. wide in schist and sheared dike rocks near granite intrusive. **Dev:** Shaft. **Ref:** 58, p. 58. 75, pp. 29, 31. 98, 1925, p. 1827. 112, p. 197.
- Rich Bar (34)**
(see under copper)
- Ruby (31)**
(see under silver)
- St. Paul (130)**
(see under silver)
- Salmon River (70)**
(see under silver)
- San Francisco**
Loc: On Similkameen R., near Nighthawk. **Prop:** 3 claims. **Owner:** Frank Grogan (1897). **Ore:** Lead, gold. **Ore min:** Galena. **Dev:** 60-ft. adit. **Ref:** 63, p. 101.
- Security (40)**
(see under copper)
- Seven Devils**
(see Mineral Hill under silver)
- Sharp**
(see Silver King under copper)
- Sharp and Balthus (107)**
(see under zinc)
- Shelby**
(see under silver)
- Sheridan (98)**
(see under silver)

Sherman (Standard) (87)

Loc: SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 20 and sec. 29, (34-26E). **Elev:** 1,500 ft. **Access:** 3 mi. from railroad at Omak by unsurfaced road. **Prop:** 15 unpatented claims, including: Lizzie Bell, Standard, Brook. **Owner:** Sherman Mining Co., C. C. Sherman, Omak, and William Sherman, Tacoma, Wash. (1946-1952) leasing to Telesite Mining Corp., Seattle, Wash. (1952). **Ore:** Lead, zinc, silver, gold. **Ore min:** Pyrite, arsenopyrite, galena, sphalerite. **Gangue:** Breccia, hydrothermally altered rock. **Deposit:** A 2-ft. breccia zone along the contact of granite and rhyolite is sparsely mineralized. **Dev:** 100-ft. inclined shaft, 40-ft. incline, 15-ft. open cut. **Assays:** 10 samples showed 0.01 to 0.08 oz. Au, nil to 17.9 oz. Ag, 0.1% to 3.6% Pb, 2.5% to 22.0% Zn. **Ref:** 157. 158.

Silver Cliff (132)

(see under silver)

Silver King (9)

(see under copper)

Silver King (Bunker Hill, Hargrove) (71)

Loc: SW $\frac{1}{4}$ sec. 31, (36-25E). **Elev:** 2,700 ft. **Access:** 1 mi. N. of Conconully on Salmon Cr. road. **Prop:** 13 claims. **Owner:** Wm. Hargrove, Conconully, Wash. (1943). **Ore:** Lead, silver, zinc, copper. **Ore min:** Galena, sphalerite pyrite, scheelite, chalcopyrite, tetrahedrite. **Deposit:** Mineralized quartz veins up to 3 ft. wide in granite. **Dev:** 240-ft. adit, 100-ft. inclined shaft, 130-ft. drift, 2 other adits several hundred ft. in length, and several open cuts. **Prod:** Test shipment of lead-silver ore in 1918. **Ref:** 37, p. 43. 51, p. 10. 58, p. 11. 97, 1918, p. 506. 111, p. 5.

Silver Mountain (53)

(see under silver)

Silver Point (124)

(see under copper)

Silver Seal

(see Antimony Queen under antimony)

Silver Star

(see under silver)

Silver Star

(see Silver Mountain under silver)

Six Eagles

(see Little Chopaka)

Snowshoe (108)

(see also Castle Creek, Mountain Boy, Summit)

Loc: Sec. 12, (33-31E), on NW. slope of Old Glory Mtn. **Elev:** 4,225 ft. **Access:** 1½ mi. by road from Park City. **Prop:** 1 claim: Snowshoe, part of Mountain Boy group. **Owner:** Castle Creek Mining Co. (1918-1922). Colville Mining & Smelting Co. (1907). Tweedmont Mining & Milling Co. (1921). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite, pyrite, limonite. **Deposit:** 2- to 3-ft. quartz vein along a granite-limestone contact. **Dev:** 180-ft. adit, discovery hole, abandoned adit. **Ref:** 7, p. 206. 46, pp. 183-185. 97, 1921, p. 427. 98, 1922, p. 1623; 1925, p. 1808. 122, pp. 93, 94. 129, p. 189.

Sonny Boy (85)

(see under silver)

Spokane (American Rand) (44)

(see under gold)

Spokane (Gold Crown) (10)

(see under gold)

Standard

(see Sherman)

Star

(see Lone Star)

Submarine

(see Lone Pine under silver)

Summit (109)

(see also Castle Creek, Mountain Boy, Snowshoe)

Loc: Sec. 11, (33-31E). **Elev:** 4,360 ft. **Access:** 1 mi. NE. of Park City by road. **Prop:** 1 claim: Summit, part of Mountain Boy group. **Owner:** Castle Creek Mining Co. (1918-1922). Colville Mining & Smelting Co. (1907). Tweedmont Mining & Milling Co. (1921). **Ore:** Lead, silver, copper, zinc, gold. **Ore min:** Galena, pyrite, chalcopyrite, sphalerite, tetrahedrite, malachite, azurite, anglesite. **Gangue:** Quartz, gouge. **Deposit:** Shear zone 18 in. wide in granite contains mineralized lenses of quartz along with much gouge. **Dev:** 350-ft. adit, 1,000-ft. adit, 100-ft. adit, 150-ft. adit, surface cuts. **Assays:** 50-ton shipment said to av. 30% Pb, 20 oz. Ag. Ore from stope in adit said to assay 0.06 to 0.12 oz. Au, 35 to 90 oz. Ag, 30% to 40% Pb. **Prod:** Reportedly 50 tons of galena. **Ref:** 7, pp. 205-206. 46, pp. 183-185. 97, 1907, p. 474; 1921, p. 427. 98, 1922, p. 1637; 1925, p. 1808. 114, no. 12, 1907, p. 16. 122, p. 94. 129, pp. 190-191.

Summit (29)

(see under silver)

Sunshine

(see Hidden Treasure under gold)

Sunshine Chief

(see Chief Sunshine under silver)

Three L's (110)

(see also Mountain Boy)

Loc: Near N. line sec. 12, (33-31E), Park City dist. **Prop:** Part of Mountain Boy group. **Ore:** Lead, silver. **Ore min:** Galena. **Gangue:** Quartz. **Deposit:** Open pits expose veinlets of quartz and galena in a 6-ft. shear zone in granite. Veinlets 1 in. to 2 in. wide. **Dev:** 200-ft. adit, open pits. **Ref:** 122, p. 96.

Tip Top (131)

(see under copper)

Tomlinson

(see under copper)

Tonasket (56)

(see under copper)

Tough Nut (72)

(see under silver)

Triangle

(see Hidden Treasure under gold)

Trinidad

(see Central under silver)

Triune (45)

(see under gold)

Twisp View (11)

(see under gold)

Uncle Sam

(see under silver)

Viola

Loc: Conconully dist. **Owner:** Viola Copper-Gold Mining Co. (1906-1908). **Ore:** Lead. **Ref:** 33, 1907, p. 1145; 1908, p. 1401. 98, 1918, p. 145. 105, no. 16, 1906, p. 469.

War Eagle

(see under silver)

Wasco (100)

(see under silver)

Washington

(see under silver)

Washington Consolidated

(see Mineral Hill under silver)

West King

(see under silver)

Whitestone (97)

(see under gold)

Wolframite (1)

(see under tungsten)

Woo Loo Moo Loo (86)

(see under silver)

Wyoming (83)

(see under copper)

Yakima (94)

(see under copper)

PACIFIC COUNTY

Naselle (1)

Loc: E½ sec. 2, (11-8W), under foundation of splash dam on E. Fk. Naselle R. **Ore:** Lead. **Deposit:** A 3- to 4-in. stringer of galena. **Ref:** 158.

PEND OREILLE COUNTY

Ace Ten Spot (96)

(see under zinc)

D. Aldrich

(see Lead King)

Alger and McCullough (117)

(see under copper)

American Zinc, Lead and Smelting Co.

(see under zinc)

Auburn (26)

Loc: Secs. 25 and 26, (40-43E), Metaline dist. **Access:** Highway crosses the property. **Prop:** 18 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Slight showings of lead and zinc largely covered by overburden. **Dev:** Open cuts, stripping. **Ref:** 29, p. 46.

Bailey-Hanson

(see Red Top)

Baker City (114)

(see under silver)

Barefoot (110)

(see under silver)

Bead Lake (119)

(see also Kootenai Conquest and Comstock)

Loc: NE¼ sec. 22, (32-45E), Newport dist. **Prop:** Several claims, including: Comstock, Conquest. **Owner:** Hoover Mining Co. (1930-1942). Conquest Consolidated Mining Co. (1907). Bead Lake Gold Copper Mining Co. (1908-1924). Bead Lake Mining Co. (1924-1926). **Ore:** Lead, copper, silver. **Ore min:** Galena, chalcopryrite, pyrrhotite, sphalerite, pyrite, arsenopyrite. **Gangue:** Quartz, barite, calcite, siderite. **Deposit:** Irregular veins in quartzite intruded by diorite. **Ref:** 33, 1908, p. 360. 73, pp. 41-44. 97, 1918, 1923, 1928, 1930, 1938. 98, 1922, 1925, 1926. 106, no. 9, 1920, pp. 6-7. 112, 1918, p. 167. 113, 7/1/37, p. 16. 129, pp. 75-79.

Beaty (42)

Loc: Secs. 26 and 27, (40-43E), Metaline dist. **Access:** Some distance from road. **Prop:** 6 unpatented claims, among them the Ethel, Evelyn, Ellen, Mary. **Owner:** B. T. Beaty, Metaline, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Replacement zone in silicified limestone is about 4 ft. wide. **Dev:** 100 ft. of adit and shafts, open cuts. **Ref:** 29, pp. 53-54.

Bella May (99)

(see under zinc)

Berkin

(see Wolf Creek)

Blue Bucket (97)

(see under zinc)

Blue Jim (105)

(see under silver)

Bluebird

(see Dumont under zinc)

Bob Tail and Four Flush (90)

(see under zinc)

Boundary (20)

Loc: Secs. 2 and 11, (40-43E), Metaline dist. **Access:** Road. **Prop:** 15 unpatented claims. **Owner:** J. D. Nelson and associates, Metaline Falls, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Slightly mineralized silicified limestone. **Dev:** Numerous cuts and trenches, mostly caved. **Ref:** 29, pp. 50-51.

Bromide

(see La Sota under silver)

Bunker Hill

(see Lead Hill under zinc)

Buzzell

(see Lucky Strike under zinc)

Campbell (123)

(see under copper)

Caribou (1)

Loc: Sec. 8, (40-43E), Metaline dist. **Access:** 3 mi. from road. **Prop:** 12 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Sparsely mineralized quartz stringers in a fracture zone. **Dev:** Open cuts, caved in 1941. **Ref:** 29, p. 53.

Clark

(see Josephine under zinc)

Cliff (11)

(see under zinc)

Coffin (107)

(see under zinc)

Columbia Lead & Zinc Mining Co. (9)

(see under zinc)

Comstock (120)

(see also Bead Lake)

Loc: N½NE¼ sec. 22, (32-45E), above and E. of the Fractional Key property. **Elev:** 3,000 ft. **Access:** 8½ mi. by road NW. of Newport. **Prop:** 1 claim: Comstock. **Owner:** Newport Mining & Leasing Co., Spokane, Wash. (1951). Bead Lake Gold Copper Mining Co. (1917-1924). Hoover Mining Co. (1937). **Ore:** Lead, silver, copper, zinc. **Ore min:** Galena, chalcopryrite, a little sphalerite. **Gangue:** Quartz, calcite, siderite, barite. **Deposit:** Zones in diorite near its contact with quartzite contain irregular mineralized quartz veins. Several zones are exposed by the workings. **Dev:** 325-ft. adit, 100-ft. adit, 530-ft.

adit, 100-ft. adit, several surface cuts. **Assays:** A carload of ore shipped in 1930 returned \$1,650. **Prod:** Ore shipped in 1917, 1922, 1923, 1927, 1929, 1937. **Ref:** 73, pp. 43-44. 129, pp. 75-80. 139, pp. 46-49. 141, p. 22.

Conquest

(see Kootenai Conquest)

Corzine (108)

Loc: Sec. 16, (38-42E), Metaline dist. **Access:** Near road. **Prop:** 40-acre State lease. **Owner:** L. D. Corzine (1941). **Ore:** Lead, silver, zinc. **Deposit:** Quartz vein 2 to 3 ft. wide. **Dev:** 40-ft. adit, 16-ft. shaft. **Ref:** 29, p. 40.

Cougar (75)

(see under copper)

Dan Fieldner

(see under silver)

Davenport-Troyer

(see Gem under iron)

Diamond Eagle (93)

(see under zinc)

Diamond R. (94)

(see also Metaline Mining & Leasing Co. under zinc)

Loc: Near center sec. 30, (39-43E), 1 mi. W. of old Bella May workings, Metaline dist. **Elev:** 3,400 ft. **Prop:** 1 patented claim. **Owner:** Metaline Mining & Leasing Co., Spokane, Wash. (1936-1952). **Diamond R. Mining Co.** (1918-1924). **Riverview Mining Co.** (1931). **Century Zinc Co.** (1932). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, smithsonite, cerussite, wulfenite. **Gangue:** Dolomite, coarse calcite. **Deposit:** Small irregular streaks of galena in brecciated dolomitic limestone. **Dev:** An adit reported to contain about 200 ft. of drifts. **Prod:** A carload of ore shipped in 1918. **Ref:** 29, p. 31. 73, pp. 66-67. 98, 1922, p. 1643; 1925, p. 1813. 106, 11/19/31. 112, p. 176. 114, no. 5, 1909, p. 54. 128, p. 68. 129, pp. 86-87.

Doherty

Loc: Metaline dist. **Ore:** Lead. **Prod:** 1925. **Ref:** 97, 1925, p. 559.

Dreadnaught-Emily

(see Hoage under zinc)

Dumont (29)

(see under zinc)

Eagle (33)

(see under zinc)

Eagle

(see Ries)

Elliot (74)

Loc: Secs. 18 and 19, (39-44E), Metaline dist. **Access:** 1 mi. from road. **Prop:** Several claims. **Owner:** Formerly Pat Elliot. Believed abandoned (1941). **Ore:** Lead, silver. **Deposit:** Fracture zone in slate is impregnated with narrow irregular quartz stringers which carry lead and silver. **Dev:** Number of open cuts. **Ref:** 29, p. 36.

Emily

(see Hoage under zinc)

Eureka (31)

(see under zinc)

Fairview Copper

(see Skippy and Queen Bess)

Fairview-Hoosier (95)

(see under zinc)

Falls View (44)

Loc: Sec. 35, (40-43E), Metaline dist. **Owner:** Silver-Lead Mining Co. (1907). **Ore:** Lead. **Ref:** 116, no. 12, 1907, p. 16.

Flusey

(see Flusey-Hoopala)

Flusey-Hoopala (Flusey) (25)

(see also Pend Oreille Mines & Metals Co. under zinc)

Loc: E½SW¼ sec. 26, (40-43E), on W. bank of Pend Oreille R., Metaline dist. **Elev:** 2,000 ft. **Access:** About 9 mi. from Metaline Falls on Z Canyon road. **Prop:** 2 patented claims: Flusey, Hoopala. **Owner:** Pend Oreille Mines & Metals Co. (1944). **Ore:** Lead, zinc, silver, copper. **Ore min:** Galena, sphalerite, marcasite, pyrite, chalcopyrite, bornite. **Gangue:** Cherty dolomitic limestone. **Deposit:** Mineralized shear zones in dolomitic limestone exposed on surface for 300 ft. **Dev:** Several surface cuts and 2 adits. **Assays:** Max. values 0.68 oz. Ag, 29.8% Pb, 11.9% Zn. **Ref:** 29, p. 35. 73, pp. 62-63. 98, 1926, p. 1580. 114, no. 5, 1909, p. 54. 128, p. 68.

Flying Squirrel

(see Giant-Flying Squirrel under zinc)

Four Flush

(see Bob Tail and Four Flush under zinc)

Galena Hill

(see Whoopie-Galena Hill under zinc)

Gardner (2)

(see under zinc)

Gem (85)

(see under iron)

General MacArthur (Glass) (126)

Loc: Center sec. 21, (31-45E), Newport dist. **Access:** Highway crosses the property. **Prop:** 4 unpatented claims. **Owner:** Charles I. Barker and associates, Newport, Wash. (1941). **Ore:** Lead, silver, gold, copper, zinc. **Ore min:** Galena, chalcopyrite, pyrite. **Deposit:** A fracture zone as much as 6 ft. wide is impregnated with mineralized quartz. **Dev:** 700 ft. of adits and shaft, partially caved. **Assays:** Handpicked sample assayed \$31.50 per ton. **Ref:** 29, p. 70. 139, p. 43.

Georgia Rose-Texas Slim (23)

(see under zinc)

Giant-Flying Squirrel (12)

(see under zinc)

Gilt Top (27)

(see under zinc)

Glass

(see General MacArthur)

Gold Arrow

(see Ries)

Gold Coin-Hardtack (115)

(see under silver)

Gold Hill (60)

Loc: Secs. 12 and 13, (40-44E), Metaline dist. **Access:** ¼ mi. from road. **Prop:** 11 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Slight mineralization in the form of a replacement deposit. **Dev:** Open cuts. **Ref:** 29, p. 57.

Golden Anchor

(see Ries)

Grandview mine (82)

(see under zinc)

Grandview Mines, Inc.

(see under zinc)

Gray Eagle

(see Hawkeye-Gray Eagle-Last Chance under copper)

Gray Goose**Loc:** Newport dist. **Ore:** Lead. **Prod:** 1922. **Ref:** 97, 1922, p. 254.**Haliday (36)****Loc:** Center S½ sec. 30 and center N½ sec. 31, (40-44E), Metaline dist. **Access:** 1 mi. from road. **Prop:** 1 patented claim: Hill No. 2. **Owner:** Moraldus Pierce (1941). **Ore:** Lead, silver. **Deposit:** Mineralized fracture zone impregnated with narrow quartz stringers. **Dev:** 125 ft. of adits, several open cuts. **Ref:** 29, p. 47.**Hanley (4)**

(see under zinc)

Hansen (130)

(see under gold)

Hanson

(see Red Top)

Hardtack

(see Gold Coin-Hardtack under silver)

Hawkeye-Gray Eagle-Last Chance (124)

(see under copper)

Hemlock (67)**Loc:** Sec. 15, (40-44E), Metaline dist. **Access:** 1 mi. from road. **Prop:** 5 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Small showings of lead and zinc. **Ref:** 29, p. 55.**Hidden Treasure (59)**

(see also Grandview Mines, Inc. and Metaline Mining & Leasing Co. under zinc)

Loc: Secs. 11 and 12, (40-44E), Metaline dist. **Access:** Forest Service road. **Prop:** 10 unpatented claims. **Owner:** Grandview Mines, Inc. and Metaline Mining & Leasing Co. are jointly leasing from Thomas Dougherty and associates, Metaline Falls, Wash. (1952). **Ore:** Lead, zinc. **Ore min:** Sphalerite, galena. **Deposit:** Replacement deposit in silicified limestone has been traced by cuts and trenches for 2,500 ft. or more along the strike. **Dev:** Considerable trenching and a number of open cuts. **Improv:** Cabin. **Assays:** 21 samples taken over the mineralized area assayed tr. to 16.49% Pb, tr. to 6.0% Zn. **Prod:** None. Some ore in dumps. **Ref:** 29, p. 60. 158.**Hoage (13)**

(see under zinc)

Hoosier

(see Fairview-Hoosier under zinc)

Hortense (89)

(see also Josephine under zinc)

Loc: NE¼SW¼ sec. 16, (39-43E), Metaline dist. **Prop:** Part of Josephine property. **Owner:** Pend Oreille Mines & Metals Co. (1930). **Ore:** Lead. **Prod:** 1930. **Ref:** 97, 1930, p. 674.**Huffman**

(see Mule Deer)

Independence (125)

(see under silver)

Ira Troyer

(see Troyer)

Iron Cap (63)**Loc:** Secs. 14 and 15, (40-44E), Metaline dist. **Access:** 1¼ mi. by trail from good road. **Prop:** 10 unpatented claims. **Owner:** Miss E. Thompson and associates, Ione, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Replacement deposit in silicified limestone has been exposed by trenching for a length of 2,000 ft. and as much as 40 ft. in width. **Dev:** Numerous open cuts and trenches, 300 ft. of diamond drilling. **Ref:** 29, p. 56.**Iron Crown (45)****Loc:** Sec. 35, (40-43E), Metaline dist. **Owner:** Silver-Lead Mining Co. (1907). **Ore:** Lead. **Ref:** 116, no. 12, 1907, p. 16.**Jenny Dee-Snowshoe (65)****Loc:** Secs. 14, 22, and 23, (40-44E), Metaline dist. **Access:** Road. **Prop:** 7 unpatented claims. **Owner:** Messrs. Johnson and Bailey, Metaline Falls, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Replacement deposit in silicified limestone has been exposed for a length of 60 ft. and a width of 10 ft. **Dev:** Numerous open cuts, stripping. **Ref:** 29, p. 57.**Jim Creek (106)****Loc:** SW¼NW¼ sec. 9, SE¼ sec. 10, and sec. 15, (38-42E), Smackout Pass area. **Elev:** 4,600 ft. **Access:** 8 mi. by road to railroad at Ione. **Prop:** 24 claims. **Owner:** Jim Creek Mines, Inc., Spokane, Wash. (1950—). **Ore:** Lead, silver, zinc. **Ore min:** Galena, sphalerite, pyrite. **Gangue:** Dolomitic marble. **Deposit:** Strong mineralization in marble near granite contact, in irregular zones 6 to 48 in. wide. **Dev:** Open cuts. 35-ft. shaft, 178-ft. shaft with workings on the 50-ft. and 150-ft. levels. **Improv:** 2 cabins, garage, blacksmith shop (1952). **Assays:** Owner reports av. 15% Pb, 15% Zn, 4 oz. Ag, presumably on picked samples. **Ref:** 133, p. 35. 158.**Jordan****Loc:** Metaline dist. **Ore:** Lead, zinc. **Ref:** 106, 8/20/31, p. 11.**Josephine (87)**

(see under zinc)

K. K.**Loc:** Metaline dist. **Ore:** Lead. **Prod:** 1925. **Ref:** 97, 1925, p. 559.**Katydid**

(see Ries)

Key Fraction (121)

(see also Alger and McCullough)

Loc: SE¼ sec. 15 and NE¼ sec. 22, (32-45E). **Access:** 8 mi. by road from railroad at Newport. **Prop:** 1 patented claim, part of Alger and McCullough group. **Owner:** Ed Alger, Newport, Wash. (1941-1951) leasing to Newport Mining & Leasing Co. (1951). **Ore:** Lead, silver, copper. **Ore min:** Galena, chalcopryrite. **Gangue:** Quartz, calcite, siderite. **Deposit:** Irregular branching quartz veins and stringers in diorite near quartzite contact. **Dev:** 300-ft. adit, 762-ft. adit. **Ref:** 73, pp. 44-45. 139, pp. 40-41.**King Tut (Velvet Lode) (54)****Loc:** Secs. 2 and 11, (40-44E), Metaline dist. **Access:** ½ mi. by trail from good road. **Prop:** 4 unpatented claims. **Owner:** Harry Sanborne, Metaline, Wash. (1941). **Ore:** Lead, zinc, silver. **Deposit:** Replacement deposit in silicified limestone has been traced by open cuts for a length of 500 ft. and a width of 8 ft. **Dev:** 90 ft. of adit, several open cuts and trenches. **Assays:** Ore shipped yielded 83.4% Pb, 2.3 oz. Ag. **Prod:** Some crude lead ore shipped. **Ref:** 29, pp. 57-58.**Kootenai Conquest (Bead Lake, Conquest) (118)**

(see also Bead Lake)

Loc: Near center SE¼ sec. 22, (32-45E). **Elev:** 2,750 to 2,950 ft. **Access:** 8 mi. by road from railroad at Newport. **Prop:**

About 170 acres of patented land and 2 claims. **Owner:** Newport Mining & Leasing Co., Metaline Falls, Wash. (1951). Conquest Gold & Copper Mining & Milling Co. (1898). Conquest Consolidated Mining Co. (1907). Bead Lake Gold Copper Mining Co. (1908-1926). Bead Lake Mining Co. (1924-1926). Hoover Mining Co. (1930-1942). W. E. Allen (1942). Pend Oreille County (1944-1948). **Ore:** Lead, copper, silver. **Ore min:** Galena, chalcopryrite, arsenopyrite, pyrite. **Gangue:** Quartz, sericite, calcite, siderite. **Deposit:** Irregular quartz veins and stringers in diorite near its contact with quartzite. One vein 3 to 9 ft. wide. **Dev:** 200-ft. shaft, 800-ft. adit, 250-ft. adit. **Assays:** 1.03 oz. Ag, 3.39% Pb, 0.79% Cu. 32.2 tons shipped av. 6.2 oz. Ag per ton, 23.65% Pb. **Prod:** Ore shipped in 1917, 1922, 1923, 1927, 1929, 1930 (32.2 tons ore), 1937 (5 tons ore). **Ref:** 29, p. 64. 58, pp. 15, 31. 73, pp. 41-43. 129, pp. 75-80. 139, pp. 46-49. 141, p. 22. 157. 158.

Kroll

(see Blue Bucket under zinc)

Kurlew (55)

Loc: Secs. 2 and 11, (40-44E). **Prop:** 4 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Small showings of lead and zinc. **Dev:** Open cuts. **Ref:** 29, p. 58.

Lakeview (16)

(see under zinc)

La Sota (Bromide, Silver Crest) (109)

(see under silver)

La Sota (Troyer)

(see Troyer)

Last Chance (37)

Loc: Secs. 25, 26, 35, and 36, (40-43E), Metaline dist. **Access:** Highway passes the property. **Prop:** 6 unpatented claims. **Owner:** J. W. Bustua, Metaline Falls, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** A mineralized and silicified limestone body has been exposed for a length of 60 ft. and a width of 10 ft. **Dev:** 25-ft. shaft, numerous open cuts and trenches. **Ref:** 29, p. 46.

Last Chance (57)

Loc: Sec. 11, (40-44E), Metaline dist. **Prop:** 5 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Small spotty showings of lead and zinc. **Dev:** Open cuts. **Ref:** 29, p. 60.

Last Chance

(see Hawkeye-Gray Eagle-Last Chance under copper)

Lead Hill (61)

(see under zinc)

Lead Hill Extension (71)

(see under zinc)

Lead King (D. Aldrich) (40)

Loc: Near center sec. 27, (40-43E). **Elev:** 2,700 ft. **Access:** About 9 mi. from Metaline Falls on Z Canyon road. **Prop:** 10 claims, including: Lead King, Robert E. Lee, Twin Lakes, Alameda, Mocking Bird, D. Aldrich. **Owner:** Pend Oreille Mines & Metals Co. (1928-1945). Lead King Mines Co. (1915-1926). Pend Oreille Lead & Zinc Co. (1928). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite. **Gangue:** Dolomite, quartz. **Deposit:** Mineralized quartz and mineralized dolomite breccia. Mineralization is low grade and is mostly in upper 100 ft. of the carbonate rocks. **Dev:** 191-ft. adit, shallow shafts, 2 short adits, open cuts, trenches, 2,200 ft. of diamond drill holes. **Prod:** Small shipments 1917-1918, 1925-1926. **Ref:** 5, pp. 197-198. 7, pp. 48-49. 29, p. 34. 73, pp. 60-62. 97, 1917, 1918, 1925, 1926. 98,

1925, p. 1822; 1926, p. 1586. 113, no. 11, 1937, p. 7. 128, p. 70. 158.

Lead Metal (62)

(see under iron)

Lead Queen (Scandinavian) (5)

Loc: Center S½ sec. 11, (40-43E), Metaline dist. **Elev:** 3,000 ft. **Access:** 12 mi. from Metaline Falls on Crescent Lk. road. **Prop:** 12 unpatented claims. **Owner:** Scandinavian Pend Oreille Mining Co. (1943). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite. **Gangue:** Calcite, quartz. **Deposit:** Silicified zone in dolomitic limestone. Churn drill holes 800 ft. apart have shown mineralization. **Dev:** Several open cuts and trenches, churn drill holes. **Prod:** Has produced. **Ref:** 29, pp. 48-49. 97, 1917, p. 503. 106, 8/4/31, p. 4. 128, p. 74. 158.

Little Noisy (79)

(see under zinc)

Lloyd (128)

Loc: Sec. 10, (30-45E), Newport dist. **Access:** Road. **Prop:** 1 unpatented claim. **Owner:** Dan Lloyd, Newport, Wash. (1941). **Ore:** Lead, silver, copper, zinc. **Deposit:** Said to be a mineralized quartz vein about 18 in. wide. **Dev:** 22-ft. shaft, 50 ft. of trenching. **Ref:** 29, p. 68.

Lookout (30)

Loc: Sec. 30, (40-44E), Metaline dist. **Access:** Near road. **Prop:** 2 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Slight mineralization. **Dev:** Open cuts. **Ref:** 29, p. 47.

Lucky Boy (56)

Loc: Sec. 10, (40-44E), Metaline dist. **Access:** 4 mi. from road. **Prop:** 4 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Sparsely mineralized replacement deposit. **Dev:** Open cuts. **Ref:** 29, p. 53.

Lucky Boy Rex (28)

(see under zinc)

Lucky Strike (46)

(see under zinc)

MM (17)

Loc: Sec. 1, (40-43E), Metaline dist. **Access:** Highway crosses the property. **Prop:** 11 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Slight showings of lead and zinc along a replacement zone. Largely hidden by heavy overburden. **Dev:** Open cuts mostly in overburden. **Ref:** 29, p. 50.

McCullough

(see Alger and McCullough under copper)

Mack (68)

Loc: Sec. 15, (40-44E), Metaline dist. **Access:** 4 mi. from road. **Prop:** 11 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Slight showings of lead and zinc. **Dev:** Open cuts, partially caved. **Ref:** 29, p. 54.

Mammoth

(see Morning and Mammoth)

May Thomas

Loc: Metaline dist. **Owner:** Drumheller Investment Co. (1937). **Ore:** Lead, zinc. **Ref:** 113, 6/17/37, p. 7.

Maybeso (69)

Loc: Sec. 15, (40-44E), Metaline dist. **Prop:** 2 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Said to be small values in lead and zinc. **Dev:** Open cuts. **Ref:** 29, p. 57.

Meade (47)

Loc: SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 35, (40-43E), Metaline dist. **Access:** 1 mi. W. of State Highway No. 6 on Slate Cr. road. **Prop:** 8 claims. **Owner:** A. L. Lakin and Ed Tanghe, Metaline Falls, Wash. (1941). **Ore:** Lead, copper. **Ore min:** Pyrite, marcasite, galena, chalcopyrite. **Gangue:** Calcite, quartz. **Deposit:** Ore minerals occur as bunches along bedding planes in dolomite. **Dev:** 2 adits, each about 110 ft. long. **Ref:** 5, p. 200. 7, p. 51. 158.

Metaline Contact (91)

(see under zinc)

Metaline Falls (83)

(see also Pend Oreille Mines & Metals Co. under zinc)

Loc: SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 21, (39-43E), Metaline dist. **Elev:** 2,000 ft. **Access:** $\frac{1}{4}$ mi. N. of town of Metaline Falls. **Prop:** 1 claim. **Owner:** Pend Oreille Mines & Metals Co., Spokane, Wash. (1943). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite. **Gangue:** Dolomite. **Deposit:** Galena and sphalerite are disseminated in shattered dolomite above a thrust fault contact with slate. **Dev:** 150-ft. shaft, diamond drilling. Ore also exposed in the intake tunnel and surge tank excavation for the power plant in 1937. **Ref:** 128, p. 75.

Metaline Metals (72)

(see under zinc)

Metaline Mining & Leasing Co. (101)

(see under zinc)

Meteor (116)

(see under silver)

Midas

(see Ries)

Mockingbird (43)

Loc: NE. cor. sec. 34, (40-43E), Metaline dist. **Owner:** Drumheller Investment Co. (1937). **Ore:** Lead, zinc. **Ref:** 73, pp. 60-62. 113, 6/17/37, p. 7.

Mohawk (81)

(see also Grandview Mines, Inc. under zinc)

Loc: SE $\frac{1}{4}$ sec. 15, (39-43E), Metaline dist. **Prop:** Part of Grandview group. **Ore:** Lead. **Prod:** 1926. **Ref:** 73, pp. 59-60. 97, 1926, p. 468.

Morning and Mammoth (80)

Loc: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 15, (39-43E), Metaline dist. **Elev:** 2,100 ft. **Access:** About 4 mi. from Metaline Falls on Slate Cr. road. **Owner:** Metaline Metals Co. (1931-1941). Morning Mining Co. (1907-1909). Morning Mammoth Concentrator Co. (1908). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite. **Gangue:** Dolomite, silicified carbonate rock, paligorskite. **Deposit:** Disseminations in breccia. **Dev:** 372-ft. adit and 135 ft. of drifts accessible. **Assays:** 8% Pb, 4 oz. Ag. **Ref:** 46, p. 8. 114, no. 5, 1909, p. 56. 116, no. 10, 1907, p. 18; no. 3, 1908, p. 57; no. 5, 1908, p. 116; no. 6, 1908, p. 139. 128, pp. 71-72.

Mount Pisgah (129)

Loc: Sec. 16, (30-45E), Newport dist. **Prop:** State land. **Owner:** State of Washington. **Ore:** Lead, silver, copper, zinc. **Deposit:** Said to be a mineralized quartz vein 18 in. wide. **Ref:** 29, p. 67.

Mountain Goat (15)

Loc: Sec. 2, (40-43E), Metaline dist. **Access:** 1 mi. from road. **Prop:** 10 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Slight mineralization of silicified limestone largely hidden by heavy overburden. **Dev:** Open cuts, mostly in overburden. **Ref:** 29, p. 51.

Mule Deer (Huffman) (112)

Loc: W. center sec. 15, (35-44E), 4 mi. E. of Ruby, Newport dist. **Elev:** 3,050 ft. **Access:** 3 mi. by road from the Panhandle lumber camp. **Prop:** 80-acre State land lease and 80-acre lease from Panhandle Lumber Co. **Owner:** New Deal Mining Co. (1943). Mule Deer Mining Co. (1937). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, sphalerite, pyrite. **Gangue:** Quartz. **Deposit:** Described as a pipe-like ore body in sheared and altered quartz monzonite. **Dev:** Shallow adit and 30-ft. shaft. **Improv:** 50-ton flotation mill installed in 1938. **Ref:** 29, p. 64. 46, p. 39. 104, 5/15/37, p. 31. 128, pp. 64-65. 158.

Nelroe (38)

Loc: Secs. 26 and 35, (40-43E), Metaline dist. **Access:** 1 mi. by road from main highway. **Prop:** 6 unpatented claims. **Owner:** J. D. Nelson, Metaline Falls, Wash. (1949). **Ore:** Lead, silver. **Deposit:** Replacement deposit in limestone exposed by trenches for about 200 ft. **Dev:** 90-ft. adit, trenches, open cuts. **Ref:** 29, p. 45.

O. K. (98)

(see under silver)

Ore Hill (103)

(see under zinc)

Oriole (92)

(see under zinc)

Pacnor Mines

(see under zinc)

Pat (77)

Loc: Sec. 32, (39-44E), Metaline dist. **Access:** Road. **Prop:** 5 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver, gold. **Deposit:** Sparsely mineralized narrow quartz stringers in a fracture zone. **Dev:** 300 ft. of partially caved adits. **Ref:** 29, p. 48.

Pay Day (10)

(see under zinc)

Pearson (102)

(see under zinc)

Peewee (8)

(see under zinc)

Pend Oreille Iron, Lead, and Zinc (18)

(see under zinc)

Pend Oreille Mines & Metals Co. (86)

(see under zinc)

Pindle (131)

(see under copper)

Pine Cone-Z Canyon (24)

(see under zinc)

Poorman and Sullivan Lake (78)

Loc: SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 17, (38-44E), E. of S. end of Sullivan Lk., Metaline dist. **Prop:** 2 unpatented claims: Poorman, Sullivan Lake. **Owner:** J. F. Moore and C. D. Smeltzer, Spokane, Wash. (1945). **Ore:** Lead. **Ore min:** Galena. **Gangue:** Quartz. **Deposit:** Narrow sporadic lenses of galena along a fracture in schist. **Dev:** 200-ft. adit. **Ref:** 157.

Prouty (76)

(see under silver)

Queen Bess

(see Skippy and Queen Bess)

Red Crown (48)

Loc: Sec. 35, (40-43E), Metaline dist. **Access:** 1 mi. from road. **Prop:** 9 unpatented claims. **Owner:** E. O. Dressel and associates, Metaline Falls, Wash. (1941). **Ore:** Lead, zinc, iron. **Deposit:** Replacement of silicified limestone. Zone has been exposed for 200 ft. on the surface and about 40 ft. in width in the adits. **Dev:** 200 ft. of adits, 400 ft. of stripping, numerous open cuts. **Assays:** Low-grade ore. **Ref:** 29, pp. 43-44.

Red Top (Bailey-Hanson) (52)

(see also Grandview Mines, Inc. and Metaline Mining & Leasing Co. under zinc)

Loc: Secs. 1 and 2, (40-44E), Metaline dist. **Elev:** 4,500 ft. **Access:** Forest Service road. **Prop:** 19 unpatented claims. **Owner:** Grandview Mines, Inc. and Metaline Mining & Leasing Co. are jointly leasing from Raymond Bailey and associates, Metaline Falls, Wash. (1952). **Ore:** Lead, zinc. **Ore min:** Sphalerite, galena, smithsonite. **Gangue:** Dolomite. **Deposit:** Replacement deposit in silicified dolomite has been exposed in open cuts for 1,500 ft. along the strike. **Dev:** 150 ft. of adits, numerous open cuts. **Improv:** Several buildings. **Assays:** Ore shipped said to av. 40% Pb. **Prod:** 5 tons of crude lead ore. **Ref:** 29, p. 59. 104, 3/30/32, p. 28. 128, pp. 63-64. 133, p. 30. 158.

Ries (Gold Arrow, Eagle, Midas, Golden Anchor, Katydid) (127)

Loc: N $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 12, (31-45E), on W. bank of Pend Oreille R. **Elev:** 2,200 ft. **Access:** 2 mi. by road N. of Newport. Milwaukee railroad crosses the property. **Prop:** 2 claims: Eagle, Owl; and 40 acres of deeded land. **Owner:** Hartman A. Ries, Metaline Falls, Wash. (1941). Ries Mining Co. (1919-1933). Gold Arrow Mines, Ltd. (1936). **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, pyrite, some chalcocopyrite. **Deposit:** Mineralized quartz vein in quartz diorite porphyry near its contact with quartzite. Vein said to be 6 ft. wide. **Dev:** 80-ft. shaft on Owl claim and 215-ft. shaft on Eagle claim, also a 40-ft. adit. **Improv:** 3 buildings (1935). **Assays:** A carload of ore shipped in 1922 to Bunker Hill smelter assayed 0.16 oz. Au, 15.5 oz. Ag, 9.8% Pb. **Prod:** 3 carloads of ore said to have been shipped. **Ref:** 29, p. 65. 73, pp. 46-47. 97, 1919, p. 294; 1922, p. 254. 98, 1920-1926. 104, 6/15/33, p. 18; 9/15/36, p. 34. 129, pp. 80-81. 141, p. 22. 158.

Riverside (49)

(see also Pend Oreille Mines & Metals Co. under zinc)

Loc: W $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 35, (40-43E), in vertical cliffs on E. side of Pend Oreille R., Metaline dist. **Elev:** 2,000 ft. **Owner:** Pend Oreille Mines & Metals Co. (1943). Silver-Lead Mining Co. (1907). Riverside Mining Co. (1909). Metaline Metals Co. (1932). **Ore:** Lead. **Ore min:** Galena, pyrite, chalcocopyrite. **Gangue:** Iron oxides, coarse calcite, gypsum, native sulfur. **Deposit:** Fissure veins in dolomite, one exposed for vertical distance of 250 ft. has width of 2 to 8 ft. **Ref:** 5, pp. 199-200. 7, pp. 50-51. 114, no. 5, 1909, p. 54. 116, no. 12, 1907, p. 16. 128, p. 74.

Riverview (39)

(see under zinc)

Robert E. Lee (50)

Loc: NW $\frac{1}{4}$ sec. 35, (40-43E), $\frac{1}{2}$ mi. W. of mouth of Slate Cr., Metaline dist. **Access:** 1 mi. of trail from Ledbetter Lk. road. **Prop:** 5 patented claims, including Robert E. Lee. **Owner:** Sullivan Mining Co., Wallace, Idaho (1950-1952). San Ramone Mining Co. (1924). Drumheller Investment Co. (1937). Columbia Lead & Zinc Mining Co. (1943). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite. **Gangue:** Dolomite. **Deposit:** Disseminated sphalerite and galena in dolomite. Mineralized zone has been

traced for 2,000 ft. along the strike. **Dev:** Short inclined shaft, a few open pits. **Ref:** 29, p. 54. 69, p. 14. 73, p. 63. 113, 6/17/37, p. 7. 128, p. 70.

Rocky Creek (111)

(see under silver)

Saddle (22)

(see under zinc)

Salmon (58)

Loc: Sec. 11, (40-44E), Metaline dist. **Access:** 1 mi. from road. **Prop:** 4 unpatented claims. **Owner:** Messrs. Bailey and Johnson, Metaline Falls, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Replacement deposit in silicified limestone has an exposed length of 20 ft. and a width of 2 ft. **Dev:** Open cuts and trenches. **Ref:** 29, p. 58.

Sanborn (53)

Loc: Near international boundary W. of Bailey-Hanson group, Metaline dist. **Ore:** Lead. **Ore min:** Galena. **Deposit:** High-grade streak of galena. **Ref:** 128, p. 64.

Scandinavian

(see Lead Queen)

Schallenberg (Schellenberg) (73)

Loc: 2 $\frac{1}{2}$ mi. N. of Metaline Falls on E. side of Pend Oreille R., approx. sec. 11, (39-43E). **Elev:** 2,550 ft. **Prop:** May be part of present holdings of Pend Oreille Mines & Metals Co. **Ore:** Lead. **Gangue:** Dolomite breccia. **Deposit:** Mineralized dolomite breccia along fault planes. **Dev:** Surface trenches 1 to 5 ft. deep and 6 to 100 ft. long. **Prod:** Small shipment in 1918. **Ref:** 5, pp. 198-199. 7, pp. 49-50. 97, 1918, p. 507.

Schellenberg

(see Schallenberg)

Silver Crescent (21)

Loc: Sec. 11, (40-43E), Metaline dist. **Access:** Road. **Prop:** 2 unpatented claims. **Owner:** J. D. Nelson, Metaline Falls, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Replacement of silicified limestone. A slightly mineralized area is exposed for 200 ft. **Dev:** 90 ft. of adits, numerous open cuts. **Ref:** 29, p. 37.

Silver Crest

(see La Sota under silver)

Silverado

(see Z Canyon)

Skippy and Queen Bess (Fairview Copper) (113)

Loc: Sec. 23 and SW $\frac{1}{4}$ sec. 14, (34-44E), Newport dist. **Elev:** 4,000 ft. **Access:** Road. **Prop:** 2 unpatented claims. **Owner:** Jack Gallagher and associates, Newport, Wash. (1941-1948). **Ore:** Lead, silver, copper, gold. **Deposit:** Upper adit exposes 14 ft. of quartz vein 10 to 12 in. wide highly mineralized with argentiferous galena. Lower adit shows breccia zone with quartz and galena. **Dev:** 105-ft. adit and caved 80-ft. adit. **Assays:** Picked sample assayed 18% Pb, 7 oz. Ag, 4% Cu, \$1.50 Au. **Ref:** 29, pp. 68-69. 139, pp. 53-54.

Slate Creek

(see Whoopie-Galena Hill under zinc)

Snowbird and Stanley (122)

Loc: NE $\frac{1}{4}$ sec. 22, (32-45E), Newport dist. **Access:** $\frac{1}{4}$ mi. from road, by which it is 8 mi. to railroad at Newport. **Prop:** 2 patented claims: Snowbird, Stanley. **Owner:** Newport Mining & Leasing Co. leasing from Ed Alger, Newport, Wash. (1951). Newport Mining Co. (1919-1926). Dr. Sutherland, Newport, Wash. (1941). **Ore:** Lead, silver, copper, arsenic. **Ore min:** Galena. **Deposit:** Mineralized quartz veins 4 to 6 in.

- wide. **Dev:** 620-ft. crosscut short of the vein, and a 25-ft. adit. **Ref:** 29, p. 69. 98, 1925, p. 1825; 1926, p. 1589. 139, p. 54. 157. 158.
- Snowshoe**
(see Jenny Dee-Snowshoe)
- Snyder**
(see Gold Coin-Hardtack under silver)
- Sphinx**
(see Torrential-Sphinx under zinc)
- Stanley**
(see Snowbird and Stanley)
- Star (34)**
Loc: Sec. 28, (40-44E), Metaline dist. **Access:** 2 mi. from road. **Prop:** 4 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Sparse disseminations of lead and zinc. **Dev:** Open cuts, partially caved. **Ref:** 29, p. 54.
- Star (32)**
Loc: Sec. 29, (40-44E), Metaline dist. **Access:** ¾ mi. from road. **Prop:** 4 unpatented claims. **Owner:** George Wehnert, Metaline Falls, Wash. (1949). **Ore:** Lead, zinc. **Deposit:** Replacement deposit in limestone has been exposed on the surface for a length of 100 ft. and a width of 20 ft. **Dev:** Open cuts, trenches. **Ref:** 29, p. 59.
- Star (Campbell)**
(see Campbell under copper)
- Star (Independence)**
(see Independence under silver)
- Sterling (100)**
(see under zinc)
- Sullivan (88)**
(see also Josephine under zinc)
Loc: NW¼ sec. 16, (39-43E), Metaline dist. **Prop:** Part of Josephine property. **Owner:** Sullivan Mining Co. (1924). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite. **Prod:** 1926. **Ref:** 73, p. 59. 97, 1926, p. 468; 1930, p. 674.
- Sullivan Lake**
(see Poorman and Sullivan Lake)
- Sunshine (70)**
Loc: Secs. 16 and 21, (40-44E), Metaline dist. **Access:** Road. **Prop:** 10 unpatented claims. **Owner:** E. O. Dressel and associates, Metaline Falls, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Fracture in dolomite impregnated with quartz stringers and mineralized with lead and zinc. Mineralized zone has been exposed for a length of 100 ft. and a width of 4 ft. **Dev:** Open cuts, trenches. **Ref:** 29, p. 55.
- Tamarack (51)**
Loc: Sec. 2, (40-44E), Metaline dist. **Prop:** 5 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, zinc. **Deposit:** Slight showings of lead and zinc. **Dev:** Open cuts. **Ref:** 29, p. 59.
- Texas Slim**
(see Georgia Rose-Texas Slim under zinc)
- Tom Cat (3)**
(see under zinc)
- Torrell**
Loc: NW. of Ione. **Ore:** Lead, zinc. **Ref:** 108, 9/51, p. 79.
- Torrential-Sphinx (6)**
(see under zinc)
- Troyer (Davenport-Troyer, Gem)**
(see Gem under iron)
- Troyer (La Sota, Ira Troyer) (66)**
Loc: Near center sec. 22, (40-44E), on NE. bank of Slate Cr., Metaline dist. **Elev:** 3,750 ft. **Access:** Road. **Owner:** F. P. La Sota and E. P. Jones, Metaline Falls, Wash. (1951—). Ira Troyer (1943). **Ore:** Lead, zinc. **Ore min:** Galena. **Gangue:** Jasperoid. **Deposit:** Mineralized zone 50 ft. in dia. in brecciated dolomite directly below Ledbetter slate. **Dev:** Diamond drill holes. **Ref:** 104, 7/15/34, p. 27. 128, p. 64. 133, p. 36. 158.
- Twin Lakes (14)**
Loc: Secs. 22 and 27, (40-43E), Metaline dist. **Access:** Road. **Prop:** 3 unpatented claims. **Owner:** James Ehle and associates, Metaline, Wash. (1941). **Ore:** Lead, zinc. **Deposit:** Replacement deposit in silicified limestone has been exposed in several places along the strike for a distance of 200 ft. **Dev:** 40-ft. shaft, open cuts, trenches. **Ref:** 29, p. 58.
- Uncas (35)**
(see under zinc)
- Velvet**
Loc: Metaline dist. **Owner:** Northwest Explorations, Inc. (1931). **Ore:** Lead, zinc. **Ref:** 106, 9/17/31.
- Velvet Lode**
(see King Tut)
- Washington (Washington Rock) (84)**
(see also Pend Oreille Mines & Metals Co. under zinc)
Loc: NE¼ sec. 21, (39-43E), on W. bank of Pend Oreille R., on top of Washington Rock. **Elev:** 2,700 ft. **Access:** ¼ mi. by road from the town of Metaline Falls. **Prop:** Group of claims including the Washington. **Owner:** Pend Oreille Mines & Metals Co. (1943). Lead King Mines Co., Inc. (1924-1926). Lehigh Portland Cement Co. (1935-1936). **Ore:** Lead, zinc, silver, iron. **Ore min:** Limonite, galena, pyrite, sphalerite. **Gangue:** Dolomite. **Deposit:** Said to be a body of solid pyrite mixed with galena. Ore occurs as a replacement of dolomite along a fracture zone between two faults. Limonite body formed by oxidation of pyrite. **Dev:** 90-ft. adit, several open cuts. **Assays:** Smelter returns on a sample of the galena-pyrite ore showed 26.2% Pb, 12.6% Zn, 0.8 oz. Ag, no Au, 15.4% Fe. **Prod:** Some production of lead-silver-zinc ore. Limonite was mined by the Lehigh Portland Cement Co. for use in portland cement in 1936. **Ref:** 46, pp. 7-19. 73, pp. 55-56. 98, 1925, p. 1822; 1926, p. 1586. 128, pp. 75, 78. 158.
- Washington Rock**
(see Washington)
- West**
(see Blue Jim under silver)
- Whoopie-Galena Hill (64)**
(see under zinc)
- Wolf Creek (Berkin) (104)**
Loc: N½NW¼ sec. 4, (38-43E), on E. side Pend Oreille R., Metaline dist. **Elev:** 2,300 ft. **Access:** 2½ mi. by road S. of Metaline Falls. **Prop:** 14 claims: Wolf Creek Lead Nos. 1-9, Silver Lead Nos. 1-3, and 2 others. **Owner:** Fred E. Davenport and Ira Troyer (1945). **Ore:** Lead, zinc, silver, iron. **Ore min:** Galena, sphalerite, pyrite, hemimorphite (?), limonite. **Gangue:** Dolomite, paligorskite, gypsum. **Deposit:** Breccia zone in dolomite between 2 intersecting shear zones. Exposed to width of 15 ft. and length of 80 ft. in one adit. **Dev:** Several shallow adits and surface cuts and an inaccessible inclined shaft. **Ref:** 29, p. 42. 46, p. 34. 73, p. 73. 104, 7/15/34, p. 27. 128, p. 75. 158.

Woodpecker (41)

(see under zinc)

Yellowhead

(see under zinc)

Z Canyon (Pine Cone-Z Canyon)

(see Pine Cone-Z Canyon under zinc)

Z Canyon (Silverado) (7)

(see also Pend Oreille Mines & Metals Co. under zinc)

Loc: SW¼ sec. 11, (40-43E), on E. side Pend Oreille R., Metaline dist. **Elev:** 2,300 ft. **Access:** 2 mi. W. of Crescent Lk. by road. **Prop:** 18 unpatented claims. **Owner:** Pend Oreille Mines & Metals Co., Spokane, Wash. (1943). Washington Mining & Milling Co. (1910-1930). Z-Canyon Mutual Mines Co. (1931-1932). Z-Canyon Consolidated Mines Co. (1934-1936). Z-Canyon Mining Co. (1941). **Ore:** Lead, zinc, gold. **Ore min:** Galena, sphalerite, smithsonite, greenockite. **Gangue:** Dolomite, coarse calcite. **Deposit:** Ore minerals disseminated in dolomite and breccia. Mineralized zone has been exposed for a length of 800 ft. on the surface. **Dev:** Several shallow cuts and 2 adits totaling about 120 ft. **Prod:** Small amount in 1926. **Ref:** 29, p. 50. 73, p. 72. 97, 1925, p. 559; 1926, p. 468. 104, 2/15/34, p. 20; 10/30/35, p. 25; 12/15/36, p. 27. 106, 5/21/31; 5/19/32; 7/34. 113, 6/34, p. 15; 7/34, p. 15; 10/34, p. 14; 8/36, p. 6. 128, pp. 75-76. 158.

Z Canyon Mutual (19)

(see under zinc)

PIERCE COUNTY

Silver Creek (2)

(see under gold)

Silver Creek Gold & Lead (1)

(see under gold)

SKAGIT COUNTY

Alta (12)

Loc: Approx. in sec. 24, (35-13E). **Prop:** 4 claims: Alta, Montreal, Cerrico, Helena Butte. **Ore:** Lead, silver, zinc. **Ore min:** Galena, sphalerite, pyrite, arsenopyrite. **Deposit:** A cross vein of the Boston vein consisting of a quartz vein in a shear zone in gneiss near diorite contact. **Ref:** 13, p. 140.

Black Canyon

Loc: Cascade dist. **Ore:** Lead. **Ore min:** Galena. **Deposit:** 12-in. paystreak in 4½-ft. vein. **Ref:** 63, p. 56.

Boston (13)

Loc: Sec. 24, (35-13E), and sec. 19, (35-14E), N. side of Boston Basin. **Elev:** 5,500 to 6,000 ft. **Access:** Trail from end of Cascade R. road. **Prop:** 4 patented claims. **Owner:** Adolph Behrens and sons estate (1934). J. C. and G. L. Rouse (1892). **Ore:** Lead, silver, zinc, gold, copper. **Ore min:** Galena, arsenopyrite, pyrite, sphalerite, calcanthite, chalcocopyrite. **Gangue:** Quartz, calcite, grossularite. **Deposit:** A 6- to 9-ft. quartz vein in foliated diorite. Some faulting along the vein. **Dev:** 35-ft. adit and a 60-ft lower adit. **Assays:** Chip sample across back of upper adit shows 8 in. of ore assaying 0.16 oz. Au, 8.4 oz. Ag, 0.2% Cu, 22.1% Pb, 13% Zn; and 6 ft. of ore assaying 0.02 oz. Au, tr. Ag, 0.4% Pb, 1.5% Zn. **Prod:** 2 tons shipped in 1890's. **Ref:** 12, p. 93. 13, p. 138. 63, p. 55. 105, no. 21, vol. 62, p. 325. 158.

British

(see Skagit Queen under silver)

Buchanan

(see Queen under copper)

Cascade (24)

Loc: NW¼ sec. 7, (34-13E), on S. Fk. of Cascade R. **Prop:** 3 claims: Cascade, Iron Clad, Silver Butte. **Owner:** Messrs. McIntosh and Daly (1892). **Ore:** Lead, silver, gold. **Ore min:** Pyrite. **Deposit:** 5-ft. vein with a 10-in. paystreak. **Dev:** 100-ft. adit. **Assays:** 32% to 37% Pb, 48 to 51 oz. Ag, tr. Au. **Ref:** 13, p. 141. 63, p. 56.

Cascade Minerals

Loc: Thunder Cr. dist. **Owner:** Cascade Minerals Corp. (1928). **Ore:** Lead, silver. **Prod:** 1927. **Ref:** 97, 1928, p. 701.

Cerrico

Loc: T. 35 N., R. 13 E., Cascade dist. **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, arsenopyrite, pyrite. **Deposit:** Quartz vein in shear zone in gneissic diorite. **Ref:** 13, p. 173.

Chicago (14)

Loc: Western extension of the Boston claim in sec. 24, (35-13E), Cascade dist. **Prop:** 4 claims: Chicago, Cincinnati, New York, Buffalo. **Owner:** Gilbert, Landry, Landers and Co. (1892). **Ore:** Lead, silver, gold, zinc. **Ore min:** Galena, sphalerite, arsenopyrite, pyrite. **Deposit:** 6- to 9-ft. quartz vein in gneissic diorite. **Ref:** 13, p. 139. 63, p. 55.

Dorothy

(see Thunder Creek)

Eldorado (11)

(see under silver)

Epoch (25)

Loc: Near center E½ sec. 10, (34-13E), on Middle Fk. of Cascade R. **Access:** 2½ mi. by trail from Mineral Park. **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Said to be a 3-ft. vein of solid galena ore. **Dev:** Adit. **Assays:** 38% to 45% Pb, 39 to 102 oz. Ag, tr. Au. **Ref:** 13, p. 141.

Everett

(see Willis and Everett under silver)

Everett Extension

(see under silver)

Friend (16)

(see under silver)

Grand Republic (27)

Loc: Sec. 1, (34-13E), Cascade dist. **Ore:** Lead, silver. **Ref:** 58, p. 27. 63, p. 56.

Granite (22)

(see under silver)

Hartford (3)

Loc: Sec. 19, (35-14E), eastern extension of the Boston claim. **Prop:** 1 claim. **Owner:** George Sanger (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Gangue:** Quartz. **Deposit:** Similar in width and character to the Boston vein. **Ref:** 13, p. 139.

Icegate

Loc: Thunder Cr. dist. **Ore:** Lead. **Ore min:** Galena. **Ref:** 63, p. 59.

Iowa-Olympia

(see under silver)

Johnsburg (23)

Loc: Secs. 27 and 34, (35-13E), Cascade dist. **Elev:** 5,100 ft. **Access:** 22 mi. from Marblemount on Cascade R. road. **Prop:** 4 patented claims: Johnsburg, Lookout, Tarcoo Union, Prospectors Friend. **Owner:** Kaess Mining Co., Mount Vernon, Wash. (1954—). Silver Queen Mining & Smelting Co. (1892).

Johnsburg Mining & Milling Co., Mount Vernon, Wash. (1949-1954). **Ore:** Lead, silver, copper, zinc, gold. **Ore min:** Galena, cerussite, anglesite, chalcopryrite, sphalerite, mimetite, malachite, azurite. **Gangue:** Leached silicified schist, calcite. **Deposit:** Mineralized shear zone in schist. A lens of galena ore 50 ft. long and from 4 to 30 in. wide is exposed at one place on the vein. **Dev:** 200-ft. drift, 50-ft. adit, 15-ft. open cut. **Improv:** Cabin, aerial tram under construction (1955). **Assays:** 5 samples across the vein from 10 to 28 in. long over a distance of 35 ft. along the vein showed an av. value of 0.077 oz. Au, 42.64 oz. Ag, 50.74% Pb. 1953 shipments av. 56.9% Pb, 0.4% Zn, 0.42% Cu, 0.067 oz. Au, 40.4 oz. Ag. **Prod:** 1953 (19,638 lb. ore), 1955 (18,056 lb. ore). **Ref:** 13, p. 140. 22, p. 4. 63, p. 56. 133, p. 35. 158.

Kildare (17)

Loc: Sec. 25, (35-13E), Cascade dist. **Prop:** 2 claims: Kildare, Harrison. **Ore:** Lead, silver, zinc. **Deposit:** A cross vein of the West Seattle said to be similar to the Boston. **Ref:** 13, p. 140.

Lakeside

Loc: On S. side of Silver Basin on the S. Fk. of Thunder Cr. **Access:** Trail. **Prop:** Many claims. **Owner:** Silver Tip Mining & Power Co. (1918-1926). Silver Trail Mining Co. (1922). **Ore:** Lead, zinc, copper, gold, silver. **Ore min:** Galena, chalcopryrite, sphalerite, pyrite. **Gangue:** Quartz. **Deposit:** Said to be 10 veins of varying size in granite and metamorphic rocks. **Assays:** A typical mineral analysis said to show 23.66% galena, 16.32% sphalerite, 28.14% pyrite, 2.58% chalcopryrite, 51.96 oz. Ag, 0.18 oz. Au. **Ref:** 46, p. 227. 88, pp. 51-52. 98, 1918-1926. 158.

Logan No. 2 (6)

(see under silver)

Marine

(see under gold)

Michigan (26)

(see under silver)

Midas (18)

(see under silver)

Olympia

(see Iowa-Olympia under silver)

Ontario (4)

Loc: Near center sec. 19, (35-14E), on eastern extension of the Boston vein. **Prop:** 1 claim. **Owner:** Grant, Ferguson, Getchell and Co. (1892). **Ore:** Lead, silver, gold. **Deposit:** Presumably similar to the Boston. **Ref:** 13, p. 139.

Pioneer (28)

(see under silver)

Protection (7)

Loc: Approx. in NE. cor. sec. 16, (35-14E), ¼ mi. or less W. of the Thunder Cr. mine cabin. **Elev:** 5,000 ft. **Access:** Trail. **Owner:** Protection Mining Co. (1940). **Ore:** Lead, zinc, copper. **Ore min:** Galena, sphalerite, chalcopryrite, pyrite. **Deposit:** Fault in diorite is mineralized to a max. width of 6 in. Mineralization is rich over this narrow width. **Dev:** 500-ft. adit. **Ref:** 158.

Queen and Buchanan (19)

(see under copper)

Sierra Grande (5)

Loc: Extension of the Hartford claim in sec. 19, (35-14E), Cascade dist. **Prop:** 1 claim. **Owner:** Grant, Ferguson, Getchell and Co. (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena, pyrite. **Gangue:** Quartz. **Deposit:** Presumably similar to Boston and Hartford claims. **Ref:** 13, p. 139.

Silver Tip (8)

Loc: Across Thunder Cr. from the Skagit Queen property in secs. 16 and 17, (35-14E). **Access:** Trail. **Prop:** 4 patented claims: Imperial, English No. 3, Liberty, Lakeview. Also 8 unpatented claims and 2 millsites. **Owner:** Silver Tip Mining Co. (1941). Silver Tip Mining & Development Corp. (1918-1934). **Ore:** Lead, silver, zinc, gold. **Ore min:** Galena. **Deposit:** Reportedly a 3- to 4-ft. vein containing 1 to 2 ft. of ore. Other veins reported. **Dev:** Open cuts, short adits, 40-ft. shaft. **Assays:** Sample across 12 to 16 in. of ore showed 20.5% Pb, 6.6% Zn, 19.9 oz. Ag, 20¢ Au. **Ref:** 119, no. 2, 1912, p. 1. 158.

Skagit Queen (2)

(see under silver)

Soldier Boy (20)

(see under gold)

Standard

(see under silver)

Stenmo (9)

Loc: At Park Cr. Pass, at head of Thunder Cr. **Access:** Trail. **Prop:** 2 claims. **Owner:** John Stenmo, Seattle, Wash. (1934). **Ore:** Lead, silver, zinc. **Ore min:** Galena. **Deposit:** Vein 2 to 4 ft. wide in granite. **Ref:** 158.

Thunder Creek (Dorothy) (10)

Loc: 2 mi. W. of Park Cr. Pass. Approx. in sec. 16, (35-14E). **Elev:** 4,100 to 6,000 ft. **Access:** Branch trail from Thunder Cr. trail. About 22 mi. by trail from highway at Diablo Dam. **Prop:** 6 patented claims: Dorothy Nos. 1 to 6, and a millsite. **Owner:** Thunder Creek Mining Co. (1928-1952). **Ore:** Lead, silver, zinc, copper, gold. **Ore min:** Galena, sphalerite, chalcopryrite, pyrite. **Gangue:** Quartz, altered diorite. **Deposit:** Vein av. 5 in. wide along a fault in diorite. Vein composed of breccia cemented by gouge and ore minerals. A ton or so of ore on the trail below the mine. **Dev:** 425-ft. adit, 760-ft. adit. **Assays:** Sample across mining width showed 10% Pb, 4% Zn, 7 oz. Ag. A sample width of 2 ft. in upper adit 215 ft. from portal showed 5% Pb, 4.7% Zn, 0.34% Cu, 4.25 oz. Ag, 0.01 oz. Au. **Ref:** 46, p. 229. 97, 1929, p. 427. 106, 7/16/31. 157. 158.

Ventura (21)

(see under silver)

West Seattle (15)

Loc: Parallel to the Boston group in sec. 24, (35-13E), Boston Basin. **Prop:** 3 claims: Mitus, Diamond, West Seattle. **Ore:** Lead, silver, zinc. **Deposit:** Said to be similar to the Boston in size and character. **Ref:** 13, p. 141.

Willis and Everett (1)

(see under silver)

SKAMANIA COUNTY

Athens

(see under copper)

Bonanza (4)

Loc: Sec. 12, (10-5E), Mt. St. Helens dist. **Ore:** Lead. **Ore min:** Galena. **Deposit:** 2-ft. vein with an 8-in. paystreak. **Ref:** 63, p. 50.

Bumble Bee

(see under copper)

Chief

(see Ripper and Chief under copper)

Commonwealth (7)

(see under copper)

Copper Bottom

(see under copper)

Golconda (6)

(see under gold)

Gold Creek

(see Zinc Creek under zinc)

Grizzly Creek (5)

(see under gold)

Independence (2)

(see under copper)

Last Chance (10)

(see under copper)

Minnie Alice (1)

(see under copper)

Mount Fairy (8)

(see under gold)

Rainbow (11)

(see under vanadium)

Ripper and Chief

(see under copper)

Snowflake (3)**Loc:** NW¼ sec. 13, (10-5E), Mt. St. Helens dist. **Ore:** Lead, zinc. **Ref:** 63, p. 50.**Zinc Creek (9)**

(see under zinc)

SNOHOMISH COUNTY**Ala-Dickson (27)**

(see under copper)

Alleghany

(see Foggy under copper)

Alta (47)

(see under gold)

Anacortes**Loc:** Silverton dist. **Prop:** 3 claims. **Owner:** George Hall and M. L. Moleque (1897). **Ore:** Lead. **Ore min:** Galena, arsenopyrite. **Ref:** 63, p. 18.**Arlington (15)**

(see under copper)

Bald Mountain (16)

(see under copper)

Baltimore (32)

(see under gold)

Bear (48)

(see under gold)

Beatrice

(see Sunset and Beatrice)

Bell and Crown (24)

(see under copper)

Big Four (28)**Loc:** NW¼ sec. 33, (30-10E), on N. slope of Big Four Mtn., Silverton dist. **Prop:** 7 claims. **Owner:** Big Four Mining Co. (1909). **Ore:** Lead, silver, antimony. **Ore min:** Galena, arsenopyrite, probably tetrahedrite. **Deposit:** 30 in. of sulfide ore between syenite hanging wall and granite footwall. **Dev:** 100-ft. adit. **Assays:** \$50 Pb, Ag, Sb. **Ref:** 14, p. 41. 63, p. 19. 114, no. 5, 1909, p. 99.**Billy Lee (49)****Loc:** Sec. 7, (28-11E), on W. side of Silver Cr. about 2 mi. S. of Mineral City. **Owner:** A. W. Frater, Senator Vestal, and Judge Denny (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 18-ft. vein carries a 2-ft. paystreak of ore. **Dev:** 112-ft. adit, 25-ft. adit. **Assays:** Said to run as high as \$200 Au, Ag, Pb. **Ref:** 13, p. 157. 14, p. 29. 63, p. 33.**Blue Bird (75)**

(see under gold)

Bluebell (50)

(see under gold)

Bonanza

(see Mineral Center under gold)

Bullion King

(see under gold)

Calumet

(see Glacier Peak under copper)

Calumet (72)

(see under gold)

Champion (51)

(see under gold)

Clara Thompson

(see Jasperson under gold)

Cleveland (19)

(see under copper)

Cleveland**Loc:** Silver Cr. dist. **Prop:** 1 claim. **Owner:** Mr. Maxwell (1892). **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** 5-ft. vein. **Ref:** 13, p. 163. 14, p. 30.**Commonwealth**

(see Jasperson under gold)

Cooperative (83)

(see under copper)

Copper Chief (52)

(see under copper)

Cornucopia (29)

(see under gold)

Courtney (8)

(see under copper)

Crown

(see Bell and Crown under copper)

Crown Point (53)**Loc:** Sec. 8, (28-11E), in Straightup Gulch on E. side of Silver Cr. **Prop:** 5 claims: Crown Point, Silver Shield, Helena, Hidden Treasure, Crawford. **Owner:** Crown Point Mining Co. (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** 5-ft. vein, 4-ft. vein, 12-ft. vein, 11-ft. vein, and 20-ft. vein. **Dev:** 30-ft. adit and several open cuts. **Assays:** A mill-run from the Crown Point claim returned 40% Pb, 107 oz. Ag per ton. **Ref:** 13, pp. 161-162. 14, p. 30. 58, p. 17. 63, p. 30.**Daisy (45)**

(see under gold)

Darrington

(see Gold Mountain under copper)

Deerfly (14)**Loc:** Sec. 11, (31-15E), in Suiattle Pass, Glacier Peak dist. **Elev:** 5,000 ft. **Prop:** 9 claims. **Ore:** Lead, silver, gold. **Deposit:** 8-ft. vein in shear zone in granitic rock. Exposed for length of 1,000 ft. **Dev:** 500 ft. of adits and drifts in ore. **Assays:** 1 oz. Au, 12 to 30 oz. Ag, 40% to 60% Pb. **Ref:** 14, p. 12. 158.

Delta

(see under copper)

Dominion

Loc: T. 28 N., R. 10 E., in Dominion Gulch on Salmon Cr., Silver Cr. dist. **Prop:** 7 claims. **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** 2 parallel 3-ft. veins. **Ref:** 14, p. 31. 63, p. 33.

Edison

(see Mineral Center under gold)

Editor (76)

(see under silver)

Elmo

(see Gold Bar and Elmo)

Emma Moore (38)

Loc: Sec. 27, (29-11E), on W. side of '76 Basin about 1 mi. from Monte Cristo. **Access:** Trail from Monte Cristo. **Ore:** Lead, silver, gold. **Ore min:** Arsenopyrite, pyrite, galena. **Deposit:** 24-ft. fracture zone in andesite. **Assays:** \$40 Au, Ag, 15% Pb. **Ref:** 13, p. 149. 14, p. 23.

Emma No. 2

Loc: Silver Cr. dist. **Ore:** Lead, gold, silver. **Ore min:** Galena. **Deposit:** 6-ft. vein. **Assays:** \$50 per ton. **Ref:** 13, p. 163. 14, p. 31.

Etruria

Loc: Silver Cr. dist. **Prop:** 1 claim. **Owner:** John Wesley (1892). **Ore:** Lead, gold, silver. **Ore min:** Galena, pyrite. **Deposit:** 10-ft. vein. **Assays:** \$25 Au, Ag. **Ref:** 13, p. 163. 14, p. 31.

Eureka (18)

(see under copper)

Feldt (4)

(see under silver)

Florence Rae (73)

(see under copper)

Foggy (34)

(see under copper)

"45" (25)

(see under silver)

Four Brothers (54)

Loc: Sec. 6, (28-11E), adjacent to the Silver Slipper property, Silver Cr. dist. **Prop:** 1 claim. **Owner:** John Dowd, P. J. Field, and William Flobeck (1892). **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** 4-ft. vein with 14 in. of ore. **Ref:** 13, p. 162. 14, p. 32.

Garfield

Loc: Silver Cr. dist. **Prop:** 1 claim. **Owner:** Lloyd and Parkinson (1892). **Ore:** Lead, gold, silver. **Ore min:** Galena, pyrite. **Deposit:** 6-ft. vein. **Assays:** \$30 Au, Ag, Pb. **Ref:** 13, p. 163. 14, p. 32.

Gettysburg (55)

Loc: Sec. 7, (28-11E), E. of Silver Slipper property, Silver Cr. dist. **Prop:** 1 claim. **Owner:** James W. Maple and Dr. Wright (1892). **Ore:** Lead, gold, silver. **Ore min:** Galena, pyrite. **Deposit:** 4½-ft. quartz vein with 15 in. of ore. **Assays:** \$40 Au, Ag. **Ref:** 13, p. 162. 14, p. 32.

Glacier Peak (13)

(see under copper)

Golconda

Loc: On Troublesome Cr. E. of Silver Cr. **Prop:** 3 claims: Pride of the West, Victoria, Monte Cristo. **Owner:** Golconda Mining Co. (1892). **Ore:** Lead, gold, silver. **Ore min:** Galena,

pyrite. **Gangue:** Quartz. **Deposit:** One mineralized shear zone from 4 to 20 ft. wide with 2 ft. of ore. Two other mineralized shear zones. **Dev:** 40-ft. adit and open cuts. **Assays:** \$20 to \$30 Au, Ag, and as high as 42% Pb. **Ref:** 13, pp. 162-163. 14, p. 32.

Gold Bar (69)

(see under copper)

Gold Bar and Elmo

Loc: 4 mi. up Wallace R. from Gold Bar, Index dist. **Ore:** Silver, lead, copper, gold. **Ore min:** Galena, chalcopyrite. **Deposit:** 16-ft. shear zone with 2 ft. of galena ore on both hanging and footwalls. **Dev:** 27-ft. adit. **Assays:** \$44 to \$102 Au, Ag, Pb. **Ref:** 14, p. 17. 63, p. 26.

Gold Mountain (12)

(see under copper)

Good Hope (39)

(see under gold)

Granite and Maud (20)

(see under gold)

Gray Eagle (77)

(see under copper)

Gray Mare (5)

(see under silver)

Gypsy Queen (56)

Loc: Sec. 6, (28-11E), on E. side of the W. Fk. of Silver Cr. **Ore:** Lead, gold, silver. **Ore min:** Galena. **Deposit:** An extension of the Webster vein. **Dev:** 20-ft. adit. **Ref:** 14, p. 33. 63, p. 30.

Hidden Treasure

(see under silver)

Howard

(see Cooperative under copper)

Hunter (9)

(see under copper)

Idaho (57)

Loc: Sec. 7, (28-11E), on W. side of Silver Cr. **Ore:** Lead, gold, silver. **Ore min:** Galena. **Deposit:** 7-ft. vein with from 6 to 12 in. of ore. **Assays:** \$20 to \$40 Au, Ag. **Ref:** 13, p. 157. 14, p. 33.

Imperial (21)

(see under copper)

Index Gold Mines, Inc. (78)

(see under gold)

Iowa

(see Washington-Iowa under copper)

J. B. (40)

(see under gold)

Jasper

Loc: On W. slope of National Mtn., on N. part of Silver Cr. **Elev:** 4,000 ft. **Ore:** Lead, silver. **Ore min:** Galena. **Gangue:** Quartz. **Deposit:** 7-ft. vein with a 12-in. paystreak. **Dev:** 27-ft. drift. **Assays:** Sample from dump assayed 44% Pb, 138 oz. Ag. **Ref:** 12, p. 88.

Jasperson (58)

(see under gold)

Jones (74)

(see under silver)

Kazian (79)

(see under copper)

Keystone (33)

(see under gold)

Lalla Rookh

(see Tobique and Lalla Rookh under gold)

Larson (3)

Loc: Secs. 19 and 30, (32-9E), 2½ mi. from White Horse schoolhouse on the highway between Arlington and Darrington. **Elev:** 1,000 to 4,000 ft. **Access:** 2½ mi. from road. **Prop:** 10 claims. **Owner:** C. A. Larson, Arlington, Wash. (1941). **Ore:** Gold, silver, lead, zinc. **Ore min:** Galena. **Deposit:** Said to be large veins in country rock of limestone and granite. **Dev:** 105-ft. and 40-ft. adits. **Assays:** 0.1 oz. Au, 25 oz. Ag, 3% Zn, 60% Pb. **Ref:** 14, p. 9. 58, p. 38. 158.

Last Chance (80)

(see under gold)

Le Roy (66)

(see under silver)

Lockwood (59)

Loc: SW¼ sec. 7, (28-11E), on W. side of Silver Cr. **Prop:** 2 patented claims. **Ore:** Lead, gold, silver. **Ore min:** Galena, pyrite. **Deposit:** Large vein with from 10 to 30 in. of ore. **Dev:** 90-ft. adit, two 10-ft. adits, 30-ft. adit, another adit of unknown length. **Assays:** \$23 to \$97 per ton. **Ref:** 14, p. 34. 63, p. 28.

Louise

(see Mineral Center under gold)

Lulu (22)

(see under gold)

McCombs

(see Jasperson under gold)

Magus

(see "45" under silver)

Martin Engdahl (60)

Loc: NE¼ sec. 7, (28-11E), on W. side of Silver Cr. **Access:** 3 mi. up Silver Cr. road from Galena. 11 mi. from railroad at Index. **Ore:** Lead, silver, zinc, copper, gold. **Ore min:** Galena, sphalerite, chalcopyrite, arsenopyrite, pyrite, molybdenite (?). **Gangue:** Quartz. **Deposit:** 3 mineralized shear zones as much as 4 ft. wide in argillite, quartzite, and limestone. Ore is mainly finely disseminated throughout the shear zones. **Dev:** Lower adit 425 ft. long, middle adit of unknown length, upper adit 150 ft. long. **Assays:** Vein 2½ ft. wide showed 0.18 oz. Au, 0.9 oz. Ag, 2.1% Zn. **Ref:** 14, pp. 34-35. 111, p. 10. 158.

Maud

(see Granite and Maud under gold)

Milwaukee (26)

(see under zinc)

Mineral Center (70)

(see under gold)

Mineral Mines (61)

(see under copper)

Monte Cristo (37)

(see under gold)

Morning Star (46)

Loc: NE¼ sec. 4, (28-11E), Silver Cr. dist. **Elev:** 4,100 ft. **Prop:** 5 claims. **Owner:** E. H. Hubbard and John Maxwell (1892). **Ore:** Lead, silver, copper, gold. **Ore min:** Galena, pyrite, chalcopyrite. **Deposit:** Several mineralized shear zones. The main shear zone carries 6 ft. of ore. **Dev:** Several adits aggre-

gating 140 ft. **Assays:** \$40 to \$60 Au, Ag, Pb, Cu. **Ref:** 12, pp. 88-89. 13, p. 161. 14, p. 35. 63, p. 28.

Mountain Goat

Loc: Silver Cr. dist. **Prop:** 1 claim. **Owner:** Scott McKrause (1892). **Ore:** Lead, gold, silver. **Ore min:** Galena, pyrite. **Deposit:** 20-ft. mineralized shear zone. **Assays:** As high as \$150 Pb, Au, Ag. **Ref:** 13, p. 163. 14, p. 35.

Murdock

Loc: Silver Cr. dist. **Prop:** 1 claim. **Owner:** Messrs. Murdock, Noble, and Black (1892). **Ore:** Lead, gold, silver. **Ore min:** Galena, pyrite. **Gangue:** Quartz. **Deposit:** 10-ft. mineralized shear zone. **Ref:** 13, p. 163. 14, p. 35.

Mystery

(see Monte Cristo under gold)

Nesta (10)

(see under copper)

Nickel Bird (23)

(see under copper)

North Star

(see Sunrise under gold)

O and B (67)

(see under copper)

Old Gray Mare

(see Gray Mare under silver)

Oldfield

(see Sunrise under gold)

Ontario (62)

Loc: Sec. 7, (28-11E), just S. of Copper Chief property, Silver Cr. dist. **Prop:** 5 claims. **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Deposit:** 6-ft. mineralized shear zone. Values chiefly in lead. **Dev:** Several short adits. **Ref:** 14, p. 36. 88 pp. 75-76.

P. I. (81)

(see under copper)

Peabody (41)

(see under gold)

Penn

(see Foggy under copper)

Perm

(see under gold)

Pride

(see Monte Cristo under gold)

Pullman

Loc: Silver Cr. dist. **Prop:** 1 claim. **Owner:** Messrs. Maxwell and Parkinson (1892). **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** 3-ft. mineralized shear zone. **Ref:** 13, p. 163. 14, p. 36.

Queen Anne (11)

(see under gold)

Red Cloud (63)

(see under gold)

Republican (35)

Loc: Sec. 13, (29-11E), ¼ mi. SE. of Goat Lk., Monte Cristo dist. **Ore:** Gold, silver, lead. **Ore min:** Pyrite, galena. **Deposit:** 4-ft. fracture zone. **Ref:** 14, p. 25. 63, p. 16.

Ruby King (64)

(see under gold)

Rustler (31)

(see under copper)

Seventy Six (42)

Loc: Sec. 27, (29-11E), on E. side of '76 Basin about 1 mi. S. of Monte Cristo. **Elev:** 5,000 ft. **Prop:** 5 claims. **Ore:** Gold, silver, lead. **Ore min:** Galena, pyrite. **Deposit:** 6- to 24-in. slightly mineralized fracture zone. **Dev:** 130-ft. upper adit, 800-ft. lower adit. **Assays:** Surface samples show \$30.00 Ag, \$22.73 Au, 26% Pb. **Ref:** 1, no. 5, 1892, p. 397. 13, p. 150. 14, p. 25. 63, p. 13, 149, p. 822.

Silver Coin (17)

(see under gold)

Silver Horseshoe (30)

(see under silver)

Silver Lake (43)

(see under gold)

Silver Queen (44)

(see under gold)

Standard

Loc: Silver Cr. dist. **Prop:** 1 claim. **Owner:** Messrs. Lloyd and Parkinson (1892). **Ore:** Lead, gold, silver. **Ore min:** Galena. **Deposit:** 6-ft. shear zone. **Assays:** \$40 Au, Ag, Pb. **Ref:** 13, p. 163. 14, p. 37.

Sunrise (6)

(see under gold)

Sunset and Beatrice (82)

Loc: Sec. 17, (28-11E), on E. side of Silver Cr. **Prop:** 2 claims. **Ore:** Lead, gold, silver. **Ore min:** Galena. **Deposit:** 20-ft. shear zone with 8 to 36 in. of ore. **Dev:** 60-ft. adit. **Assays:** As high as \$80 per ton. **Ref:** 14, p. 36. 63, p. 31.

Threadwell

(see under gold)

Tobique and Lalla Rookh (68)

(see under gold)

Trade Dollar

Loc: Silver Cr. dist., on Trade Dollar Cr. W. of Mineral City. **Elev:** 2,600 ft. **Prop:** 1 claim. **Owner:** J. T. Hubbart and Co. (1892). **Ore:** Lead, silver. **Ore min:** Galena, iron sulfides. **Deposit:** 4-ft. vein. **Dev:** 50-ft. drift. **Assays:** Samples from dump assayed 63% Pb, 37 oz. Ag. **Ref:** 12, p. 89. 13, p. 161.

Vandalia (65)

Loc: SW $\frac{1}{4}$ sec. 7, (28-11E), Silver Cr. dist. **Access:** 13 mi. by road to railroad at Index. **Prop:** 5 claims. **Owner:** R. W. Habel, Index, Wash. (1935). **Ore:** Lead, silver, gold. **Ore min:** Pyrite, galena. **Deposit:** 20-ft. shear zone with 6 to 36 in. of ore. **Dev:** 75-ft. shaft with drifts at 2 levels, and a 220-ft. adit. **Assays:** \$40 Pb, Ag, Au. **Ref:** 13, p. 156. 14, p. 38. 63, p. 31. 114, no. 5, 1909, p. 106. 158.

Victory

(see under gold)

Washington-Iowa (71)

(see under copper)

Wayside (1)

(see under copper)

Webster

(see Jasperson under gold)

Whistler (36)

Loc: Sec. 23, (29-11E), on N. slope of Cadet Peak, Monte Cristo dist. **Ore:** Gold, silver, copper, lead. **Ore min:** Pyrite, galena, tetrahedrite. **Deposit:** 4- to 20-ft. fracture zone that carries 1 $\frac{1}{2}$ ft. of ore. **Dev:** 20-ft. and 30-ft. adits. **Ref:** 14, p. 26, 63, p. 14.

Whitehorse (7)

(see under zinc)

Yankee Boy (2)

(see under copper)

SPOKANE COUNTY

Silver Hill (1)

(see under tin)

STEVENS COUNTY

A and C (142)

(see under copper)

Abe Lincoln

(see Comstock)

Acme (Acme-Dora) (161)

Loc: SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 27, (35-37E), on E. bank of Columbia R. 5 mi. below its junction with Colville R. **Elev:** 2,400 ft. **Access:** 3 mi. by road from a place on the Colville highway 4 mi. S. of the bridge. **Prop:** 2 patented claims. **Owner:** Louis Strauss, Colville, Wash. (1949). **Ore:** Lead, silver, zinc, copper, gold. **Ore min:** Boulangerite, bournonite, andorite, pyrite, arsenopyrite, sphalerite, covellite. **Deposit:** Sparsely mineralized quartz vein in granite, argillite, and associated basic dikes. **Dev:** 250-ft. adit, 80-ft. shaft, open cuts, 1,450-ft. crosscut. **Assays:** Said to assay \$44 Au, Ag, Pb. **Ref:** 30, p. 58. 132, pp. 136-137. 164, pp. 224-225.

Acme-Dora

(see Acme)

Acorn

Loc: Colville dist. **Ore:** Lead. **Ore min:** Galena. **Prod:** Small shipment in 1913. **Ref:** 97, 1913, p. 800.

Admiral (193)

(see under copper)

Admiral Consolidated (91)

(see under zinc)

Advance (65)

(see under zinc)

Aguila (Eagle-Newport) (160)

Loc: SE $\frac{1}{4}$ sec. 25, (35-37E), on N. side of gulch, Kettle Falls dist. **Access:** 11 mi. by road to railroad at Kettle Falls. **Prop:** 2 unpatented claims: Eagle, Newport. Also 5 lots comprising 160 acres. **Owner:** John Marty, Rice, Wash. (1942-1949). **Ore:** Lead, silver, copper, gold. **Ore min:** Pyrite, chalcopyrite, galena, malachite, azurite, tetrahedrite. **Deposit:** Shear zone 25 ft. wide in argillite and quartzite contains numerous mineralized quartz veins cut by post-mineral faults. **Dev:** 580-ft. adit with 2 short crosscuts and 2 shallow winzes. Also an open cut and a 40-ft. shaft. **Assays:** 8-ft. channel sample along the adit yielded \$6 per ton. 28 sacks of ore assayed 9.5% Pb, 19 oz. Ag, 2.1% Cu, \$1.75 Au. Another sample across 3 $\frac{1}{2}$ ft. of vein assayed 0.82% Pb, 10 oz. Ag, 0.3% Cu, \$0.35 Au. **Prod:** Trial shipment of 28 sacks of ore in 1938. **Ref:** 158.

Aichan Bee (213)

(see under silver)

Al Ki (145)

Loc: Bruce Cr. area near Silver Trail mine. **Prop:** 5 claims: Silver Wave, Myrtle, Morning, Ranger, Fraction. **Owner:** Al Ki Mining Co. (1892). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** One 4-ft. vein and another 3-ft. vein of galena ore. **Assays:** 17 to 56 oz. Ag, 50% to 64% Pb, 2.5 oz. Au. **Ref:** 12, pp. 81-82. 13, p. 127.

Aladdin (120)

Loc: SW $\frac{1}{4}$ sec. 9 and NW $\frac{1}{4}$ sec. 16, (37-41E), on Rocky Cr. **Elev:** 2,600 ft. **Access:** 22 mi. by county road to railroad at Colville. **Prop:** 240 acres deeded land. **Owner:** Aladdin Mines, Inc. (1936). **Ore:** Lead, zinc, gold, silver, copper. **Ore min:** Galena. **Deposit:** Quartz stringers in schist and limestone. **Dev:** 550-ft. adit. **Assays:** 4% Pb, 2.4% Zn, \$4.55 Au, \$0.80 Ag, 0.47% Cu. **Ref:** 46, pp. 46-47. 158.

Aladdin (Blue Ridge, Sierra Zinc)

(see Sierra Zinc under zinc)

Alma (162)

(see under silver)

Anaconda (86)

(see also Red Top)

Loc: NW. cor. sec. 30, (40-42E), Northport dist. **Elev:** 3,375 to 3,960 ft. **Access:** 2 mi. from Deep Cr. road on Red Top Mtn. road. **Prop:** 2 patented claims. **Owner:** Red Top Mining Co., Spokane, Wash. (1941). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, sphalerite, tetrahedrite. **Gangue:** Quartz, calcite. **Deposit:** 2- to 4-ft. vein between limestone and schist composed of partly replaced country rock and ore minerals in alternate bands. Solid band of galena 6 in. wide at one place. **Dev:** 40-ft. shaft with 30-ft. drift at bottom, 225-ft. adit. **Prod:** 30 tons in 1902. **Ref:** 7, p. 57. 46, p. 76. 58, p. 3. 73, p. 102. 164, pp. 300-301.

A. Anderson (66)

(see under zinc)

Anderson (103)

Loc: Sec. 18, (39-42E), Northport dist. **Owner:** W. L. Clearwaters, lessee, Millwood, Wash. (1951). **Ore:** Lead. **Ref:** 150, p. 27.

Anderson (67)

(see under zinc)

Ark (157)

(see under silver)

Austin

(see Aichan Bee under silver)

Avondale-Dome (Tenderfoot, Gillete) (132)

Loc: SW $\frac{1}{4}$ sec. 23, (37-39E), on S. side of canyon from Chloride Queen property. **Elev:** 3,600 ft. **Access:** 15 mi. up Clugston Cr. road from Colville. **Prop:** 2 claims joined end to end. **Owner:** Lloyd T. Jacobson and Eric Eklund (1941). New York & Sulfide Mountain Mining & Milling Co. (1903). Orient Metals Mining & Smelting Co. (1918-1921). Chloride Queen Mining Co. (1922-1926). **Ore:** Lead, silver, zinc. **Ore min:** Galena predominant, also cerussite, pyrite, calamine, wulfenite, anglesite, limonite, azurite. **Gangue:** Clay and gouge. **Deposit:** Ore minerals occur as nodules and lenses in a 4-ft. fracture zone in limestone. **Dev:** 108-ft. adit on which are a drift and 2 winzes. Also a 125-ft. adit and an open cut. Total workings about 800 ft. **Assays:** Some ore in main adit said to assay 2% Pb, tr. Ag. Other assays show as much as 15 oz. Ag, 60% Pb. **Prod:** Several carloads of ore shipped prior to 1890. **Ref:** 12, pp. 80-81. 13, pp. 125-126. 30, p. 81. 73, p. 112. 97, 1917, p. 507. 98, 1922, 1925, 1926. 112, 1918, p. 196. 164, pp. 239-241.

Bald Eagle (13)

(see under gold)

Banshee (189)

(see under copper)

Baxter

(see Snyder and Baxter under silver)

Bear Mountain (171)

Loc: NW $\frac{1}{4}$ sec. 23, (34-40E), Chewelah dist. **Access:** Road. **Prop:** 3 unpatented claims. **Owner:** Les Young and Roy Demorest, Colville, Wash. (1941). **Ore:** Lead, silver, zinc, gold. **Deposit:** Quartz vein av. about 3 ft. in width. **Dev:** 1,500 ft. of adits. **Ref:** 30, p. 39.

Bechtol (W. J. Bryan, Woohaa) (108)

Loc: Secs. 23 and 26, (39-41E), halfway between the Thompson property and Deep Lk. **Elev:** 2,400 to 2,800 ft. **Access:** $\frac{1}{2}$ mi. by trail NE. of road at S. end of Deep Lk. **Prop:** 3 claims: W. J. Bryan, Kismet, Mannering; a fractional claim; and 20 acres of patented land. **Owner:** Estate of William Bechtol and B. J. Hofer, Northport, Wash. (1949). **Ore:** Lead, silver, iron. **Ore min:** Galena, cerussite, limonite, siderite, anglesite. **Gangue:** Siderite, dolomite, calcite, breccia. **Deposit:** Galena and cerussite occur as nodules in a matrix of soft limonite, clay, and decomposed dolomite along faults of diverse orientation. **Dev:** Crooked adit 1,090 ft. long, 150-ft. adit, 100-ft. incline, 370 ft. of drifts and crosscuts, 50-ft. surface slope, many cuts and pits. **Assays:** Shipments in 1917 and 1918 returned 73.0% to 73.1% Pb, 0 to 1.2 oz. Ag. **Prod:** Reportedly 90 tons of galena ore prior to 1924. 6.034 tons in 1917 and 5.307 tons in 1918 are known to have been shipped by wagon to the Northport smelter. Shipments reported in 1925, 1937, 1939, 1940 (77 tons), and 1943. **Ref:** 7, p. 59. 21. 22, p. 4. 30, p. 99. 73, pp. 98-99. 97, 1917, 1925, 1938, 1940, 1941. 142, pp. 48-50. 158.

Beecher (15)

(see under gold)

Belcher (176)

(see under copper)

Bertha M. (173)

Loc: Sec. 26, (34-40E), Chewelah dist. **Prop:** 3 unpatented claims. **Owner:** C. L. Miles, Spokane, Wash. (1941). **Ore:** Lead, silver, gold. **Deposit:** Quartz vein about 2 ft. wide in quartzite and schist. **Dev:** 15-ft. shaft and short crosscut. **Ref:** 30, p. 36.

Big Chief (Tenderfoot, Royal, Silver Key) (133)

Loc: S $\frac{1}{2}$ sec. 14, (37-39E), on branch of Clugston Cr. **Elev:** 3,220 to 4,200 ft. **Access:** 15 mi. by road from railroad at Colville. **Prop:** 12 claims and a millsite: Big Chief Nos. 1 to 8, Spokane, Vindicator, Good Enough, Blue Grouse. **Owner:** Clugston Creek Mining Co. leasing to Silverton Mines, Inc. (1954—). Big Chief Mining & Milling Co. (1926). Silver Chief Mining Co. (1929-1932). Silver Key Mines Corp. (1935). Crater Mining Co., Spokane, Wash. (1949-1951). **Ore:** Lead, silver, zinc. **Ore min:** Galena, sphalerite, pyrite, cerussite, limonite. **Deposit:** Ore minerals occur as nodules and stringers along zones of fracture and brecciation in limestone. Also 3 quartz veins in limestone carrying ore minerals. **Dev:** 2,500-ft., 700-ft., and 450-ft. adits, also 2 shafts, one 80, the other 20 ft. deep. **Assays:** Ore from shaft said to av. 14% Pb. Other ores said to assay high in Ag. Ore said to av. about \$30 per ton. **Prod:** 50 tons prior to 1940. **Ref:** 30, pp. 79-80. 46, pp. 49-50. 98, 1926, p. 1570. 104, 9/30/35, p. 24. 106, no. 22, 1925, p. 5; 10/1/29; 7/21/30; 8/24/30. 150, p. 30. 158. 164, pp. 237-239.

Black Canyon

Loc: Northport dist. **Owner:** President Mining Co., Northport, Wash. (1939). **Ore:** Lead, zinc, silver. **Ref:** 57, pp. 7, 54.

Black Cat (94)

Loc: Sec. 8, (39-42E), 2 mi. W. of Electric Point property, Northport dist. **Access:** Some distance from road. **Prop:** 4 claims: Boot Jack, Crow, Humming Bird, Black Cat. **Owner:** Abandoned (1941). **Ore:** Lead. **Ore min:** Galena, cerussite,

limonite. **Gangue:** Quartz. **Deposit:** Ores replace limestone at fracture intersections. **Dev:** 25-ft. shaft. **Ref:** 30, p. 93. 164, p. 309.

Black Rock (58)
(see under zinc)

Black Witch
(see Alma under silver)

Bland

Loc: Near Cleveland mine, Deer Trail dist. **Ore:** Lead, copper, silver. **Ref:** 63, p. 114.

Bliss
(see Galena Hill)

Blue Lime (Sauvola) (96)

Loc: NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 18, (39-42E), Northport dist. **Elev:** 3,800 to 4,200 ft. **Access:** 4 mi. by road from Leadpoint. **Prop:** 1 claim: Blue Lime. **Owner:** Walter L. Sauvola and associates (1949). **Ore:** Lead. **Deposit:** Lead ore said to occur as chimneys. **Dev:** 50-ft. shaft. **Ref:** 25, p. 6. 30, p. 94.

Blue Ridge
(see Sierra Zinc under zinc)

Blue Star
(see Eagle under silver)

Bluegrouse (155)
(see under silver)

Bonanza (148)

Loc: Secs. 2 and 11, (37-38E), 5 mi. SE. of Bossburg. **Elev:** 2,200 ft. **Access:** $\frac{1}{2}$ mi. by truck road from Echo Valley road. **Prop:** 60 acres of patented land. **Owner:** Bonanza Lead, Colville, Wash. (1946—). Deer Trail Consolidated Mining Co. (1902-1924). Bonanza Mining Co. (1929-1930). Northern Lead Mining & Milling Co. (1930-1931). Russell Parker (1942). George Vervacke (1943). Anaconda Copper Mining Co., Butte, Mont. (1951-1952). **Ore:** Lead, silver, zinc, copper. **Ore min:** Steel galena, pyrite, sphalerite. **Gangue:** Quartz, siderite. **Deposit:** Lenticular deposit along a shear zone in chlorite and graphite schist. Ore occurs as irregular stringers in the zone. Zone as much as 4 ft. wide. New ore body 27 ft. thick discovered in 1950. **Dev:** More than 15,000 ft. of underground workings. **Improv:** 100-ton flotation mill at Palmers (1955). **Assays:** Ore said to contain 22% Pb, 30% Fe, 2.7% SiO₂, 10.5% S, 4.7 oz. Ag. **Prod:** 1906-1908, 1910-1911, 1914, 1916, 1923-1924, 1929-1930, 120 tons 1923. 2,000 tons prior to 1890. \$40,000 prior to 1944 reported. \$2,000,000 from 1944 to 1950. 1949 (14,163 tons ore). 1950 (20,000 tons ore). 1951 (13,700 tons ore). 1952-1954. **Ref:** 7, pp. 63-64. 12, pp. 26, 76. 13, p. 121. 30, p. 82. 63, pp. 112-113. 73, pp. 118-120. 88, p. 7. 97, 1907, 1908, 1911, 1912, 1915, 1917, 1923, 1924, 1929, 1930, 1942-1952. 106, 6/5/30, p. 19; 8/7/30, p. 20; 11/19/31. 129, pp. 117-119. 133, p. 31. 141, pp. 21, 22. 158. 164, pp. 174-176.

Botts (138)

Loc: Secs. 3 and 10, (37-39E), on E. side of Clugston Cr. near its head, Northport dist. **Elev:** 3,200 to 3,350 ft. **Access:** Near road. **Prop:** 3 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver. **Ore min:** Argentiferous galena. **Gangue:** Quartz. **Deposit:** Ore and quartz occur as small nodules and irregular shapes replacing limestone along zones of fracture. **Dev:** Several short adits, open cuts, and shallow shafts, total about 60 ft. **Ref:** 30, p. 84. 164, p. 242.

Boucher
(see Wildcat)

Boundary Silver Lead
(see Lucile under zinc)

Brooks (207)
(see under silver)

Bruce Creek
(see A and C under copper)

W. J. Bryan
(see Bechtol)

Buck Mountain
(see under silver)

Buffalo (73)
(see under silver)

Bullion (33)

Loc: Sec. 8, (39-39E), on hill overlooking Rattlesnake Valley. **Elev:** 3,800 ft. **Access:** 8 mi. W. of Northport. **Prop:** 7 claims. **Owner:** S. M. Kaemmerling, Philadelphia, Pa. (1942). Bullion Mining Co. (1902). **Ore:** Lead, silver, gold, copper, zinc. **Ore min:** Galena, sphalerite, chalcopryrite, bornite. **Deposit:** Said to be 50- to 80-ft. quartz veins cutting argillite and schist. **Dev:** Shaft, reportedly 160 ft. deep, from which drifts of 80 and 100 ft. have been driven. **Assays:** Conc. av. 70% Pb, 40 oz. Ag, \$2 Au. **Prod:** Small shipment in 1924. **Ref:** 88, pp. 5-6. 97, 1925, p. 561. 164, p. 255.

Burrus (119)
(see under zinc)

Cast Steel (52)

Loc: Sec. 10, (39-40E), Northport dist. **Access:** Road. **Prop:** 2 patented claims. **Owner:** Judge Carey estate (1941). **Ore:** Lead, silver. **Deposit:** Quartz vein said to av. 4 ft. in width and to be traceable for 400 ft. on the surface. **Dev:** 400-ft. vertical shaft, 400-ft. inclined shaft. Both caved. **Prod:** Reportedly some ore shipped prior to 1941. **Ref:** 30, pp. 96-97.

Cedar Canyon
(see under silver)

Center Star (130)
(see under silver)

Chewelah Consolidated (172)

Loc: N. part sec. 25, (34-40E), on a branch of N. Fk. of Chewelah Cr. **Access:** 12 mi. due N. of Chewelah. **Prop:** 4 claims. **Owner:** Bean and Stolp Lumber Co. (1941). German Silver and Gold Mining Co. (1908). **Ore:** Lead, silver, gold, copper. **Ore min:** Galena, chalcopryrite, pyrite, arsenopyrite. **Deposit:** Metamorphic series of schist, conglomerate, quartzite, and greenstone cut by veins of quartz. One vein 6 ft. wide. **Dev:** 200-ft. adit, 125-ft. shaft, and other shallow shafts, short adits, and open cuts. **Assays:** One vein said to assay \$51 Au. **Ref:** 30, p. 36. 116, no. 6, 1908, p. 123. 164, pp. 162-163.

Chewelah Eagle
(see Eagle under silver)

Chewelah Silver
(see Fred B.)

Chloride (198)

Loc: Near S. $\frac{1}{4}$ cor. sec. 7, (30-37E), 100 ft. W. of the highway, Cedar Canyon dist. **Access:** 1 mi. S. of Hunters on Hunters-Fruitland highway. **Owner:** Mr. Isaacson (1939). **Ore:** Lead, silver. **Ore min:** Pyrite, arsenopyrite, galena. **Gangue:** Calcite. **Deposit:** A 2-ft. quartz vein in argillite carries pyrite, arsenopyrite, and galena. Pyrite also occurs along fractures in the argillite. **Dev:** 100-ft. adit, open cuts, several shafts, 50-ft. adit. **Ref:** 158.

Chloride Queen (Colville Queen) (131)

Loc: E $\frac{1}{2}$ sec. 23 and W $\frac{1}{2}$ sec. 24, (37-39E), on one of E. branches of Clugston Cr. **Elev:** 3,400 to 3,515 ft. **Access:** 1

mi. E. of Clugston Cr. highway by road. 15 mi. from railroad at Colville. **Prop:** 4 unpatented claims. **Owner:** Clugston Creek Mining Co., Spokane, Wash., leasing from Colville Queen Mining Co. (1949-1951). Chloride Queen Mining Co. (1920-1926). Mohawk Consolidated Mining & Smelting Co. (1930). Union Mining & Smelting Co. (1930). Colville Queen Mining Co. (1937-1951). **Ore:** Lead, silver, zinc, copper, iron. **Ore min:** Galena, cerussite, chalcopyrite, sphalerite, limonite, pyrite. **Gangue:** Quartz, siderite. **Deposit:** 5-ft. quartz vein along contact of quartzite and dolomite. Lead-silver ore also found in a silicified breccia zone in dolomite. Limonite ore occurs in the dolomite. **Dev:** 350-ft. adit in which are drifts, shafts, and stopes, a longer adit at lower elevation, and surface workings said to total 2,000 ft. **Assays:** 34.3% Pb, 14 oz. Ag. Some limonite ore assayed \$13 Ag, Pb. Ore from stope said to assay 18% to 20% Zn, 3% Cu, 16% Pb, 3 oz. Ag. **Prod:** 400 tons of limonite ore shipped to Colville smelter in early days. Lead ore shipped in 1900, 1914, 1925, 1928. **Ref:** 12, p. 81. 13, p. 126. 30, p. 79. 46, pp. 43-45. 48, p. 19. 73, pp. 113-115. 97, 1926, p. 469; 1929, p. 429. 98, 1922-1925. 104, 2/28/37, p. 28. 105, no. 124, 1922, p. 381. 106, no. 15, 1921, p. 8; no. 23, 1923, p. 5; 5/1/30, p. 20; 9/4/30. 113, 2/4/37, p. 6. 117, no. 9, 1922, p. 7; no. 16, 1922, p. 7. 142, pp. 46-47. 158. 164, pp. 235-237.

Cholett

(see under zinc)

City View (151)

(see under gold)

Cleveland (Santa Rita) (195)

Loc: Secs. 3, 4, 9, and 10, (30-38E), at head of Hunters Cr., Deer Trail dist. **Elev:** 3,400 ft. **Access:** 10 mi. E. of Hunters by road. 25 mi. to railroad at Springdale. **Prop:** 12 patented claims and 1 fraction. **Owner:** Stewart Compton, Bayview, Idaho, leasing to Frank Marr, Spokane, Wash. (1952). F. R. Tinsby and W. L. Falter (1892). Cleveland Mining & Milling Co. (1917). Sharp Mining Co. (1918). Santa Rita Mining Co. (1918, 1922-1926). Cleveland Mining Co. (1920-1922). Base Metals, Inc. (1950). Leased by Spokane-Idaho Mining Co. (1951). **Ore:** Lead, zinc, silver, antimony. **Ore min:** Sphalerite, galena, tetrahedrite, boulangerite, stibnite, arsenopyrite, pyrite, cerussite, anglesite. **Gangue:** Calcite, siderite, quartz. **Deposit:** Series of argillite, quartzite, and dolomite cut by basic dikes is the country rock. Lenses of ore lie along parallel brecciated zones in the dolomite. Richest ore from surface down to 100-ft. depth. **Dev:** Adit with several hundred ft. of drifts and cross-cuts, 200-ft. inclined shaft, with a 250-ft. drift, 50-ft. shaft, other short adits and shafts. **Assays:** 4,000 tons produced in 1942 said to av. 6% Pb, 6% Zn. Weighted av. of 6 samples from av. width of 11 ft. showed 6.85% Pb, 3.07% Zn, 1.03% Sb, 3.77 oz. Ag. **Prod:** 1,500 tons prior to 1897. 1910, 1917, 1921-1924, 1937-1939, 1942-1944, 1947. **Ref:** 30, p. 74. 46, pp. 91-96. 63, p. 114. 68, p. 6. 73, pp. 127-132. 97, 1911, 1918, 1922-1925, 1938-1940. 98, 1918-1926. 100, 1899, p. 210. 104, 1/15/37. 106, no. 12, 1918. 112, p. 173. 132, pp. 137-141. 133, p. 32. 141, pp. 21, 22, 43. 157. 158. 164, pp. 205-209.

Clugston

(see Silver Trail)

Coffer (25)

(see under copper)

Columbia

(see Iroquois under zinc)

Colville Queen

(see Chloride Queen)

Comstock (10)

(see under copper)

Comstock (Abe Lincoln) (36)

Loc: Sec. 6, (40-39E), on W. slope of Sophia Mtn. near international boundary. **Access:** 15 mi. by road to railroad at Northport. **Prop:** 5 unpatented claims. **Owner:** John and Elmer Godfrey, Northport, Wash. (1941). **Ore:** Lead, zinc, silver, gold. **Ore min:** Pyrite. **Gangue:** Quartz. **Deposit:** Said to be a vein 3 ft. or more wide and 6,000 ft. long. **Dev:** 350-ft. adit, 50-ft. shaft. **Assays:** 7% Pb, 7% Zn, 2 oz. Ag, 0.10 oz. Au. **Ref:** 30, p. 111. 46, p. 87. 158.

Contention

(see Mountain View under silver)

Copper-Gold

(see Coffer under copper)

Copper King (113)

Loc: Sec. 20, (38-41E). **Elev:** 2,500 ft. **Access:** 15 mi. by road from railroad at Northport. **Prop:** 3 claims. **Owner:** Charles Clarke, A. E. Wilkerson, C. L. Baker, Spokane, Wash. (1941-1951). Lew Towner (1910). **Ore:** Lead, zinc, gold, iron. **Ore min:** Galena, sphalerite, pyrite, pyrrhotite. **Deposit:** Quartz veins in limestone near granite contact. Also some low-grade disseminated sphalerite and galena in limestone. **Dev:** 90-ft. shaft with a 40-ft. crosscut, a 200-ft. adit, 17 diamond drill holes from the crosscut at bottom of shaft reported. 4 of these holes reported to have cut 14-ft. vein containing tetrahedrite. **Prod:** Several shipments reported sent to Northport smelter for flux. **Ref:** 30, p. 90. 111, p. 8. 157. 158.

Copper King (88)

Loc: NE. cor sec. 25, (40-41E), Northport dist. **Elev:** 3,400 to 3,700 ft. **Access:** 1½ mi. from Deep Cr. road on Red Top Mtn. road. **Prop:** 2 claims: Copper King Nos. 1 and 2. **Owner:** Red Top Mining Co., Spokane, Wash. (1941). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite, tetrahedrite. **Gangue:** Quartz. **Deposit:** Ore occurs along contact of limestone and an intrusive dike. Also a 6- to 7-in. quartz vein in limestone. Bands of galena and sphalerite 4 to 10 in. wide. **Dev:** 285-ft. adit, 20-ft. shaft, 221-ft. adit. **Prod:** Has produced. **Ref:** 7, pp. 57-58. 30, p. 107. 46, pp. 76-77. 73, p. 102. 116, no. 3, 1908, p. 102. 158. 164, pp. 299-300.

Copper Queen (177)

(see under copper)

Coyote (Rightside)

(see Rightside under copper)

Coyote (Coyotte) (40)

Loc: Sec. 26 or 23, (40-39E). **Access:** 2 mi. W. to railroad at Northport. **Prop:** 3 patented claims. **Owner:** T. T. Richardson, Northport, Wash. (1941). **Ore:** Lead, silver, zinc, gold. **Ore min:** Argentiferous galena. **Gangue:** Quartz. **Deposit:** Argillite and limestone intruded by granite. A 2-ft. mineralized zone parallels the bedding in argillite. **Dev:** Shaft with 20-ft. drift at 20-ft. level, considerable trenching and open cut work. **Assays:** Said to run \$30 to \$60 per ton. **Prod:** Some lead-silver ore shipped 1915-1916. **Ref:** 30, p. 91. 46, p. 64. 63, p. 108. 97, 1916, p. 616; 1917, p. 506. 158. 164, p. 313.

Coyotte

(see Coyote)

Crackerjack (139)

Loc: Secs. 3 and 10, (37-39E), Colville dist. **Access:** 12 mi. N. of Colville by road. **Ore:** Lead. **Ref:** 158.

Crystal (101)

Loc: Secs. 7 and 18, (39-42E), Northport dist. **Owner:** W. L. Clearwaters, Millwood, Wash., lessee (1949). **Ore:** Lead. **Ref:** 68, p. 7.

Daisy

(see Daisy-Tempest under silver)

Daisy-Tempest (165)

(see under silver)

Dead Medicine

(see Silver Trail)

Deep Creek (57)

(see under zinc)

Deep Lake

(see Farmer under zinc)

Deer Trail (205)

(see under silver)

Defender (22)

(see under zinc)

Delmonico

(see Jay Dee under silver)

Dome

(see Avondale-Dome)

Dora

(see Acme)

Double Eagle (192)

Loc: SE¼ sec. 18, (31-39E), Chewelah dist. **Elev:** 4,400 ft. **Access:** Road. **Prop:** 4 claims: Wilson, Wilson No. 2, Marshall, Marshall No. 2. Also 200 acres of deeded land. **Owner:** Mike Kulzer, Valley, Wash. (1941). Double Eagle Mining Co. (1916-1926). Roy Dahl and associates (1939). Duke of Windsor Mines Corp. (1941). **Ore:** Lead, silver, copper. **Ore min:** Galena, pyrite, chalcopryrite. **Gangue:** Breccia, gouge, magnesite. **Deposit:** Slip zones in argillite, siliceous limestone, and quartzite are mineralized by pyrite. Loose boulders of solid ore on surface. Source undetermined. **Dev:** 750-ft. adit, 300-ft. adit, one other adit, and a shaft aggregate 2,200 ft. **Assays:** 3 truckloads of ore av. 70 oz. Ag, 22% Pb. **Prod:** 1916, 1939 (Early production was from boulders in surface mantle). **Ref:** 30, pp. 36-37. 97, 1916, p. 616; 1940, p. 480. 98, 1920-1926. 112, p. 176. 158. 164, pp. 179-180.

Double Standard (37)

(see under copper)

E. M. C. (158)

(see also Ark under silver)

Loc: Secs. 11 and 12, (35-37E), across canyon N. of the Silver Queen property, Kettle Falls dist. **Elev:** 2,000 ft. **Prop:** Several unpatented claims, now part of the Ark group. **Ore:** Lead, copper, silver. **Ore min:** Galena and a little chalcopryrite. **Deposit:** Quartz vein in argillite and limestone. **Dev:** Adit at least 50 ft. long, 35-ft. shaft. **Ref:** 30, p. 59. 58, p. 19. 164, p. 225.

Eagle (180)

(see under silver)

Eagle-Newport

(see Aguila)

Easter Sunday (20)

(see under gold)

Easy Money

(see Magma under zinc)

Echo (134)

(see under zinc)

Eldorado (87)

Loc: Sec. 24, (40-41E), Northport dist. **Access:** ½ mi. from road. **Prop:** 2 unpatented claims. **Owner:** Elmer Owens, Northport, Wash. **Ore:** Lead, silver. **Deposit:** A small pocket of ore about 12 in across in a fracture zone. **Dev:** 100-ft. adit, 150-ft. adit. **Ref:** 30, p. 108.

Eldorado (Magma)

(see Magma under zinc)

Electric Point (106)

(see also Lucky Four under silver)

Loc: Extends across the intersection of secs. 17, 18, 19, and 20, (39-42E), Northport dist. **Elev:** 3,000 to 4,700 ft. **Access:** 4 mi. by road from Leadpoint. **Prop:** 9 unpatented claims, including Lucky Four. **Owner:** Northwest Mining Syndicate, Spokane, Wash. (1955—). Electric Point Mining Co. (1917-1936). Arthur Simonson (1939-1943). A. G. Lotze (1944). Leadpoint Electric Mining Co. (1950). The State Mining Co. leasing from Mrs. N. I. Simonson, Colville, Wash. (1951). Northwest Mining Syndicate (1952). The State Mining Co. (1953). **Ore:** Lead, with minor amounts of silver, zinc, copper. **Ore min:** Galena, cerussite, anglesite, pyromorphite, limonite. **Gangue:** Siderite, clay, sand, brecciated dolomite. **Deposit:** Replacement bodies in limestone known as chimneys at brecciated intersections of two or more sets of fissures. Largest chimney had a depth of 800 ft. and a dia. of 150 ft. Most are 300 ft. or less deep and 100 ft. or less in dia. **Dev:** 10,000 ft. of drifts and crosscuts and several thousand ft. of shafts. Trenching by U. S. Bureau of Mines. **Assays:** 0.1% to 1.30% Pb, 0.1% to 1.90% Zn. A 4½-ton shipment in 1952 assayed 73.4% Pb, 3 oz. Ag. **Prod:** All years from 1901 to 1955 except 1921, 1923-1924, 1943, 1945-1946. Total to 1952 was 6,950 oz. Ag, 1,143 lb. Cu, 30,260,297 lb. Pb. **Ref:** 1, vol. 21, p. 62. 25. 30, p. 93. 73, pp. 85-90. 97, 1916-1920, 1925, 1926, 1928-1931, 1934-1952. 98, 1918-1926. 102, 1916, pp. 991-992. 104, 8/15/35, p. 26; 4/15/37, p. 35. 105, 1915, p. 647. 106, no. 1, 1917, p. 14; no. 18, 1918, pp. 4-5; no. 1, 1919, p. 4; no. 1, 1920, p. 50; 12/3/21, p. 11; 3/16/33. 108, 2/42, p. 38. 112, p. 177. 129, pp. 93-102. 130, p. 72. 141, pp. 21, 22, 43. 150, p. 39. 158. 164, pp. 306-307.

Elk (97)

Loc: Sec. 17, (39-42E), Northport dist. **Access:** Near road. **Prop:** 5 unpatented claims. **Owner:** R. Boucher and D. Boucher, Colville, Wash. (1941). **Ore:** Lead. **Deposit:** Lead chimneys in limestone. **Dev:** 4 shafts, 30 to 50 ft. deep, and a number of surface cuts. **Ref:** 30, p. 106.

Elvick (39)

(see under gold)

Emerald

Loc: Northport dist. **Ore:** Lead, zinc. **Prod:** 1926. **Ref:** 97, 1926, p. 470.

Empire (59)

(see under zinc)

Enterprise

(see Jay Dee under silver)

Eureka (4)

(see under gold)

Eureka (Uncle Sam)

(see Uncle Sam)

Eureka and Orient

(see Eureka under gold)

Evergreen (77)

Loc: Sec. 25, (40-42E), on S. slope of Red Top Mtn., Northport dist. **Elev:** 3,275 to 3,700 ft. **Access:** 5 mi. by road from railroad at Boundary. **Prop:** 5 claims including the Evergreen and Olympia. **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, cerussite, limonite, pyrite. **Deposit:** Several quartz veins along fracture zones in limestone and argillite. A 16-in. vein lies along the contact of the two rocks. **Dev:** 145-ft. adit, 177-ft. adit, 100-ft. shaft, 90-ft. shaft, several other shallow shafts and open cuts. **Prod:** Reportedly 25 tons of ore shipped in 1902. **Ref:** 46, pp. 55-56. 164, pp. 301-303.

Excelsior

Loc: Near Silver Crown property, Northport dist. **Access:** Near railroad. **Owner:** J. H. Young & Co. (1892). **Ore:** Lead, silver. **Ore min:** Galena, pyrite. **Deposit:** 2-ft. vein. **Dev:** 80-ft. adit. **Assays:** Ore from dump assayed 50% Pb, 118 oz. Ag. **Ref:** 12, p. 76. 13, p. 122.

Farmer (111)

(see under zinc)

Finley

Loc: 8 mi. NW. of Chewelah. **Access:** On railroad. **Prop:** 1 claim. **Owner:** W. H. Fife, J. M. Buckley, W. E. Sullivan (1892). **Ore:** Lead, silver, copper. **Ore min:** Galena, chalcopryrite, pyrite. **Deposit:** 3-ft. quartz vein. **Dev:** 75-ft. inclined shaft. **Assays:** Ore shipped yielded 20% Pb, 90 oz. Ag. **Prod:** Ore shipped to a Montana smelter prior to 1890. **Ref:** 12, p. 80. 13, p. 125.

Fish (159)

(see under silver)

Flannigan

(see Iroquois under zinc)

Flat Creek (32)

(see under zinc)

Fred B. (Chewelah Silver, Nabob) (184)

(see also Jay Gould under silver)

Loc: Sec. 9, (32-41E), N. of Nabob property, Chewelah dist. **Access:** ¼ mi. from road. **Prop:** 2 claims and 40 acres of deeded land. Now part of Jay Gould group. **Owner:** O. C. Niles, Chewelah, Wash. (1941). Chewelah Silver Mining Co. (1920-1935). **Ore:** Lead, silver. **Ore min:** Galena, pyrite, chalcopryrite, pyrrhotite. **Deposit:** 1-ft. quartz vein in quartzite carries some galena and pyrite. Country rock slightly mineralized for 4 ft. on each side of the vein. Near granite. **Dev:** 60-ft. shaft, open cut. **Ref:** 30, pp. 35, 40. 98, 1922-1925. 104, 7/15/35, p. 26. 164, p. 159.

Frisco Standard (72)

(see under silver)

Galena Farm (Galena Ridge) (128)

Loc: NE¼ sec. 7, (37-40E), on headwaters of Onion Cr., Northport dist. **Elev:** 4,700 ft. **Access:** Road. **Prop:** 6 unpatented claims. **Owner:** Clarence Culler and Elmer Mullen, Chewelah, Wash. (1949). Galena Farm Mining Co. (1918-1924). Radio Silver Lead Mining Co. (1926). **Ore:** Lead, silver, gold. **Ore min:** Argentiferous galena, pyrite, chalcopryrite, tetrahedrite. **Gangue:** Quartz, calcite. **Deposit:** Ore minerals occur in lenses of quartz and calcite in a shear zone in argillite and dolomite. **Dev:** 300-ft. adit, inclined shaft, vertical shaft, numerous open cuts. **Assays:** Said to carry 9 oz. Ag, \$2 to \$10 Au. **Ref:** 30, p. 112. 68, p. 8. 98, 1918-1926. 112, p. 179. 164, pp. 245-246.

Galena Hill (30)

Loc: Sec. 22, (39-38E), Orient dist. **Ore:** Lead. **Ore min:** Galena. **Gangue:** Quartz. **Deposit:** Argillite and limestone cut by basic dikes. Outcrops of quartz associated with the basic dikes or along the contact of the dikes and argillite carry galena. **Dev:** Several shafts and open cuts. **Ref:** 164, p. 255.

Galena Hill (Kettle River, Bliss) (17)

Loc: Near center sec. 35, (40-36E), on E. bank of Kettle R., Orient dist. **Elev:** 1,500 to 1,900 ft. **Access:** 1 mi. by road from railroad at Rockcut. **Prop:** 5 claims and 1 fraction. **Owner:** Walter S. Bliss, Orient, Wash. (1952). Galena Hill Mining Co. (1915-1924). **Ore:** Lead, zinc, silver, copper. **Ore min:** Galena, sphalerite, chalcopryrite, pyrite. **Gangue:** Quartz, calcite, dolomite. **Deposit:** Several small veins in schist near contact with diorite. One vein 6 in. to 8 ft. wide. Ore minerals occur as small pockets and stringers 4 in. and less in width. **Dev:** 300-ft. shaft from which there are 2 crosscuts, one 170 ft., the other 76 ft. long. Also 300 ft. of drifts. **Prod:** 1 car of conc. shipped in 1911. **Ref:** 7, pp. 85-87. 46, pp. 100-102. 97, 1913, p. 801. 98, 1922, p. 1647; 1925, p. 1817. 105, no. 23, 1914, p. 947. 129, pp. 162-163. 133, p. 36. 158. 164, pp. 287-288.

Galena Knob (126)

Loc: NE¼ sec. 21, (37-40E), on top of hill, Northport dist. **Elev:** 3,850 ft. **Access:** 4½ mi. by road from the Colville-Aladdin highway, and 16½ mi. by road from railroad at Colville. **Prop:** 160 acres of deeded land. **Owner:** W. Lon Johnson, Colville, Wash. (1944-1951). Leased by Roy Davidson and Lee Wood (1950—). **Ore:** Lead, silver. **Ore min:** Galena, cerussite, lead oxides. **Gangue:** Limestone breccia, quartz. **Deposit:** Brecciated limestone covers most of the hill. Mineralized breccia zone exposed is 4 ft. wide and is about 30% galena. The ore bodies are in quartz veins containing narrow branching veinlets and irregular pockets of galena. **Dev:** 50-ft. adit, 200-ft. shaft, open cuts, 2 old shafts. **Assays:** High-grade specimen showed 63.2% Pb, 0.03% Zn, 1.8 oz. Ag. **Prod:** 50 tons sorted ore from development work stored at property (1950). **Ref:** 30, p. 104. 69, p. 8. 157. 158.

Galena Ridge

(see Galena Farm)

Georgic (26)

(see under copper)

Germania (214)

(see under tungsten)

Giant Silver

(see Red Cloud under copper)

Gillete

(see Avondale-Dome)

Gladstone (107)

Loc: Secs. 17, 18, and 19, (39-42E), Northport dist. **Elev:** 3,500 to 4,700 ft. **Access:** 14 mi. by road to railroad at Boundary. **Prop:** Several unpatented claims, 5 patented claims: Lone Star, Moonlight, Setting Sun, Silver Bell, Silver Bell Fraction. **Owner:** Gladstone Mountain Mining Co., Spokane, Wash. (1918—), leasing to A. G. Lotze, Boundary, Wash. (1953—). **Ore:** Lead, silver, zinc, copper. **Ore min:** Galena, cerussite, anglesite, pyromorphite, limonite. **Gangue:** Clay, sand, dolomite breccia. **Deposit:** Chimney-type limestone replacements at brecciated intersections of two or more sets of fissures. Remnants of galena and cerussite imbedded in gangue. Most chimneys 10 to 15 ft. in dia. and 100 ft. deep. **Dev:** 4,000 ft. of old workings. New shaft 80 ft. deep. Trenching by U. S. Bureau of Mines. **Assays:** Much ore produced ran 50% or more Pb. Some samples assayed by U. S. Bureau of Mines

assayed as high as 7% Pb, 1.84% Zn. **Prod:** Every year (except 1945-1946) from 1901 to 1955. Total to 1953, 9,274 oz. Ag, 835 lb. Cu, 14,793,421 lb. Pb, 41,357 lb. Zn. **Ref:** 22, p. 6. 25. 30, p. 94. 73, pp. 90-94. 97, 1917, 1922-1926, 1928, 1930, 1931, 1934, 1935, 1937, 1938, 1940. 98, 1918-1926. 104, 12/15/34, p. 22; 7/30/35, p. 24; 4/15/37, p. 35. 106, no. 1, 1920, p. 50; no. 9, 1920, p. 2; no. 20, 1922, p. 2; 3/3/32; 9/15/32; 9/7/33. 112, p. 180. 129, pp. 102-104. 141, pp. 21, 22, 43. 150, p. 31. 158. 164, pp. 307-308.

Globe (24)

(see under copper)

Gold Bar (149)

(see under gold)

Gold Hill

(see under gold)

Good Enough

(see Sandiego under silver)

Gorien Zinc

(see under zinc)

Gray Eagle

(see Rightside under copper)

Great Northern (99)

Loc: Secs. 12 and 13, (39-41E), Northport dist. **Access:** 2½ mi. from Leadpoint on road to Gladstone mine. **Owner:** Wm. McCue. **Ore:** Lead. **Ref:** 158.

Great Republic (38)

(see under copper)

Great Western (62)

Loc: SW¼SW¼ sec. 24, (39-40E). Joins Last Chance property on N. **Elev:** 3,120 ft. **Access:** 6 mi. by road from railroad at Northport. **Prop:** 2 patented claims: Great Western, Empire. **Owner:** Sylvia K. Lemna, Long Beach, Calif. (1953). Last Chance Consolidated Mines, Inc., Spokane, Wash. (1948-1952). Norman Mines Co. (1915-1920). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite, smithsonite, cerussite. **Gangue:** Silicified limestone. **Deposit:** Ore is in pre-mineral faults in fine-grained marble along which are limonite seams from 0 to 18 in. wide, containing locally up to 50% galena as rich lenses. Known length of the mineralized fault zone is 1,000 ft. **Dev:** 1,000 ft. of adits and about 200 ft. in 3 shafts. **Assays:** One carload returned 16.4% Pb, 28.2% Zn. **Prod:** \$40,000 prior to 1917. **Ref:** 30, pp. 98-99. 46, p. 54. 73, pp. 106, 107. 97, 1916, 1925, 1926, 1928, 1929. 98, 1918, p. 1469; 1920, p. 1499. 105, 1916, p. 27. 130, p. 91. 133, p. 36. 158. 164, p. 311.

Grubstake

(see under silver)

H & B

(see Aichan Bee under silver)

Ham (Steel Galena, Iron Cap) (166)

Loc: NW¼NW¼ sec. 32, (34-39E). **Access:** 8 mi. by road to railroad at Addy. **Prop:** 40 acres of State-owned land. **Owner:** Leased by H. A. Ham, Colville, Wash. (1942). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** Several large galena boulders found in glacial drift. One boulder reportedly produced 12 tons of ore. No vein has been discovered in the vicinity. **Dev:** About 600 ft. of adits, and pits mostly in glacial drift. **Assays:** 25% to 40% Pb, 4 to 22 oz. Ag, tr. to \$4.00 Au. **Prod:** Several boulders totaling about 15 tons of ore were shipped in 1890. **Ref:** 30, p. 53. 58, p. 65. 158.

Hartbauer (89)

Loc: Sec. 25, (40-41E), Northport dist. **Access:** Near road. **Prop:** 40 acres of deeded land. **Owner:** Konrad Hartbauer,

Northport, Wash. (1941). **Ore:** Lead, silver, zinc. **Deposit:** Mineralized fracture zone with a max. width of 2 ft. **Dev:** 70-ft. adit, 2 open cuts. **Ref:** 30, p. 101.

Hartford

(see Krug under copper)

Hazel (81)

(see under silver)

Helena Johnson (60)

Loc: Sec. 24, (39-40E), on Deep Cr., Northport dist. **Access:** Road. **Prop:** 1 claim. **Owner:** Under lease to Telford I. Moore and Firmer Walkely (1941). **Ore:** Lead, zinc, silver. **Dev:** Adit. **Ref:** 30, p. 110. 46, p. 71.

Hi Cliff

(see Uncle Sam)

High Grade

(see Jay Dee under silver)

Highland (75)

Loc: Sec. 15, (40-42E), Northport dist. **Access:** ½ mi. from road. **Prop:** 2 unpatented claims: Highland Nos. 1 and 2. **Owner:** Charles Maki and R. Gezelius, Northport, Wash. (1941). **Ore:** Lead, zinc, silver, gold. **Deposit:** Quartz vein said to be 20 to 25 ft. wide and traceable for 1,400 ft. on the surface. **Dev:** 40-ft. shaft, 25-ft. shaft, 15-ft. adit. **Ref:** 30, p. 103.

Highland Chief

Loc: At head of Oropathan Cr., Cedar Canyon dist. **Ore:** Silver, copper. **Ref:** 63, p. 115.

Homebuilder (31)

Loc: Sec. 9, (39-38E), Orient dist. **Access:** Near road. **Prop:** 3 unpatented claims. **Owner:** Louis Larson, Northport, Wash. (1941). **Ore:** Lead, silver. **Deposit:** Mineralized quartz vein 4 to 12 in. wide. **Dev:** 100 ft. of work in an adit and a shaft. **Ref:** 30, p. 136.

Homestake (28)

(see under gold)

Honest John (191)

(see under silver)

Hoodoo (206)

(see under silver)

Hubbard (Royal Gold) (34)

Loc: E½ sec. 32, (40-39E), on top of peak at head of Squaw Cr. **Elev:** 4,000+ ft. **Access:** 10 mi. W. of railroad at Northport, on Forest Service road. **Prop:** 5 unpatented claims. **Owner:** Mines Management, Inc. (1949). Hubbard Mining Corp., Colville, Wash. (1945). Bruder Mining Co. **Ore:** Lead, zinc, silver, gold, copper. **Ore min:** Galena, sphalerite, tetrahedrite, pyrite, chalcopryrite. **Deposit:** Sulfides concentrated in small bunches in quartz vein from 10 to 12 ft. wide in phyllite. Vein has been traced 1,500 ft. **Dev:** 275-ft. and 125-ft. adits, 2 shafts about 30 ft. deep. **Prod:** Reportedly 1 carload of ore shipped. **Ref:** 30, p. 107. 104, 6/30/37. 108, 4/49, p. 51. 111, p. 8.

Hunter

(see Jackson under zinc)

Ibex (53)

Loc: Sec. 7, (37-40E), N. of divide between Onion and Clugston Creeks, Northport dist. **Elev:** 4,700 ft. **Access:** Road. **Prop:** 4 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver. **Ore min:** Galena, said to be argentiferous. **Deposit:** 4-ft. quartz vein in limestone and argillite. **Dev:** 8-ft. shaft and another shallow shaft. **Ref:** 30, pp. 112-113. 164, p. 244.

- Indian**
(see Eureka under gold)
- Iron Cap**
(see Ham)
- Iron Mask (14)**
(see under zinc)
- Iroquois (84)**
(see under zinc)
- Jackson (80)**
(see under zinc)
- Jay Dee (179)**
(see under silver)
- Jay Gould (182)**
(see under silver)
- Jayhawker (19)**
(see under copper)
- Joe Creek (125)**
(see under zinc)
- John Day (178)**
(see under silver)
- John Hays (163)**
(see under silver)
- Johnny Boy**
(see Moonshine-Johnny Boy under silver)
- Jupiter**
(see Last Chance)
- Just Time (Star) (76)**
Loc: W. center sec. 15, (40-42E), Northport dist. **Elev:** 4,000 ft. **Access:** 1½ mi. from railroad at Boundary. **Prop:** 1 claim, known as Just Time or Star. **Owner:** Abandoned (1941). Herman and H. V. Rieper (1924). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite, pyrite. **Gangue:** Quartz, calcite. **Deposit:** Limestone breccia cemented by quartz and calcite is sparsely mineralized. **Dev:** Shaft and other old workings caved (1941). **Ref:** 30, p. 111. 46, p. 53. 73, p. 105. 128, p. 62.
- Keough (74)**
Loc: NE¼ sec. 14, (40-42E), 1 mi. S. of Frisco Standard property. **Owner:** Mr. Keough (1913). **Ore:** Lead, zinc, gold, copper. **Ore min:** Galena, sphalerite, tetrahedrite, reportedly free gold. **Deposit:** Slightly mineralized quartz lenses in dolomite near its contact with shale. **Dev:** Open cuts. **Ref:** 7, p. 59.
- Kettle River**
(see Galena Hill)
- Keystone (98)**
(see under iron)
- King Tut**
Loc: Northport dist. **Ore:** Lead, zinc. **Prod:** Small shipment in 1926. **Ref:** 97, 1926, p. 470.
- Koyotte**
(see Rightside under copper)
- Krug (170)**
(see under copper)
- Lake View**
(see Hazel under silver)
- Lakeview**
(see Roosevelt under silver)
- Last Chance (Jupiter) (61)**
Loc: SW¼SE¼ sec. 24, (39-40E), on E. side of Deep Cr., Northport dist. **Elev:** 2,690 ft. **Access:** 5 mi. by road from railroad at Northport. **Prop:** 3 patented claims and a millsite. **Owner:** Last Chance Consolidated Mines, Inc., Spokane, Wash. (1948—). Jupiter Lead Co. (1907-1926). Norman Mines Co. (1915-1916). **Ore:** Lead, zinc, silver. **Ore min:** Galena, cerussite, anglesite, sphalerite, pyrite, limonite. **Gangue:** Calcite, quartz. **Deposit:** Ore shoots in a mineralized shear zone in dolomite, especially at fracture intersections. Zone up to 5 ft. wide. **Dev:** 4 adits and several open cuts and trenches total more than 1,000 ft. **Improv:** 60-ton gravity-flotation mill (1950). **Assays:** Galena ore said to have av. 55% Pb without concentration. Low Zn values and only 1 oz. Ag per ton. **Prod:** \$600,000 up to 1937. 1 carload ore 1938. Small shipments of conc. 1947-1949. **Ref:** 7, pp. 54-56. 30, pp. 107-108. 46, pp. 88-90. 73, pp. 106-107. 97, 1905-1911, 1916, 1926. 98, 1918-1926. 108, 7/40, p. 34. 112, p. 185. 113, 6/3/37, p. 7. 130, p. 91. 133, p. 36. 158. 164, pp. 309-310.
- Lead King (100)**
Loc: Secs. 12 and 13, (39-41E), just S. of Lead Trust mine, Northport dist. **Elev:** 3,200 ft. **Access:** ¼ mi. from road. **Prop:** 3 claims: Lead King, Rex Nos. 1 and 2. **Owner:** Elmer Godfrey, Northport, Wash. (1941). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite, limonite, cerussite. **Gangue:** Aragonite, dolomite, gouge. **Deposit:** Galena and sphalerite occur as irregular replacement bodies in dolomite. A tight fracture cut by the adit varies from a few in. to 2 ft. in width and carries considerable galena. **Dev:** 326-ft. adit, open cuts. **Ref:** 30, pp. 102-103. 73, p. 96. 129, pp. 106-107. 158.
- Lead Trust (93)**
Loc: Sec. 7, (39-42E) and sec. 12, (39-41E). **Elev:** 3,000 ft. **Access:** 2½ mi. by road from Leadpoint. 14 mi. by road to railroad at Northport. **Prop:** 4 claims and 20 acres of deeded land. **Owner:** Ray Cater, Marlin, Wash., leasing to Felix J. Cardinal, Spokane, Wash. (1951-1954). Lead Trust Mining Co. (1910-1915). Lead Trust Mine, Inc. (1922-1926). **Ore:** Lead. **Ore min:** Galena, limonite, cerussite. **Gangue:** Dolomite, siderite. **Deposit:** Ore occurs as irregular bunches in brecciated limestone. Ore body in lower adit was from 16 to 24 in. wide. **Dev:** Glory hole, 216-ft. adit, 500-ft. adit, and 3 other adits comprise 2,000 ft. of workings. **Prod:** 1939. Occasional shipments prior to 1924 are said to have amounted to 30,000 tons of lead ore. **Ref:** 30, pp. 93-94. 73, pp. 94-96. 97, 1917, 1923, 1925, 1926, 1930, 1940. 98, 1920-1926. 129, pp. 104-106. 133, p. 36. 141, p. 22.
- Leadhill**
Loc: T. 40 N., R. 42 E., Northport dist. **Owner:** Chas. Bostrom and Ivar W. Luhr. **Ore:** Lead. **Prod:** Has produced. **Ref:** 58, p. 38.
- Leadville (137)**
Loc: Secs. 3 and 10, (37-39E), Clugston Cr. area. **Access:** Road. **Prop:** 3 claims. **Owner:** Lead Trust Mines, Inc., Spokane, Wash. (1955—). **Ore:** Lead, silver. **Deposit:** Surface showings of lead and zinc high on mountain were not encountered in long adit. **Dev:** 1,250-ft. crosscut. **Ref:** 30, p. 80. 158.
- Legal Tender (203)**
(see under silver)
- Leon C. (102)**
Loc: Secs. 7 and 18, (39-42E) and secs. 12 and 13, (39-41E), Northport dist. **Access:** 14 mi. by road from railroad at Boundary. **Owner:** Wm. McCue. **Ore:** Lead. **Ref:** 158.

Little Frank (202)

Loc: NW¼ sec. 1, (29-37E). **Access:** 9½ mi. SE. of Fruitland by road. **Prop:** Fractional claim. **Owner:** Mr. Stiles, Fruitland, Wash. (1941). **Ore:** Lead, zinc, copper, silver. **Ore min:** Galena, sphalerite, tetrahedrite, malachite, limonite. **Deposit:** 12-in. quartz vein cutting limestone-shale series. **Dev:** 8- to 10-ft. crosscut and about 100 ft. of drifting. **Ref:** 7, p. 117. 30, p. 73.

Little Giant (6)

Loc: NW¼ sec. 30, (40-37E), Orient dist. **Elev:** 2,460 ft. **Access:** 2 mi. NE. of Rockcut and ¼ mi. E. of N. Fk. of Sand Cr. by road. **Prop:** 1 unpatented claim. **Owner:** George Bryant and Charles Taylor, Orient, Wash. (1941). Little Giant Mining Co. (1897). Domingo Mining, Milling, & Smelting Co. (1907-1918). **Ore:** Lead, copper, gold, silver. **Ore min:** Galena, pyrite, chalcopryrite, bornite, copper carbonates. **Gangue:** Quartz, calcite, siderite, epidote. **Deposit:** Altered diorite, cut by a camptonite dike, is traversed by fracture zones greatly altered and mineralized to some extent. **Dev:** 160-ft. shaft from which 2 drifts have been driven, one 200 ft. long. Also shallow shafts, open cuts, and some diamond drill holes. **Assays:** One drill core assayed \$23, another \$10. **Prod:** Small shipments prior to 1913. **Ref:** 7, p. 87. 30, p. 125. 33, 1908, p. 632. 63, p. 106. 98, 1918, p. 80. 106, 7/16/31, p. 17; 7/21/32, p. 1. 114, no. 5, 1909, p. 60. 116, no. 4, 1907, p. 21. 164, p. 286.

Lone Star (46)

(see under silver)

Longshot (Newland, Pioneer) (122)

Loc: NW¼ sec. 18, (36-41E), Colville dist. **Elev:** 3,700 ft. **Access:** 6 mi. by dirt road to highway. 16 mi. to railroad at Colville. **Prop:** 3 claims. **Owner:** Robert Ferguson and George Watson, Spokane, Wash. (1942-1952), leasing to Pioneer Mining Co., Spokane, Wash. (1951—). **Ore:** Lead, zinc, silver, cadmium. **Ore min:** Galena, sphalerite, tetrahedrite, scheelite. **Gangue:** Limestone, tourmaline. **Deposit:** Mineralized zone about 20 ft. thick and 150 ft. long at base of limestone bed in Maitlen phyllite. **Dev:** Open cuts, 600-ft. crosscut, diamond drill holes, several hundred ft. of drifts, stopes, raises. **Improv:** 40-ton mill (1953). **Assays:** 0.52% Cd. A grab sample of sorted ore showed 17.8% Pb, 13.4% Zn, 9.5 oz. Ag. Dec. 1952 production av. 12% to 15% Pb and Zn, 10 oz. Ag. **Prod:** 1951-1955. **Ref:** 133, p. 38. 157. 158.

Lucile (82)

(see under zinc)

Lucky Boy (129)

Loc: Sec. 7, (37-40E), ¼ mi. E. of Galena Farm property. **Elev:** 4,300 ft. **Access:** 16 mi. SE. of Northport by road. **Prop:** 5 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver, copper. **Ore min:** Galena, cuprite, azurite, malachite. **Gangue:** Quartz. **Deposit:** 3-ft. zone in limestone is sparsely mineralized. Ore fills small fracture zones parallel to the strike of the limestone. **Dev:** 40-ft. shaft, 8-ft. shaft, 38-ft. adit, open cuts. **Assays:** Ore from 8-ft. shaft said to carry silver. **Ref:** 30, p. 112. 164, pp. 244-245.

Lucky Charlie (8)

(see under copper)

Lucky Four (104)

(see under silver)

Lucky Stone (136)

Loc: NE¼ sec. 16, (37-39E), Clugston Cr. area. **Access:** ¼ mi. from road. **Prop:** 40-acre lease from the State. **Owner:** Lloyd T. Jacobson (1941). **Ore:** Lead, zinc, silver. **Deposit:** Said to be a "contact vein" 1 ft. to 4 ft. wide. **Dev:** 1,275 ft.

of adits, winzes, shafts, etc. Also several open cuts. **Assays:** Said to run 15% Pb, 12% Zn, 3 oz. Ag. **Ref:** 30, p. 81.

Lynn (156)

Loc: NW¼ sec. 7, (35-38E), on N. slope of Mingo Mtn. **Elev:** 2,900 ft. **Owner:** Earl Lynn, Colville, Wash. (1953). **Ore:** Lead. **Ore min:** Galena, pyrite. **Deposit:** Sparse clusters of galena and pyrite in quartz gangue in dolomite just below slate contact, in zone about 50 ft. wide. **Dev:** Open cut. **Ref:** 158.

McDonald

(see Keystone under iron)

McKinley (5)

(see under gold)

McKinley (29)

Loc: Sec. 34, (39-38E), on Crown Cr., Orient dist. **Elev:** 3,500 ft. **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** 4-ft. ledge in Rossland volcanics carries a little galena. **Dev:** 52-ft. adit. **Assays:** Selected samples reported to assay \$200 Ag. **Ref:** 164, p. 256.

McNally (18)

(see under copper)

Magma (115)

(see under zinc)

Maki (112)

Loc: S½ sec. 35, (39-41E), E. of S. end of Deep Lk., on Currant Cr. **Access:** Road. **Prop:** 160 acres of deeded land. **Owner:** Grandview Mines (1953—). Mrs. Katie Maki and George Dosser (1941-1952). **Ore:** Lead, zinc, cobalt. **Ore min:** Galena, sphalerite, pyrrhotite. **Gangue:** Calcite. **Deposit:** Erratic mineralization parallel to bedding in a zone 50 to 100 ft. thick and 600 ft. long in gray limestone adjacent to granite. **Dev:** 125 ft. of workings in 4 shafts, also a number of open cuts. **Assays:** Said to carry traces of cobalt. 7 samples showed 0.1% to 1.7% Pb, 0.1% to 5.0% Zn. **Prod:** Shipped conc. in 1921. **Ref:** 30, p. 96. 97, 1921, p. 428. 158.

Maple Leaf

(see Melrose under silver)

Margarete (1)

Loc: Sec. 14, (40-36E), Orient dist. **Access:** 1 mi. of steep trail from road. **Prop:** 1 claim. **Owner:** Abandoned (1941). **Ore:** Lead, gold, silver. **Ore min:** Galena, pyrite. **Deposit:** Mineralized fracture zone about 2 ft. wide. **Dev:** 50-ft. shaft. **Ref:** 30, p. 122.

Mayflower (188)

Loc: W. part sec. 28, (32-41E), Chewelah dist. **Prop:** 4 claims. **Owner:** Abandoned (1941). **Ore:** Lead, copper. **Ore min:** Chiefly galena, also chalcopryrite, cuprite, malachite, azurite. **Deposit:** Mineralized quartz vein in calcareous argillite, the latter cut by granitic dikes. **Dev:** Main shaft, shallow shafts, open cuts, trenches. **Ref:** 30, p. 35. 164, p. 159.

Melrose (68)

(see under silver)

Mexico

(see Queen under silver)

Michigan Boy (124)

Loc: Sec. 4, (36-40E) and sec. 33, (37-40E), about 13 mi. NE. of Colville, Mill Cr. area. **Prop:** 5 unpatented claims. **Owner:** Leo, Vaughn, Leon, Edna, and C. H. Sanders, and L. L. Perry, Northport, Wash. (1949-1952). **Ore:** Lead, zinc, silver. **Ore min:** Sphalerite, galena. **Deposit:** Spotty distribution of sulfides replacing limestone in fault zone. Exposed length of

65 ft., width of 1 to 3 ft., and depth of 35 ft. **Dev:** 40-ft. inclined shaft, 200-ft. crosscut and drift, trenches. **Ref:** 133, p. 37. 157.

Middleport (121)

(see under zinc)

Mineral Belt (47)

Loc: Sec. 35, (40-39E), Northport dist. **Elev:** 2,450 ft. **Prop:** Several claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver. **Ore min:** Galena. **Gangue:** Quartz. **Deposit:** A little galena occurs in a 2- to 6-in. mineralized zone parallel to the lamination of argillite. Lamprophyre forms the footwall. **Dev:** 240-ft. adit, shaft. **Ref:** 30, p. 113. 164, p. 313.

Mineral Hill

(see Aichan Bee under silver)

Monarch (140)

Loc: Secs. 3 and 10, (37-39E), 12 mi. N. of Colville. **Ore:** Lead. **Ref:** 158.

Monday Morning (117)

(see also Morning under silver)

Note: Probably this is the same as the Morning property. **Loc:** Sec. 4, (37-41E), near head of Deep Cr. **Elev:** 2,900 ft. **Ore:** Lead, silver. **Ore min:** Galena. **Deposit:** Quartz vein from 2 in. to 4 ft. wide along bedding planes of schist. Galena occurs in both the quartz and schist. **Dev:** Open cuts, 72-ft. adit. **Ref:** 58, p. 45. 164, pp. 176-177.

Montana and Washington (7)

(see under copper)

Montgomery (187)

(see under copper)

Monumental

(see Treadwell)

Moonlite

(see Morning under silver)

Moonshine-Johnny Boy (209)

(see under silver)

Morning (116)

(see under silver)

Mountain View (48)

(see under silver)

Mountain View Extension (49)

(see under silver)

Mullen (185)

Loc: W $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 16, (32-41E), 3 mi. E. of Chewelah. **Elev:** 2,900 ft. **Access:** Road. **Prop:** State lease. **Owner:** Elmer J. Mullen, Chewelah, Wash. (1952). **Ore:** Lead, silver, zinc, antimony, gold, copper. **Ore min:** Pyrite, sphalerite, tetrahedrite, zinkenite, meneghinite, galena, chalcopyrite, malachite. **Deposit:** Mineralized quartz vein 3 to 4 ft. wide and traceable for 150 ft. on the surface occurs along the contact of granodiorite and quartzite. Mineralized portion of the vein is 1 $\frac{1}{2}$ to 2 ft. wide. **Dev:** 17-ft. shaft. **Assays:** A sample of high-grade showed 33.8% Pb, 21.6 oz. Ag, 0.56 oz. Au, 9.7% Zn, 1.0% Cu, 5.6% Sb, 0.14% As. **Ref:** 132, pp. 142-143. 133, p. 37.

Myeerah (71)

Loc: E. center sec. 11, (40-42E), across the gulch W. of Frisco Standard mine. **Access:** Road. **Prop:** 4 unpatented claims. **Owner:** Jury Robinson, Northport, Wash., lessee (1949). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, tetrahedrite. **Deposit:** Vein 2 ft. wide consisting of quartz and sheared slate, cuts black slate. Numerous lamprophyre dikes. Vein traceable

for about 1,000 ft. **Dev:** 475 ft. of adits, numerous open cuts. **Assays:** Shipments returned 27% Pb, 13 oz. Ag. **Prod:** 1926. **Ref:** 30, p. 98. 68, p. 14. 97, 1926, p. 470. 128, p. 62. 158.

Myrtle

Loc: Bossburg dist. **Ore:** Lead, silver, gold. **Ref:** 13, p. 127.

Nabob

(see Fred B.)

Neglected (135)

Loc: Secs. 10 and 11, (37-39E), on high spur between 2 branches of Clugston Cr. **Access:** $\frac{1}{2}$ mi. from road. **Prop:** 4 claims: Pine Tree, Maty, New Discovery, Neglected No. 1. **Owner:** Joe Day (1941). **Ore:** Lead, zinc. **Deposit:** Country rock of argillite and limestone is cut by a mineralized quartz-calcite vein about 8 ft. wide. **Dev:** 150-ft. adit, 100-ft. shaft, 25-ft. shaft, several open cuts, shafts, and short adits. **Prod:** 1917, 1925, 1928. **Ref:** 30, p. 83. 97, 1917, 1925, 1928. 164, p. 241.

Nevada (168)

Loc: SW $\frac{1}{4}$ sec. 23, (32-39E), Chewelah dist. **Elev:** 3,400 ft. **Access:** 5 mi. by road and 1 mi. by trail SW. of Blue Cr. **Prop:** 40 acres of deeded land. **Owner:** Nevada Syndicate Mining Co., Chewelah, Wash. **Ore:** Lead, zinc, silver, copper. **Ore min:** Galena, sphalerite, tetrahedrite, chalcopyrite, pyrite. **Gangue:** Quartz, actinolite, epidote. **Deposit:** Ore minerals form pockets replacing limestone. The pockets range from a few inches to a foot or more in dia. **Dev:** 30-ft. shaft and 2 other shallow shafts. **Assays:** Ore reported to carry Ag. **Prod:** Carload of ore hauled to siding in 1903. **Ref:** 7, p. 111. 30, p. 37. 46, pp. 97-98. 97, 1925, p. 562. 100, 1903, pp. 83-84. 164, pp. 169-170.

New England (63)

(see under zinc)

New Leadville (Yo Tambien) (141)

Loc: SE $\frac{1}{4}$ sec. 3, (37-39E), Bossburg dist. **Elev:** 3,000 to 3,800 ft. **Access:** 12 mi. by road from railroad at Colville. **Prop:** 10 claims: Bye-Joe, Una, Monarch, Blue Bell, Surprise, Aspen, Botts, Tamarack, R. J. **Owner:** Sunrise Mining Co. (1941). New Leadville Mines Co. (1924-1927). Eureka Surprise Mining Co. (1928). **Ore:** Lead. **Ore min:** Galena, cerussite, wulfenite, limonite. **Gangue:** Calcite, siderite, quartz. **Deposit:** Ore minerals occur in a brecciated zone in dolomitic limestone. The ore body is irregular and bunched. Much of it has been stoped. **Prod:** Produced prior to 1924. **Ref:** 46, pp. 73-75. 73, pp. 115-116.

Newland

(see Longshot)

Newport (Eagle-Newport)

(see Aguila)

Niles (183)

Loc: Sec. 8, (32-41E), Chewelah dist. **Owner:** O. C. Niles, Chewelah, Wash. **Ore:** Lead, silver. **Ref:** 158.

Noble Four

(see under copper)

Norman King

Loc: Colville dist. **Ore:** Lead, silver. **Prod:** 1908. **Ref:** 97, 1908, p. 580.

North Monitor (197)

(see under silver)

Northern Light (50)

Loc: NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 5 and NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 4, (39-40E), adjoining Silver Crown property on the N., on the outskirts

of Northport. **Access:** Within 500 ft. of railroad. **Prop:** 1 patented claim: Northern Light. **Owner:** Mrs. W. H. Smiley, Spokane, Wash. (1944). Silver Crown Mining Co. (1890). **Ore:** Lead, silver, zinc. **Ore min:** Cerussite, lead oxide, sphalerite, smithsonite. **Deposit:** In sight is 3,000 tons of ore which is similar in character to that of Silver Crown mine. **Dev:** 70-ft. adit, 40-ft. shaft. **Ref:** 12, p. 74. 13, p. 120. 158.

Northport

(see Deep Creek under zinc)

Norway King

Loc: Colville dist. **Ore:** Lead, silver. **Prod:** 1908-1909. **Ref:** 97, 1908, p. 580.

Oakshott (118)

Loc: Sec. 4, (37-41E), Northport dist. **Access:** Road. **Prop:** 167 acres of deeded land. **Owner:** Tom and George Oakshott, Colville, Wash. (1941). **Ore:** Lead, silver, zinc. **Deposit:** Quartz veins. **Ref:** 30, p. 106.

Occidental (64)

(see under zinc)

Old Dominion (153)

(see under silver)

Olympia (78)

Loc: Sec. 25, (40-42E), on S. slope of Red Top Mtn., Northport dist. **Elev:** 3,275 ft. **Access:** 5 mi. by road from railroad at Boundary. **Prop:** 1 claim: Olympia. **Ore:** Lead, zinc. **Ore min:** Galena, cerussite, sphalerite, pyrite. **Gangue:** Limonite. **Deposit:** Chimney of ore at intersection of 2 steeply dipping fracture zones in limestone. Also some ore in a 3-ft. quartz vein. **Dev:** 177-ft. adit with a raise and 2 winzes. **Ref:** 164, pp. 302-303.

O'Neal

(see Rightside under copper)

Onion Creek

Loc: Bossburg dist. **Ore:** Lead. **Prod:** 1925. **Ref:** 97, 1925, p. 560.

Orazada (215)

(see under silver)

Orchid (196)

(see under silver)

Ore Cache (Oro Cache) (154)

Loc: Sec. 9, (35-40E), ½ mi. S. of Old Dominion mine. **Elev:** 2,800 to 2,990 ft. **Access:** Road near the property. **Prop:** Several claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver. **Ore min:** Galena. **Gangue:** Quartz. **Deposit:** Galena has replaced some of the fractures in limestone and is especially abundant at fracture intersections. Also a quartz vein on the property. **Dev:** 55-ft. adit, 83-ft. crosscut, 85-ft. adit, 40-ft. shaft, several open cuts and other short adits. **Prod:** 1916. **Ref:** 30, p. 52. 97, 1916, p. 615. 164, pp. 173-174.

Orient-Eureka

(see Eureka under gold)

Oro Cache

(see Ore Cache)

Owen

(see Lucile under zinc)

Paragon

(see Melrose under silver)

Perry (2)

Loc: Center E½ sec. 23, (40-36E), near top of cliff on E. side of Kettle R. **Elev:** 2,300 ft. **Access:** ½ mi. by trail E. of

road on E. side of Kettle R. **Owner:** Abandoned (1941). George Perry (1932). **Ore:** Lead, zinc, silver, gold. **Ore min:** Galena, pyrite, sphalerite. **Deposit:** Narrow quartz vein and some of the adjacent country rock mineralized primarily by galena. **Dev:** 500 ft. of drifts and crosscuts in 3 adits, several open cuts. **Assays:** Ore reportedly carries silver and gold. **Ref:** 30, p. 120. 158.

Pioneer

(see Longshot)

Plata Fino (210)

(see under silver)

Plata Rica (211)

(see under silver)

Plug (109)

(see under zinc)

Pomeroy (21)

(see under zinc)

Prosperity (85)

Loc: Secs. 29 and 30, (40-42E), Northport dist. **Access:** 8 mi. by road from railroad at Boundary. **Ore:** Lead. **Ref:** 158.

Providence (204)

(see under silver)

Providence (45)

Loc: Sec. 34, (40-39E), 4 mi. SW. of Northport. **Elev:** 4,000 ft. **Prop:** Several unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver, copper, zinc. **Ore min:** Pyrite, galena, tetrahedrite, sphalerite, chalcopyrite. **Deposit:** Argillite cut by acidic dikes. 2 quartz veins contained in acidic dikes are exposed. One vein is 12 in. wide. Also a mineralized dike 8 ft. wide. **Dev:** 100-ft. inclined shaft, 192-ft. adit, 2 other shafts. **Ref:** 30, p. 113. 164, pp. 314-315.

Queen (208)

(see under silver)

Queen and Seal

(see Queen under silver)

R. J. (143)

(see also Uncle Sam)

Loc: Sec. 3, (37-39E), about 400 ft. S. of Uncle Sam property, Northport dist. **Prop:** Now part of Uncle Sam group. **Ore:** Lead, silver. **Ore min:** Galena, cerussite. **Gangue:** Quartz, siderite. **Deposit:** 10-ft. breccia zone in limestone has been cemented by ore and gangue minerals. **Dev:** Several open cuts, shallow shafts, and short adits. **Assays:** Said to carry Ag. **Prod:** 2 carloads of ore. **Ref:** 30, p. 84. 164, pp. 242-243.

Rainbow

(see under silver)

Ranch View (79)

Loc: NE¼ sec. 19, (40-42E), on E. side of Red Top Mtn., Northport dist. **Access:** ½ mi. from road. **Prop:** 2 unpatented claims. **Owner:** A. D. Terry, Boundary, Wash. (1941). **Ore:** Lead, zinc, silver. **Deposit:** Vein in argillite and limestone from 6 in. to 2 ft. in width. **Dev:** 30-ft. shaft and 2 adits comprising 210 ft. of work. **Ref:** 30, p. 98.

Red Cloud (201)

(see under copper)

Red Iron (95)

Loc: Sec. 8, (39-42E), on W. side of Black Cat property, Northport dist. **Elev:** 3,800 ft. **Access:** 1 mi. from road. **Prop:** 4 claims: Red Dick, Tamarack, Red Iron Nos. 1 and 2. **Owner:** Abandoned (1941). **Ore:** Lead. **Ore min:** Galena, cerussite,

limonite. **Gangue:** Clay, altered limestone, quartz, siderite. **Deposit:** Chimneys of lead ore along fracture intersections in limestone. **Dev:** 80-ft. shaft, 20-ft. shaft, open cuts. **Assays:** Ore from a 50-ft. shaft on Red Iron No. 1 claim said to assay 7% Pb. **Ref:** 30, p. 99. 73, pp. 96-97. 164, pp. 308-309.

Red Top (90)

(see also Anaconda, Copper King)

Loc: NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 25, (40-41E), Northport dist. **Elev:** 3,100 ft. **Access:** 16 mi. by road from railroad at Northport. 1 $\frac{1}{2}$ mi. of good truck road connects the property with the Leadpoint-Northport road 4 mi. from Leadpoint. **Prop:** 5 patented and 3 unpatented claims, including the Anaconda. **Owner:** Pacific Northwest Mining Co., Bremerton, Wash. (1952-1954). Red Top Mining Co., Spokane, Wash. (1924-1952). **Ore:** Lead, zinc, silver, tungsten. **Ore min:** Galena, sphalerite, chalcopryrite, pyrite, scheelite. **Gangue:** Quartz. **Deposit:** Mineralized shear zones in marble and argillite crisscrossed by quartz veins. Some ore shoots as much as 4 ft. wide and 18 ft. long. **Dev:** 2,700-ft. adit; some 1,500 ft. of drifts, raises, and winzes have been opened off the adit. **Improv:** Several buildings in good condition. **Assays:** High-grade sample showed 36% Pb, 18% Zn, 16 oz. Ag. One zone carried 2% to 4% scheelite. **Prod:** Small shipments of lead-silver-zinc ore 1938, 1944, 1953. 4 shipments prior to 1939 totaled about 200 tons of ore. **Ref:** 30, pp. 89, 100-101. 37, pp. 59-61. 46, pp. 69-70. 97, 1928, p. 703; 1939, p. 491; 1945. 98, 1922, p. 1663; 1925, p. 1829. 104, 8/15/32, p. 29. 106, 8/4/32; 9/7/33. 150, p. 38. 158.

Redwood (181)

(see under silver)

Rightside (152)

(see under copper)

Rinchaw

(see Middleport under zinc)

Riverview (43)

Loc: SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 30, (40-40E), Northport dist. **Owner:** John A. Peterson and William Parrott, lessees, Colville, Wash. (1952). **Ore:** Lead, zinc, silver. **Ref:** 133, p. 38.

Robena

(see Young America under zinc)

Rockcut (3)

Loc: Secs. 23 and 26, (40-36E), Orient dist. **Access:** Road. **Prop:** Several unpatented claims. **Owner:** W. S. Bliss, Orient, Wash. (1941). **Ore:** Lead, silver, zinc. **Deposit:** Quartz vein which varies from a few in. to 5 ft. in width. Said to be 5,000 tons of ore blocked out. **Dev:** 700 ft. of shaft with some drifting. **Assays:** Ore blocked out said to run \$6 to \$22 per ton. **Ref:** 30, p. 135.

Rocky Creek

(see Burrus under zinc)

Roosevelt (69)

(see under silver)

Rosebud (164)

Loc: Sec. 22, (34-37E), Summit dist. **Access:** Near road. **Prop:** 3 unpatented claims. **Owner:** Abandoned (1941). **Ore:** Lead, silver. **Deposit:** Small stringers of quartz 1 in. and less in width. **Dev:** Small shaft and surface cuts, caved (1941). **Ref:** 30, p. 65.

Royal

(see Big Chief)

Royal Gold

(see Hubbard)

S. L.

(see under tungsten)

St. Crispin (41)

(see under gold)

Sandiego (199)

(see under silver)

Santa Rita

(see Cleveland)

Saratoga

(see under gold)

Saturday Night-Sunday Morning (212)

Loc: Sec. 11, (29-37E), Deer Trail dist. **Elev:** 3,600 ft. **Access:** Poor road. **Prop:** 2 claims. **Owner:** Mr. Stiles, Fruitland, Wash. (1941). Plata Fino Mining Co. (1918-1920). **Ore:** Lead, silver, zinc, copper. **Ore min:** Galena, sphalerite, tetrahedrite, malachite, limonite. **Gangue:** Quartz, barite. **Deposit:** Ore minerals occur in small patches along fracture zones in limestone and argillite. Main vein is about 18 in. wide. **Dev:** About 800 ft. of workings in several adits and shafts, mostly caved. **Assays:** 2 tons from 50-ft. level from shaft shipped prior to 1897 returned 71 oz. Ag at smelter. **Prod:** Small amount. **Ref:** 7, p. 116. 30, p. 73. 63, p. 115. 112, p. 197. 164, pp. 191-192.

Sauvola

(see Blue Lime)

Scaman (83)

Loc: Sec. 19, (40-42E), on Red Top Mtn., Northport dist. **Elev:** 2,850 to 2,925 ft. **Access:** 6 mi. by road to railroad at Boundary. **Prop:** 4 claims and 1 fraction. **Owner:** Fred Scaman & Bros., Wenatchee, Wash. (1920). **Ore:** Lead. **Ore min:** Galena, cerussite. **Deposit:** Ore found as pockets in limestone near a dike. Width of ore zone about 3 ft. **Dev:** 340-ft. adit, 240-ft. adit with some drifting. **Prod:** 65 tons from upper adit prior to 1920. **Ref:** 7, p. 57. 164, pp. 297-298.

Scandia (56)

(see under zinc)

Schenk

(see Rightside under copper)

Seal

(see Queen under silver)

Shoemaker (123)

(see under zinc)

Short Wait (54)

Loc: Sec. 17, (39-39E), on W. side of Columbia R. **Access:** 1 mi. from highway. **Prop:** 5 unpatented claims. **Owner:** George McGowan, Northport, Wash. (1941). **Ore:** Lead, zinc, silver, gold, copper, molybdenum. **Deposit:** Small pockets of ore along a fracture zone. **Dev:** 20-ft. shaft, 18-ft. adit. **Ref:** 30, pp. 94-95. 158.

Sierra Zinc (114)

(see under zinc)

Silver Basin

(see Queen under silver)

Silver Crest

(see under silver)

Silver Crown (51)

Loc: NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 5 and NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 4, (39-40E), on outskirts of town of Northport. **Elev:** Workings at 2,100 to 2,300 ft. **Access:** Within 500 ft. of railroad. **Prop:** 1 patented claim: Silver Crown. **Owner:** Mrs. W. H. Smiley, Spokane,

Wash. (1944). Hughes estate (1941). **Ore:** Lead, silver, zinc. **Ore min:** Cerussite, lead oxide, sphalerite, smithsonite. **Deposit:** Ore is in quartz fissure veins along faults in limestone. The veins are less than 2 ft. wide and generally are only 2 or 3 in. They are mineralized for a few yd. laterally and vertically, as exposed on the surface and in shafts. **Dev:** 60-ft. shaft, 130-ft. adit with 73 ft. of crosscuts, 100-ft. adit. **Assays:** Best showing 2 to 5 ft. wide and 100 ft. long est. to contain 1% to 2% Pb, 2% to 3% Zn. **Prod:** Reportedly 2 cars of ore shipped. **Ref:** 12, p. 74. 13, p. 120. 30, p. 104. 97, 1925, p. 561; 1926, p. 470. 100, vol. 10, 1902, p. 49. 158.

Silver Key

(see Big Chief)

Silver King

Loc: 4½ mi. SE. of Northport. **Prop:** 4 claims. **Owner:** Silver King Mining Co. (1902). **Ore:** Lead, silver. **Deposit:** Several veins of lead-silver ore. **Dev:** 3 shafts, 30 ft., 28 ft., and 20 ft. in depth. **Assays:** Some assays of solid ore yielded 77% Pb, 6 oz. Ag. **Ref:** 88, p. 6.

Silver Mountain

(see Daisy-Tempest under silver)

Silver Queen (Ark)

(see Ark under silver)

Silver Queen (Queen)

(see Queen under silver)

Silver Seal

(see Queen under silver)

Silver Summit (Summit) (167)

Loc: Near center sec. 33, (33-38E), Chewelah dist. **Access:** Road. **Prop:** 2 patented claims. **Owner:** Mrs. A. J. Moore, Seattle, Wash. (1941). Silver Summit Mining Co. (1923-1926). **Ore:** Lead, silver, copper. **Ore min:** Galena, anglesite. **Gangue:** Quartz. **Deposit:** 3-ft. vein cutting trachite. **Dev:** 2 shafts, one a 300-ft. incline from which 300-ft. and 40-ft. drifts have been driven. **Assays:** 20% to 41.30% Pb, 15 to 63 oz. Ag. **Prod:** Some rich silver ore packed out in the 1880's. **Ref:** 12, p. 26. 30, pp. 38-39. 63, p. 113. 97, 1923, p. 414. 98, 1925, p. 1832; 1926, p. 1595. 117, no. 1, 1922, p. 41. 141, p. 22.

Silver Trail (Clugston, Dead Medicine) (146)

Loc: N. part sec. 33, (38-39E), near head of E. branch of Bruce Cr. **Elev:** 3,025 ft. **Access:** 8 mi. by road to railroad at Bossburg. **Prop:** 2 patented and 4 unpatented claims. **Owner:** Silver Trail Mining Co. (1912-1952). Leased by Robert Ramser, Spokane, and A. B. Sylvester, Evans, Wash. (1951-1952). John Keough (1887-1889). I. N. Peyton (1889). **Ore:** Lead, silver, zinc, cadmium. **Ore min:** Galena, sphalerite, chalcopryrite. **Deposit:** Quartz vein 1½ to 8 ft. wide in argillite and quartzite is parallel to and within 600 ft. of granite contact. **Dev:** 850-ft. lower adit, 320-ft. upper adit from which the ore was shipped. Total about 2,000 ft. **Improv:** Bunkers (1952). **Assays:** 5,000 tons of ore av. 7 oz. Ag, 1½% Pb. A carload assayed 54.5 oz. Ag, 14.1% Pb, 9.5% Zn, 16% S, 11% Fe, 1.7% CaO, no Au. **Prod:** \$122,000 prior to 1928. 1938, 1939, 1941, 1950, 1951. **Ref:** 12, p. 82. 13, pp. 127-128. 30, p. 84. 46, pp. 57-59. 97, 1912, 1925, 1939, 1940. 98, 1918-1926. 104, 4/15/28, p. 56; 2/15/34, p. 20; 6/15/35, p. 27. 106, 5/1/30, p. 20. 108, 4/15/52, p. 85. 112, p. 203. 133, p. 39. 164, pp. 246-248.

Silver Wave

Loc: Bossburg dist. **Ore:** Lead, silver. **Ref:** 13, p. 127.

Smoky Bullion

(see A and C under copper)

Snyder and Baxter

(see under silver)

Squire

Loc: Summit dist., 18 mi. W. of Chewelah. **Access:** Road from Chewelah. **Prop:** 4 claims, including the Summit and Blanche. **Owner:** J. N. Squire (1890). **Ore:** Lead, silver, copper. **Ore min:** Galena, anglesite, chalcocite. **Gangue:** Quartz. **Deposit:** 2 veins, one 3 ft. wide carries lead and silver, another 2 ft. wide carries copper and silver. **Dev:** 300-ft. shaft, 50-ft. incline. **Assays:** High-grade from Summit claim assayed 50 oz. Ag, 45% Pb. Lesser grade assayed 15 oz. Ag, 20% Pb. Ore from Blanche claim assayed 100 to 400 oz. Ag, 8% to 10% Cu. **Ref:** 12, pp. 76-77. 13, pp. 122-123.

Star

(see Just Time)

Steel Galena

(see Ham)

Stemwinder (11)

(see under copper)

Sterrett (44)

Loc: Sec. 33, (40-40E), Northport dist. **Access:** Near road. **Prop:** 10 acres of deeded land. **Owner:** Ray Evans, Northport, Wash. (1941). **Ore:** Lead, silver, zinc, gold. **Deposit:** Vein which varies in width from nothing to 3 ft. **Dev:** 500 ft. of work in drifts, raises, and stopes. **Assays:** 5,870-lb. shipment assayed 56.2% Pb, 3% Zn, 34.2 oz. Ag, 0.013 oz. Au. **Prod:** 5,870 lb. shipped prior to 1941. **Ref:** 30, p. 100.

Stone

(see New England under zinc)

Stonewall-Sunnyside (55)

Loc: Secs. 16 and 22, (39-40E), Northport dist. **Access:** 1 mi. by trail from road. **Prop:** 3 unpatented claims. **Owner:** Henry Evjin, Northport, Wash. (1941). **Ore:** Lead, zinc, silver. **Deposit:** Vein said to av. 3 ft. in width occurs along the contact of granite and argillite. **Dev:** 75-ft. shaft and 300-ft. crosscut. **Ref:** 30, p. 95.

W. B. Stuart

(see John Day under silver)

Sugar Loaf

(see Vanasse under silver)

Summit

(see Silver Summit)

Sunday Morning

(see Saturday Night-Sunday Morning)

Sunnyside

(see Stonewall-Sunnyside)

Sunset (42)

Loc: SW¼ sec. 30, (40-40E), ½ mi. N. of Northport, 300 ft. W. of Columbia R. **Elev:** 1,350 ft. **Prop:** 20 acres of deeded land. **Owner:** Mr. Gourley and associates, Wenatchee, Wash. (1941). **Ore:** Lead, silver, gold, zinc, copper. **Ore min:** Galena, sphalerite, pyrite, tetrahedrite, chalcopryrite, much pyrrhotite. **Gangue:** Quartz. **Deposit:** Mineralization along contact of kersantite dikes with limestone and shale. Vein varies from a few inches to several feet in width. **Dev:** 400-ft. inclined shaft from which short drifts were driven at 100-ft. intervals. **Assays:** \$2.00 to \$62.00 Au, 3.0 to 38.9 oz. Ag, 9.0% to 75.0% Pb. **Ref:** 7, pp. 59-60. 116, no. 2, 1908, pp. 37-38. 164, p. 316.

Superior Copper (169)

(see under copper)

Surprise

(see Uncle Sam)

Tempest

(see Daisy-Tempest under silver)

Tenderfoot (Avondale-Dome)

(see Avondale-Dome)

Tenderfoot (Big Chief)

(see Big Chief)

Three Orphans (9)

Loc: Sec. 26, (40-36E), Orient dist. **Elev:** 2,190 ft. **Access:** Near road. **Prop:** 1 claim. **Owner:** Adrian Gold Mining & Milling Co. (1920-1941). **Ore:** Lead, gold, silver. **Ore min:** Galena. **Deposit:** 4- to 10-in. vein of quartz cutting Orient gneiss contains a small amount of galena. Another vein of white crystalline quartz also occurs on the claim. **Dev:** 240-ft. adit. **Assays:** Reported to carry Au. **Ref:** 30, p. 119. 164, p. 288.

Togo (200)

(see under copper)

Tom Moore (12)

Loc: W½ sec. 30, (40-37E), Orient dist. **Access:** Just N. of the road on a flat. **Prop:** 1 unpatented claim. **Owner:** Abandoned (1941). **Ore:** Lead, silver, gold. **Ore min:** Galena. **Deposit:** A 1-ft. quartz vein carrying considerable galena. **Dev:** A series of shallow open cuts, one 15 ft. long and 8 ft. deep. **Ref:** 30, p. 119. 164, pp. 284-285.

Treadwell (Iron Mask)

(see Iron Mask under zinc)

Treadwell (Monumental) (92)

Loc: Sec. 12, (39-41E). **Elev:** 3,500 ft. **Access:** 17 mi. by road from railroad at Northport. **Prop:** Several claims. **Owner:** Monumental Lead Co. (1914). **Ore:** Lead. **Ore min:** Galena, pyrite. **Gangue:** Limestone, dolomite. **Deposit:** Ore occurs as pockets or bunches in limestone and dolomite. Resembles Metaline occurrences. **Dev:** Several open cuts and short adits. **Prod:** No large shipments. **Ref:** 7, p. 56.

Trojan (23)

(see under gold)

Tungsten King (190)

(see under tungsten)

Turquoise

Loc: Northport dist. **Ore:** Lead. **Prod:** 1918. **Ref:** 97, 1918, p. 510.

Uncle Sam (27)

(see under copper)

Uncle Sam (Hi Cliff, Eureka, Surprise) (144)

Loc: Sec. 3, (37-39E), near head of Clugston Cr., Northport dist. **Elev:** 3,000 to 3,125 ft. **Access:** 12 mi. by road from railroad at Colville. **Prop:** 2 unpatented claims. **Owner:** Ray and Roy Johnson leasing (1948) from J. D. McDonald, Evans, Wash. (1941-1948). New Leadville Co. (1924). **Ore:** Lead, zinc, silver. **Ore min:** Galena, sphalerite, smithsonite, cerussite. **Gangue:** Quartz, dolomite. **Deposit:** Ore occurred as a chimney in highly brecciated dolomite. Chimney 185 ft. long and 4½ to 8 ft. in dia. Similar to Gladstone. **Dev:** 3 adits comprise 1,400 ft. One at least 400 ft. long. Upper one 65 ft. long with winze at face said to intersect lower adit. Considerable stoping from upper adit. **Improv:** One building in poor repair. **Assays:** One sample across 3.5-ft. width showed 0.34 oz. Ag, 7.2% Pb, 6.4% Zn. **Prod:** Considerable tonnage of lead ore produced prior to 1924. Produced 1948-1949. **Ref:** 30, p. 80. 46, pp.

73-74. 68, p. 7. 73, pp. 116-117. 97, 1926, p. 469. 98, 1926, pp. 1588, 1598. 106, 9/17/31, p. 14. 157. 158. 164, pp. 243-244.

United Treasure (70)

(see under silver)

Van Stone (127)

(see under zinc)

Vanasse (150)

(see under silver)

Venus

(see Deer Trail under silver)

Victory

(see Vanasse under silver)

Viking (16)

(see under copper)

Washington

(see Montana and Washington under copper)

Washington Black Rock

(see Black Rock under zinc)

Wellington

Loc: 4 mi. S. of Daisy mine, Summit dist. **Prop:** 1 claim. **Owner:** W. H. Kearney (1892). **Ore:** Lead, silver. **Ore min:** Cerussite, siderite. **Deposit:** 2½-ft. vein. **Dev:** 30-ft. shaft, crosscut. **Assays:** 75 oz. Ag, 20% Pb. **Ref:** 12, p. 78. 13, p. 124.

Wells Fargo (194)

(see under antimony)

White Horse (35)

(see under copper)

Wildcat (Boucher) (105)

Loc: Near center sec. 18, (39-42E), Northport dist. **Elev:** 3,900 to 4,500 ft. **Access:** 4 mi. by road from Leadpoint. **Prop:** 2 claims and 1 fraction. **Owner:** Heirs to the estate of B. A. Boucher (1949). **Ore:** Lead. **Deposit:** 2 gossan outcrops like those on chimneys of lead ore mined at Gladstone and Electric Point mines. **Dev:** Trenching by U. S. Bureau of Mines, 100 ft. of old shafts. **Ref:** 25, p. 6. 30, p. 105.

Wilkie Lode (175)

Loc: Sec. 33, (33-41E), Chewelah dist. **Access:** 1 mi. from road. **Prop:** 1 unpatented claim. **Owner:** Messrs. Dobson and Schmeller, Colville, Wash. (1941). **Ore:** Lead, silver, copper. **Deposit:** Quartz vein about 4 ft. wide. **Dev:** Open cuts. **Assays:** One assay showed 15% Pb. **Ref:** 30, p. 36.

Windfall (186)

(see under copper)

Winslow (174)

Loc: Sec. 26, (33-41E), Chewelah dist. **Elev:** 3,900 ft. **Access:** Road. **Prop:** 3 claims. **Owner:** John Harritt, Spokane, Wash. (1941). Silver Queen Mining Co. (1920). **Ore:** Lead, copper, zinc, gold, silver. **Ore min:** Galena, chalcopryrite, pyrite, sphalerite. **Gangue:** Quartz, calcite. **Deposit:** Quartzite with interbedded slate and chert is cut by a vein consisting of quartz and breccia. **Dev:** 230-ft. crosscut, 80-ft. shaft, 30-ft. shaft. **Assays:** \$8.00 Au reported. **Ref:** 30, p. 35. 164, p. 158.

Woohaa

(see Bechtol)

Yo Tambien

(see New Leadville)

Young (110)

Loc: NW¼NW¼ sec. 34, (39-41E). **Elev:** 2,150 to 2,250 ft. **Owner:** Goldfield Consolidated Mining Co., lessee (1949). A. W.

Young and Walter Johnson, Northport, Wash. (1945). **Ore:** Lead, zinc. **Ore min:** Galena, sphalerite. **Deposit:** Disseminated sulfides in limestone at and near its contact with granite. **Dev:** 5 open pits. **Ref:** 68, p. 10. 157.

Young America (147)
(see under zinc)

WHATCOM COUNTY

Allen Basin (6)
(see under gold)

Azurite (12)
(see under gold)

Baltimore Mines, Inc. (7)
(see under gold)

Chancellor (8)
(see under gold)

Evergreen (4)
(see under gold)

Galena
(see Verona under gold)

Gargett (2)
(see under gold)

Gold Hill (9)
(see under silver)

Golden Arrow
(see Tacoma under gold)

Great Excelsior (1)
(see under gold)

Indiana
(see Chancellor under gold)

Lincoln
(see Great Excelsior under gold)

Mammoth (10)
(see under gold)

Northern Cascade
(see Gold Hill under silver)

Peterson
(see Gold Hill under silver)

President
(see Great Excelsior under gold)

Saginaw (3)
(see under gold)

Tacoma (11)
(see under gold)

Verona (5)
(see under gold)

Willow Lake
Loc: On upper Skagit R. **Prop:** 1 unpatented claim. **Owner:** Alfred Standberg, Seattle, Wash. (1952). **Ore:** Lead. **Ref:** 158.

YAKIMA COUNTY

Chinook (3)
(see under copper)

Elizabeth Gold Hill (2)
(see under gold)

Gold Hill (1)
(see under gold)

Keystone (5)
(see under copper)

Richmond (4)
Loc: NE¼ sec. 32, (16-13E), on Martha Cr. near headwaters of N. Fk. of Rattlesnake Cr. **Elev:** 4,600 ft. **Access:** 3 mi. by trail from Clover Spring. **Prop:** 26 unpatented claims. **Owner:** George V. Rankin, Frank Hardy, William Eamon, and Lin B. Bissell, Yakima, Wash. (1946). **Ore:** Lead, silver, zinc, copper, gold. **Ore min:** Galena, tetrahedrite, sphalerite, pyrite, malachite, azurite, arsenopyrite, bornite, chalcopyrite. **Gangue:** Siderite, calcite, quartz. **Deposit:** A 2-ft. shear zone in andesite. Brecciated rock has been cemented by calcite and ore minerals. Ore minerals occur in small local shoots. **Dev:** 3 adits, one 50 ft., another 10 ft. long, and a longer one caved. Also a shaft and an open cut. **Improv:** Cabin (1946). **Assays:** 5 assays on picked samples show 22.5 to 248.0 oz. Ag, 0.02% to 5.02% Pb, 0.08% to 1.08% Zn, 0.02% to 1.87% Cu. **Ref:** 58, p. 58. 158.

LITHIUM

Properties—Lithium is the lightest element which is solid at ordinary temperatures, and only the gases hydrogen and helium have lower atomic weights. It is less than one-third as heavy as aluminum and half as heavy as water. It is silver white and has a brilliant luster on fresh surfaces but slowly tarnishes when exposed to air. It is ductile, readily extrudable, and soft ($H=0.6$), being harder than sodium and potassium but softer than lead and softer than talc. Chemically, it is similar to the other alkali metals, sodium, potassium, rubidium, and cesium. It has a valence of 1, and forms salts analogous to those of sodium and potassium. Lithium reacts with water to form the hydride and hydrogen. Pound for pound, it is the most effective metallic reducing agent, and it is not only an efficient deoxidizer but it also has a high affinity for nitrogen, hydrogen, sulfur, phosphorus, carbon, and silicon. Other properties are shown in the table on page 12.

Uses—Lithium metal, alloys, and compounds have a wide variety of uses, although as yet only in compara-

tively small quantities. The principal use of the metal is as a scavenger for degasification and deoxidation of high-conductivity copper and other nonferrous metals. Similarly, it is used as a "getter" in vacuum tubes. The metal is used in certain organic chemical reactions, and is reported to be used in the production of tritium for the thermonuclear bomb ("hydrogen bomb") project of the United States Atomic Energy Commission. Lithium may be alloyed with aluminum, lead, copper, zinc, iron, calcium, beryllium, and magnesium; even in very minor amounts it imparts the qualities of hardness, toughness, tensile strength, ductility, and improved uniformity to its alloys. In high-pressure castings it densifies the grain in the metal and eliminates porosity. It is used to improve the qualities of certain steels and is used, as a substitute for tin, to harden bearing alloys. Lithium minerals and compounds have an even wider use than the metal and alloys, in the glass, optical, ceramic, chemical, and air-conditioning industries. Lithium chloride is one of the most efficient desiccants known. In addition, various lith-

ium salts are used in high-temperature greases (an important and rapidly expanding use), in medicines (a declining use), in photographic developers, alkaline storage batteries, and pyrotechnics. Lithium hydride (LiH) is a convenient source of hydrogen. One cubic foot of the hydride, when combined with water, will produce 2,300 cubic feet of hydrogen.

Production—The only two plants in the United States producing the metal in 1950 were in New Jersey and Minnesota. Their total output usually is only a few tens of thousands of pounds per year. Annual shipments of lithium ore from domestic mines averaged 1,327 tons (equivalent to 88 short tons of Li_2O) valued at \$48,280 per year in the years 1935-1939. The 1940 shipments were nearly one-third larger, and by 1944 they were 10 times larger. By 1947 production dropped back to only about one-fifth of the war-time peak, but this was still twice as great as pre-war, and production increased rapidly again, so that by 1950 the tonnage almost equaled the war-time high, and the value was greater.

No lithium minerals have been mined in Washington, nor are there any plants in the state producing the metal or its compounds.

Prices—Lithium metal was valued at \$96 per pound in 1929, but at only \$18 in 1931, and near \$15 for the next 10 years. Metal of 98-percent purity was quoted at \$12.50 per pound in 1945, at \$9.85 to \$11 in 1950, and \$11 to \$14 in 1955. Prices quoted for lithium ore in 1950 were: (1) amblygonite, air floated, carlots, \$110 per ton; (2) lepidolite, 4 percent Li_2O , powdered, carlots, \$80 per ton; and (3) spodumene, 6 percent Li_2O , carlots, \$6 to \$8 per short ton unit of contained Li_2O .

Lepidolite has been reported to occur in a dike a few miles west of Riverside, Okanogan County, and an occurrence at the Royal Development mine in Chelan County is mentioned (under mica) in Part I of this report. It

Properties—Magnesium is a silver-white metal having a bright luster; it slowly oxidizes in moist air, the thin oxide coat protecting the metal from further action. Magnesium is light in weight (37 percent less than aluminum), the only lighter metals being lithium, potassium, sodium, and calcium. It is ductile, malleable, and fairly tough. It has excellent machinability (best of the industrial metals) but has a low modulus of elasticity and is incapable of being easily cold-worked. Only silver, copper, and aluminum have higher electrical conductivity, and in mass conductivity it is second only to aluminum. Magnesium is bivalent in all its chemical compounds. It is a powerful reducing agent, and in ribbon or powder form it ignites on heating and burns with a brilliant white flame. Other properties are shown in the table on page 12.

Uses—In 1950, transportation equipment used the greatest quantity of magnesium, principally as aircraft and automotive parts. Magnesium was used in about equal amounts in castings, sheet, structural shapes (extrusions), and aluminum alloys, and in somewhat smaller quantities as cathodic protection against corrosion—a rapidly increasing use. During war times magnesium con-

Ore minerals—Lithium has been found in more than 140 minerals, mostly silicates and phosphates, in quantities ranging from spectroscopic traces to more than 9 percent. Lithium is more abundant in the earth's crust than tin, lead, or zinc. It is widely distributed in minute quantities, but only 3 minerals have been important ores of lithium: the phosphate, amblygonite, $\text{LiAl}(\text{F},\text{OH})\text{PO}_4$, containing 8 to 9 percent Li_2O ; and the silicates, lepidolite, $\text{KLi}(\text{OH},\text{F})_3\text{Al}_2\text{Si}_3\text{O}_{10}$ (lithium mica), containing 2 to 4 percent Li_2O , and spodumene, $\text{LiAl}(\text{SiO}_3)_2$, containing 2 to 4 percent Li_2O . Zinwaldite, a variety of lepidolite, containing 2 to 3 percent Li_2O , and triphylite, LiFePO_4 , containing 2 to 6 percent Li_2O , have also been mined for their lithium content. In recent years lithium compounds have been recovered in important quantities from the brines of Searls Lake in California. These brines contain about 0.0115 percent Li_2O , and it is likely that other playa lake muds, brines, and salts may prove valuable for their lithium content. Many mineral springs contain lithium in very low concentration. Although much lithium ore is processed to make the metal and compounds, much ore also is used by industry without treatment other than concentration and purification.

Geology—Except for the playa lake brines, salts, and muds, the lithium deposits are restricted to pegmatites. Most pegmatites contain few if any lithium minerals, and where these do occur it is seldom in any considerable quantity. The lithium minerals apparently come in as a late phase in the formation of complex pegmatites, such as those that contain tin or columbium-tantalum. Pegmatites rich in lithium are likely to be poor in feldspar. Usually the lithium minerals occupy the central portion of pegmatite bodies.

OCCURRENCES

is probable, however, that the report of the latter occurrence is erroneous. Lithium has been detected spectroscopically in water from Summit Creek Soda Springs in eastern Lewis County.

MAGNESIUM

sumption is largely for aircraft parts and for incendiary bombs. The metal is used in metallurgy as a deoxidizing and desulfurizing agent in smelting nickel and making nickel alloys, and as a reducing agent in the production of titanium and zirconium. The addition of only 0.1 percent of magnesium to cast iron produces the equivalent of malleable iron, and this use accounted for more than a million pounds of magnesium in 1952. The powdered metal has long been used in pyrotechnics, signal lights, and photoflash lights. Magnesium has been used in place of zinc in dry batteries. Increasing uses are being developed in household appliances, tools, machinery, office equipment, sporting goods, and transportation equipment. Most magnesium is alloyed—aluminum, zinc, manganese, copper, zirconium, and cerium being the more common alloying metals. Magnesium is used in the chemical industries, especially in the synthesis of complex organic compounds. Magnesium compounds are used in medicine and for a wide range of industrial uses.

Production—The first commercial production of magnesium metal in the United States was 44 tons in 1915. Under the impetus of World War I, production rose to

142 tons in 1918, then later dropped back to less than 80 tons annually for a few years. It gradually rose to 6,261 tons in 1940, and 48,963 tons in 1942, then jumped to 183,584 tons as a result of military demands in 1943, only to again drop far back to 5,317 tons in the post-war year of 1946. The output in 1950 (all from 1 plant) had risen to 15,726 tons, and 2 years later it had reached 105,386 tons (from several plants). In 1943, the peak year, 63 plants, nearly all government owned, were in operation or preparing to operate. One of these, having an annual capacity of 24,000 short tons, was near Spokane, at Mead, but it operated only about a year and produced only 12,000 tons of magnesium and an equal amount of ferrosilicon before being closed and "put in mothballs" in November 1944. This plant was again in production from August 1951 to May 1953. During both its periods of operation the Mead plant used dolomite from a quarry at Marble in Stevens County.

Prices—The first metallic magnesium produced in this country in 1915 sold for \$5 per pound. By 1918 the price was down to \$1.81 per pound and by 1927, to 69 cents. The decline continued, reaching 30 cents in 1933 and 26 cents in 1934, but there was an increase to 30 cents in 1935. Again the price dropped, and from 1943 through 1949 it remained at 20½ cents per pound for ingots, 99.8-percent purity, in carlots. Several increases in 1950 brought the price to 24½ cents, where it remained through 1952. In June 1953 the price was 27 cents per pound.

Ore minerals—Magnesium is a very common element and constitutes 2.1 percent of the earth's crust. It is the third most abundant of the engineering metals, being surpassed in quantity only by aluminum and iron. It never occurs free in nature, but its compounds are very abundant, and a great many of the common rock-forming minerals contain magnesium. Minerals which have been

mined as ores of magnesium are: magnesite, $MgCO_3$, containing 28.7 percent magnesium; dolomite $CaCO_3 \cdot MgCO_3$, containing 13.1 percent magnesium; brucite, $Mg(OH)_2$, containing 41.6 percent magnesium; and carnallite, $KMgCl_3 \cdot 6H_2O$, containing 8.7 percent magnesium. For many years underground brines containing about 3 percent magnesium chloride were the only source of the metal utilized in this country, but sea-water bitterns are now an important source. Natural sea water contains about 0.13 percent magnesium. A method to recover the metal from the silicate mineral olivine, $(Mg,Fe)_2SiO_4$, containing 28 to 30 percent magnesium, has been developed but never tried on a commercial scale.

Geology—The several ore minerals of magnesium occur in a great variety of deposits. Dolomite occurs as thick beds of sedimentary rock or its metamorphosed equivalent. It is abundant in the Paleozoic and pre-Cambrian rocks of northeastern Washington. Magnesite is found as replacements of dolomite or limestone, as veins in serpentine, and as chemical precipitates. Some of the largest deposits of the replacement type known in this country are in the pre-Cambrian Stensgar dolomite belt near Chewelah in Stevens County. The largest magnesite producer in the United States has been operating in these deposits almost continuously since 1916, but the products of this plant have been refractories rather than magnesium metal.

Olivine has several modes of occurrence. One of the largest deposits in the country is in the Twin Sisters Mountains in Whatcom and Skagit Counties, where an ultrabasic intrusive, constituting a mountain mass about 10 miles long by 5 miles wide, includes fresh, nonserpentinized olivine, free of other minerals, cropping out in an area of several square miles. The rest of the ultrabasic rock is a mixture of olivine and pyroxene, and a small area of serpentine.

OCCURRENCES

The magnesium ore minerals which are known to occur in commercial quantities in Washington are described in Part I of this report, under dolomite and mag-

nesite. Other magnesium minerals described in Part I are olivine, brucite (under miscellaneous nonmetallic minerals), and epsomite and brines (under saline compounds).

MANGANESE

Properties—Manganese metal is steel gray or gray white and has a slightly ruddy tinge. It is lustrous, hard, and brittle. Three allotropic forms of the metal are known. It resembles iron both physically and chemically. It is superficially oxidized when exposed to air. In its compounds manganese shows valences of 2, 3, 4, 6, and 7. Other properties are shown in the table on page 12.

Uses—In 1950 more than 96 percent of the consumption of manganese in this country was in the metals industries; 2½ percent went to dry batteries; and 1½ percent, to chemicals. It is used as a scavenging agent or as an alloying component in more alloys, probably, than any other element. Its principal combinations are with iron, copper, aluminum, magnesium, and nickel as bases. Manganese is an essential constituent of all grades of commercial steel, being used as an oxidizer and desulfurizer in the manufacturing process. Also, when added to steel in

larger amounts it increases the hardness, toughness, and strength, as well as allowing the steel to be more easily rolled and forged. Consumption of manganese in the steel industry averages 14 pounds per ton of steel. Manganese chemicals are used in the manufacture of glass and ceramics, paint, dyes, fertilizer, leather, medicines, disinfectants, and such gases as oxygen, chlorine, and bromine.

Production—Normally about 90 percent of the manganese consumed in this country is imported. During the 50 years following 1900, imports have risen steadily from about 200,000 short tons of ore to 1,800,000 tons annually. Domestic production was essentially nil from 1900 to 1915, but rose to a peak of 342,573 short tons in 1919 during the first world war, only to drop back to an average of about 50,000 tons annually until the beginning of the second world war. A second peak of 247,616 tons was

reached in 1944, and the post-war production through 1952 has averaged about 125,000 tons per year.

The first recorded production of manganese ore in Washington was 101 tons in 1916. The next production was 18,228 short tons from 1924 through 1926, then 11 tons in 1939, and 33,596 tons from 1941 through 1946. A few carloads were shipped in 1952 and 1953. During the 1941 to 1946 period, Washington's production amounted to about 3½ percent of the total United States output. Production has been reported in Clallam, Grays Harbor, Jefferson, Mason, and Okanogan Counties, but by far the most of the ore has come from the Crescent mine at the west end of Lake Crescent, Clallam County.

Prices—The price schedules for manganese metal, alloys, and ore are quite complex, the price varying with such factors as grade, impurities, and place of origin. In general, prices are comparatively low during normal times. During World War I they rose to a sharp peak, but during World War II prices were stabilized by government order. In 1952, prices of imported ore of metallurgical grade were \$1.20 to \$1.25 per long-ton unit (22.4 pounds of contained manganese), 48 percent manganese, duty extra. Chemical-grade ore was quoted at \$65 per long ton, minimum 80 percent MnO₂, Brazilian or Cuban ore, carlots, in barrels. Domestic chemical-grade ore, 70 to 72 percent MnO₂, f.o.b. mines, was \$45 per long ton. Ferromanganese alloy was quoted at \$200 per net ton, 74 to 76 percent manganese, f.o.b. Pennsylvania plants; and manganese metal, at 36 to 37½ cents per pound, 96 percent manganese, carlots, bulk, delivered. Buyers' specifications regarding impurities in manganese ores vary somewhat, but, in general, metallurgical-grade ore should have high manganese (45 to 50 percent) and low silicon, oxygen, phosphorus, sulfur, and nonferrous metals, but the calcium oxide content may be high. Chemical-grade ore requires high manganese dioxide content, may have a considerable amount of silicon and phosphorus, but must be low in calcium oxide.

Ore minerals—Manganese is the twelfth most abundant element in the earth's crust. It is present in small amounts as a primary element in all igneous rocks, and is an essential constituent of more than 120 minerals. Pyrolusite, MnO₂, containing 63.2 percent manganese, is the most important ore mineral, followed by psilomelane, an oxide containing 45 to 60 percent manganese and various amounts of adsorbed water and barium, potassium, and sodium oxides. Other ore minerals are braunite, 3Mn₂O₃·MnSiO₃, containing 69.0 percent manganese; hausmannite, Mn₃O₄, containing 72.1 percent manganese; manganite, Mn₂O₃·H₂O, containing 62.5 percent manganese; wad, impure hydrous oxides of manganese of varying composition; and rhodochrosite, MnCO₃, containing 47.8 percent manganese. Recently, consideration as possible ores of manganese has been given to the silicates, rhodonite, MnSiO₃, containing 42.0 percent manganese, and bementite, 2MnSiO₃·H₂O, containing about 32 percent manganese and 35 percent silica. Most, if not all, of the above minerals are found in ore deposits in Washington, and bementite, a rare mineral elsewhere in the world, comprises most of the manganese mineralization in the Olympic Peninsula. Other manganese minerals of more or less incidental interest found in the Olympics are neotocite, inesite, ephroite, manganophyllite, manganocalcite, piedmontite, and jacobsite.

Geology—Most of the world's supply of manganese comes from sedimentary and residual deposits. Other types are hydrothermal open-space fillings or replacement deposits and metamorphosed deposits. Of particular interest in Washington are the deposits in the Olympic Peninsula, where bementite is the principal ore mineral; it is commonly accompanied by jasper and usually occurs closely associated with red argillaceous limestone intercalated with submarine lavas. The ores here appear to have been derived from the rapidly cooling lavas and deposited on the ocean floor, possibly as a gel, at the time the lavas were extruded beneath the sea.

OCCURRENCES

The map showing the numbered manganese occurrences is plate 15, on page 41 in volume 2.

CHELAN COUNTY

Black

Loc: NW. of Wenatchee. **Owner:** C. A. Black, Seattle, Wash. (1949). **Ore:** Manganese. **Ore min:** Psilomelane, pyrolusite. **Deposit:** Said to be a 2- to 10-ft. vein of ore of unknown length and depth. **Dev:** Scant. **Assays:** Grab sample: 49% to 52.6% Mn, 2.02% to 2.4% Fe, 15% SiO₂, 0.066% P. **Ref:** 158.

Peterson

Loc: Stehekin dist., along the N. side of Bridge Cr. **Ore:** Manganese. **Ref:** 40, p. 24. 67, p. 42.

CLALLAM COUNTY

Associated (17)

Loc: Sec. 25, (30-11W). **Owner:** Thomas R. Barton, Sappho, Wash. (1941). **Ore:** Manganese. **Deposit:** Well-defined "vein." **Ref:** 158.

Aurora Ridge (48)

Loc: Sec. 7, (29-8W). **Elev:** 5,200 ft. **Access:** 8 mi. by trail from Olympic Highway at a point 1 mi. E. of Lapoel. **Owner:** Ralph V. Beymer, Seattle, Wash. (1947). **Ore:** Manganese. **Deposit:** 3 exposures of ore. **Ref:** 157. 158.

Barbara (12)

Loc: SW¼ sec. 23, (30-11W). **Elev:** 2,320 ft. **Access:** 350 ft. W. of the Kloshe Nanich trail. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** 2 bementite bodies enclosed in greenstone, one 20 ft. long and 5 ft. av. width, the other 16 ft. by 5 ft. **Assays:** 16.51% to 39.80% Mn, 11.69% to 21.75% Fe, 30.01% to 44.85% SiO₂. **Ref:** 48-A, p. 27. 94, p. 17.

Barnes Creek (49)

Loc: Near headwaters of a S. tributary to Barnes Cr. in what would be about sec. 7, (29-8W) if area were surveyed. **Elev:** 4,200 ft. **Access:** Trail to Lizard Head Peak. **Prop:** 2 claims: Lakeview, Victory. **Ore:** Manganese. **Ore min:** Bementite, psilomelane, braunite. **Gangue:** Chalcedony. **Deposit:** 3 deposits, one exposed on face of a high bluff has an est. height of 175 ft., width of 50 ft., and length of 125 ft. **Assays:** U. S. Bureau of Mines sample from Lakeview claim: 11.4% Mn,

21.4% Fe, 34.8% insol., 31.7% SiO₂, 9.5% Ca, 0.05% S, 0.8% Al₂O₃, 0.050% P, 0.85% MgO, nil Ba, nil Zn. U. S. Bureau of Mines sample from Victory claim: 26.0% Mn, 14.0% Fe, 30.7% insol., 26.9% SiO₂, 6.9% CaO, 1.35% S, 0.4% Al₂O₃, 0.054% P, 1.0% MgO, nil Ba, nil Zn. **Ref:** 48-A, p. 32. 94, p. 19. 109.

Beans (44)

Loc: N. side of Storm King Mtn., 2 mi. from Maple Grove on Lk. Sutherland. **Owner:** Wm. Thompson et al. **Ore:** Manganese. **Ref:** 158.

Bear Creek

(see Victor)

Bear Ridge (4)

Loc: N½ sec. 23, (30-12W) and vicinity. **Access:** On ridge extending from Bear Cr. to Beaver Cr. **Ore:** Manganese. **Ore min:** Bementite, some neotocite and hausmannite. **Deposit:** Several manganiferous deposits. One lens is 20 ft. long and 2 to 3 ft. thick in center. **Dev:** Open cut. **Ref:** 48-A, p. 26. 94, pp. 17-18.

Beaver Creek

(see State Lease)

Bertha (47)

Loc: Just below the crest of Aurora Ridge about 1½ mi. W. of Lizard Head Peak. **Elev:** 4,900 ft. **Access:** A poor trail from Olympic Hot Springs. **Prop:** 1 claim. **Owner:** Harry Sweeds et al., Port Angeles, Wash. **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper. **Deposit:** Main outcrop extends NW. for about 50 ft. but pinches from 40 to 6 ft. in this distance. Ore lies between red argillaceous limestone and basalt. **Assays:** High iron content. **Ref:** 48-A, p. 32. 94, p. 19. 127, pp. 447-448.

Blue Eyes (11)

Loc: N½SW¼ sec. 24, (30-11W). **Elev:** 2,260 ft. **Access:** 1 mi. N. of U. S. Highway 101, 3 mi. E. of Snider Ranger Station. **Ore:** Manganese. **Ore min:** Bementite and some neotocite. **Deposit:** 2 bodies of ore. One is 54 ft. long and 19 ft. av. width. The other is 34 ft. long and 8 ft. av. width. Ore occurs in red argillaceous limestone. **Dev:** 2 trenches. **Ref:** 48-A, pp. 27-29. 94, pp. 16-17.

Bright Angel (41)

Loc: Sec. 28, (30-9W). **Prop:** 12 claims. **Owner:** Edward Fitzpatrick, Ovington, Wash. (1941). **Ore:** Reportedly manganese, antimony, and tin, but the occurrence of antimony or tin here is most unlikely. **Prod:** 1941. **Ref:** 99, 2/12/35. 104, 1/30/35, p. 23. 158.

Broken Shovel (59)

(see also Idaho, Broken Shovel, and Ella)

Loc: Sec. 20, (29-6W). **Ore:** Manganese. **Deposit:** 40- by 500-ft. ore body. **Assays:** 25.8% Mn, 15.2% Fe, 34.1% SiO₂. **Ref:** 158.

Cedar (45)

(see also Thompson)

Loc: Sec. 34, (30-8W). **Prop:** 1 claim of Thompson group. **Ore:** Manganese. **Assays:** 19.2% Mn, 5.4% Fe, 39.9% SiO₂. **Ref:** 158.

Chappie (54)

Loc: On a spur connecting Hurricane Ridge and Unicorn Peak. Approx. sec. 24, (29-7W). **Elev:** 3,600 to 5,500 ft. **Prop:** 8 claims. **Ore:** Manganese. **Ore min:** Predominantly bementite. **Deposit:** Outcrops exposed in the face of vertical serrated cliffs 100 to 300 ft. high. Ore bodies 2 to 5 ft. thick. **Assays:** 17.4% Mn, 15.0% Fe, 22.8% SiO₂. **Ref:** 48-A, p. 34. 94, p. 20. 158.

Charles A. (37)

Loc: Sec. 19, (30-9W), on southward-facing slope on which Crescent mine is located but at lower elev. **Prop:** 1 claim: Charles A. **Ore:** Manganese. **Deposit:** Reportedly a good showing. **Ref:** 125, pp. 19-20.

Charles G. (38)

Loc: Sec. 19, (30-9W), on southward-facing slope on which Crescent mine is located but somewhat lower in elev. **Prop:** 1 claim: Charles G. **Ore:** Manganese. **Deposit:** Reportedly a good showing. **Ref:** 125, pp. 19-20.

Clallam (8)

Loc: NW¼NW¼ sec. 28, (30-11W). **Elev:** 1,615 to 1,675 ft. **Access:** 1 mi. NW. of Snider Ranger Station on U. S. Highway 101. No trail. **Ore:** Manganese. **Ore min:** Bementite, cinnabar, neotocite, hausmannite. **Deposit:** 5 lenses of manganese ore lying between greenstone and red argillaceous limestone—54 ft. long, 10 ft. wide; 20 ft. long, 4 ft. wide; 26 ft. long, 5 ft. wide; 12 ft. long, 3 ft. wide; and 26 ft. long, 5½ ft. wide. **Dev:** 5 trenches. **Assays:** 5.57% to 30.92% Mn, 8.90% to 29.69% Fe, 19.90% to 58.54% SiO₂. **Ref:** 48-A, p. 27. 94, p. 17. 127, p. 445.

Crescent (33)

(see also Peggy)

Loc: Near line between secs. 23 and 24, (30-10W), Lk. Crescent area. **Elev:** 1,000 ft. at main adit. **Access:** Road. Railroad crosses the property. **Prop:** 3 patented claims, 1 unpatented claim. **Owner:** Leased by Dan C. Peacock, Orinda, Calif. (1955). Jamison & Peacock (1923-1926). Washington Manganese Co. (1926-1927). Leased by the Sunshine Mining Co. from Charles S. Anderson, Theodore F. Rixon, and Mrs. K. Morgenroth (1941-1945). Leased by K. E. Hopper, Mel Lewis, and Sam Marsh, Seattle, Wash. (1953). **Ore:** Manganese. **Ore min:** Hausmannite, bementite, neotocite, cinnabar, native copper, braunite, hematite. **Gangue:** Manganiferous carbonate, inesite, calcite. **Deposit:** 3 known lenses of manganese ore in crushed limestone and greenstone. 2 lenses mined out. A third, 1,150 ft. below surface. The upper lens was 120 ft. long, 180 ft. deep, and 6 to 14 ft. thick, av. about 8 ft. **Dev:** 5 adits with drifts and stopes total more than 3,500 ft. of underground workings. **Improv:** 1,400-ft. aerial tram from mine to bunker on the Lyon & Hill Railway. **Assays:** Av. of 16,000 tons shipped: 50.92% to 54.33% Mn, 8.93% to 7.78% SiO₂, 1.13% to 0.74% S, 0.055% to 0.53% P₂O₅. Shipments in 1941-1946 av. about 51.6% Mn, 1.6% Fe, 9.1% SiO₂, 0.05% P, 4% H₂O. **Prod:** 16,275 short tons 1924-1926, about 33,500 short tons 1941-1946, small amount 1952, 1953. **Ref:** 48-A, pp. 30-31. 82, pp. 52-54 (1942 ?). 94, pp. 13-14. 108, 5/42, pp. 9-15; 1/53, p. 87. 125, pp. 16-19. 127, pp. 443-445. 142, p. 110. 158.

Daddy and Mother (40)

Loc: Common discovery post 67 ft. E. and 7 ft. N. of SW. cor. lot 4, sec. 30, (30-9W). **Elev:** 780 ft. **Access:** 30 ft. above county road to Ovington. **Prop:** 2 unpatented claims: Daddy, Mother. **Owner:** Charles S. Anderson and Theodore F. Rixon, Port Angeles, Wash. (1934). **Ore:** Manganese. **Ore min:** Principally bementite, some hausmannite, neotocite. **Gangue:** Chalcedonic quartz. **Deposit:** Lens of ore in altered basalt 2 ft. in greatest thickness. **Dev:** Short adit. **Assays:** 30.60% Mn, 4.60% Fe, 26.50% SiO₂ from outcrop. **Ref:** 48-A, p. 32. 94, p. 14. 125, pp. 20-21. 158.

Daisy (39)

Loc: Near SW. cor. sec. 19, (30-9W), E. of Peggy claim. **Elev:** 2,100 ft. **Access:** Trail. **Prop:** 7 unpatented claims. **Owner:** Joe Orris et al., Port Angeles, Wash. (1934). **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Outcrops show an

av. thickness of about 6 ft. over lateral distance of 300 ft. They are not parts of a continuous body. **Dev:** 30-ft. adit. **Ref:** 48-A, p. 32. 94, p. 14. 158.

Divide (28)

Loc: SW $\frac{1}{4}$ sec. 22, (30-10W). **Ore:** Manganese. **Ref:** 158.

East Extension

Loc: Olympic Mountains. **Ore:** Manganese. **Ref:** 158.

Ed B (Madeline, Eureka) (19)

Loc: SW $\frac{1}{4}$ sec. 19, (30-10W), and SE $\frac{1}{4}$ sec. 24, (30-11W). **Elev:** 1,545 to 1,825 ft. **Access:** About 1 mi. N. of U. S. Highway 101, 1 mi. W. of Heckles. Road in bad condition. **Prop:** 6 unpatented claims: Ed B, Jim, Joker, Joe, Lillian, Burnt Mountain. **Owner:** Ed. Brooks et al., Port Angeles, Wash. (1934). **Ore:** Manganese. **Ore min:** Bementite, limonite, hematite, neotocite, hausmannite, rhodochrosite, pyrolusite, psilomelane. **Gangue:** Chalcedony. **Deposit:** 3 ore bodies—260 ft. long and 25 ft. av. width; 64 ft. long, 35 ft. av. width; and 125 ft. long, 82 ft. av. width—enclosed in greenstone and red argillaceous limestone. **Dev:** Overburden stripped, open cuts, 85-ft. shaft put down by U. S. Bureau of Mines; two 50-ft. adits. **Assays:** 13.63% to 33.00% Mn, 11.40% to 34.66% Fe, 12.75% to 55.94% SiO₂. A 2-ton sample tested by U. S. Bureau of Mines showed 25.7% Mn, 11.0% Fe, 29.9% insol., 26.9% SiO₂, 2.6% CaO, 5.2% Al₂O₃, 0.026% P, 0.36% MgO, nil Ba, nil Zn. **Ref:** 48-A, p. 29. 58, p. 39. 94, p. 16. 109. 125, pp. 21-22. 127, pp. 444-446. 158.

Ella (60)

(see also Idaho, Broken Shovel, and Ella)

Loc: Sec. 20, (29-6W). **Ore:** Manganese. **Assays:** 13.2% Mn, 8.4% Fe, 68.3% SiO₂. **Ref:** 158.

Eureka

(see Ed B)

Eureka Creek (13)

Loc: SE $\frac{1}{4}$ sec. 24, (30-11W), E. of Eureka Cr. **Elev:** 1,545 ft. **Ore:** Manganese. **Ore min:** Limonite, hematite. **Deposit:** Body of ore exposed for a length of 125 ft., width of 82 ft., and depth of 10 ft. Ore lies between greenstone and red limestone. Limestone grades into limonite with small patches of hematite. **Dev:** Trenching and stripping. **Ref:** 48-A, p. 29. 94, p. 16.

F. and L. (61)

Loc: NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 20, (29-6W), on a spur trending northward from Hutton Ridge. **Elev:** 4,000 to 4,200 ft. **Access:** By trail either up river from the Little R. road or from the Hurricane Lookout road to the S. **Prop:** 7 claims. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Manganiferous bodies 6 to 43 ft. wide exposed for 200 ft. Bodies pinch and swell within short distances. **Dev:** Trenches. **Assays:** 9.92% to 25.80% Mn, 9.28% to 16.58% Fe, 34.10% to 63.88% SiO₂. **Ref:** 48-A, p. 34. 94, p. 20. 127, pp. 449-450. 158.

Fir

Loc: T. 30 N., R. 8 W. **Ore:** Manganese. **Ref:** 158.

Griff Creek (51)

Loc: Sec. 1, (29-7W). **Ore:** Manganese. **Ref:** 158.

Happy Lake Ridge

Loc: N. slope of Happy Lk. Ridge. **Ore:** Manganese. **Ore min:** Presumably bementite. **Deposit:** Small outcrops containing manganese minerals are exposed for distance of 1 $\frac{1}{2}$ mi. eastward from Bertha claim. **Ref:** 48-A, p. 32.

Heckle

Loc: Clallam County. **Ore:** Manganese. **Ref:** 158.

Helen (27)

Loc: Near center N $\frac{1}{2}$ sec. 21, (30-10W). **Elev:** 1,905 and 1,965 ft. **Access:** $\frac{3}{4}$ mi. N. of U. S. Highway 101, 1 $\frac{1}{2}$ mi. E. of Heckles. **Owner:** Mel Lewis and K. E. Hopper, Seattle, Wash. (1953). **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** 2 bementite ore bodies, one 30 ft. long and 6 ft. wide, the other 23 ft. long and 6 ft. wide. **Dev:** 3 trenches. **Assays:** 26.38% to 40.74% Mn, 6.62% to 19.47% Fe, 9.07% to 32.40% SiO₂. **Ref:** 48-A, p. 30. 94, p. 15.

Hemlock (42)

(see also Thompson)

Loc: Sec. 29, (30-8W). **Elev:** 3,250 ft. **Access:** 3 mi. from road. No trail. **Prop:** 1 claim of Thompson group. **Ore:** Manganese. **Deposit:** 6 ft. wide. **Dev:** 20-ft. shaft, open cut. **Assays:** 33.6% Mn, 3.6% Fe, 22% SiO₂. **Ref:** 58, p. 29. 158.

Hurricane (52)

Loc: Near Hutton Cr., a few hundred ft. S. of the Skookum claims. **Elev:** 4,000 ft. **Access:** By trail either up river from the Little R. road or from the Hurricane Lookout road to the S. **Prop:** 1 claim: Hurricane. **Ore:** Manganese. **Ore min:** Hausmannite. **Deposit:** Ore body said to consist primarily of hausmannite of high grade. Another ore body 300 ft. eastward. **Dev:** Shaft more than 45 ft. deep, a 25-ft. adit, and 2 open cuts. **Assays:** Said to be high grade. **Prod:** 1,000 tons of ore taken out. **Ref:** 48-A, p. 33. 127, pp. 448-449.

Hurricane Hill Lookout (55)

Loc: Sec. 23, (29-7W), along crest of ridge extending westward from Hurricane Hill Lookout. **Access:** Trail. **Ore:** Manganese. **Deposit:** Small natural outcrops of ore. **Ref:** 158.

Idaho, Broken Shovel, and Ella (62)

(see also Broken Shovel, Ella)

Loc: Sec. 20, (29-6W), on crest of Hutton Ridge. **Elev:** 4,200 to 4,720 ft. **Access:** By trail either up river from the Little R. road or from the Hurricane Lookout road to the S. **Prop:** 3 claims: Idaho, Broken Shovel, Ella. **Ore:** Manganese. **Gangue:** Jasper. **Deposit:** Massive manganese bodies 50 to 200 ft. long and 20 to 125 ft. wide occur intermittently for a distance of 4,000 ft. **Assays:** 13.84% to 25.06% Mn, 13.02% to 12.14% Fe, 50.85% to 53.59% SiO₂. **Ref:** 48-A, pp. 33-34. 94, p. 21. 127, pp. 449-450. 158.

J and J and Sunset (56)

Loc: Sec. 23, (29-7W), extending 2 mi. along S. edge of Hells Canyon at W. end of Hurricane Ridge. **Elev:** 5,500 ft. **Prop:** 3 claims. **Ore:** Manganese. **Ore min:** Bementite, neotocite. **Deposit:** Several outcrops of manganese silicates. **Assays:** 6.6% Mn, 11.2% Fe, 15.2% SiO₂. **Ref:** 48-A, p. 34. 94, p. 21. 158.

Johnnie M.

(see Peacock and Johnnie M.)

June (21)

Loc: SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 19, (30-10W). **Elev:** 1,265 ft. **Access:** About 1 mi. NW. of Heckles. **Ore:** Manganese. **Ore min:** Bementite, cinnabar. **Deposit:** Bementite lens enclosed in basalt and red limestone. Cinnabar veinlets in limestone. **Dev:** Shaft 16 ft. deep and 13 by 9 ft. in section. **Assays:** 14.98% to 18.18% Mn, 19.34% to 23.61% Fe, 26.78% to 30.99% SiO₂. **Ref:** 48-A, p. 29. 94, pp. 15-16.

Kate (6)

Loc: Sec. 30, (30-11W). **Ore:** Manganese. **Ref:** 125, p. 21.

King

Loc: T. 30 N., R. 8 W., in Olympic Mountains. **Ore:** Manganese. **Ref:** 158.

Lady Norma (50)

Loc: Sec. 30, (30-6W). **Ore:** Manganese. **Ref:** 158.

Last Chance (22)

Loc: Sec. 20, (30-10W). **Ore:** Manganese. **Ref:** 158.

Lena (29)

Loc: Sec. 22, (30-10W). **Ore:** Manganese. **Ref:** 158.

Littleton (23)

(see also Peacock and Johnnie M.)

Loc: Sec. 20, (30-10W), 500 ft. W. of Littleton Cr. **Elev:** 1,400 ft. **Access:** Road within ¼ mi. of the property. **Prop:** 3 unpatented claims: Star, Peacock, Johnnie M. **Owner:** Charles H. Anderson leasing to K. E. Hopper, Mel Lewis, Sam Marsh, Seattle, Wash. (1952—). Charles S. Anderson and C. W. Greenlee, Port Angeles, Wash. (1934). **Ore:** Manganese. **Deposit:** Outcrop about 6 ft. thick, 50 ft. long, and 6 ft. high. **Dev:** Caved adit, surface stripping. **Assays:** A sample from the outcrop assayed 44.35% Mn, 2.25% Fe, 14.3% SiO₂, 0.026% P. **Prod:** 1952, 1953. **Ref:** 48-A, p. 30. 94, p. 15. 108, 1/53, p. 87. 125, p. 21. 158.

Lookout (34)

Loc: SE¼ sec. 23, (30-10W). **Ore:** Manganese. **Ref:** 158.

Lost Kremer (18)

Loc: Sec. 25, (30-11W). **Ore:** Manganese. **Ore min:** Cinnabar was found in NW¼ sec. 25, (30-11W), in the E. bank of small stream, possibly at the Lost Kremer property. **Assays:** 2.73% Mn, 19.68% Fe, 70.14% SiO₂. **Ref:** 158.

Lucky Strike (20)

Loc: SE¼ sec. 20, (30-10W). **Ore:** Manganese. **Ref:** 158.

Madeline

(see Ed B)

Mark Twain

Loc: Clallam County. **Ore:** Manganese. **Ref:** 158.

Maybee (9)

Loc: Sec. 28, (30-11W). **Ore:** Manganese. **Ref:** 125, p. 21.

Mother

(see Daddy and Mother)

Mount Angeles (63)

Loc: On S. side of Third Peak of Mt. Angeles, probably in sec. 20, (29-6W). **Ore:** Manganese. **Deposit:** Ore exposures of substantial size are reported. **Ref:** 158.

Oberg

Loc: T. 30 N., R. 11 W. **Ore:** Manganese. **Ref:** 125, p. 21.

Old Gold Quartz (35)

Loc: SW¼ sec. 24, (30-10W). **Ore:** Manganese. **Ref:** 158.

Olympia Star (24)

Loc: NW¼ sec. 20, (30-10W). **Ore:** Manganese. **Ref:** 158.

Peacock and Johnnie M. (25)

(see also Littleton)

Loc: On Littleton Cr. in sec. 20, (30-10W). **Elev:** 1,400 and 1,700 ft. **Access:** About 1½ mi. NE. of Heckles. **Prop:** Part of Littleton Cr. group. **Ore:** Manganese. **Ore min:** Bementite, neotocite. **Deposit:** 4 exposures—14 ft. long and 10 ft. wide, 9 ft. long and 5 ft. wide, 10 ft. long and 6 ft. wide, and another small exposure. **Assays:** 33.08% to 33.20% Mn, 7.17% to 7.42% Fe, 23.86% to 25.54% SiO₂. **Ref:** 48-A, pp. 29-30. 94, p. 15.

Peggy (36)

(see also Crescent)

Loc: NW¼ sec. 24, (30-10W), 1,300 ft. NE. of portal of main Crescent adit. **Elev:** 2,100 ft. **Prop:** 1 claim: Peggy (part of Crescent property). **Owner:** E. F. McTarnahan, Port Angeles, Wash. (1952). **Ore:** Manganese. **Ore min:** Hausmannite, pyrolusite. **Gangue:** Calcite. **Deposit:** Body of ore similar to that at Crescent mine encountered 85 ft. below the surface, 4 ft. thick and 15 ft. long. **Dev:** Drill hole. Shaft to depth of drill hole now caved. **Assays:** 45.90% Mn, 8.21% Fe, 17.6% SiO₂. Preliminary work indicates ore equivalent to the Crescent. **Ref:** 48-A, pp. 31-32. 94, p. 14. 125, p. 20. 133, p. 38. 158.

Pine Ridge (14)

Loc: SE¼ sec. 24, (30-11W), 1 mi. N. of U. S. Highway 101, 1½ mi. W. of Heckles. **Elev:** 2,135 ft. **Ore:** Manganese. **Ore min:** Bementite, limonite, hematite. **Deposit:** Manganese ore body between greenstone and limestone, exposed for length of 62 ft. and av. width of 24½ ft. **Dev:** Trench, 45-ft. adit, short crosscut. **Assays:** 12.33% to 25.69% Mn, 11.92% to 33.15% Fe, 18.33% to 60.65% SiO₂. **Ref:** 48-A, p. 29. 94, p. 16. 158.

Riverside (10)

Loc: NE¼ sec. 28, (30-11W). **Ore:** Manganese. **Ref:** 158.

Royal (2)

Loc: Sec. 10, (31-14W), 3 mi. up Big R. from Royal. **Ore:** Manganese. **Ore min:** Bementite, cinnabar, free mercury. **Deposit:** Outcrop 22 ft. long with 7-ft. av. width. **Ref:** 48-A, p. 26.

St. Regis (26)

Loc: NE¼ sec. 20, (30-10W), 1 mi. N. of U. S. Highway 101, 1 mi. E. of Heckles. **Elev:** 1,985 ft. **Ore:** Manganese. **Ore min:** Bementite, cinnabar. **Deposit:** Bementite lenses with lengths of 22 and 10 ft. and widths of 12 and 6 ft. respectively. Cinnabar veinlets in the bementite. **Dev:** 2 trenches. **Assays:** 33.2% Mn, 7.17% Fe, 23.86% SiO₂. **Ref:** 48-A, p. 30. 94, p. 15. 158.

Seattle (7)

Loc: SE¼ sec. 21, (30-11W), on S. slope of Snider Peak about 1 mi. NW. of Snider Ranger Station. **Elev:** 1,845 ft. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Manganese ore body 25 ft. long and 12 ft. wide surrounded by altered vesicular basalt. **Dev:** Trench. **Assays:** 14.65% to 32.49% Mn, 15.63% to 23.76% Fe, 16.59% to 46.12% SiO₂. **Ref:** 48-A, p. 27. 94, p. 17.

Section 23 (15)

Loc: SE¼ sec. 23, (30-11W), ½ mi. N. of U. S. Highway 101 and about 2½ mi. E. of Snider Ranger Station. **Elev:** 1,735 ft. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Body of bementite ore 32 ft. long and 8 ft. wide enclosed in greenstone. **Ref:** 48-A, p. 27. 94, p. 17.

Sekiu River (1)

Loc: SE¼ sec. 27, (32-14W), about 10 mi. W. of the Hoko R. bridge. **Access:** 6 mi. by trail from Clallam Bay-Ozette Lk. road. **Ore:** Manganese, mercury. **Ore min:** Cinnabar, free mercury, manganese silicates and oxides. **Deposit:** Manganese appears to be of excellent grade. **Ref:** 48-A, p. 26. 94, p. 18.

Skookum (53)

Loc: Sec. 12, (29-7W), 4,000 ft. NW. of the 6 mi. post on the Little R. trail, on a ridge extending northward from Unicorn Peak. **Elev:** 3,700 to 4,250 ft. **Access:** By trail either up river from the Little R. road or from the Hurricane Lookout road to the S. **Prop:** 1 claim. **Ore:** Manganese. **Ore min:** Bementite,

neotocite, some hausmannite. **Deposit:** Lenses of ore between red limestone and basalt. One is 6 to 8 ft. wide and has been explored for 200 ft. along the strike. **Dev:** 4 open cuts. **Assays:** 30.6% to 34.2% Mn, 6.2% Fe, 34.2% SiO₂. **Ref:** 48-A, p. 33. 94, p. 20. 127, pp. 448-449. 158.

Sooes River

Loc: Tributaries of the Sooes R. and in hills adjacent to upper reaches of the river. **Access:** N. of the Ozette-Sekiu road. **Ore:** Manganese float. **Ref:** 48-A, p. 26.

State Lease (Beaver Creek) (3)

Loc: Near center NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 16, (30-12W), about 2 mi. NE. of Sappho on Beaver Cr. **Elev:** 1,300 ft. **Access:** $\frac{1}{4}$ -mi. trail from Rainy Cr. road. **Prop:** State land. **Owner:** Leased by John C. Krueger, Port Angeles, Wash. (1953—). Frank Murphy Enterprises (1952). **Ore:** Manganese. **Ore min:** Hausmannite predominant, bementite, neotocite, rhodochrosite, cinnabar, mercury. **Gangue:** Chalcedonic quartz. **Deposit:** Massive lens 34 ft. long, 15 ft. wide, and 8 ft. thick in red limestone. **Dev:** 70-ft. adit, trench, sluicing. **Assays:** 41.84% Mn, 3.21% Fe, 13.68% SiO₂. As much as 6.6 lb. per ton Hg. **Prod:** 1952-1954. **Ref:** 48-A, p. 26. 94, p. 18. 125, pp. 22-23. 158.

Storm King (43)

Loc: Sec. 29, (30-8W), on N. slope of Baldy Ridge between Mt. Baldy and Storm King Mtn. **Elev:** 3,400 ft. **Access:** 3 mi. from highway. No trail. **Ore:** Manganese. **Deposit:** Open cut showed ore body 6 ft. thick for a height of 7 ft. **Assays:** "Average grade." **Ref:** 158.

Summit (30)

Loc: SW $\frac{1}{4}$ sec. 22, (30-10W). **Ore:** Manganese. **Ref:** 158.

Sunrise (16)

Loc: SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 24, (30-11W), 1 mi. N. of U. S. Highway 101, $1\frac{1}{2}$ mi. W. of Heckles. **Elev:** 2,176 to 2,194 ft. **Prop:** 1 claim: Sunrise. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** 3 bodies of bementite ore—50 ft. long, 4 ft. av. width; 26 ft. long, 3 ft. av. width; and 21 ft. long, 4 ft. av. width. **Dev:** 3 trenches. **Assays:** 4.64% to 29.85% Mn, 12.76% to 34.85% Fe, 18.36% to 63.93% SiO₂. **Ref:** 48-A, p. 29. 94, p. 16. 158.

Sunset

(see J and J and Sunset)

Sunshine (32)

Loc: NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 23, (30-10W), $\frac{3}{4}$ mi. SE. of summit of Mt. Muller. **Elev:** 2,340 ft. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Body of bementite 24 ft. long and 6 ft. in av. width, enclosed in greenstone. **Ref:** 48-A, p. 30. 94, p. 15.

Sutherland

(see Thompson)

Thompson (Sutherland) (46)

(see also Cedar, Hemlock)

Loc: Due S. of center of Lk. Sutherland in what would be about sec. 27, (30-8W) if surveyed. **Elev:** 3,400 ft. **Access:** Not accessible by trail or road; reached by 3 mi. of overland travel. **Prop:** 6 claims: Cedar, Hemlock, and 4 others. **Ore:** Manganese. **Ore min:** Bementite, neotocite, hausmannite. **Deposit:** Lenses of manganese minerals have been found for 600 ft. along strike of tuff and limestone which lie between basalt flows generally less than 3 ft. thick. **Dev:** 135-ft. shaft, sunk by U. S. Bureau of Mines, and some open cuts. **Assays:** 30.60% to 34.20% Mn, 6.20% to 9.20% Fe, 19.20% to 34.20% SiO₂. **Ref:** 48-A, p. 33. 94, p. 19. 127, pp. 446-447. 158.

Three Musketeers (31)

Loc: Sec. 34, (30-10W). **Ore:** Manganese. **Deposit:** Av. 4 ft. thick. **Ref:** 158.

Victor (Bear Creek) (5)

Loc: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 24, (30-12W). **Elev:** 800 ft. **Access:** 3 mi. up Bear Cr. from U. S. Highway 101, by way of Rainy Cr. road and $\frac{1}{4}$ mi. trail. **Owner:** Victor Mining Co. (1953—). H. W. Pollock and Victor Oberg, Port Angeles, Wash. (1938-1952). **Ore:** Manganese. **Ore min:** Principally bementite, also neotocite. **Deposit:** 2 ft. of siliceous ore between 2 flows of basaltic breccia. **Assays:** A 50-ton shipment av. 49.16% Mn. **Prod:** 50 tons or more in 1953. **Ref:** 48-A, p. 27. 94, pp. 17-18. 125, p. 21. 158.

Victoria

Loc: Clallam County. **Ore:** Manganese. **Ref:** 158.

West Extension

Loc: Clallam County. **Ore:** Manganese. **Ref:** 158.

Whistler Flats South (57)

Loc: Sec. 24, (29-7W), on Hutton Ridge, S. of Whistler Flats. **Elev:** 4,000 to 4,200 ft. **Access:** Trail. **Ore:** Manganese. **Deposit:** Several bold outcrops 20 to 50 ft. high, as much as 125 ft. wide and 200 ft. long. **Dev:** Open cuts. **Ref:** 158.

Whistler Flats Southwest (58)

Loc: Sec. 24, (29-7W), on a spur connecting Unicorn Peak and Hurricane Ridge, SW. of Whistler Flats. **Access:** Trail. **Ore:** Manganese. **Deposit:** Ore bodies 2 to 5 ft. thick stand in vertical cliffs 120 to 300 ft. high for a distance of $\frac{1}{4}$ mi. **Ref:** 158.

Wildcat

Loc: Clallam County. **Ore:** Manganese. **Ref:** 158.

FERRY COUNTY

Humboldt (3)

(see under copper)

Last Chance (2)

(see under copper)

Meteor (1)

(see under silver)

Ray

Loc: Probably near Republic. **Owner:** Clyde W. Ray, Republic, Wash. (1941). **Ore:** Manganese. **Assays:** 49% Mn. **Ref:** 158.

GRAYS HARBOR COUNTY

Antlers (8)

(see also Egge)

Loc: SW $\frac{1}{4}$ sec. 30, (22-9W), on tributary to Stevens Cr. **Access:** Trail. **Prop:** 1 claim: Antlers. **Owner:** Henry Egge, Hoquiam, Wash. (1941). **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Greenstone, jasper. **Deposit:** A lens of manganese ore in greenstone 4 ft. thick and 10 ft. in dia. **Dev:** Open cut, 10-ft. adit. **Ref:** 158.

Black Wonder (9)

Loc: N $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 30, (22-9W). **Elev:** 1,300 ft. **Ore:** Manganese. **Ore min:** Pyrolusite, bementite, neotocite. **Deposit:** Lens of manganese ore about 4 ft. wide and perhaps 30 ft. long in greenstone. **Dev:** Several open cuts, 2 adits, each about 40 ft. long; a caved adit. **Prod:** 5 tons in 1936. **Ref:** 61, p. 51. 158.

Burnt Mountain

(see Burnt Peak)

Burnt Peak (Burnt Mountain) (15)

Loc: SE $\frac{1}{4}$ sec. 7, (21-9W). **Elev:** 800 ft. **Access:** Burnt Peak Lookout road, $2\frac{1}{2}$ mi. from U. S. Highway 410. **Prop:** 1 section

(640 acres). **Owner:** Leased by Dave Pryde and Henry Egge from Polson Lumber Co. (1944). **Ore:** Manganese. **Ore min:** Bementite, manganese oxides. **Gangue:** Greenstone, jasper. **Deposit:** Several small isolated lenses of silicate ore in greenstone and red limy argillite. Aggregate tonnage may be considerable. **Dev:** 200-ft. adit, 3 open cuts, trenches. **Assays:** 36% Mn, 18% Fe, 5.5% SiO₂. **Prod:** Approx. 80 tons of ore mined and shipped. **Ref:** 48-A, p. 44. 125, pp. 242-243.

Cook Creek (2)

Loc: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 20, (22-9W). **Elev:** 1,170 ft. **Access:** Mine-to-market road up Cook Cr. from U. S. Highway 101. **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper. **Deposit:** Small body of low-grade bementite ore underlying greenstone and overlying red shale. **Ref:** 48-A, p. 43. 94, p. 25. 127, p. 457. 158.

Coon Creek

Loc: Coon Cr. **Owner:** Henry Egge, Hoquiam, Wash. (1941). **Quinault Manganese Co.** (1929-1935). **Ore:** Manganese. **Prod:** 1941. **Ref:** 97, 1935.

East Cook Creek (3)

Loc: NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 20, (22-9W). **Elev:** 1,250 ft. **Access:** Mine-to-market road up Cook Cr. from U. S. Highway 101. **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper. **Deposit:** 2 tons of bementite-jasper ore on dump. None exposed in the adit. **Dev:** 10-ft. adit. **Ref:** 48-A, p. 43. 94, p. 25. 127, p. 457.

Egge (Quinault) (4)

(see also Antlers, Pioneer)

Loc: Secs. 19, 20, and 30, (22-9W), at headwaters of Cook, Skunk, and Stevens Creeks. **Access:** Roads up Stevens and Cook Creeks. **Prop:** 17 claims: Surprise, Geraldine, Ethel, Antlers, Lola, Lady Ann, Lady B., Pioneer, Sunrise, Gideon, Tubal Cain, Black Gold, Lady Margaret, Martha, Pyrolusite, Boulder, Olga. **Owner:** Henry Egge et al., Hoquiam, Wash. (1941), leasing to Consolidated Coal Exporters, Inc., Seattle, Wash. (1952—). **Ore:** Manganese. **Assays:** 2 samples gave 24.51% and 27.58% Mn, 17.58% and 24.95% Fe, 44.14% and 23.81% SiO₂. **Prod:** Minor production 1941, 1952. **Ref:** 58, p. 20. 133, p. 32. 158.

Esther-Irene (5)

Loc: SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 19, (22-9W), at head of Phillips Cr. **Elev:** 1,265 ft. **Access:** Connected to U. S. Highway 101 by mine-to-market road. **Prop:** 2 claims: Elizabeth, Esther-Irene. **Owner:** Dave Pryde and Henry Egge, Hoquiam, Wash. (1944). **Ore:** Manganese. **Ore min:** Bementite, neotocite, manganite, psilomelane. **Deposit:** Ore exposed in 4 places within 135 ft. in red argillite and greenstone. One ore body 20 ft. wide. **Dev:** Open cut and strip pits. **Assays:** As high as 40% Mn. **Prod:** At least 75 tons. **Ref:** 48-A, pp. 43-44. 127, p. 457.

Excelsior (16)

Loc: Sec. 5, (20-12W). **Ore:** Manganese. **Ref:** 158.

Fishel (1)

Loc: S $\frac{1}{2}$ sec. 8, (22-9W). **Access:** 1 $\frac{1}{2}$ mi. by trail and 36 mi. by road N. of Hoquiam. **Prop:** 1 claim. **Owner:** E. E. Fishel and George Newberry (1936). **Ore:** Manganese. **Ore min:** Bementite or hausmannite. **Gangue:** Red chalcedony. **Dev:** 18-ft. adit. **Ref:** 61, pp. 52-53.

Fossburg (22)

Loc: Sec. 20, (22-7E). **Owner:** Victor Fossburg. **Ore:** Manganese. **Ref:** 158.

A. E. Graham (23)

Loc: Secs. 18, 19, and 30, (22-7W). **Ore:** Manganese. **Ref:** 158.

Grays Harbor Title (24)

Loc: Sec. 19, (22-7W). **Ore:** Manganese. **Ref:** 158.

W. H. Hopkinson (25)

Loc: Secs. 17, 18, 19, and 30, (22-7W). **Ore:** Manganese. **Ref:** 158.

Hydman (26)

Loc: Sec. 19, (22-7W). **Ore:** Manganese. **Ref:** 158.

Irene

(see Esther-Irene)

Knowles (21)

Loc: SW $\frac{1}{4}$ sec. 12, (22-8W). **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Float. **Ref:** 158.

Lizard (6)

Loc: Secs. 19 and 30, (22-9W), 6 mi. S. of Lk. Quinault. **Ore:** Manganese. **Ore min:** Bementite. **Assays:** Ore mined contained 36% Mn, 18% Fe, 5.5% SiO₂. **Prod:** Small amount in 1916. **Ref:** 125, pp. 242-243.

Norma

Loc: Grays Harbor County. **Ore:** Manganese. **Ref:** 158.

Paramont (17)

Loc: Sec. 6, (20-12W). **Ore:** Manganese. **Ref:** 158.

Pioneer (10)

(see also Egge)

Loc: Center N $\frac{1}{2}$ sec. 30, (22-9W), $\frac{1}{4}$ mi. SE. of Black Wonder workings. **Owner:** Henry Egge, Hoquiam, Wash. (1941). **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** 10 ft. of manganiferous ore. **Dev:** Pit. **Ref:** 158.

Polson (30)

Loc: Sec. 30, (22-7W). **Ore:** Manganese. **Ref:** 158.

Quinault

(see Egge)

Ralfson (27)

Loc: Sec. 20, (22-7W). **Ore:** Manganese. **Ref:** 158.

Reed & Sims

Loc: Grays Harbor County. **Ore:** Manganese. **Ref:** 158.

Richards (11)

Loc: NW $\frac{1}{4}$ sec. 29, (22-9W). **Ore:** Manganese. **Ref:** 158.

Robinson (28)

Loc: Sec. 18, (22-7W). **Ore:** Manganese. **Ref:** 158.

Sims

(see Reed & Sims)

Skunk-Cook Creek Divide (7)

Loc: SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 20, (22-9W). **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper. **Deposit:** Bementite ore in greenstone near red limestone contact. **Dev:** Small adit (caved). **Ref:** 48-A, p. 43. 94, p. 24. 127, p. 457.

Spurr

Loc: Grays Harbor County. **Ore:** Manganese. **Ref:** 158.

Star (12)

Loc: Near center sec. 30, (22-9W). **Elev:** 1,300 to 1,470 ft. **Access:** Trail from U. S. Highway 101 at a point about 10 mi. N. of Humpstulips. **Prop:** 3 claims: Star Nos. 3, 4, and 5. **Ore:** Manganese. **Ore min:** Bementite, rhodochrosite, pyrolusite, neotocite, manganese oxides. **Gangue:** Chalcedonic quartz. **Deposit:** 3 isolated masses or lenses of bementite ore in greenstone and red limestone. One is 6 ft. wide and 10 ft. long, two others are 7 by 9 ft., and 5 by 9 ft. **Ref:** 48-A, p. 43. 94, p. 24. 125, pp. 23-24. 127, p. 457.

Stevens Creek (13)

Loc: SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 30, (22-9W). **Elev:** 790 ft. **Access:** 3 mi. E. of U. S. Highway 101 by tractor road. **Owner:** Consolidated Minerals Co., Seattle, Wash. (1952—). Henry Egge and Robert Steele, Hoquiam, Wash. (1941). **Ore:** Manganese. **Ore min:** Bementite, some neotocite, possibly rhodonite. **Deposit:** 2 deposits in greenstone and red calcareous argillite, one 6 ft. wide can be traced 10 ft., the other 3 to 4 ft. wide exposed for 15 ft. **Dev:** Open cuts, stripping. **Improv:** Cabin (1941). **Prod:** 5 tons 1941. 1952. **Ref:** 48-A, p. 43. 94, p. 24. 104, 6/15/41. 108, 6/41, p. 36. 127, p. 457.

Stevens Creek, North Fork (14)

Loc: Sec. 30, (22-9W). **Elev:** 1,150 ft. **Access:** 1,500 ft. up N. Fk. of Stevens Cr. from the Stevens Creek occurrence. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Several large boulders of bementite. **Dev:** 12-ft. adit in greenstone. **Ref:** 48-A, p. 43. 94, p. 24. 127, p. 457.

Superior (18)

Loc: Sec. 6, (20-12W). **Ore:** Manganese. **Ref:** 158.

Supreme (19)

Loc: Sec. 6, (20-12W). **Ore:** Manganese. **Ref:** 158.

Thomas Svendsen (29)

Loc: Sec. 18, (22-7W). **Ore:** Manganese. **Ref:** 158.

Wynoochee (20)

Loc: SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 22, (23-7W), 800 ft. up Road No. 915 of Simpson Logging Co., on headwaters of Wynoochee R. **Access:** Logging road. **Owner:** Simpson Logging Co. (1951). **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Outcrop 20 by 200 ft. of ore-bearing basalt. **Ref:** 158.

JEFFERSON COUNTY**Albino Rodriguez (6)**

Loc: Near center NW $\frac{1}{4}$ sec. 25, (26-3W), on tributary to Dosewallips R. **Ore:** Manganese. **Ore min:** Manganese silicate. **Deposit:** Manganese deposit in greenstone is 1 to 2 ft. wide and traceable for 100 ft. **Ref:** 158.

Black Hump (9)

Loc: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 19, (25-3W). **Elev:** 4,500 ft. **Access:** 3 mi. up Cabin Cr. from the Hamma Hamma R. road. **Prop:** 1 claim. **Ore:** Manganese, iron. **Ore min:** Hematite. **Deposit:** Hematite in greenstone, very little manganese. **Ref:** 48-A, p. 39.

Duckabush River (8)

Loc: Secs. 4 and 5, (25-3W), on flanks of Big and Little Hump Mountains. **Access:** Duckabush R. road. **Ore:** Manganese. **Deposit:** Reported manganiferous outcrops. **Ref:** 48-A, p. 38.

Elkhorn (4)

(see also Karnes)

Loc: Secs. 13 and 24, (26-4W), on steep S. slope of Mt. Constance, between Miners Cr. and Bull Elk Cr. **Elev:** 1,000 to 5,700 ft. **Access:** 13 $\frac{1}{2}$ mi. up Dosewallips R. road from U. S. Highway 101. **Prop:** 28 unpatented claims, including Karnes group. **Owner:** American Manganese Corp., Seattle, Wash. (1935-1951). **Ore:** Manganese. **Ore min:** Bementite predominant. **Deposit:** 3 limestone beds in basalt contain lenses of manganese ore, some with known thickness of 25 ft. **Dev:** 20 small cuts, 3 short adits, trenches. **Assays:** 23.4% to 26.4% Mn, 4.3% to 18.0% Fe, 23.4% to 39.1% SiO₂, 6.9% to 12.3% CaO. **Ref:** 48-A, p. 35. 94, p. 22. 127, pp. 451-452. 158.

Karnes (5)

(see also Elkhorn)

Loc: Near center sec. 24, (26-4W). **Elev:** 2,150 ft. **Prop:** Part of Elkhorn group. **Owner:** American Manganese Corp., Seattle, Wash. (1951). **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Small pods of bementite ore in limestone interbedded with greenstone. **Dev:** Several open cuts. **Ref:** 158.

Lucky Creek (7)

Loc: Sec. 25, (26-3W), on S. side of Dosewallips R. **Elev:** 1,500 to 1,790 ft. **Access:** $\frac{3}{4}$ mi. S. of Corrigenda Guard Station on the Dosewallips R. road. **Prop:** 10 claims. **Ore:** Manganese. **Ore min:** Bementite, neotocite. **Gangue:** Jasper. **Deposit:** Tabular body of silicate manganese ore 2 to 3 ft. wide exposed continuously for 500 ft. **Dev:** Short adit. **Assays:** 25.2% Mn, 6.1% Fe, 30.6% SiO₂. **Ref:** 48-A, p. 35. 94, p. 22. 127, p. 452. 158.

Mount Claywood (1)

Loc: Sec. 30, (27-5W). **Elev:** 6,150 ft. **Access:** 12 mi. by trail from end of Dosewallips R. road. **Ore:** Manganese, iron. **Ore min:** Probably manganmagnetite. **Deposit:** Layers and lenses of ore conformable to associated limestone, and irregular isolated lenses in greenstone, and veins cutting greenstone. **Assays:** 14.1% SiO₂, 27.7% Fe, 16.2% CaO, 7.72% Mn. **Ref:** 48-A, pp. 35-39.

North Pole Quartz (10)

Loc: Near Lena Lk. in NE $\frac{1}{4}$ sec. 35, (25-4W). **Elev:** 3,200 ft. **Access:** Trail up Lena Cr. from Hamma Hamma R. road. **Prop:** 1 claim. **Ore:** Manganese, iron. **Ore min:** Manganmagnetite (?). **Gangue:** Jasper, hematite. **Deposit:** Iron-manganese ore in greenstone, one outcrop 6 ft. by 4 ft., another 8 ft. by 5 ft. **Ref:** 48-A, p. 38.

Tubal Cain (2)

Loc: Sec. 7, (27-3W), on NW. side of Iron Mtn. **Elev:** 4,400 to 6,300 ft. **Access:** 12 mi. by trail from dirt road at Dungeness Forks. **Prop:** 11 patented claims. **Owner:** Olympic Manganese Co., Seattle, Wash. (1935-1941). Tubal Cain Copper & Manganese Mining Co. (1908-1924). **Ore:** Manganese, copper. **Ore min:** Bementite, neotocite, native copper. **Deposit:** Tabular body of manganese silicates about 300 ft. long, and 1 to 2 ft. in av. width. Wall rock mainly basalt, some limestone. **Dev:** 2,300-ft. crosscut. **Assays:** 2 assays show 5.67% and 47.39% Mn, 15.30% and 20.30% SiO₂, 9.62% and 2.51% Fe, 28.65% and 1.73% CaO. **Ref:** 33, 1908, p. 1341. 48-A, pp. 34-35. 94, p. 21. 98, 1925, p. 1835. 105, vol. 99, 1909, p. 345. 112, p. 206. 124, pp. 241-242. 125, pp. 450-451. 129, p. 318. 130, pp. 75, 76-77. 141, p. 84. 158.

Tull City (3)

Loc: Approx. $\frac{1}{2}$ mi. NW. of Tubal Cain adit. **Prop:** May be part of Tubal Cain group of claims. **Ore:** Manganese. **Deposit:** Manganese ore crops out on E. side of the craggy ridge between Tull City and Tubal Cain prospects. **Ref:** 48-A, p. 34. 125, p. 450.

KITTITAS COUNTY**Denney (1)**

Loc: Reportedly 5 mi. N. of Denney's cabin or approx. in the NW. part of T. 19 N., R. 15 E. **Owner:** V. C. Denney, Ellensburg, Wash. (1942). **Ore:** Manganese. **Ore min:** Manganese oxide. **Deposit:** A 1-lb. sample of pure manganese oxide reportedly came from the location above. **Ref:** 158.

LEWIS COUNTY

Chehalis River (1)

Loc: NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14, (11-5W), on headwaters of E. Fk. of Chehalis R. **Access:** Trail from end of Shepard road. **Owner:** Weyerhaeuser Timber Co., Tacoma, Wash. (1952—). **Ore:** Manganese. **Ore min:** Manganese oxide. **Deposit:** Said to be a deposit of manganese which could be cheaply mined. **Assays:** 34% Mn, 12% SiO₂, 0.12% P. **Ref:** 158.

MASON COUNTY

Apex (Black Rock) (9)

Loc: Sec. 8, (23-5W), $\frac{1}{2}$ mi. up Copper Cr. from Triple Trip mine. **Elev:** 2,400 ft. **Access:** $\frac{3}{4}$ mi. up Copper Cr. from Skokomish R. road near Lincoln Guard Station. **Prop:** 3 claims: Black Rock Nos. 1, 2, and 3. **Owner:** Manganese Products, Inc., Seattle, Wash. (1940). Mt. Elinor Manganese Mining & Smelting Co. (1921-1926). **Ore:** Manganese. **Ore min:** Bementite, neotocite, manganese oxides, rhodochrosite, specularite. **Gangue:** Jasper. **Deposit:** Lens of manganese ore along a greenstone-red limestone contact. Lens of 25-ft. max. width explored for length of 250 ft. **Dev:** Diamond drilling by U. S. Bureau of Mines, surface trenching. **Assays:** Sample across 6-ft. section of the lode showed 43.10% MnO, 12.65% Fe₂O₃, 3.87% CaO, 18.91% SiO₂. **Ref:** 48-A, pp. 39-40. 94, pp. 22-23. 98, 1922-1926. 124, pp. 237-238. 127, pp. 455-456. 129, p. 315. 130, pp. 77-78. 158.

Arkansas Traveler (1)

Loc: Sec. 20, (24-5W), 750 ft. NW. of Black and White mine shaft. **Ore:** Manganese. **Ore min:** Bementite (?), copper sulfides and carbonates. **Deposit:** Small showing of manganese. **Ref:** 48-A, p. 41. 124, p. 240. 127, p. 454.

Black Hump (4)

Loc: N $\frac{1}{2}$ N $\frac{1}{2}$ sec. 33, (24-5W). **Access:** 2 mi. by trail N. of Staircase resort at head of Lk. Cushman. **Prop:** 1 unpatented claim. **Owner:** L. L. Dickenson of Staircase resort (1942). **Ore:** Manganese. **Ore min:** Bementite. **Assays:** 28% Mn, 17% Fe, 25% SiO₂. **Prod:** Some production prior to 1924. **Ref:** 124, p. 240. 141, p. 83. 158.

Black Queen (5)

Loc: SE $\frac{1}{4}$ sec. 4, (23-5W), $\frac{1}{2}$ mi. below Staircase resort and $\frac{1}{4}$ mi. up W. side of Skokomish R. from Copper Cr. **Prop:** 6 claims: Black Queen Nos. 1 to 6. **Owner:** Manganese Mining & Manufacturing Co., Seattle, Wash. (1942). **Ore:** Manganese. **Ore min:** Bementite, neotocite. **Gangue:** Jasper. **Deposit:** Manganese silicate body at contact of greenstone and red calcareous argillite. **Dev:** Several open cuts, shallow shaft. **Ref:** 48-A, p. 40. 158.

Black Rock

(see Apex)

Black and White (2)

(see under copper)

Bosnia (Steel Creek) (11)

(see also Jolly Jack)

Loc: Sec. 10, (23-6W), a short distance above Steel Cr. cabin. **Access:** About 11 mi. by trail up S. Fk. Skokomish R. from end of road at Intermount Guard Station. **Prop:** 1 claim. May be part of Jolly Jack property. **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper. **Deposit:** 2 lenses of bementite rock enclosed in red limestone; one is 8 to 10 ft. wide, at least 200 ft. long, and 100 ft. in vertical extent. **Assays:** Av. of several analyses shows 24% Mn, 10.5% Fe, 30% SiO₂. **Ref:** 48-A, pp. 41-42. 94, p. 23. 124, p. 241. 127, pp. 456-457. 141, pp. 83-84.

Brown Mule

(see Triple Trip)

Hi Hope (6)

Loc: E $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 4, (23-5W), across the river from Black Queen group. **Access:** Skokomish R. road near Lincoln Guard Station. **Prop:** 2 claims: Hi Hope Nos. 1 and 2 on Olympic National Park ground. **Owner:** U. S. Government. **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper. **Deposit:** Manganese ore on a greenstone-red limestone contact. Ore very spotty. **Dev:** 50-ft. adit (partly caved in 1942), open cut. **Ref:** 48-A, p. 40. 158.

India (Steel Creek) (12)

Loc: Sec. 10, (23-6W), $\frac{1}{2}$ mi. beyond Bosnia claim, Lk. Cushman area. **Elev:** 2,000 to 3,500 ft. **Prop:** 1 claim. **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper. **Deposit:** Lens of bementite rock 15 ft. wide and 50 ft. long associated with red limestone. **Assays:** 13.56% to 37.64% Mn, 5.84% to 11.31% Fe, 17.16% to 52.59% SiO₂, 0.048% to 0.119% P. **Ref:** 48-A, p. 42. 124, p. 241. 127, pp. 456-457.

Jolly Jack (13)

(see also Bosnia)

Loc: SE $\frac{1}{4}$ sec. 9, (23-6W), on tributaries of Steel Cr. **Elev:** 2,400 to 2,700 ft. **Access:** 12 mi. by road and 11 mi. by trail from Hoodsport. **Prop:** 12 unpatented claims. May include Bosnia claim. **Owner:** John Fadness, Jim Dammel, and associates, Tacoma, Wash. (1951). **Ore:** Manganese. **Ore min:** Bementite. **Gangue:** Jasper, limestone. **Deposit:** 4 exposures of ore as much as 4 ft. wide and 20 ft. long. **Dev:** Open cuts. **Ref:** 158.

Keller Smith

(see Smith)

Lucky Jack

Loc: Mason County. **Ore:** Manganese. **Assays:** 44.98% MnO, 4.00% MnO₂, 12.93% Fe₂O₃, 15.15% SiO₂, 0.19% P₂O₅, 1.45% Al₂O₃, 1.00% CaO, 17.01% ignition loss. **Ref:** 58, p. 41. 158.

McKean (10)

(see also Triple Trip)

Loc: Sec. 5, (23-5W). **Prop:** Part of Triple Trip property. **Ore:** Manganese. **Deposit:** 6 ft. of ore but not all commercial. Similar to Triple Trip in character. **Prod:** 1918. **Ref:** 129, p. 317.

Old Crow (15)

Loc: NE $\frac{1}{4}$ sec. 16, (23-6W), on a tributary of Steel Cr. **Elev:** 2,300 ft. **Access:** 12 mi. by road and 11 mi. by trail from Hoodsport. **Owner:** Alex Hunt, Hoodsport, Wash. (1951). **Ore:** Manganese. **Ref:** 158.

Rose Aster (7)

Loc: Center N $\frac{1}{2}$ sec. 4, (23-5W), on S. side of N. Fk. of Skokomish R., 400 ft. down river from Staircase resort. **Prop:** 1 claim. **Owner:** C. E. Brown and C. E. Russell, Olympia, Wash. (1942). **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** About 10 lb. of manganese ore exposed at contact of red argillaceous limestone and greenstone. **Dev:** Open cut. **Improv:** Cabin (1942). **Ref:** 158.

Russian No. 1

Loc: T. 23 N., R. 6 W., Lk. Cushman area. **Ore:** Manganese. **Ore min:** Bementite. **Assays:** 25.20% Mn, 28.90% SiO₂, 11.00% Fe, 0.099% P. **Ref:** 158.

Smith (Keller Smith) (3)

Loc: Sec. 22, (24-5W), 1 mi. SE. of Black and White property. **Ore:** Manganese. **Ore min:** Bementite. **Ref:** 48-A, p. 41. 124, p. 240.

Steel Creek

(see Bosnia, India)

Triple Trip (Brown Mule) (8)

(see also McKean)

Loc: Secs. 4 and 9, (23-5W), on Copper Cr., about ½ mi. above its confluence with Skokomish R. **Elev:** 1,000 ft. **Access:** ½ mi. up Copper Cr. from Skokomish R. road near Lincoln Guard Station. **Prop:** Includes McKean claim. **Owner:** C. E. Brown and C. E. Russell, Olympia, Wash., hold the property by possessory title (1942). Triple Trip Mining & Milling Co. (1910). Mt. Elinor Manganese Mining & Smelting Co. (1921-1924). **Ore:** Manganese, iron. **Ore min:** Bementite, manganomagnetite (?). **Deposit:** Elongated lens along a basalt-red limestone contact is 50 ft. long and 1 to 4 ft. wide. **Dev:** 60-ft. crosscut with a 75-ft. drift, and another old adit with about 50 ft. of workings. **Assays:** Analyses of 6 samples showed 6% to 25% Mn, 8% to 21% Fe, 11% to 37% SiO₂, 4% to 36% CaO. **Prod:** Reportedly a carload of ore during World War I; said to contain 35% to 45% Mn, 17% to 30% SiO₂. **Ref:** 48-A, p. 39. 94, p. 22. 98, 1922, p. 1656; 1925, p. 1824; 1926, p. 1588. 105, vol. 101, 1910, p. 124. 124, pp. 236-237. 127, pp. 454-455. 129, pp. 315-317. 130, pp. 75, 77. 141, pp. 81-82. 158.

Widow (14)

Loc: SE¼ sec. 9, (23-6W), on a tributary of Steel Cr. **Access:** 12 mi. by road and 11 mi. by trail from Hoodsport. **Prop:** 6 claims. **Owner:** Ben Booth (1951). **Ore:** Manganese. **Ref:** 158.

OKANOGAN COUNTY

Hermance

(see Moore)

Hilo

(see St. Paul under silver)

Moore (Hermance) (1)

Loc: Sec. 22, (38-30E) and secs. 30 and 31, (38-31E), 4 mi. N. of Wauconda. **Elev:** 4,200 ft. **Access:** 21 mi. by road to railroad at Republic. **Prop:** 360 acres deeded land and mineral lease on adjoining State land. **Owner:** J. A. Hermance, Wauconda, Wash. (1951). W. R. Moore, Wauconda, Wash. (1941-1943), leased (1942) by Conrad Wolfie, Spokane, Wash. **Ore:** Manganese. **Ore min:** Rhodonite, pyrolusite, pyrite. **Gangue:** Quartz. **Deposit:** Fracture zone in quartzite at its contact with shale contains small lenses of pyrolusite and stringers of quartz with small spots of rhodonite. **Dev:** Deposit has been explored for 800 ft. along strike by 3 open cuts, an 18-ft. shaft, and a 10-ft. adit. **Assays:** Most assays show less than 10% Mn. **Prod:** 3½ tons in 1936 reported by owner. **Ref:** 111. 157.

Myrtle

(see St. Paul under silver)

Pogue Flat (Three Buttes) (2)

Loc: Near SW. cor. sec. 15, (34-26E). **Elev:** 1,400 ft. **Access:** Short road from Pogue Flat road. 3.5 mi. to railroad at Omak. **Owner:** R. J. Jones, Omak, Wash. (1942). **Ore:** Manganese. **Ore min:** Pyrolusite. **Deposit:** 2 quartz veins in decomposed granite, one 2 ft. wide, the other 1 ft. wide. Manganese occurs as stringers in the quartz and as disseminations in the granite. **Dev:** 80-ft. adit, 50-ft. stope, shaft, open cut. Geophysical prospecting by P. H. Holdsworth indicates the deposit has little depth. **Assays:** 20% Mn reported in ore shipped. **Prod:** 1916, produced twenty-five 30-ton cars of ore said to contain 20% Mn. **Ref:** 43, vol. 105, 1918, p. 1082. 124, p. 243. 130, pp. 78-79. 141, pp. 85-86. 158.

St. Paul (4)

(see under silver)

Silver Cliff (3)

(see under silver)

Three Buttes

(see Pogue Flat)

PEND OREILLE COUNTY

Sterling (1)

(see under zinc)

SKAGIT COUNTY

Belleville (Koehler) (4)

Loc: NE¼SE¼ sec. 13, (35-3E), in Belleville gravel pit. **Access:** Spur of Great Northern railroad. **Prop:** Deeded land. **Owner:** Great Northern Railway Co. (1940). **Ore:** Manganese. **Ore min:** Pyrolusite. **Gangue:** Sand and gravel. **Deposit:** Cross-bedded sands and gravels 30 ft. thick are underlain by a bed of gravel with a matrix of black sooty material. Sooty bed reportedly av. 4 ft. thick. **Dev:** Pit. **Ref:** 111. 158.

Eagle

(see under iron)

Fidalgo (1)

Loc: On Fidalgo Is., a few mi. S. of Anacortes. **Ore:** Manganese, copper. **Ore min:** Bementite, native copper. **Gangue:** Greenstone. **Deposit:** Bementite and hard black manganese oxide are enclosed by greenstone in which are specks of native copper. Some bementite bodies as much as 10 ft. wide. **Ref:** 141, p. 85.

Hamilton (5)

(see under iron)

Iron Mountain

(see Hamilton under iron)

Katie

(see under iron)

Koehler

(see Belleville)

Last Chance (6)

(see under iron)

Mountain Home (2)

Loc: On Fidalgo Is., a few mi. S. of Anacortes, near Lk. Campbell. **Prop:** 1 claim: Mountain Home. **Owner:** A. V. Ginnett et al. (1921). **Ore:** Manganese, copper. **Ore min:** Bementite, native copper, pyrite, chalcopyrite. **Deposit:** Bementite ore body in greenstone is 10 ft. wide. Part of the body composed of hard black oxide material similar to that in some deposits in Skokomish R. area. Lode can be traced 400 to 500 ft. **Dev:** Pit 15 ft. deep. **Ref:** 124, p. 242.

Pittsburg

(see under iron)

Samish Bay (3)

Loc: Reported on the mainland E. of Samish Bay, near the place where Chuckanut Drive crosses Oyster Cr. **Ore:** Manganese. **Ore min:** Bementite. **Deposit:** Manganiferous deposit similar to Olympic Peninsula ore. **Ref:** 124, p. 242. 141, p. 85.

Tennessee No. 3

(see under iron)

SNOHOMISH COUNTY

Cicero (Paddock) (1)

Loc: Sec. 4, (32-6E), on S. slope of Bald Mtn. **Access:** About 1½ mi. by trail up Grant Cr. **Prop:** 1 unpatented claim. **Owner:**

William S. Paddock, Arlington, Wash. (1940). **Ore:** Manganese. **Ore min:** Pyrolusite. **Gangue:** Chert. **Deposit:** Thin sooty seams of manganese oxide along the bedding planes of chert. Less than 2 tons of manganese oxide in entire outcrop. **Dev:** None. **Assays:** One sample gave 36.35% Mn. **Ref:** 158.

French Creek (3)

Loc: Near center sec. 16, (32-8E), in cuts along French Cr. road, 4 mi. from railroad. **Access:** Road. **Ore:** Manganese. **Ore min:** Rhodonite, rhodochrosite (?), manganese oxide. **Deposit:** Road cut exposes a lens or faulted vein of rhodonite and possibly rhodochrosite in schistose greenstone. The lens or vein is 8 to 10 ft. long and 3 ft. wide. It is weathered to black manganese oxide for about 1 ft. below the surface. **Dev:** None. **Ref:** 111, p. 2. 158.

Lake Riley (2)

Loc: W $\frac{1}{2}$ sec. 19, (32-7E), E. of Lk. Riley. **Ore:** Manganese. **Ore min:** Rhodonite, rhodochrosite. **Deposit:** Metamorphosed sediments. **Ref:** 14, p. 9.

Paddock

(see Cicero)

SPOKANE COUNTY

Dartford (1)

Loc: Across road from abandoned flour mill on the river at Dartford, 10 mi. N. of Spokane. **Owner:** James M. Moore, Spokane, Wash. (1943). **Ore:** Manganese. **Ore min:** Manganese oxide. **Deposit:** Vein 10 ft. wide crops out along a hillside for several hundred ft. **Assays:** 18% Mn. **Ref:** 158.

STEVENS COUNTY

Hawthorn

Loc: Probably near Colville. **Owner:** Albert W. Hawthorn, Colville, Wash. (1942). **Ore:** Manganese. **Assays:** 21% Mn. **Ref:** 158.

Johnny's Luck

(see Marty)

Marty (Johnny's Luck) (1)

Loc: N $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 6, (34-38E). **Access:** 11 mi. from railroad. **Owner:** John Marty, Rice, Wash. (1941-1952). **Ore:** Manganese. **Ore min:** Manganese oxide. **Gangue:** Quartz. **Deposit:** Secondary concentration of oxides in quartz which cements brecciated quartzite in a zone 200 ft. wide. Zone can be traced $\frac{1}{2}$ mi., but only locally does it contain small areas showing manganese. **Dev:** Open cut, 12-ft. shaft. **Assays:** Est. av. less than 5% Mn. Most of the silicified zone shows only traces of Mn. **Ref:** 111, p. 2.

Turtle Lake (3)

Loc: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 16, (28-38E), 1 mi. S. of Turtle Lk., in Spokane Indian Reservation. **Elev:** 2,500 ft. **Access:** Dirt road to deposit. **Ore:** Manganese. **Ore min:** Manganese oxides. **Gangue:** Quartz, feldspar. **Deposit:** Manganese and iron oxides cement decomposed granite over an exposed area of several thousand sq. ft. **Ref:** 158.

Wellpinit (2)

Loc: S. center sec. 24 and N. center sec. 25, (29-38E), in Spokane Indian Reservation, 7 mi. N. of Wellpinit. **Elev:** 2,500 ft. **Access:** Dirt road to property. **Ore:** Manganese. **Ore min:** Manganese oxides. **Gangue:** Quartz, feldspar. **Deposit:** Manganese and iron oxides cement disintegrated granite to a depth of as much as 10 ft. in an area several hundred ft. wide and about 1,500 ft. long. **Dev:** Open cuts. **Assays:** A 1,500-lb. sample ran 6.4% Mn. **Ref:** 36-A. 158.

WHATCOM COUNTY

Smith (1)

Loc: Sec. 23, (40-4E), 5 mi. E. of Everson. **Access:** On South Pass road. **Owner:** Mr. Smith. **Ore:** Manganese. **Ref:** 158.

YAKIMA COUNTY

Ironstone Mountain (1)

Loc: SE $\frac{1}{4}$ sec. 19, (14-13E), near top of Ironstone Mtn. **Owner:** M. H. Van Nuys, Seattle, Wash. (1951). **Ore:** Manganese. **Dev:** Open cut. **Ref:** 158.

MERCURY

Properties—Mercury, called quicksilver by most miners, is a silver-white heavy metal (heavier than lead) which is liquid at ordinary temperatures. It solidifies at -39° C. and is then tin-white, ductile, malleable, and soft enough to be cut with a knife. Mercury when pure does not tarnish on exposure to air. It has low vapor pressure and has a regular coefficient of expansion. It is a fair conductor of heat and electricity, the thermal heat conductivity being about two-thirds that of silver. Its vapor conducts electricity and, in doing so, emits radiations rich in ultraviolet rays. Mercury alloys with most metals except iron and platinum, and it combines with sulfur at ordinary temperatures. It is next to silver in the electromotive series and resembles copper in its chemical behavior. It is both bivalent and univalent, and its compounds are poisonous, but in small doses they are medicinal. Other properties are shown in the table on page 12.

Uses—The various uses from year to year consume markedly different proportions of the total United States mercury consumption. In 1950 the most important uses were for electrical apparatus, pharmaceuticals, industrial

and control instruments, and agriculture (disinfectants and fungicides), which used respectively 24, 12, 11, and 9 percent of the total consumption. Other uses, in declining order of importance, were in antifouling paint for ship bottoms, catalysts, dental preparations, electrical preparation of chlorine and caustic soda, fulminate for munitions and blasting caps, amalgamation of gold and silver ores, vermilion paint, and minor uses in making mirrors and for mercury salts for wood and fabric preservation, printing, staining, and photography. An increasing use is in a new type of dry battery, and another interesting use is in mercury-vapor boiler power plants, replacing water vapor.

Production—During periods of high mercury prices domestic mines have been able to supply the demands for the metal, but normally this country is a large importer of mercury. United States production was high during the two world wars and from 1928 to 1931, but since 1943 (highest production since 1882) domestic production dropped off each year until 1950, when the output was lower than in any year since before 1850. With increasing prices in 1951 and 1952, production increased somewhat.

Cinnabar, the ore of mercury, is known to occur in 13 of Washington's 39 counties, but the only production of any consequence has come from the Morton district of Lewis County. The first recorded production there was 75 flasks in 1916. The district later produced 6,438 flasks (76 pounds per flask) valued at \$689,656 during the period 1926 through 1942, with production in each year except 1939.

Prices—For many years the price of mercury has been controlled by international cartels, but the Spanish-Italian cartel which had dominated the market was reported to be dissolved in 1950 and to be inoperative throughout the year. Average yearly mercury prices stayed very close to \$40 per flask from 1876 to 1913, then rose to \$120 during World War I, dropped to \$45 in 1921, and gradually rose to a high of \$124 in 1928, only to slip back to \$58 in 1932. During World War II the average yearly price rose to \$198 in 1942. After 1943 the price dropped off to a low of \$70 in June 1950, then rose to \$225 in January 1951, a more than three-fold increase in a period of seven months. The price continued to rise to \$330 in October 1954, but by June 1955 it had dropped back to \$281. Such violent price fluctuations as these are among the reasons the large mining companies are reluctant to engage in mercury mining. In 1954 the General

Services Administration announced a 3½-year purchase program, with a floor of \$225 per flask, to purchase 125,000 flasks of mercury from domestic producers.

Ore minerals—More than 95 percent of the world's supply of mercury comes from the sulfide, cinnabar, HgS, which contains 86.2 percent mercury. Some ores contain native mercury, others contain metacinnabarite, HgS, and a few other minerals have occasionally been mined for their mercury content. In all, about 25 mercury minerals are known.

Geology—Mercury ores are widespread in their occurrence and are found in rocks of all ages and kinds, but most commonly are in regions of late Tertiary or Recent volcanic activity. They are shallow, less than 2,000 feet deep, and usually much less than that, and were deposited from low-temperature alkaline waters in highly fractured veins and bodies of irregular shape. Common accessory minerals are marcasite, pyrite, and stibnite; and the gangue minerals may be quartz, chalcedony, opal, calcite, dolomite, or barite. The tenor of ore mined in this country in 1950 ranged from 0.15 to 5.1 percent (3 to 102 pounds of mercury per ton of ore), and averaged 0.465 percent, or 9.3 pounds per ton. For comparison, ore mined in 1850 averaged 740 pounds per ton; in 1863, 360 pounds; in 1895, 20 pounds; and in 1928, 7.9 pounds.

OCCURRENCES

The map showing the numbered mercury occurrences is plate 16, on page 43 in volume 2.

CHELAN COUNTY

Bartlett (2)

Loc: S½ sec. 29, (23-17E), on N. side of Ingalls Cr. **Access:** 4½ mi. by trail up Ingalls Cr. from highway U. S. 97. **Prop:** 4 claims. **Owner:** Harry Bartlett, Wenatchee, Wash. (1942). **Ore:** Mercury. **Ore min:** Cinnabar. **Gangue:** Quartz, carbonates. **Deposit:** "Nickel ledge." **Dev:** 2 short adits. **Improv:** Cabin (1942). **Ref:** 67, p. 14.

Black Jack (6)

(see under gold)

Blewett

(see Black Jack under gold)

Cinnabar King

(see under gold)

King Creek (7)

Loc: At head of King Cr., probably in sec. 10, (22-17E). **Ore:** Mercury. **Deposit:** Veinlet of cinnabar 0.1 in. thick cuts serpentine. Can be traced 20 ft. **Ref:** 161, p. 78.

La Rica

(see Black Jack under gold)

Leavenworth

(see Orondo)

North Pole (4)

(see under gold)

Orondo (Leavenworth) (1)

Loc: In Chelan County near Orondo. **Ore:** Mercury. **Ore min:** Cinnabar. **Gangue:** Quartz and siliceous altered rock. **Deposit:** About 12 ft. wide, with 1 ft. of high grade. **Dev:** Small amount in 1911. **Ref:** 67, p. 26. 97, 1911, p. 916. 141, p. 87.

Shoshone (5)

Loc: Sec. 4, (22-17E), on N. side of Nigger Cr. at end of road. **Elev:** 3,500 ft. **Access:** 4-mi. road up Nigger Cr. from its mouth. **Owner:** G. J. Niemeyer, Z. T. Parker, and Roy Fontaine, Spokane, Wash. (1942). **Ore:** Mercury, nickel. **Ore min:** Cinnabar, garnierite (?). **Gangue:** Quartz. **Deposit:** "Nickel ledge." **Dev:** 135 ft. of adit, a small open cut. **Ref:** 67, p. 18.

Squaw Saddle (8)

Loc: On Squaw Saddle Mtn., 3 mi. from Wenatchee. **Ore:** Mercury. **Ore min:** Cinnabar. **Ref:** 67, p. 46. 130, p. 86. 141, p. 87.

Tom Burke

Loc: Blewett dist. **Ore:** Mercury. **Ore min:** Cinnabar. **Ref:** 106, 9/3/31, p. 13.

Velma (3)

Loc: N½ sec. 32, (23-17E), on S. side of Ingalls Cr. **Access:** 4½ mi. of trail up Ingalls Cr. from highway U. S. 97. **Prop:** 5 claims. **Owner:** L. G. Olds, Wenatchee, Wash. (1951). **Ore:** Mercury, nickel, gold, silver, copper. **Ore min:** Cinnabar, garnierite (?). **Gangue:** Quartz, carbonates. **Deposit:** "Nickel ledge." Cinnabar paystreak is 1½ to 3 ft. wide. **Dev:** Several open cuts. **Improv:** A good cabin (1949). **Assays:** As high as 0.5% Hg, and a selected sample ran 20% Ni. **Ref:** 67, p. 19. 133, p. 40.

CLALLAM COUNTY

Beaver Creek

(see State Lease under manganese)

Clallam (4)

(see under manganese)

Crescent (8)

(see under manganese)

June (6)
(see under manganese)

Lost Kremer (5)
(see under manganese)

Royal (2)
(see under manganese)

St. Regis (7)
(see under manganese)

Sekiu River (1)
(see under manganese)

State Lease (3)
(see under manganese)

CLARK COUNTY

Golden Wonder (1)

Loc: NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 32, (6-4E), 2 mi. E. of Yale bridge on Lewis R. **Elev:** 300 ft. **Access:** Aerial tram across Lewis R. from Frazier ranch. **Prop:** 120 acres of deeded land. **Owner:** V. V. Rand, Vancouver, Wash. (1942). **Golden Wonder Mining Co.** (1934). **Ore:** Mercury, gold. **Ore min:** Pyrite, cinnabar. **Gangue:** Calcite, gouge, quartz. **Deposit:** Weakly mineralized shear zone in altered tuff. Zone is 150 to 200 ft. wide at one place. Cinnabar occurs as a few scattered crystals. **Dev:** Adit caved at 600 ft. from portal, and other short adits and open cuts also caved. **Assays:** Said to assay 0.02 oz. Au. **Ref:** 158.

Smith (2)

Loc: Sec. 16, (2-4E). **Access:** Road. **Owner:** C. L. Smith, Vancouver, Wash., leasing from State of Wash. (1951). **Ore:** Mercury. **Deposit:** Lessee reports quartz and altered rock in a very large area. **Assays:** Lessee reports 2 to 38 lb. Hg per ton. **Ref:** 157, 158.

COWLITZ COUNTY

Green River (1)

Loc: On Green R. near its confluence with the N. Fk. of Toutle R. **Owner:** J. E. Bracey, R. F. Dotsch, Olympia, Wash. (1940). **Ore:** Mercury. **Improv:** 2 amalgamators, a mercury feeder, and screens (1941). **Prod:** 1941. **Ref:** 104, 1/15/40.

Red Star

Loc: Cowlitz County. **Owner:** Red Star Mining Co. (1924). **Ore:** Mercury. **Deposit:** Mercury reportedly occurs in a 8-ft. ledge. **Ref:** 141, p. 88.

KING COUNTY

Byrd (1)

Loc: Sec. 9, (21-7E), near Byrd. **Ore:** Mercury. **Ref:** 158.

KITTITAS COUNTY

Ben Nevis

Loc: Near Mt. Hawkins. **Owner:** Ben Nevis Quicksilver Mining Co. (1921). **Ore:** Mercury. **Ore min:** Cinnabar. **Ref:** 130.

Big Thing (5)

Loc: Sec. 8, (22-16E). **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Low-grade ore. **Ref:** 130, p. 86.

Boulder Creek

Loc: Near head of Boulder Cr. **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Cinnabar reportedly occurs along a joint plane in altered rock of the Peshastin formation. The ore is rich but occurs in such thin bands that it is of doubtful commercial value. **Ref:** 141, pp. 87-88, 146, p. 14.

Denney (1)

(see under chromium)

Ellensburg

Loc: Cle Elum dist. **Owner:** Cascade Mining Corp., 100 N. La Salle St., Chicago, Ill. (1941). **Ore:** Mercury. **Ref:** 13, p. 46, 158.

Elsener (3)

Loc: Sec. 6, (22-15E). **Access:** 17 mi. from railroad at Ronald. **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Small seams in Peshastin formation. **Ref:** 111, p. 2.

H-O-M-E (6)

(see also Silver Tip)

Loc: Secs. 26, 27, 28, and 34, (19-15E), near junction of Frosty and Taneum Creeks. **Elev:** 2,000 to 3,500 ft. **Access:** 25 mi. by road from railroad at Ellensburg. **Prop:** 27 claims, 5 of which are patented. Includes Silver Tip and Gold Crown claims. **Owner:** H-O-M-E Mining Co., Seattle, Wash. (1943). **Ore:** Mercury. **Ore min:** Cinnabar, free mercury. **Deposit:** Cinnabar is found in local faults and fracture zones near contact between carbonaceous schist and highly altered calcareous sediments. **Dev:** At least 1,000 ft. of adits and shafts. **Principal adit** is on Silver Tip claim. **Prod:** Owner reports 9 $\frac{1}{2}$ tons of ore shipped. **Ref:** 157.

Keystone (2)

Loc: Sec. 33, (23-15E), Cle Elum dist. **Ore:** Mercury, gold, nickel. **Ref:** 58, p. 36, 63, p. 65.

Silver Tip (7)

(see also H-O-M-E)

Loc: Near center SE $\frac{1}{4}$ sec. 28, (19-15E), on N. side of S. Fk. of Taneum Cr. **Elev:** 250 ft. above stream. **Owner:** V. C. Denney, Ellensburg, Wash., and T. F. Gannon, Ballard, Wash. (1942). **Ore:** Mercury. **Ore min:** Cinnabar. **Gangue:** Sheared rock. **Deposit:** Shear zone about 12 ft. wide at contact of Taneum sandstone and Easton schist contains small specks and thin seams of cinnabar. **Dev:** 300-ft. adit with two 150-ft. drifts. **Assays:** Ore said to av. 0.5% Hg, but this appears to be too high. **Prod:** 5 tons reported by owners. **Ref:** 111, p. 2, 158.

Teaway River (4)

Loc: At head of Middle Fk. of Teaway R. **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Cinnabar occurs as a thin seam along a joint plane in altered rock of the Peshastin formation. **Ref:** 144, p. 9.

Washington Quicksilver

Loc: Kittitas County. **Ore:** Mercury. **Ore min:** Cinnabar. **Ref:** 130, p. 86.

LEWIS COUNTY

Apex (Gallagher, Miller, Consolidated) (8)

Loc: SW $\frac{1}{4}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, and NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 6, (12-5E), about 800 ft. NE. of Parmenter adit, Morton dist. **Elev:** 1,875 to 2,002 ft. **Access:** About 1,000 ft. by trail from truck road to Parmenter adit. **Prop:** 120 acres. **Owner:** Apex Mercury Mining Co., Tacoma, Wash. (1943). **Ore:** Mercury. **Ore min:** Cinnabar. **Gangue:** Sandstone, breccia. **Deposit:** Cinnabar occurs as disseminations in sandstone and in breccia along a fault zone in coal and shale. **Dev:** 260-ft. adit, two 50-ft. adits, 1,000-ft. adit. **Ref:** 92-A, pp. 34-37, 99, no. 4, 1935, 158.

Barnum-McDonnell (9)

Loc: N $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 7, (12-5E), about 2 $\frac{1}{4}$ mi. SE. of Morton. **Access:** Morton-Kosmos highway crosses lowermost adit. Other workings accessible by truck road. **Prop:** 320 acres. **Owner:**

C. W. Lane and Floyd Ray, Morton, Wash. (1954—). Barnum McDonnell Mining Co. (1916-1929). Consolidated Mercury Mining Co. (1929-1933). Puget Sound Mercury Mining Co. (1935). Hermes Mercury Mining Co. (1936-1937). Cascade Mining Co. (1938). Mercury Corp. of America (American Mercury Co.), (Pacific Mining Co.) (1940-1942). **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Cinnabar occurs in fractures and breccia along fault zones in a series of sandstones, shales, and siltstones cut by igneous sills and dikes. Shear zone has probable max. thickness of 10 ft. Best ore is in tuffaceous sandstone. **Dev:** More than 3,400 ft. of underground workings on 5 levels. **Assays:** 3 to 47 lb. Hg per ton. **Prod:** 75 flasks 1916, 489 flasks 1926, 1,265 flasks 1926-1929, 441 flasks 1931. Also produced 1932, 1934, 1941. **Ref:** 92-A, pp. 5-30. 97, 1926-1934. 104, 11/15/30, p. 11; 6/30/32, p. 28. 106, 3/5/31, p. 19. 130, p. 86. 141, p. 88. 158.

Chapman

Loc: Morton dist. **Ore:** Mercury. **Ore min:** Cinnabar. **Ref:** 158.

Charlotte Ann

(see Lytle-Lynch)

Consolidated

(see Apex)

Eight-Seventeen (14)

Loc: SW $\frac{1}{4}$ sec. 8 and NW $\frac{1}{4}$ sec. 17, (12-5E), Morton dist. **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Small amounts of cinnabar. **Dev:** Prospect pits. **Ref:** 158.

Fisher

(see Roy)

Fisher Lease (4)

Loc: NE $\frac{1}{4}$ sec. 36, (13-4E), Morton dist. **Access:** Reached by $\frac{1}{2}$ mi. of trail from the highway. **Prop:** State lease. **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Cinnabar mineralization along a fault zone in sedimentary and igneous rocks. **Dev:** 2 adits. **Ref:** 158.

Gallagher

(see Apex)

Gillispie

(see Roy)

Kropolis

(see Lytle-Lynch)

Ladd (1)

Loc: Sec. 12, (14-4E), N. of Morton. **Access:** Road. **Ore:** Mercury. **Deposit:** Cinnabar float was found when a new road was built to the upper adit of the Ladd coal mine. **Ref:** 158.

Lynch

(see Lytle-Lynch)

Lytle-Lynch (Charlotte Ann, Kropolis) (10)

Loc: NW $\frac{1}{4}$ and N $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 6, (12-5E), about $\frac{3}{4}$ mi. N. of the Roy-Barnum-McDonnell workings. **Elev:** 1,610 to 1,725 ft. **Access:** Truck road from Morton-Kosmos highway. **Prop:** 240 acres. **Owner:** Barnum-Patterson Mining Co. (1939). Charlotte Ann Mercury Co. (1931-1932). Baker-Fonsec Co., Portland, Oreg. (1937). **Ore:** Mercury. **Ore min:** Cinnabar, pyrite or marcasite. **Deposit:** Cinnabar occurs as thin seams in fault breccia and rocks adjacent to the fault. Country rock consists of shale, sandstone, coal, and porphyry. **Dev:** 3 adits and at least 2 caved workings. One adit 230 ft., another 110 ft., and the other 70 ft. long. **Assays:** Ore said to av. about \$5.00. **Prod:** 1930-1932. **Ref:** 92-A, pp. 37-39. 97, 1931, p. 205; 1932-1933, p. 235. 158.

McDonnell

(see Barnum-McDonnell)

Miller

(see Apex)

Morton

(see Roy)

N. P. (3)

Loc: SE $\frac{1}{4}$ sec. 31, (13-5E), Morton dist. **Prop:** 200 acres. **Owner:** Northern Pacific Railway Co. **Ore:** Mercury reported. **Dev:** Small amount. **Ref:** 158.

Parmenter (11)

Loc: Near E. line SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 6, (12-5E), about 2,000 ft. E. of the portal of Roy adit. **Elev:** 1,048 ft. **Access:** About 1 mi. of truck road from the Morton-Kosmos highway. **Prop:** 160 acres. **Owner:** B. H. Parmenter, Morton, Wash., leasing to John Early, Morton (1937). **Ore:** Mercury. **Ore min:** Cinnabar. **Gangue:** Altered country rock. **Deposit:** Sheared zone in shales, coal, porphyry, and sandstone contains a few small stringers of cinnabar. **Dev:** 425-ft. adit. **Assays:** Low grade. **Ref:** 92-A, p. 32. 158.

Roy (Fisher, Morton, Gillispie) (12)

Loc: S $\frac{1}{2}$ SW $\frac{1}{4}$ and NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 6, (12-5E), 2 mi. SE. of Morton. **Elev:** 1,080 to 1,500 ft. **Access:** $\frac{1}{2}$ mi. of truck road from the Morton-Kosmos highway. 2 mi. to railroad at Morton. **Prop:** 120 acres. **Owner:** Roy Mining Co. (1933-1949). Fisher Mercury Mining Co. (1926). Morton Cinnabar Co. (1926-1930). Washington Cinnabar Co. (1930-1933). Fowler & O'Conner (1938). **Ore:** Mercury. **Ore min:** Cinnabar, pyrite. **Gangue:** Calcite, hydrothermally altered country rock. **Deposit:** Cinnabar occurs along fractures and breccia zones in a series of sandstones, shales, and siltstones cut by igneous dikes and sills. Shear zone has probable max. thickness of 10 ft. **Dev:** More than 6,000 ft. of underground workings on 5 levels. **Assays:** 1931 production av. 5 lb. Hg per ton. **Prod:** About 2,500 flasks 1928-1929, 1,079 flasks 1930, 1,581 tons of ore 1931, recovered 65 flasks of mercury from 1,000 tons of ore 1940, produced 1941. **Ref:** 1-A, 1931, pp. 447-448. 92-A, pp. 5-30. 97, 1916, 1928-1935, 1941. 104, 11/15/30, pp. 11, 32; 1/30/35, p. 23; 8/30/35, p. 24. 158.

Roy No. 5 (13)

Loc: NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 6, (12-5E), about 1,100 ft. N. of the portal of Roy No. 1 adit. **Elev:** 1,381 ft. **Access:** Truck road from the Morton-Kosmos highway. **Ore:** Mercury. **Ore min:** Cinnabar. **Gangue:** Brecciated country rock, sandstone. **Deposit:** Cinnabar occurs as disseminations in coarse white massive sandstone and in a breccia at the junction of two faults. Rocks in the breccia are porphyry, coaly shale, and sandstone. **Dev:** 125-ft. adit driven along a fault. **Assays:** Lean showings of cinnabar. **Ref:** 92-A, pp. 32-34.

Section One (6)

Loc: SE $\frac{1}{4}$ sec. 1, (12-4E), Morton dist. **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Small amount of cinnabar. **Dev:** Prospect pits. **Ref:** 158.

Section Thirty-Six (5)

Loc: SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 36, (13-4E), about 2,000 ft. NE. of the Spencer workings. **Ore:** Mercury. **Ore min:** Cinnabar. **Deposit:** Cinnabar encountered in one of the old adits and in two trenches. **Dev:** 2 old adits and several trenches. Trenches opened in 1937. **Ref:** 92-A, p. 41. 158.

Seventeen

(see Eight-Seventeen)

Spencer (7)

Loc: NW¼NE¼ sec. 1, (12-4E). **Elev:** 1,365 to 1,500 ft. **Access:** ½ mi. by road N. of Morton Grange No. 1066. **Owner:** Northern Pacific Railway Co. (1937—) leasing to Rainier Mining Co. (1954—). Spencer Mining Co. (1935). **Ore:** Mercury. **Ore min:** Cinnabar, pyrite. **Gangue:** Sandstone. **Deposit:** Cinnabar seams as much as ¾ in. wide occur along joints in coarse sandstone. Thin cinnabar seams also occur along a 6- to 14-in. breccia zone. **Dev:** 2 caved adits, 6 shallow pits, 7-ft. shaft, caved shaft, bulldozer trenches. **Improv:** Retort. **Prod:** 1934. **Ref:** 92-A, pp. 39-41. 97, 1935, p. 457. 158.

Tilton River, East Fork

Loc: On E. Fk. of Tilton R. **Ore:** Mercury. **Deposit:** Cinnabar has been panned from the stream. **Ref:** 158.

Tilton River, West Fork (2)

Loc: Sec. 13, (13-4E), on W. Fk. of Tilton R. **Ore:** Mercury. **Deposit:** Cinnabar float has been found. **Ref:** 158.

OKANOGAN COUNTY

Jones (1)

(see under copper)

PIERCE COUNTY

Mashel River (1)

Loc: SE¼SW¼ sec. 18, (16-6E). **Elev:** 2,175 to 2,500 ft. **Access:** 1 mi. from end of logging road. 16 mi. from railroad at Eatonville. **Prop:** Deeded land. **Owner:** St. Paul & Tacoma Lumber Co. has given an option to lease to Joe Bath, Puyallup, Wash. (1951). **Ore:** Mercury. **Ore min:** Cinnabar. **Gangue:** Quartz. **Deposit:** Andesite is cut by several tabular masses of quartz about 100 ft. by 100 ft. by 20 ft. thick which have numerous cavities and joints filled and coated with cinnabar and limonite. **Dev:** Several short adits. **Ref:** 158.

SKAGIT COUNTY

La Conner (1)

(see under nickel)

Mount Eldorado (2)

Loc: Near a receding glacier on Mt. Eldorado, upper Cascade R. **Owner:** A. G. Mosier, Sedro Woolley, Wash. (1943). **Ore:** Mercury. **Deposit:** Cinnabar-healed breccia. **Ref:** 158.

SNOHOMISH COUNTY

Clara Thompson

(see Jaspersion under gold)

Commonwealth

(see Jaspersion under gold)

Dahl

(see Eclipse under gold)

Eclipse (4)

(see under gold)

Forest Hope (1)

(see under copper)

Granite Falls (5)

(see under nickel)

Jaspersion (7)

(see under gold)

Justin (2)

(see under gold)

McCombs

(see Jaspersion under gold)

Myrtle C. (3)

(see under copper)

Webster

(see Jaspersion under gold)

Wild Rose (6)

(see under copper)

STEVENS COUNTY

Dumbolton (1)

(see under gold)

YAKIMA COUNTY

Clear Lake (3)

Loc: Sec. 12, (13-12E), near Clear Lk. **Ore:** Mercury. **Ore min:** Cinnabar. **Ref:** 111.

Indian Creek (1)

Loc: NE¼ sec. 23, (14-12E), on a tributary to Indian Cr. **Elev:** 4,525 to 4,825 ft. **Access:** 4 mi. by trail and 34 mi. by road to railroad at Naches. **Prop:** 2 unpatented claims: Denny-Ray, Indian Creek. **Owner:** Indian Creek Mercury Mines, Inc., Ray R. Whiting and Milton T. Roumm, Seattle, Wash. (1951—). **Ore:** Mercury. **Ore min:** Cinnabar, pyrite. **Gangue:** Ankerite, dolomite, calcite, quartz. **Deposit:** Silica-carbonate hydrothermally altered zone, 150 ft. by 1,500 ft. exposed to depth of 300 ft. in gneissoid diorite, contains cinnabar widely disseminated through the zone. Slight nickel stain in places. **Dev:** 15-ft. adit, a longer adit, numerous trenches, diamond drill holes. **Assays:** Dump sample ran 0.03% Hg. Selected samples showed 4.8 to 11 lb. Hg per ton. **Ref:** 133, p. 35. 157. 158.

Wildcat Creek (2)

Loc: NW¼ sec. 27 and NE¼ sec. 28, (14-13E). **Access:** 5 mi. by trail up Wildcat Cr. from road. **Prop:** 6 claims: Red Cloud, Iron Mountain Nos. 1 and 2, Elk Nos. 1 to 3. **Owner:** W. C. Thorp, Yakima, Wash. (1941). **Ore:** Mercury, nickel (?). **Ore min:** Cinnabar, pyrite. **Gangue:** Quartz, calcite. **Deposit:** Sandstone, conglomerate, and silica-carbonate rock laced with veinlets of calcite and quartz, some of which carry a little cinnabar. **Dev:** Open cuts, 80-ft. trench, 5-ft. pit, 25-ft. trench, 115-ft. adit, stripping. **Improv:** Cabin (1941). **Assays:** 1,600 lb. of ore reported to have produced 50 to 60 lb. of Hg. **Ref:** 158.

MOLYBDENUM

Properties—Molybdenum is usually prepared as a gray metallic powder, but the pure metal is silvery white and is soft, tough, malleable, and has high tensile strength. Very small amounts of certain impurities make the metal brittle, hard, and darker in color. It can be filed, polished, machined, forged when hot, and drawn into wire, although it was formerly thought to be non-ductile. The

properties of strength, toughness, and resistance to repeated shocks are retained at relatively high temperatures. Its melting point is higher than that of all but four other elements: tantalum, rhenium, tungsten, and carbon. Its electrical conductivity is fair but is less than one-third that of copper. Molybdenum is closely related chemically to chromium, tungsten, and uranium. It has

valences of 2, 3, 4, 5, and 6, but the compounds in which it acts in the 6 state are the most important. Other properties are shown in the table on page 12.

Uses—In 1950 more than 90 percent of the molybdenum consumption was for metallurgical uses, about 70 percent going into steel and 20 percent into cast iron. The remaining 10 percent was used as the pure metal and in nonferrous alloys and nonmetallic products. Molybdenum may be used as a substitute for tungsten in many steels. Used alone in steel it gives a product which is strong and easily welded, and used with other steel-forming elements it enhances the effects of those elements on the steel. Molybdenum steels are put to such uses as boiler plate, rifle barrels, auto parts, propeller shafts, and tool steel. Added to cast iron, molybdenum adds strength, toughness, and machinability. Nonferrous alloys of molybdenum are not very important, but an alloy with cobalt is useful in having a coefficient of expansion equal to that of glass, and alloys with tungsten make good incandescent filaments. A few other alloys are chromium-molybdenum; nickel-chromium-molybdenum; and the alloy illium, that contains 4 percent molybdenum plus chromium, nickel, copper, manganese, tungsten, and iron. Pure molybdenum metal is used as supports for filaments in electric lights and radio tubes, for X-ray tube elements, for winding resistance units for electric furnaces, and for electrical contact points. Molybdenum compounds are finding increasing uses in lubricants, pigments, printer's ink, leather tanning, enameling of iron and steel, fabric dyeing, and as a catalyst in the hydrogenation of coal and mineral oil.

Production—Molybdenum is the only alloying element used in steel-making in which the United States is self-sufficient, and production in this country in the past 20 years has averaged about 90 percent of world output during that period. Domestic reserves have been estimated to be sufficient to last for 400 years at the 1935 to 1939 rate of use. A few very large mines dominate the production. Of the nine mines producing molybdenite concentrate in this country in 1950 only two were mining molybdenum as the principal product; molybdenum was a byproduct at the other seven mines, six of which were copper mines and one tungsten. United States molybdenum ore production rose from 1,397 pounds of contained molybdenum in 1914 to 861,537 pounds in 1918, dropped to 22,667 pounds in 1923, and rose to an all-time high of 61,406,000 pounds in 1943. Production had dropped to 18,047,000 pounds in 1947 but had risen again to 38,855,000 pounds by 1951.

Washington has numerous occurrences of molybdenum in at least 16 counties, but only a few of the occurrences have been in production, and these only in very small amount. Some production from the Castleman mine in Whatcom County was reported in 1899. During 1901 and 1902 about 20 to 24 tons of molybdenite was produced at the Crown Point mine in Chelan County; this mine for a few years was the only molybdenum producer in the United States. The same mine produced unrecorded

amounts in 1903, 1906, 1907, 1914, and 1917. Some of the finest molybdenite specimens to be found in museums all over the country came from this property. One large crystal or cluster of crystals which was recovered weighed 300 pounds. About 22 tons of molybdenite concentrate was produced at the Deer Trail Monitor mine in Stevens County from 1936 to 1939, and in 1941 the Juno-Echo mine in the same county milled 300 or 400 tons of ore, but the molybdenum concentrate produced did not meet purchaser's specifications.

Prices—In 1900 the price was reported to be about \$400 per ton of 50- to 55-percent ore. (Only about 10 tons of molybdenum metal had been produced in the world prior to 1900.) From 1908 to 1912 the price was only 30 cents per pound of contained MoS_2 in 92-percent ore. In 1914 the price varied between 70 cents and \$2.00, and in 1915 to 1919, from over \$3.00 to about 30 cents. The 1920 average of 74 cents per pound rose to 84 cents in 1923 and dropped to 36 cents in 1933. In 1936 it was 42 cents, from 1938 to January 1949 it remained unchanged at 45 cents, from January 1949 to December 1950 it remained at 54 cents, and from that date through 1953, at 60 cents per pound of contained MoS_2 in 90-percent concentrate, f.o.b. mines. In December 1954 the price rose to \$1.05 per pound of contained Mo in 90-percent concentrate. Small shippers are likely to receive several cents less than the published price quotations. In 1954 pure molybdenum metal sold at from \$6.35 to \$16.70 per pound.

Ore minerals—Molybdenum never occurs free in nature, and its compounds are not numerous. The sulfide, molybdenite, MoS_2 , containing 60.0 percent molybdenum, is the only important ore mineral, but minor ore minerals are the lead molybdate, wulfenite, PbMoO_4 , containing 26.2 percent molybdenum; the oxide, molybdite, $\text{Fe}_2\text{O}_3 \cdot 3\text{MoO}_3 \cdot 8\text{H}_2\text{O}$, containing about 39 percent molybdenum; and the calcium molybdate, powellite, $\text{Ca}(\text{Mo,W})\text{O}_4$, containing about 40 percent molybdenum. All these minerals have been found in Washington.

Ore at the Climax mine in Colorado, the largest molybdenum mine in the world, averaged about 0.5 percent MoS_2 in 1947, but a small deposit having molybdenum as its only recoverable value would have to be several times as rich as this in order to be minable at a profit. Some of the large disseminated copper ore bodies in this country carry about 0.04 percent MoS_2 as a recoverable byproduct.

Geology—Molybdenite almost always is associated with acid igneous rocks. In its economically most important concentrations it occurs as disseminations in replacement deposits. It also occurs in fissure veins, in contact metamorphic deposits, and in pegmatites. Molybdenite is of widespread occurrence in Washington and is found in each of the above types of deposits here, but generally not in sufficient quantity to be profitably recovered. Probably the most common associated mineral is chalcopyrite. Molybdite is an oxidation product of molybdenite, and wulfenite is found in the oxidized parts of some lead veins.

OCCURRENCES

The map showing the numbered molybdenum occurrences is plate 17, on page 45 in volume 2.

CHELAN COUNTY

Aurelia Crown

(see Crown Point)

Copper King

(see Robischaud)

Crown Point (Aurelia Crown, Crown Power) (1)

Loc: NE¼ sec. 8, (31-16E), in cirque basin SW. of Hart Lk. at head of Railroad Cr. **Elev:** 4,300 ft. **Access:** Road to Holden and 6 mi. by trail to the mine. **Owner:** Chemical Products Association (1925-1926). Crown Point Mining Co. (1900-1907). Aurelia Crown Mines Corp. (1909-1918). Crown Point Mining Co. (1918). Crown Power Molybdenum Co. (1922-1924). **Ore:** Molybdenum. **Ore min:** Molybdenite, pyrite, chalcopryrite. **Deposit:** A flat-lying quartz vein in diorite. The vein has a max. thickness of 3 ft. but pinches to less than 3 in. Molybdenite occurs as large crystals in the quartz. **Dev:** 2 adits totaling more than 400 ft. Considerable ore has been stoped out. **Prod:** 1897-1902. Produced 10 tons of ore in 1901 and 12 tons in 1902. **Ref:** 33, 1907, p. 546. 36, pp. 283-288. 64, pp. 78-83. 67, p. 35. 88, p. 55. 97, 1901, 1902, 1904, 1914, 1934. 98, 1918-1926. 104, 9/30/33, p. 17. 105, vol. 90, 1905, p. 125; vol. 91, 1905, pp. 22, 216. 112, p. 167. 130, p. 82. 133-B, pp. 23-25. 141, p. 94. 158.

Crown Power

(see Crown Point)

Holden (2)

(see under copper)

Howe Sound

(see Holden under copper)

Irene

(see Holden under copper)

Jack Creek (6)

Loc: On Jack Cr. on N. side of Mt. Stuart. **Ore:** Molybdenum. **Ore min:** Molybdenite. **Ref:** 67, p. 28. 130, p. 84.

Keefer Brothers (4)

Loc: On W. slope of Red Mtn., near headwaters of Chiwawa R., about 1 mi. S. of Lyman Glacier. **Elev:** 6,200 to 6,800 ft. **Access:** Road to Royal Development mine, then 7 mi. by trail along Chiwawa R. **Prop:** Many unpatented claims. **Owner:** Lloyd and Boyd Keefer, 1918 N. Prescott, Portland, Oreg. (1948—). **Ore:** Molybdenum, copper, gold, silver, tungsten, uranium. Also reported are lead, zinc, nickel, cobalt, bismuth, antimony, chromium. **Ore min:** Molybdenite, chalcopryrite, arsenopyrite, pyrite, uraninite, gummite, scheelite. **Gangue:** Quartz, tourmaline, chlorite. **Deposit:** Narrow fissures with some hydrothermal alteration of the wall rock, which is granodiorite intruding schist and gneiss. **Dev:** Several hundred feet of workings divided among many claims. **Assays:** A channel sample taken at the most radioactive spot known on the veins assayed 0.1% U₂O₅. A pitchblende sample of unknown origin assayed 18.00% U₂O₅. The Ag content of the ore runs about 2 oz. for each 1% of Cu. **Ref:** 156. 158.

Merritt (Smith) (5)

Loc: NW¼NW¼ sec. 5, (26-16E), at Merritt. **Access:** 0.2 mi. by private road from Stevens Pass highway. **Owner:** Harry B. Smith, Merritt, Wash. (1944). **Ore:** Molybdenum. **Ore min:** Molybdenite, pyrrhotite. **Deposit:** Lens of pure white quartz in gneiss contains a little disseminated molybdenite. Too small to be commercial. **Ref:** 67, p. 56. 158.

Robischaud (Safety Harbor Creek, Copper King) (3)

Loc: SE¼ sec. 31, (31-20E), on headwaters of Safety Harbor Cr. **Elev:** 6,500 ft. **Access:** 5½ mi. by trail from end of road at Safety Harbor Cr. **Owner:** Norman Lindsley, Colville, Wash. (1933-1951). **Ore:** Molybdenum, copper, gold. **Ore min:** Molybdenite, chalcopryrite. **Deposit:** 2 systems of veins essentially at right angles to one another in highly altered rock. **Dev:** An adit cuts 12 east-trending and 3 north-trending veins each less than 18 in. wide. **Improv:** Small stamp mill (1933). **Prod:** A small stamp mill was set up in 1933 and the ore tested. Results indicated that economic recovery was not likely. **Ref:** 64, p. 84. 67, p. 26. 74. 130, p. 82. 133-B, pp. 25-26. 141, pp. 94-95.

Safety Harbor Creek

(see Robischaud)

Smith

(see Merritt)

FERRY COUNTY

Abe Lincoln (7)

(see under copper)

Addie B (10)

(see under copper)

Apex

(see Big Chief under lead)

Barstow (Lucky Five and Lakeview) (2)

Loc: Sec. 36, (38-36E), on Boulder Cr., 8 mi. N. of Boyds. **Access:** 2 mi. from railroad. **Prop:** 21 claims. **Owner:** Dayton Stewart and Joe Dilly, Spokane, Wash. (1942). **Ore:** Molybdenum. **Deposit:** Drill holes spaced as much as 2,000 ft. apart are said to have encountered molybdenum in amounts as high as 13%. **Dev:** 12 drill holes 8 to 10 ft. deep. **Assays:** Samples from 12 holes said to av. 1% Mo. **Ref:** 157. 158. **Note:** Former owner states that the reported molybdenite has been proven to be graphite.

Big Chief (4)

(see under lead)

Blevins

(see Meadow Creek under copper)

California (12)

(see under copper)

Chief

(see Big Chief under lead)

Clay (8)

(see under copper)

Cold Spring (3)

(see under lead)

Consolidated Mines and Smelting Co., Ltd.

(see under copper)

Great Western (6)

(see under silver)

Handspike (13)

(see under copper)

Iconoclast (14)

(see under copper)

Illinois (15)

(see under copper)

Jumper (16)

(see under copper)

Kelly Camp (1)

(see under tungsten)

King Richard

(see Meadow Creek under copper)

Lakeview

(see Barstow)

Lucky Five and Lakeview

(see Barstow)

Meadow Creek (9)

(see under copper)

Mount Tolman (11)

(see under copper)

Oregon

(see Illinois under copper)

Polepick (17)

(see under copper)

Rosario (5)

(see under copper)

San Poil Monitor

(see Meadow Creek under copper)

Schminski (19)

Loc: Secs. 1 and 2, (28-33E), 3 mi. N. of Hellgate Rapids, Keller dist. **Owner:** E. Schminski (1913). **Ore:** Molybdenum (gold and silver have been reported, but apparently erroneously). **Ore min:** Molybdenite. **Gangue:** Quartz, feldspar. **Deposit:** Molybdenite distributed in widely scattered tiny patches in pegmatite enclosed in granite. **Dev:** Several thousand feet of work, distributed among several adits. **Assays:** Gold assays reported to be consistently nil. **Prod:** None. **Ref:** 122, pp. 108, 139. 130, p. 82. 141, p. 96. 158.

Walla Walla (18)

(see under copper)

GRANT COUNTY

Big Four

(see Electric City)

Black-Rosauer (1)

(see under silver and see also Electric City)

Daniels

(see Electric City)

Electric City (Big Four, Daniels, Black-Rosauer) (2)

(see also Black-Rosauer under silver)

Loc: Sec. 14, (28-30E), ½ mi. E. of Electric City, at foot of E. wall of Grand Coulee. **Prop:** 4 claims. **Owner:** Black-Rosauer Mines, Inc. (1937). Big Four Mining Co. **Ore:** Molybdenum, silver, gold. Bismuth, beryllium reported. **Ore min:** Molybdenite, pyrite, pyrolusite. **Gangue:** Quartz, fluorite. **Deposit:** Pegmatitic lenses of mineralized quartz as much as 10 ft. thick in granite. **Dev:** 100-ft. shaft, several cuts, pits, shallow shafts, and short adits. **Assays:** Probably less than 1% MoS₂. Owner states \$5.00 in Au, \$3.00 Mo. One sample showed 0.13% Mo, 1.90 oz. Ag, and no Bi, Be, Au. **Ref:** 111, p. 9. 157.

KING COUNTY

Bear Basin (2)

(see under silver)

Clipper (5)

(see under copper)

Devils Canyon (3)

Loc: Sec. 26 and S½ sec. 27, (25-10E), Buena Vista dist. **Elev:** 3,200 to 3,700 ft. **Access:** Reached from railroad at North Bend by 35 mi. of road to Cougar Cr. and 1¼ mi. of trail to the property. **Prop:** 4 unpatented claims: Devil's Canyon, Vera, Cougar, Royal Flush. **Owner:** Consolidated Molybdenum, Inc., Seattle, Wash. (1948—). Dr. V. M. Osterberg (1912-1926). **Ore:** Molybdenum, tungsten, silver. **Ore min:** Molybdenite, powellite, pyrite, chalcopyrite, scheelite. **Gangue:** Quartz, siderite. **Deposit:** A shear zone as much as 25 ft. wide in altered granodiorite is laced by 1- to 6-in. quartz veinlets. Zone can be traced 600 ft. and has a depth of at least 400 ft. Some of the quartz veinlets are well mineralized with molybdenite. **Dev:** 160-ft. adit. **Improv:** Cabin (1952). **Assays:** A 4-ft. channel sample across face of the adit av. 0.11% MoS₂. Sample across 1-ft. width on surface showed 0.40% Mo, 0.29% WO₃. **Ref:** 11-A, pp. 222-231. 37, p. 27. 130, p. 82. 133, p. 32. 133-B, pp. 29-31. 158.

Goat Mountain (4)

(see under lead)

Lost Lode (6)

Loc: Sec. 12, (24-9E), Snoqualmie dist. **Ore:** Molybdenum, lead, gold, silver. **Ore min:** Galena, molybdenite. **Ref:** 58, p. 40. 63, p. 42. 158.

Monte Carlo (1)

(see under gold)

KITITAS COUNTY

Big Z

(see Zerwekh under gold)

Zerwekh

(see under gold)

LEWIS COUNTY

Eagle Peak (1)

(see under copper)

Short Canyon

(see under copper)

LINCOLN COUNTY

Egypt

(see Pitney Butte)

Pitney Butte (Spokane Molybdenum, Egypt) (1)

Loc: NE¼SE¼ sec. 32, (28-37E), on NE. side of Pitney Butte. **Elev:** 1,850 to 2,100 ft. **Access:** Road. **Prop:** 40 acres deeded land and 8 claims: Spokane, Isabella, Prosperity No. 1, Bayley Fr., and 4 others. **Owner:** Spokane Molybdenum Mines, Inc., Spokane, Wash. (1941—). **Ore:** Molybdenum, gold, silver. **Ore min:** Molybdenite, pyrite, pitchblende. **Gangue:** Quartz, fluorite. **Deposit:** A 3- to 4-ft. quartz vein in granite is fairly well mineralized but is badly faulted. Much of the vein is barren. Molybdenite occurs in scattered crystals through the quartz. In the main level a cross-fracture in the main vein contains a black radioactive lens 4 in. or more thick. **Dev:** 655-ft. adit. A 100-ft. crosscut with a 260-ft. drift cuts the vein 147 ft. higher than at the longer adit (1955). **Assays:** 0.03 to 0.10 oz. Au, 0.20 to 0.60 oz. Ag, tr. to 2.34% MoS₂. Small reserve of ore est. at 0.3% MoS₂ (1942). **Prod:** 1941. **Ref:** 82-A. 97, 1934, p. 429. 113, 7/1/37, p. 16. 133-B, pp. 31-34. 158.

- Spokane Molybdenum**
(see Pitney Butte)
- OKANOGAN COUNTY**
- Adams**
(see Moncosilgo under copper)
- American Graphite (32)**
(see under gold)
- American Band**
(see Spokane under gold)
- Arnold Peak**
(see Horseshoe Basin)
- Billy Goat (2)**
(see under copper)
- Bi-Metallic (17)**
Loc: NW¼ sec. 26, (39-29E), near Havillah. **Elev:** 4,100 to 4,800 ft. **Access:** 22 mi. by road from railroad at Tonasket. **Prop:** 4 patented claims, on NE ridge of Bi-Metallic Mtn. **Owner:** R. C. Mulligan, R. J. Pulley, M. F. Fowler, John Healem, Okanogan, Wash., leasing (1954—) from John B. Stanton, South Pasadena, Calif. (1946—). **Ore:** Molybdenum, copper, silver, gold, tungsten. **Ore min:** Molybdenite, molybdate, powellite, scheelite. **Gangue:** Kaolinized and sericitized granite porphyry. **Deposit:** Molybdenite in zone 1 to 5 ft. wide and 50 ft. long in fractures and intersecting faults in Moly adit. Also ore in 2 other fault zones in Moly adit. Slight radioactivity (up to 4 times background count) in ore zones. Oxidized copper mineralization in oval fractured zone 260 ft. long and 70 ft. wide. Deposit is in granite porphyry near contact with metasediments. **Dev:** 2 adits totaling 600 ft., several shafts, and trenches. Moly adit is at 4,580-ft. elev. **Assays:** Weighted av. of 4 samples in ore zone is 3.07% Mo across av. width of 4.9 ft. 27 assays by U. S. Bureau of Mines show tr. to 3.87% Mo, 0.02% to 1.26% Cu, tr. to 0.50 oz. Ag, tr. Au. 12 other assays of representative samples av. 1.68% MoS₂. **Prod:** Several tons of copper-gold ore in 1918. 500 lb. of high-grade molybdenum ore was shipped. **Ref:** 63, p. 110. 97, 1918, p. 506. 98, 1925, p. 1805. 133-B, pp. 34-44. 151. 158.
- Boundary**
(see Sheep Mountain)
- Buck Mountain (24A)**
(see under tungsten)
- Buckhorn**
(see Buck Mountain under tungsten)
- Caaba**
(see Kaaba under lead)
- Campbell**
(see Holden-Campbell under gold)
- Carr (3)**
(see under copper)
- Corson (25)**
Loc: SE¼NE¼ sec. 5, (32-27E), near Omak Lk. **Access:** ¾ mi. from highway. **Owner:** Abandoned (1950). O. F. Corson leasing to T. T. Spencer and Joe Matthews, Winlock, Wash. (1939). **Ore:** Molybdenum. **Ore min:** Sparse molybdenite. Scheelite reported. **Deposit:** Pegmatite in steeply dipping schists and gneisses. **Dev:** Open cut. **Ref:** 158.
- Crescent**
(see Triune under gold)
- Dodd**
(see Sheep Mountain)
- Dutch John (28)**
(see under tungsten)
- Eagle (18)**
(see under gold)
- Fluorspar**
(see Tonasket under copper)
- Four Metals (9)**
(see under lead)
- Frankie Boy (22)**
(see under silver)
- Golden Chariot (12)**
(see under copper)
- Golden Zone (8)**
(see under gold)
- Green Lake (24)**
Loc: SW¼NW¼ sec. 13, (34-25E), about 1 mi. W. of Green Lk. **Ore:** Molybdenum. **Ore min:** Molybdenite. **Deposit:** Quartz vein containing molybdenum. **Ref:** 158.
- Hanks (4)**
(see under copper)
- Holden-Campbell (30)**
(see under gold)
- Hoot Owl (31)**
Loc: NE¼ sec. 22, (34-29E), Park City dist. **Owner:** Molybdenum Mines Co. (1934-1937). **Ore:** Molybdenum, gold. **Gangue:** Calcite, quartz. **Deposit:** 100-ft. mineralized zone. **Assays:** 0.02 oz. Au, 0.014% Mo, 3.43% graphite. **Ref:** 97, 1938, p. 566. 104, 8/30/33, p. 18. 158.
- Horseshoe Basin (MacPhearson, Arnold Peak) (7)**
Loc: Center sec. 11, (40-23E), on S. slope of Arnold Peak. **Elev:** 7,000 to 7,500 ft. **Access:** Road from Loomis to Duncan James ranch, thence by bulldozer road to Horseshoe Basin. **Prop:** 2 claims: Horseshoe Basin No. 1 and No. 2. **Owner:** Paul Loudin, Robert Curtis, Loy McDaniels, Loomis, Wash. (1951). Fred Manweller (1926). **Ore:** Molybdenum. **Ore min:** Molybdenite, reportedly tantalum. **Gangue:** Quartz. **Deposit:** Pegmatite dikes in schist in an area ¼ mi. long and 300 ft. wide. **Dev:** Open cut. **Assays:** No Au, Ag, Cu; 1.12% MoS₂. **Prod:** 1941. **Ref:** 133, p. 35. 133-B, pp. 46-48. 158.
- Hudnut (Hudnutt) (36)**
(see under zinc)
- Independence (29)**
(see under gold)
- Jim Dodd**
(see Sheep Mountain)
- Kaaba (11)**
(see under lead)
- Kaaba-Texas**
(see Kaaba under lead)
- Lady of the Lake (23)**
(see under silver)
- Lodge**
(see Dutch John under tungsten)
- Luke**
(see Molly under copper)
- MacPhearson**
(see Horseshoe Basin)

Malott (26)

(see under copper)

Mineral Hill (21)

(see under silver)

Molly (6)

(see under copper)

Molly (Sheep Mountain)

(see Sheep Mountain)

Moncosilgo (14)

(see under copper)

Montgomery

(see Tonasket under copper)

O. K. (13)

(see under copper)

Pioneer**Loc:** Palmer Mtn. dist. **Ore:** Molybdenum. **Ref:** 105, 1907, p. 201.**Rustler (27)**

(see under gold)

Seven Devils

(see Mineral Hill under silver)

Sheep Mountain (Molly, Dodd, Jim Dodd, Boundary)

(1)

Loc: SW $\frac{1}{4}$ sec. 8, (40-20E), on E. side of Sheep Mtn. about $1\frac{3}{4}$ mi. S. of Monument No. 90 on the international boundary. **Elev:** 7,500 ft. **Access:** 5 mi. from road. **Prop:** 2 claims: Moly Nos. 1 and 2. **Owner:** J. J. Sullivan, Pateros; Orin Dodd, Wenatchee; and Lester Dodd, Wenatchee (1942). **Ore:** Molybdenum, gold, silver. **Ore min:** Molybdenite, free gold, pyrite. **Deposit:** 3 parallel gently dipping quartz lenses in granite. The lenses are well defined and from 4 in. to 5 ft. thick. **Dev:** Open cuts, 60-ft. adit. **Ref:** 130, p. 81. 133-B, pp. 48-50. 141, p. 95. 158.**Sherwood**

(see Dutch John under tungsten)

Silver Tip

(see Starr)

Spokane (15)

(see under gold)

Starr (Silver Tip) (19)**Loc:** SE $\frac{1}{4}$ sec. 8 or NE $\frac{1}{4}$ sec. 16, (37-26E), on E. flank of Aeneas Mtn. between Aeneas Cr. and Horse Springs Coulee. **Elev:** 3,200 ft. **Access:** 1 mi. of road from Aeneas Cr. road in NE $\frac{1}{4}$ sec. 17, (37-26E). 12 mi. from railroad at Tonasket. **Prop:** 1 claim: Silver Tip. **Owner:** Wilbur Starr, Tonasket, Wash. (1942-1945). Molybdenum Products Co. (1926). Molybdenum Corporation of America (1928). Titanium Alloy Manufacturing Co. (1936). **Ore:** Molybdenum, tungsten. **Ore min:** Pyrite, molybdenite, scheelite, chalcopyrite, and rarely arsenopyrite and pyrrhotite. **Gangue:** Quartz. **Deposit:** Mineralized fracture zone in granite 80 by 400 ft. in plan and at least 240 ft. in depth. Est. 800,000 tons of 0.30% MoS₂ ore. **Dev:** Main adit of 1,800 ft., 2 short adits and several open cuts total nearly 3,000 ft. of workings. Deposit has been developed to depth of 250 ft. **Assays:** Fraction of one percent scheelite, and 0.165% to 0.7% MoS₂. Av. of 29 general samples was 0.42% MoS₂. Av. of 8 other samples was 0.53% MoS₂. **Prod:** 3,000 tons of ore from dump shipped to mill at Nighthawk in 1939 reported to assay 1% MoS₂. **Ref:** 34, 37, p. 42. 64, p. 83. 97, 1927, pp. 398-399. 106, 8/2/28, p. 3. 130, p. 81. 133-B, pp. 51-62. 141, p. 95. 157. 158.**Sterling (34)****Loc:** NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 8, (31-30E). **Access:** 6 mi. NW. of Nespelem. Road for 4 mi. at least. **Prop:** 1 claim: Sterling. **Ore:** Molybdenum. **Ore min:** Molybdenite, pyrite, limonite. **Deposit:** 15-ft. quartz vein contains sparsely disseminated flakes of molybdenite and pyrite. **Dev:** Small shaft, open cuts. **Assays:** Appears to be barren of Cu, Pb, Zn minerals. **Ref:** 122, p. 79.**Summit (10)**

(see under silver)

Swayne (5)

(see under copper)

Texas Creek

(see Dutch John under tungsten)

Tonasket (20)

(see under copper)

Triune (16)

(see under gold)

Twin Pine (35)

(see under zinc)

Wasco (33)

(see under silver)

Washington Consolidated

(see Mineral Hill under silver)

Washington Nickel**Loc:** Tonasket dist. **Owner:** Washington Nickel Mining and Alloys Co. (1936). **Ore:** Molybdenum. **Ref:** 104, 3/15/36, p. 23; 7/15/36, p. 30.

PEND OREILLE COUNTY

Coffin (2)

(see under zinc)

Little Noisy (3)

(see under zinc)

Molybdenite Mountain (4)**Loc:** Sec. 18, (37-44E), Metaline dist. **Access:** 6 mi. by trail. **Prop:** Several unpatented claims. **Owner:** Abandoned (1941). Empire Molybdenite Mining & Milling Co. (1918-1922). Molybdenum Mining & Milling Co. (1925). **Ore:** Molybdenum. **Ore min:** Molybdenite, pyrite. **Deposit:** A quartz vein 3 ft. wide and exposed for a length of 40 ft. is sparsely mineralized with molybdenite and pyrite. **Dev:** 40-ft. adit, open cuts. **Prod:** \$6,000 prior to 1916. **Ref:** 29, p. 52. 98, 1922-1926. 105, 1916, p. 387. 112, p. 178. 116, no. 11, 1907, p. 7.**Polly Molly (1)****Loc:** Sec. 36, (40-43E), Metaline dist. **Access:** Near road. **Prop:** 2 unpatented claims. **Owner:** Abandoned (1941). Metaline Contact Mines. **Ore:** Molybdenum. **Deposit:** Some traces of molybdenum found. **Dev:** Open cuts and stripping. **Ref:** 29, p. 42.

PIERCE COUNTY

Golden Rule (1)

(see under zinc)

White River**Loc:** Near White R. glacier on N. side of Mt. Rainier. **Ore:** Molybdenum. **Ref:** 130, p. 84.

SKAGIT COUNTY

Bornite

(see North Coast under gold)

British

(see Skagit Queen under silver)

North Coast (2)

(see under gold)

Skagit Queen (3)

(see under silver)

Thunder Creek

Loc: On Thunder Cr., a headwater tributary of Skagit R.
Ore: Molybdenum. **Ore min:** Molybdenite. **Deposit:** Said to be a promising deposit. **Note:** Investigation in this area by the Division of Geology (1940) did not reveal any molybdenite. **Ref:** 130, p. 82. 141, p. 96.

Washington (1)

Loc: Up Skagit R. 5 mi. from Marblemount. **Owner:** Washington Molybdenum Co. (1935). **Ore:** Molybdenum. **Ref:** 158.

SKAMANIA COUNTY

Columbia Gold and Copper

(see Miners Queen under copper)

Miners Queen (1)

(see under copper)

Spirit Lake

Loc: Near Spirit Lk. **Owner:** Molybdenite Co., Ltd. (1937).
Ore: Molybdenum. **Ref:** 158.

SNOHOMISH COUNTY

Armament (17)

(see under copper)

Bergensen

(see Taylor & Nunn under gold)

Bonanza

(see Mineral Center under copper)

Calumet

(see Glacier Peak under copper)

Copper Lake (6)

Loc: Sec. 4, (29-10E), at head of Copper Lk., Sultan Basin.
Elev: 3,600 ft. **Access:** 7 mi. from Sultan Basin road by trail up Williamson Cr. **Ore:** Molybdenum. **Ore min:** Molybdenite. **Deposit:** Molybdenite sparsely present in ¼-in. quartz veinlets on sides of quartz diorite talus blocks. **Ref:** 133-B, p. 63. 158.

Edison

(see Mineral Center under copper)

Engdahl

(see Martin Engdahl under lead)

Glacier Peak (4)

(see under copper)

Golden Eagle (14)

Loc: S½ sec. 7, (28-10E) and SE¼ sec. 12, (28-9E), Sultan Basin dist. **Elev:** 3,000 to 3,400 ft. **Access:** 6 mi. of trail up S. Fk. Sultan R., and 20 mi. by road to railroad at Sultan. **Prop:** 10 unpatented claims. **Owner:** Washington Molybdenum Co., Seattle, Wash. (1943). **Ore:** Molybdenum, gold, silver. **Ore min:** Molybdenite, chalcopryrite, scheelite, pyrite. **Gangue:** Quartz, gouge. **Deposit:** Gouge zone 6 to 30 in. thick and narrow

mineralized fractures in quartz diorite, also a 3-ft. pegmatite lens. **Dev:** Open cuts and pits. **Prod:** 1941. **Ref:** 23, p. 75. 133-B, p. 64. 158.

Hicks

(see Sultan King under copper)

Hustler (7)

(see under copper)

Iowa (10)

(see under copper)

Jones

(see Kromona under copper)

Kromona (16)

(see under copper)

Louise

(see Mineral Center under copper)

Martin Engdahl (13)

(see under lead)

Mineral Center (12)

(see under gold)

Mint

(see Iowa under copper)

Molly (18)

(see under uranium)

Nesta (3)

(see under copper)

North Star

(see Sunrise under gold)

Nunn

(see Taylor & Nunn under gold)

Oldfield

(see Sunrise under gold)

Rustler (8)

(see under copper)

St. Theresa (15)

Loc: S½ sec. 1 and N½ sec. 12, (28-9E), Sultan Basin dist. **Elev:** 2,000 to 4,500 ft. **Access:** 5 mi. by trail up S. Fk. Sultar R., and 20 mi. by road to railroad at Sultan. **Prop:** 10 unpatented claims. **Owner:** Washington Molybdenum Co., Seattle, Wash. (1943). **Ore:** Molybdenum, copper. **Ore min:** Molybdenite, chalcopryrite. **Gangue:** Quartz, calcite, siderite. **Deposit:** Widely distributed mineralized fractures paper thin to 2 in. wide in quartz diorite. **Ref:** 23, pp. 74-75. 133-B, p. 65. 158.

Scriber

(see Kromona under copper)

Silver Horseshoe (5)

(see under silver)

Sultan King (11)

(see under copper)

Sultan Queen

(see Sultan King under copper)

Sunrise (1)

(see under gold)

Sunrise (9)

(see under copper)

Taylor & Nunn (2)

(see under gold)

Tum Tum

(see Taylor & Nunn under gold)

Washington-Iowa

(see Mineral Center under gold)

Wayside

(see Armament under copper)

STEVENS COUNTY

Aladdin

(see Sierra Zinc under zinc)

American (2)

Loc: SE¼SW¼ sec. 16, (38-39E), about ¼ mi. NE. of Phalen Lk. **Elev:** 2,500 ft. **Access:** 15 mi. by road from railroad at Bossburg. **Prop:** State land. **Ore:** Molybdenum. **Ore min:** Molybdenite, pyrite. **Deposit:** 25 ft. E. of a granite-slate contact there is a ¼-in. to 5-ft. quartz vein which can be traced for about 100 ft. **Dev:** Open cuts. **Ref:** 133-B, pp. 65-66. 158. 164, pp. 177-178.

Black Horse

(see Columbia Tungsten under tungsten)

Blue Ridge

(see Sierra Zinc under zinc)

Blue Star

(see Eagle under silver)

Chewelah Eagle

(see Eagle under silver)

Chewelah Standard (14)

(see under copper)

Columbia River (8)

(see under copper)

Columbia Tungsten (11)

(see under tungsten)

Constitution

(see Lawrence)

Coyote

(see Rightside under copper)

Deer Trail Monitor (17)

Loc: Near NW. cor. sec. 24, (30-37E), Deer Trail dist. **Elev:** 3,500 ft. **Access:** 5½ mi. E. of Fruitland by road. 31 mi. by road to railroad at Springdale. **Prop:** 9 unpatented claims: Chance, Chance No. 2, Mercy, Mobile, Mainstay, Mogul, Montreal, Monitor, and Mohawk; and 480 acres of deeded land. **Owner:** Deer Trail Monitor Mines Co., Spokane, Wash. (1929-1944). **Ore:** Molybdenum, copper. **Ore min:** Molybdenite, chalcocopyrite, pyrite, pyrrhotite. **Gangue:** Garnet, epidote, calcite. **Deposit:** Greenish siliceous mineralized zone cutting limestone and argillaceous limestone series near its contact with Loon Lk. granite. The molybdenite is intimately associated with the garnet zone. **Dev:** About 3,000 ft. of workings on 3 levels. **Improv:** Physical plant, removed (1952). **Assays:** Ore mined av. 0.46% to 0.28% MoS₂. **Prod:** In 4 months in 1936 and 1937 mill produced 5 tons of 60% MoS₂ conc. from 2,000 tons of 0.16% MoS₂ ore. 210 tons of 0.28% MoS₂ ore yielded 2,500 lb. 47.4% MoS₂ conc., 1938. 3,000 tons ore yielded 10 tons of conc. in 1939. Produced 1941. **Ref:** 30, p. 67. 58, p. 18. 97, 1937-1940. 99, no. 4, 1935. 104, 7/15/35, p. 26; 10/30/36, p. 32. 106, 7/16/31. 133-B, pp. 66-67. 158.

Eagle (13)

(see under silver)

Easy Money

(see Magma under zinc)

Eldorado

(see Magma under zinc)

Germania (18)

(see under tungsten)

Germania Consolidated (19)

(see under tungsten)

Gray Eagle

(see Rightside under copper)

Industrial Tungsten

(see Germania Consolidated under tungsten)

Judd

(see Lawrence)

Juno-Echo (15)

(see under copper)

Keeth

(see Germania Consolidated under tungsten)

Koyotte

(see Rightside under copper)

Lawrence (Constitution, Judd) (3)

Loc: Sec. 21, (38-39E), E. of Phalen Lk. **Access:** Road. **Prop:** 4 unpatented claims. **Owner:** Joe Day and/or William Heritage, Colville, Wash. (1941). **Ore:** Molybdenum. **Ore min:** Molybdenite. **Gangue:** Quartz. **Deposit:** Small lenses or pockets of lean ore in granite near its contact with argillite. Argillite near contact contains molybdenite seams also. **Dev:** 100 ft. of workings in 3 adits, and several open cuts. **Ref:** 30, pp. 82-83. 158.

Magma (7)

(see under zinc)

Nellie S.

(see Chewelah Standard under copper)

New Leadville (5)

(see under lead)

Norton

(see Germania Consolidated under tungsten)

O'Neal

(see Rightside under copper)

Ray Cox Moly (4)

Loc: NE. cor. sec. 33, (38-39E). **Access:** Road up Bruce Cr. **Owner:** Ray Cox, Colville, Wash. (1950). **Ore:** Molybdenum. **Ore min:** Molybdenite. **Deposit:** Widely scattered thin quartz-filled fractures in green lime-silicate rock close to granite contact. **Ref:** 158.

Redwood

(see Eagle under silver)

Rightside (9)

(see under copper)

Rocky Lake (10)

Loc: SE¼NE¼ sec. 34, (35-39E), Colville dist. **Access:** ¼ mi. from road by which it is 2 mi. to railroad at Arden. **Prop:** 8 unpatented claims. **Owner:** None (1949). Formerly owned by Ross Moorehead, Colville, Wash. **Ore:** Molybdenum, gold, silver, copper. **Ore min:** Molybdenite, pyrite. **Gangue:** Quartz. **Deposit:** Said to be an 8-ft. altered zone, traceable for 400 ft. in granite. Zone contains 30 in. of quartz having sparsely scattered molybdenite and pyrite. **Dev:** 100-ft. inclined shaft, open cuts. **Ref:** 30, p. 51. 158.

Sand Creek (20)

(see under tungsten)

Schenk

(see Rightside under copper)

Short Wait (1)

(see under lead)

Sierra Zinc (6)

(see under zinc)

Stockwell

(see Columbia Tungsten under tungsten)

Tungsten King (16)

(see under tungsten)

Washington Metals (12)

(see under tungsten)

Western Molybdenum

(see Juno-Echo under copper)

Yo Tambien

(see New Leadville under lead)

WHATCOM COUNTY**Castleman**

Loc: Mt. Baker dist. **Ore:** Molybdenum. **Prod:** Produced in 1898. **Ref:** 43, vol. 68, 1899, p. 800. 97, 1899, p. 307. 141, p. 96. **Note:** Division of Mines and Geology could not verify this reported occurrence.

Midas (1)

Loc: Sec. 25, (40-9E), Mt. Baker dist. **Owner:** J. A. Nesbitt and John and David Cress, Bellingham, Wash. (1949). **Ore:** Molybdenum. **Deposit:** Owners reported showings too small to be of interest. **Ref:** 68, p. 13.

Shuksan

(see Sulphide Creek)

Silver Creek (2)

Loc: S½ sec. 8, (40-13E), on Silver Cr., 2 mi. S. of Canadian boundary. **Elev:** 2,200 ft. **Access:** Boat up Ruby Lk., thence by

trail up Silver Cr., or by road through Canada to mouth of Silver Cr. **Prop:** 4 claims, including Molybdenum, Lost Mine. **Owner:** Roy Davis, George Hunt, A. E. Blockberger, Shelton, Wash. (1950). H. B. Davis and Dr. Harry Deegan, Shelton, Wash. (1939). **Ore:** Molybdenum, copper, gold, silver. **Ore min:** Molybdenite, chalcopyrite. **Deposit:** On S. side of Silver Cr. in granodiorite near contact with volcanic rock is zone 10 ft. wide containing ¼- to 1-in. quartz stringers with scattered chalcopyrite and clusters of molybdenite. On N. side of creek an open cut and an adit 64 ft. lower show a bleached and silicified zone in volcanic breccia 50 ft. in dia. containing scattered molybdenite and chalcopyrite. **Dev:** 85-ft. adit, open cuts. **Assays:** Chip sample of zone at face of adit showed Au nil, Ag 0.40 oz., Cu 1.50%, molybdenite 0.15%. In open cut 64 ft. higher the ore is est. to carry 1% molybdenite and 2% to 3% Cu. **Ref:** 133-B, pp. 87-88. 158.

Sulphide Creek (Shuksan) (3)

Loc: At head of N. Fk. of Sulphide Cr., on E. side of Mt. Shuksan. **Owner:** Charles Bagnell and Robert Johnson, Concrete, Wash. Joe Morovitz (1916). Mount Shuksan Molybdenite Mine and Milling Co. (1917). **Ore:** Molybdenum. **Ore min:** Molybdenite. **Gangue:** Quartz. **Deposit:** Veins up to 1 in. thick, also as films along joints. **Assays:** Reported to be of no economic value. **Ref:** 158.

YAKIMA COUNTY**Bird (2)**

(see under tungsten)

Chinook (1)

(see under copper)

Copper Mining Co. (3)

(see under copper)

Crosetti (4)

Loc: Sec. 21, (15-12E), Bumping Lk. dist. **Ore:** Molybdenum. **Ore min:** Molybdenite. **Deposit:** Very slight molybdenite mineralization along joints in aplite stringers in granodiorite. **Ref:** 158.

NICKEL

Properties—Nickel is a lustrous white metal capable of taking a high and lasting polish. It is harder than iron and is tenacious and very malleable and ductile. It is somewhat magnetic and is a fair conductor of heat and electricity, its electrical conductivity being about one-fifth that of copper. Nickel imparts to its alloys toughness and strength as well as desirable anti-corrosion and thermal properties. Chemically, it is closely allied with cobalt and iron. Nickel has valences of 2 and 3, but in most of its compounds it is bivalent. The metal is stable in air at ordinary temperatures. Other properties are shown in the table on page 12.

Uses—Although the pure metal is used for electroplating, nickel is chiefly valuable for the alloys it forms with other metals. Over 3,000 alloys of nickel with iron and copper have been developed. Other metals with which it has been alloyed are silver, zinc, tin, beryllium, magnesium, aluminum, and cobalt. The steel and iron industry used about 43 percent of the nickel consumed in the United States in 1950. The leading uses in their order of importance were for nonferrous alloys, stainless steel,

electroplating, other steels, high-temperature and electrical-resistance alloys, cast iron, catalysts in hydrogenating organic substances, and ceramics. Minor uses are in coinage, in Edison alkaline storage batteries, and in pharmaceuticals and dyes.

Production—There are few nickel smelters in the world, and most of them do little, if any, custom smelting. Although the United States accounts for more than half of the world nickel consumption, domestic production of the metal amounts to less than 1 percent of that of the world. About 80 to 85 percent of the world production normally comes from Canada. The small domestic output in 1950 was in the form of nickel sulfate and came entirely as a byproduct of copper smelting from five smelters, one of which was the copper smelter of the American Smelting and Refining Company, at Tacoma, Washington.

Although nickel occurrences have been reported in at least 13 counties in Washington, no ore has ever been mined for its nickel content in this state. Some of the lateritic deposits in the Cle Elum River-Blewett area in Kittitas and Chelan Counties are of sufficient size and

grade to indicate a potential value as ores of nickel, especially in view of the development of the Riddle, Oregon, deposit (somewhat similar metallurgically), where three electric furnaces in 1954 started production of nickel from local ore.

Prices—For many years the price of nickel has been comparatively stable. From 1929 to 1944 the price was 35 cents per pound for the metal, and from 1944 to 1946 it was 31½ cents per pound, including duty, for electrolytic nickel in carlots, f.o.b. Port Colborne, Ontario. In 1946 the price rose to 36 cents and remained there for more than a year, but it dropped a little to 33¾ cents in 1948 and rose to 40 cents in the same year. The price remained the same until two rises in 1950 brought it to 50½ cents and further rises in 1951 brought the price to 56½ cents, where it remained through the following year. In June 1955 the price was 64½ cents per pound.

Ore minerals—Nickel occurs native in meteorites and is combined with sulfur, arsenic, iron, and antimony in many ores. At least 35 nickel minerals are known. The most important nickel ores are nickeliferous pyrrhotite and chalcopyrite, containing up to 6 percent nickel, usually in the form of minute particles of pentlandite, (Fe-Ni)S, which contains about 22 percent nickel. Another nickel sulfide is millerite, NiS, containing 64.7 percent nickel. Garnierite, another important ore mineral, is a

hydrated silicate of magnesium and nickel having an extremely variable composition. All these above-named minerals occur in Washington in addition to the secondary hydrous nickel sulfate, morenosite, NiSO₄·7H₂O.

The important ores of Sudbury, Canada, average about 1½ percent nickel and 2 percent copper. The New Caledonian silicate ores run from 2 to 6 percent, and 1940 production averaged 3.8 percent nickel. Cuban laterites, similar to the Cle Elum River-Blewett ores, comprise large ore bodies averaging 0.8 to 1.5 percent nickel and 1 to 2 percent chromium.

Geology—There are relatively few workable deposits of nickel in the world, because, although nickel is more abundant in the earth's crust than copper, zinc, or lead, it generally is not concentrated but is widely and diffusely distributed, especially in magnesium-rich rocks. There are only two important types of nickel deposits—residual nickel silicate concentrations from the weathering of nickel-bearing ultrabasic rocks, and sulfide deposits of nickel and copper formed either by replacement or magnetic injection. The Sudbury deposit is of the latter type. It contains pentlandite closely associated with pyrrhotite and chalcopyrite in the outer, basic, edge of a large spoon-shaped intrusive body of norite-micropegmatite 36 miles long and 20 miles wide. Of much less importance as a source of nickel are the silver-cobalt-nickel vein deposits such as those at Cobalt, Ontario.

OCCURRENCES

The map showing the numbered nickel occurrences is plate 5, on page 15 in volume 2.

CHELAN COUNTY

Black Republican
(see under copper)

Blewett (24)
(see under iron)

Bonanza and Deadwood
(see under gold)

Chelan
(see Dick)

Cinnabar King
(see under gold)

Davenport
(see Nigger Creek under iron)

Deadwood
(see Bonanza and Deadwood under gold)

Dick (Chelan, Winesap) (6)

Loc: S½NE¼ sec. 9, (26-21E), on a northward-trending spur on the N. side of Winesap (Oklahoma) Canyon. **Elev:** 1,400 ft. **Access:** 0.9 mi. by road from railroad and highway U. S. 97. **Prop:** 80 acres of deeded property. **Owner:** E. N. Patty, Seattle, Wash., leasing from Mrs. Hazel E. Growden and associates, Yakima, Wash. (1942-1946). Condi Dick (1898). **Ore:** Nickel, cobalt, copper. **Ore min:** Pyrrhotite, pentlandite, chalcopyrite, pyrite, malachite, nickel sulfate. **Gangue:** Peridotite. **Deposit:** Body of peridotite about 400 ft. long and 100 ft. wide, enclosed in quartz diorite and gneiss, contains disseminated primary and secondary ore minerals. Oxidation zone

extends to 40-ft. depth. **Dev:** 4 adits, two 50 ft. and one 80 ft. in length, also some trenching, and 7 diamond drill holes by U. S. Bureau of Mines totaling 1,016 ft. **Assays:** 2 assays showed 0.03% Co. Av. assay from 80-ft. adit gave 1.5% Ni and 0.3% Cu. A gossan above the No. 3 adit assayed 0.5% Ni. **Reserves:** Est. 30,000 tons of 0.6% to 1.7% Ni and up to 0.7% Cu. **Ref:** 35. 67, pp. 25-26. 131. 158.

Ellen
(see Van Epps under antimony)

Excelsior
(see Nevada and Excelsior under gold)

Garnierite (20)
Loc: Sec. 24, (23-17E) and sec. 19, (23-18E). **Prop:** 9 claims. **Owner:** Leased to Harry J. Hood, Detroit, Mich. (1943). **Ore:** Nickel. **Ore min:** Garnierite. **Gangue:** Silica-carbonate rock. **Deposit:** "Nickel ledge" in serpentine. **Dev:** 110-ft. adit. **Assays:** 10 samples at 10-ft. intervals along the adit showed 0.09% to 0.20% Ni and had an av. of 0.143% Ni. **Ref:** 157. 158.

Goman (5)
Loc: SW¼ sec. 6, (26-21E), on a ridge near head of Winesap (Oklahoma) Canyon. **Access:** About 4 mi. of county road up Winesap Canyon from highway U. S. 97. **Owner:** George Goman, Winesap, Wash. (1942). **Ore:** Nickel. **Deposit:** Dike or segregational mass of ultrabasic rock in Swakane gneiss. **Dev:** None. **Assays:** Qualitative tests gave moderately strong reactions for nickel. **Ref:** 67, p. 26. 158.

Gordon (25)
(see under gold)

Hardcash (8)
Loc: Sec. 25, (23-15E), near Mt. Stuart. **Prop:** 2 claims: Hardcash Nos. 1 and 2. **Owner:** C. L. Waite and Carl Anderson,

- Tacoma, Wash. (1936). **Ore:** Nickel, chromium. **Assays:** Reported 2% Ni, 3.75% Cr. **Ref:** 158.
- Holden (3)**
(see under copper)
- Howe Sound**
(see Holden under copper)
- Irene**
(see Holden under copper)
- Keefer Brothers (4)**
(see under molybdenum)
- King Solomon**
(see Van Epps under antimony)
- Meridian (12)**
(see under gold)
- Monarch (18)**
(see under gold)
- Nevada and Excelsior**
(see under gold)
- New York (17)**
(see under gold)
- Nickel Plate**
(see under gold)
- Nigger Creek (26)**
(see under iron)
- North Pole (11)**
(see under gold)
- Ontario (16)**
(see under gold)
- P. P. Nickel (13)**
(see under gold)
- Peshastin (23)**
Loc: SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 1, (22-17E), on hillside just W. of old town of Blewett. **Prop:** 1 claim. **Owner:** J. B. Woodworth, Vancouver, B. C. (1949). **Ore:** Nickel. **Ore min:** Green stain. **Gangue:** Quartz, calcite, magnesite. **Deposit:** "Nickel ledge" rock 200 to 800 ft. wide. **Dev:** 250-ft. adit. **Ref:** 158.
- Peshastin Creek (21)**
Loc: SW $\frac{1}{4}$ sec. 19, (23-18E). **Access:** $\frac{1}{2}$ mi. up Peshastin Cr. road from Blewett Pass highway. **Owner:** Washington Nickel Mining & Alloys Co. (1943). **Ore:** Nickel. **Ore min:** Reportedly garnierite. **Gangue:** Chalcedonic quartz, carbonates. **Deposit:** "Nickel ledge" rock about 150 to 200 ft. wide traceable for a distance of nearly 2 mi. **Dev:** 125-ft adit. **Assays:** Said to av. 1% to 2% Ni. **Ref:** 158.
- Rainier (10)**
(see under gold)
- Red Butte (19)**
(see under gold)
- Red Cloud and Tralee**
(see under copper)
- Sevenmile Creek (3A)**
(see under antimony)
- Shoshone (9)**
(see under mercury)
- Snook and Ellen**
(see Van Epps under antimony)
- Stephens (22)**
Loc: Secs. 19 and 20, (23-18E). **Owner:** James Stephens, Seattle, Wash. (1942). **Ore:** Nickel. **Ref:** 158.
- Tralee**
(see Red Cloud and Tralee under copper)
- Van Epps (7)**
(see under antimony)
- Velma (14)**
(see under mercury)
- War Eagle (15)**
(see under gold)
- Washington Nickel**
(see Blewett under iron)
- Winesap**
(see Dick)
- CLARK COUNTY**
- Silver Star (1)**
(see under copper)
- FERRY COUNTY**
- Big Four**
Loc: 6 mi. SW. of Republic. **Ore:** Nickel. **Ref:** 100, 5/03, p. 101.
- Congress (4)**
Loc: W $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 35, (32-33E), on Bridge Cr. **Elev:** 2,700 to 2,900 ft. **Access:** 4 mi. by dirt road E. of Sanpoil highway (State No. 4). 40 mi. by road to railroad at Wilbur. **Prop:** 4 patented and 2 unpatented claims. **Owner:** George Wilson, Wilbur, Wash., and Frank Hines, Keller, Wash. (1942). **Congress Gold & Copper Mining Co.** (1907). **Great Northern Mining Co.** (1915, 1918-1924). **Ore:** Nickel, cobalt, copper, silver, gold. **Ore min:** Nickeliferous pyrite, chalcopyrite, malachite, nickel carbonate, limonite. **Gangue:** Quartz, dolomite, barite, epidote. **Deposit:** Ore body 35 to 40 ft. wide along a shear zone in serpentine at contact with schist. Zone is mineralized by quartz, dolomite, pyrite, and chalcopyrite. **Dev:** 1,800 to 2,000 ft. of workings on 3 adit levels expose the deposit to depth of 300 ft. below outcrop. **Assays:** 0.17% to 5.17% Ni, 0.013% to 0.35% Co. Av. said to be about 0.53% Ni, 0.02% Co. Sample showed 5.5 oz. Ag and tr. Au. **Ref:** 7, pp. 182-185. 28, pp. 52-56. 33, 1907, p. 495. 98, 1918, p. 71; 1925, p. 1818. 105, 1/20/12, pp. 144-145. 112, p. 181. 122, pp. 134-136. 130, p. 84. 141, pp. 99-101. 157, 158.
- Iron Creek**
(see Shamrock)
- McJunkin (3)**
(see under silver)
- Pin Money (1)**
(see under gold)
- Shamrock (Iron Creek) (5)**
Loc: Sec. 2, (30-33E) and secs. 26, 27, 34, and 35, (31-33E), 12 $\frac{1}{2}$ mi. NE. of Keller. **Elev:** 2,000 ft. **Access:** 4 mi. by mountain road and 26 mi. by paved highway to railroad at Republic, and same distance to railroad at Wilbur. **Prop:** 10 claims. **Owner:** H. R. Taylor, Elberton, Wash., (6 claims) and J. M. Walker, Keller, Wash. (4 claims) (1942-1946). Charles Hill and Edward Hall (1902). **Iron Creek Mining Co.** (1915-1928). **Shamrock Silver-Lead Mines, Inc.** (1928-1942). **Ore:** Nickel, gold, silver, lead, zinc, copper. **Ore min:** Galena,

malachite, cerussite, lead oxide. **Gangue:** Limestone. **Deposit:** Silicified limestone surrounded by granodiorite. Silver-lead ore is 8 in. to 8 ft. wide and 700 ft. long. Nickel occurs in a mineralized zone 100 ft. wide in which there is a high-grade zone 55 ft. wide. **Dev:** More than 4,000 ft. of underground workings. **Assays:** Sample across 55-ft. width showed 0.7% Ni, and selected samples gave as much as 3.28% Ni. A 43-ton carload gave 7.7% Zn, 11.3% Pb, 0.035 oz. Au, and 51 oz. Ag. **Prod:** 1914 (50 tons), 1922 (3,500 oz. Ag), 1926. **Ref:** 46, p. 157. 97, 1922, 1924, 1926, 1929, 1930. 98, 1920-1926. 104, 9/15/35, p. 23; 11/15/35, p. 24; 1/30/37, p. 28. 105, 3/22, p. 381. 106, no. 9, 1921, p. 3; 5/21/31; 11/5/31. 112, p. 184. 113, 1/21/37, p. 7. 122, p. 139. 129, pp. 218-219. 141, p. 22. 158.

Sherman Creek (2)

Loc: SE $\frac{1}{4}$ sec. 25, (36-36E), Sherman Cr. dist. **Ore:** Nickel. **Ref:** 158.

KITTITAS COUNTY

Balfour Guthrie

(see Cle Elum River under iron)

Bean Creek (11)

(see under iron)

Blue Bonnet (2)

(see under copper)

Cle Elum River, north deposit (1)

(see under iron)

Cle Elum River, south deposit (4)

(see under iron)

Denney (5)

(see under chromium)

Devine

(see under iron)

Grandview (8)

(see under copper)

Iron Peak (9)

(see under iron)

Keystone (6)

(see under mercury)

Lost

(see Grandview under copper)

Red Rock (13)

Loc: NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 20, (19-15E), on N. Fk. of Taneum Cr. **Access:** 3 $\frac{1}{2}$ mi. by trail up N. Fk. from Taneum Cr. road. **Prop:** 6 claims. **Owner:** R. H. Turton (1942). **Ore:** Nickel, chromium. **Gangue:** Silica-carbonate rock. **Deposit:** "Nickel ledge" rock 100 to 150 ft. wide in graphite schist and overlain by continental sediments. **Dev:** 2 adits, some open cuts. **Ref:** 158.

Stafford Creek (12)

(see under iron)

Teanaway (3)

Loc: NW $\frac{1}{4}$ sec. 16, (23-15E). **Access:** 1 $\frac{1}{2}$ mi. by trail from N. Fk. of Teanaway R. road. **Ore:** Nickel, copper. **Ore min:** Pyrrhotite, chalcopyrite. **Dev:** Caved adit. **Ref:** 158.

Teanaway (10)

(see under iron)

LEWIS COUNTY

Cowlitz River

Loc: Near head of Cowlitz R. **Ore:** Nickel reported. **Ref:** 43, 8/29/96, p. 20, or p. 207. 130, p. 84.

Summit Creek (2)

Loc: Near head of Summit Cr. where Summit Cr. trail forks, one branch leading to Carlton Pass, the other to Cowlitz Pass. Probably in N $\frac{1}{2}$ sec. 14, (14-10E). **Ore:** Nickel. **Ore min:** Nickel sulfide. **Deposit:** Said to be a 2-in. vein of nickel sulfide exposed in the trail. **Ref:** 158.

MASON COUNTY

Black and White (1)

(see under copper)

OKANOGAN COUNTY

Alta Lake (6)

Loc: NW $\frac{1}{4}$ sec. 22, (29-23E), $\frac{3}{4}$ mi. S. of Alta Lk. **Elev:** 600 ft. above valley floor. **Owner:** Forrest Wooten, Azwell, Wash. (1951). **Ore:** Nickel, copper. **Ore min:** Pyrrhotite, chalcopyrite. **Gangue:** Silicified gneiss. **Deposit:** 2- to 4-ft. shear zone in schist and gneiss. **Dev:** 66-ft. adit. **Assays:** 1.48% Ni, 0.41% Cu, nil Au, nil Ag. **Ref:** 158.

Brown Lake (3)

Loc: SW $\frac{1}{4}$ sec. 6, (34-26E), in small gullies about $\frac{1}{4}$ mi. NE. of ranch house. **Ore:** Nickel. **Ore min:** Nickel-bearing sulfide. **Gangue:** Ultrabasic rock. **Ref:** 158.

Cabin

(see Stepstone)

Idell (8)

(see also Stepstone)

Loc: NE $\frac{1}{4}$ sec. 6, (32-31E). **Access:** 2.8 mi. up Stepstone Cr. road from Park City road. **Prop:** 3 claims: Idell Nos. 1 to 3. **Owner:** Mrs. Mamie Bowman owns one or all of these claims (1943). **Ore:** Nickel. **Ore min:** Genthite (?). **Deposit:** Small ramifying quartz veinlets cutting argillite and serpentine. Both vein and wall rocks are slightly nickel stained. **Dev:** Several open pits. **Ref:** 122, p. 85.

Johnson Creek (4)

Loc: NE $\frac{1}{4}$ sec. 5, (34-26E), about 150 ft. NE. of Johnson Cr. road. **Ore:** Nickel. **Ore min:** White sulfide. **Gangue:** Ultrabasic rock. **Ref:** 158.

Jumbo (9)

(see under chromium)

Lilman (11)

(see under silver)

Malott (5)

(see under copper)

Section Twelve (7)

Loc: NE $\frac{1}{4}$ sec. 12, (32-30E). **Access:** 8 mi. N. of Nespelem by road. **Ore:** Nickel. **Ore min:** Genthite. **Gangue:** Quartz, calcite, tremolite. **Deposit:** A slightly crushed quartz lode 4 ft. wide, seams of which are coated with genthite. Wall rock also nickel stained. **Dev:** Small pit. **Ref:** 122, p. 85.

Stepstone (Cabin) (10)

(see also Idell, also Jumbo under chromium)

Loc: Near center N. line sec. 5, (32-31E), Nespelem dist. **Access:** 2.8 mi. up Stepstone Cr. road from Park City road. 29 mi. by road to railroad at Grand Coulee. **Prop:** 3 claims: Cabin, Jumbo, Idell. **Owner:** Mrs. Mamie Bowman and Frank

Funkhauser, Spokane, Wash. (1949). **Ore:** Nickel, chromium. **Ore min:** Chromite, fuchsite, pyrite, pyrrhotite, genthite, zaraitite, pentlandite. **Gangue:** Quartz. **Deposit:** 6-ft. bed of limestone and 15-ft. body of serpentine enclosed in quartzite and argillite. Quartz lenses in limestone 1 to 12 in. wide are mineralized. Pyrite, pyrrhotite, and chromite disseminated in serpentine. **Dev:** 2 shafts, one 60 the other 35 ft. deep, and an open cut. **Assays:** A weighted av. of 3 channel samples, each 5 ft. long, from the inclined shaft shows 1.22% Ni, 2.97% Cr₂O₃. An assay on a quartz lens showed 1.56% Ni. A specimen of unoxidized ore from the dump assayed 2.65% Ni. **Ref:** 122, p. 84. 141, p. 101. 157. 158.

Wolverine (2)
(see under gold)

PEND OREILLE COUNTY

Grandview (Reuther) (1)
(see under silver)

Reuther
(see Grandview under silver)

SKAGIT COUNTY

Alvard (16)

Loc: N½NE¼ sec. 21, (36-11E), between the highway and railroad. **Access:** About 4 mi. N. of Marblemount by road. **Owner:** Reportedly leased by Skagit Talc, Inc. (1949). **Ore:** Nickel. **Ore min:** Pyrrhotite, green stain. **Gangue:** Talc, ankerite. **Deposit:** Disseminated metallic minerals and some nickel (?) staining occur in a body of soapstone in a shear zone in metamorphic rocks; also some silica-carbonate rock nearby. **Dev:** Several branch adits driven from a quarry face. **Ref:** 158.

Alverson (2)

Loc: NW¼SE¼ sec. 2, (33-2E), about 300 ft. W. of the Alverson strontium deposit. **Access:** Road and trail or accessible by boat. **Ore:** Nickel, arsenic. **Ore min:** Realgar, nickel stain, pyrite, arsenopyrite. **Gangue:** Quartz, carbonates. **Deposit:** Fractured siliceous zone in schist. **Assays:** A 2-ft. sample assayed 0.13% Ni. **Ref:** 158.

Bingham (15)

Loc: S. of Rockport, across Skagit R., possibly in sec. 36, (35-9E). **Owner:** Chas. Bingham, Sedro Woolley, Wash. (1943). **Ore:** Nickel. **Ore min:** Nickel silicate. **Ref:** 158.

Boschert
(see Stephens)

Cavanaugh Lake (13)

Loc: Sec. 31, (33-7E), E. of Cavanaugh Lk. **Ore:** Nickel. **Ore min:** Nickel silicate. **Ref:** 158.

Clear Lake (7)

Loc: In road cut 1½ mi. E. of Clear Lk., secs. 5 and 6, (34-5E). **Ore:** Nickel. **Gangue:** Magnesium carbonate-silicate rock. **Assays:** 0.2% Ni. **Ref:** 158.

Cultus Mountain (9)

Loc: Along the S. line of SE¼ sec. 22, (34-5E), on SW. side of Cultus Mtn. **Ore:** Nickel, chromium. **Ore min:** Pyrite, green stains, realgar, orpiment. **Gangue:** Quartz, diopside, carbonates. **Deposit:** Zones of green-stained silica-carbonate rock in contorted graphite schist. Total distance across the zones is 500 to 800 ft. Exposed length about 2,000 ft. **Ref:** 158.

Cultus Mountain (Stephens)
(see Stephens)

Devils Mountain

(see Mount Vernon)

Diobsud Creek (Germaine)

Loc: Reportedly 1½ mi. N. of Diobsud Cr., Marblemount area. **Access:** Trail, **Prop:** 2 claims. **Owner:** Mr. Germaine (1934). **Ore:** Nickel. **Deposit:** Sample of nickel-stained green limestone said to have come from above location. **Assays:** Said to assay \$4.00 Ni. **Ref:** 158.

Finney Creek (14)

Loc: Center T. 34 N., R. 8 E., at headwaters of Finney Cr. **Ore:** Nickel. **Ref:** 158.

George Scott (4)

Loc: Sec. 27, (36-5E). **Owner:** George Scott, Mount Vernon, Wash. (1943). **Ore:** Nickel. **Ore min:** Nickel silicates. **Ref:** 158.

Germaine

(see Diobsud Creek)

Jordan Creek (18)

Loc: NE¼ sec. 19 and SE¼ sec. 29, (35-11E), on N. slope of the mountain W. of Jordan. **Access:** Logging road. **Prop:** Deeded land. **Owner:** Bingham Timber Co. (1943). **Ore:** Nickel. **Ore min:** Nickel stain. **Deposit:** Rock similar to the silica-carbonate rock found SE. of Mount Vernon. Mixed green and brown alteration colors. Occurs in graphitic shale. One outcrop 60 ft. wide. **Dev:** Road cuts. **Ref:** 158.

La Conner (1)

Loc: SE¼ sec. 35, (34-2E), on W. side of Swinomish Slough about ½ mi. S. of Tesi Point road. **Access:** 1 mi. by road from La Conner. **Ore:** Nickel, mercury. **Ore min:** Cinnabar. **Deposit:** Zone of green-stained silica-carbonate rock exposed in a bluff is associated with schist. **Assays:** A 4-ft. sample assayed 0.17% Ni. **Ref:** 158.

McMyrl-Wilson (17)

Loc: NE¼ sec. 21, (36-11E), 100 ft. W. of highway. **Access:** 4 mi. by road from Marblemount. **Ore:** Nickel. **Ore min:** Nickel stain. **Deposit:** Silica-carbonate rock cutting soapstone deposit shows nickel staining. **Dev:** Adit. **Ref:** 158.

Mt. Josephine (3)

Loc: Sec. 5, (36-6E), 1 mi. S. of Mt. Josephine Lookout. **Ore:** Nickel. **Ore min:** Nickel silicate, nickeliferous pyrite. **Ref:** 158.

Mount Vernon (Devils Mountain, Pacific) (12)

Loc: S½ sec. 4, NE¼ sec. 9, N½ sec. 10, and NW¼ sec. 11, (33-4E), on Devils Mtn. **Elev:** 250 to 1,750 ft. **Access:** 4½ mi. SE. of Mount Vernon by road. 1½ mi. by road from railroad. **Prop:** 2,100 acres. **Owner:** Pacific Nickel Co. (1941-1943). **Ore:** Nickel, gold. **Ore min:** Chromite, free gold, nickeliferous ankerite, marcasite, pyrite, bravoite. **Gangue:** Quartz, chalcedony, carbonates. **Deposit:** Fault zone between serpentine and sandstone is made up of silica-carbonate rock with a central zone of sulfide-bearing breccia. Silica-carbonate rock portion is 2 mi. long and 100 to 400 ft. wide. Sulfide breccia is in small lenses along the central zone. More than 50,000,000 tons of silica-carbonate rock, of which more than 15,000,000 tons was explored by drilling and found to contain some sulfide-bearing breccia (15,000 to 50,000 tons) that av. more than 0.2% Ni and about 0.02 oz. Au. **Dev:** 300 ft. of adits and 6,375 ft. of diamond drilling. **Assays:** 157 assays on 2,598 ft. of core av. 0.0195 oz. Au, 0.251% Ni. Weighted av. of 74 assays of 600 ft. of trench samples is 0.293% Ni. **Prod:** Test shipments only. **Ref:** 60. 81. 158.

Nookachamps Creek (10)

Loc: Sec. 22, (34-5E). **Ore:** Nickel. **Ore min:** Nickel silicate. **Ref:** 158.

Pacific

(see Mount Vernon)

Powell Creek (5)**Loc:** Sec. 2, (35-5E), on Powell Cr., NW. of Minkler. **Ore:** Nickel. **Ore min:** Nickel silicate. **Ref:** 158.**Scott (6)****Loc:** Near center sec. 5, (34-5E). **Access:** On road about 2 mi. E. of Clear Lk. **Ore:** Nickel. **Ore min:** Nickel stain, pyrite. **Gangue:** Quartz, carbonates. **Deposit:** Exposure of silica-carbonate rock 25 ft. wide in a road cut. Green nickel stain on weathered surfaces and along joints. **Assays:** Said to run 0.25% Ni. **Ref:** 158.**Sedro Woolley****Loc:** Near Sedro Woolley. **Ore:** Nickel reported. **Ref:** 130, p. 84.**Stephens (Cultus Mountain, Boschert) (8)****Loc:** NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 16, (34-5E), on W. slope of Cultus Mtn. **Elev:** 2,000 ft. **Access:** $\frac{1}{2}$ mi. by road and 900 ft. by trail SE. of the Northwest Talc & Magnesium Co. pit. **Prop:** State land. **Owner:** Leased by James Stephens, Seattle, Wash. (1942). **Ore:** Nickel. **Ore min:** Green stain, magnetite, pyrite (?). **Gangue:** Serpentine, talc, brucite (?). **Deposit:** Mass of serpentine fractured and crushed and impregnated by green nickel stain. **Dev:** Open cuts. **Assays:** 7 samples with total length of 47 ft. av. 0.32% Ni. **Ref:** 158.**Walker Valley (11)****Loc:** NE $\frac{1}{4}$ sec. 33, (34-5E), on W. slope of Cultus Mtn. **Access:** About 1 mi. from Walker Valley on road up Cultus Mtn. **Ore:** Nickel. **Ore min:** Magnetite. **Deposit:** Road cut exposes a zone of crushed serpentine 100 ft. wide. Also considerable float in the area to the N. and E. **Assays:** 3-ft. sample showed 0.23% Ni. **Ref:** 158.**Wilson**

(see McMyrl-Wilson)

SNOHOMISH COUNTY

Anderson (5)**Loc:** Near N. line sec. 4, (29-7E), about 4 mi. SE. of Granite Falls. **Owner:** Vern Anderson, Tacoma, Wash. (1951). **Ore:** Nickel. **Ore min:** Nickel silicate. **Gangue:** Silica-carbonate. **Deposit:** "Nickel ledge" type of deposit. **Dev:** Open cut, short adit. **Assays:** One sample showed 1.96% Ni. **Ref:** 158.**Asbestos (3)****Loc:** On Bald Mtn., on the divide from which Deer, Marten, and Clear Creeks all spring, about 3 mi. NW. of Silverton. Probably in sec. 2, (30-9E). **Prop:** 6 claims. **Owner:** R. C. Myers and Louis Callihan (1897). **Ore:** Nickel, cobalt. **Gangue:** Associated with talc and asbestos. **Ref:** 63, pp. 18, 21.**Blue Bird (1)**

(see under gold)

Florence Rae (Rudebeck-Florence Rae) (10)

(see under copper)

Granite Falls (4)**Loc:** Center W $\frac{1}{2}$ sec. 33, (30-7E), E. of Menzel Lk. **Elev:** 500 ft. **Access:** 3 or 4 mi. SE. of Granite Falls by road. **Prop:** Deeded land. **Owner:** Blake Timber Co. (1942). **Ore:** Nickel, mercury. **Ore min:** Garnierite, genthite, cinnabar. **Gangue:** Quartz, carbonates. **Deposit:** Silica-carbonate rock at least 25 ft. thick and exposed for 2,000 ft. **Dev:** 35-ft. crosscut. **Assays:** 2 samples totaling 8 ft. av. 0.25% Ni. **Ref:** 158.**Hancock (11)**

(see under copper)

Little Chief (6)

(see under copper)

Mackinaw (8)

(see under copper)

Mountain Cedar (9)

(see under copper)

Non Pareil (13)

(see under copper)

Palmer**Loc:** Snohomish County (?). **Owner:** E. B. Palmer, Rt. 3, Arlington, Wash. (1944). **Ore:** Nickel, copper, zinc. **Ore min:** Pyrrhotite, pyrite, chalcopyrite, sphalerite. **Gangue:** Quartz, calcite. **Ref:** 158.**Rudebeck-Florence Rae**

(see Florence Rae under copper)

Verd**Loc:** Snohomish County (?). **Owner:** Will Verd, Arlington, Wash. (1944). **Ore:** Nickel. **Ore min:** Nickeliferous pyrrhotite. **Gangue:** Basic igneous rock. **Assays:** Probably would assay more than 1% Ni. **Ref:** 158.**Weden Creek**

(see Mackinaw under copper)

Wild Rose (12)

(see under copper)

STEVENS COUNTY

A. Anderson (2A)

(see under zinc)

Cedar Canyon**Loc:** Cedar Canyon. **Ore:** Nickel. **Ref:** 43, 8/4/94, p. 111.**Daisy**

(see Daisy-Tempest under silver)

Daisy-Tempest (7)

(see under silver)

Marcus (5)**Loc:** Near E. $\frac{1}{4}$ cor. sec. 31, (37-38E). **Access:** About 1,500 ft. S. of Marcus on State Highway 22. **Ore:** Nickel. **Ore min:** Nickel carbonates and sulfates, pyrite. **Deposit:** Road cut exposes breccia zone in sheared argillite over an area 100 ft. long by 400 to 500 ft. wide. Breccia resembles silica-carbonate rock. **Assays:** A 5-ft. sample assayed 0.13% Ni. **Ref:** 158.**Morning Star (6)****Loc:** Lots 6 and 7, sec. 6, (36-38E). **Access:** On highway about 1 $\frac{1}{2}$ mi. S. of Marcus. **Prop:** 1 claim. **Owner:** Z. J. Ferrill (1942). **Ore:** Nickel. **Ore min:** Pyrite or pyrrhotite, nickel stain. **Gangue:** Breccia, magnesite. **Deposit:** Strongly sheared and fractured argillites are mineralized along shear planes. The mineralized shear zone is about 5 ft. wide. **Dev:** Exposed in road cuts. **Ref:** 158.**Mose****Loc:** Northport dist. **Ore:** Nickel. **Ref:** 107, vol. 23, 1905, p. 429.**Mullen (4)****Loc:** NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 19, (37-38E), Clugston Cr. area. **Access:** Railroad and highway. **Prop:** 40 acres of deeded land. **Owner:** E. J. Mullen, Chewelah, Wash. (1941). **Ore:** Nickel. **Ore min:** Pyrite. **Deposit:** Vein said to av. 10 to 15 ft. in width. **Dev:** None. Exposed in railroad and highway cuts. **Ref:** 30, p. 78.

Silver Mountain

(see Daisy-Tempest under silver)

Tempest

(see Daisy-Tempest under silver)

Wall Street (1)

(see under copper)

Windfall (8)

(see under copper)

WHATCOM COUNTY

Mount Baker

Loc: Said to be 18 mi. from Glacier in the Mt. Baker dist. **Owner:** Mount Baker Gold, Copper & Tin Co. (1909). **Ore:** Nickel. **Deposit:** Ore said to occur in limestone. **Assays:** Reportedly 2% to 4% Ni. **Ref:** 114, 6/09, p. 88. 158.

Properties—Platinum is a silver-gray lustrous metal which is tenacious, malleable, and ductile. It is very heavy and moderately hard. The metal takes a very high and permanent polish. It has a high melting point and low vapor pressure, is a poor conductor of heat and electricity, and has a low coefficient of linear expansion, approximately equal to that of glass. The metal has a high-temperature coefficient of electrical resistivity and has high resistance to spark erosion. It is relatively inert chemically, being highly resistant to corrosion and oxidation; it does not tarnish on exposure to air and is not affected by single mineral acids. Other properties are shown in the table on page 12.

Uses—For many years about half the platinum used in this country has gone into jewelry. Lesser amounts are used in about equal parts in dentistry, electrical apparatus, and chemical industries. The metal and its alloys are used in thermocouples, resistance thermometers, electrodes, electrical contacts, acidproof containers, and laboratory apparatus. It is used as a catalyst in manufacturing high octane gasoline, some acids, and other important chemicals. Minor uses are for pen nibs and for spinnerets for glass fiber and rayon spinning. Platinum compounds have limited uses for platinum electroplating, photographic paper, platinum mirrors, fluorescent screens for X-ray work, etching zinc, and in ceramics.

Production—The United States yearly production of platinum has always been less than one-tenth of the world production and is only a small part of domestic consumption. Alaska has a considerable output of crude platinum, and a small amount is produced as a byproduct of placer-gold operations in California, but much of the domestic production is a byproduct of copper and gold smelting and refining. A very small production of platinum

The map showing the numbered platinum occurrences is plate 18, on page 47 in volume 2.

CHELAN COUNTY

Leavenworth Placer

Loc: Presumably near Leavenworth. **Ore:** Platinum. **Deposit:** Sample submitted by M. T. Hurst, Leavenworth, Wash. **Assays:**

Yellow Aster (1)

Loc: E. side of Yellow Aster Butte, Mt. Baker dist. **Elev:** 4,850 to 5,725 ft. **Access:** Trail about 6 mi. from road. **Owner:** L. C. Huntington, R. A. Griger. (1922). Mount Baker Gold, Copper & Tin Co. (1909-1918). **Ore:** Nickel, gold, silver. **Ore min:** Nickel silicate, magnetite, pyrite, azurite, chalcocopyrite. **Gangue:** Quartz, ankerite, magnesite. **Deposit:** "Nickel ledge" 50 to 75 ft. wide, 2,800 ft. long, and at least 875 ft. deep in serpentine and gabbro. **Dev:** Adit 80 ft. long, open cuts. **Ref:** 1, 3/17, p. 84. 98, 1918, p. 111. 114, no. 5, 1909, p. 87. 158.

YAKIMA COUNTY

Indian Creek (1)

(see under mercury)

Wildcat Creek (2)

(see under mercury)

PLATINUM

num was reported in Washington in 1904, and intermittent small production up to 1934 totaled probably no more than 25 ounces, all as a byproduct of placer-gold mining

Prices—Until 1902, platinum sold for only \$4 to \$6 per fine troy ounce. The price then began a rise which reached \$48 by 1913, and during World War I it reached a high of \$154.23 per ounce. Since that time the price has fluctuated between wide limits. After being held by government order at \$35 per ounce during World War II it rapidly rose to \$90 in 1946, then rose and fell repeatedly in the next 6 years, the price at times being as low as \$56 and at other times as high as \$103, the highest since 1927. The 1953 price varied between \$90 and \$93 per ounce. In June 1955 the price was \$78 per ounce. The prices quoted are for refined metal; the prices for crude platinum vary with the amounts of the different platinum-group metals present, and are usually substantially below the price for the refined metal.

Ore minerals—The principal source of platinum is natural alloys with one or more of the other members of the platinum group—iridium, osmium, palladium, rhodium, and ruthenium—and with copper and iron. Other than the native alloys, only three platinum minerals are known—the arsenides, sperrylite, PtAs₂, and cooperite, Pt(As,S)₂, and the sulfide, braggite, (Pt,Pd,Ni)S.

Geology—Platinum is widely distributed over the world, but in only a few places is it sufficiently concentrated to be recovered commercially. Most primary platinum is intimately associated either with nickel or chromite in deposits formed by magnetic processes in ultrabasic rocks such as peridotite, pyroxenite, and their metamorphosed equivalent, serpentine. The platinum in placer deposits was derived from rocks of this type.

OCCURRENCES

Two very small particles of platinum from a cleanup. **Ref:** 120, p. 10.

Mad River Placer (1)

Loc: Reported on Mad R. **Ore:** Platinum. **Deposit:** Placer. **Prod:** Said to have produced some platinum. **Ref:** 67, p. 4126, p. 10. 130, p. 85. 141, p. 103.

Silver Mountain

(see Daisy-Tempest under silver)

Tempest

(see Daisy-Tempest under silver)

Wall Street (1)

(see under copper)

Windfall (8)

(see under copper)

WHATCOM COUNTY

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YAKIMA COUNTY

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(see under mercury)

Wildcat Creek (2)

(see under mercury)

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Geology—Platinum is widely distributed over the world, but in only a few places is it sufficiently concentrated to be recovered commercially. Most primary platinum is intimately associated either with nickel or chromite in deposits formed by magnetic processes in ultrabasic rocks such as peridotite, pyroxenite, and their metamorphosed equivalent, serpentine. The platinum in placer deposits was derived from rocks of this type.

OCCURRENCES

The map showing the numbered platinum occurrences is plate 18, on page 47 in volume 2.

HELAN COUNTY

Leavenworth Placer

Loc: Presumably near Leavenworth. **Ore:** Platinum. **Deposit:** Sample submitted by M. T. Hurst, Leavenworth, Wash. **Assays:**

Two very small particles of platinum from a cleanup. **Ref:** 126, p. 10.

Mad River Placer (1)

Loc: Reported on Mad R. **Ore:** Platinum. **Deposit:** Placer. **Prod:** Said to have produced some platinum. **Ref:** 67, p. 47. 126, p. 10. 130, p. 85. 141, p. 103.

Nigger Creek Placer (2)

Loc: 6 mi. above the mouth of Nigger Cr. **Ore:** Platinum.
Deposit: Found in stream gravels by Division geologists in 1942. **Prod:** Small amount reported. **Ref:** 46, p. 47. 126, p. 10. 141, p. 103.

CLALLAM COUNTY

Cedar Creek Placer (4)

(see under gold, placer)

Lovelace Placer

(see Shi Shi Beach Placer under gold, placer)

Ozette Beach Placer (2)

(see under gold, placer)

Shi Shi Beach Placer (1)

(see under gold, placer)

Starbuck Placer

(see Cedar Creek Placer under gold, placer)

Sunset Creek Placer (5)

(see under gold, placer)

Yellow Banks Placer (3)

(see under gold, placer)

CLARK COUNTY

McMunn Placer (1)

(see under gold, placer)

FERRY COUNTY

La Fleur

(see Walla Walla under copper)

Rogers Bar Placer (2)

(see under gold, placer)

Walla Walla (1)

(see under copper)

GRAYS HARBOR COUNTY

Moclips Placer (1)

(see under cerium)

KITITITAS COUNTY

China Camp Placer

Loc: On Cle Elum R. **Owner:** Theodore Cooper, James Wright, John Lind (1897). **Ore:** Platinum, gold. **Deposit:** Low bar, placer. **Prod:** \$400 in coarse gold in 1895. **Ref:** 63, p. 66.

Properties—Potassium metal is silvery white and bright when freshly cut but quickly oxidizes on exposure to air, the oxidization being rapid enough to cause the metal to catch fire spontaneously in air. It is lighter than water, ductile, malleable, and almost as soft as wax at ordinary temperatures but becomes brittle at low temperatures. It is harder than sodium but softer than lead. It is a good conductor of heat and electricity, its electrical conductivity being exceeded by that of only three or four other metals. Potassium is one of the most active metals chemically, and its chemical properties are similar to those of sodium. It is univalent in its compounds, and, except for the silicates, most potassium salts are water soluble. The metal decomposes water with explosive vio-

OKANOGAN COUNTY

Little Mount Chopaka (1)

Loc: On Little Mt. Chopaka. **Ore:** Platinum reported. **Ref:** 141, p. 103.

Okanogan

(see under chromium)

Oro Fino

(see under gold)

Riverside Placer (3)

Loc: Near Riverside. **Ore:** Platinum. **Deposit:** Samples of placer conc. sent to the U. S. Geol. Survey (1916). **Assays:** "Placer conc. contained a considerable proportion of platinum." **Ref:** 97, 1916, p. 11. 126, p. 10. 141, p. 103.

Similkameen River Placer (2)

Loc: Similkameen R. **Ore:** Platinum. **Prod:** Small amount reported. **Ref:** 126, p. 10. 130, p. 85.

Slate Creek Placer

Loc: Slate Cr., Similkameen dist. **Ore:** Platinum. **Ref:** 141, p. 103.

PACIFIC COUNTY

Beards Hollow Placer (1)

Loc: On ocean beach at Beards Hollow. **Ore:** Platinum. **Deposit:** Black sand. **Assays:** 436 lb. magnetite, 524 lb. ilmenite, 4 lb. zircon, 0.193 oz. platinum per ton. **Ref:** 38-A, pp. 1218-1219. 126, p. 15. 141, p. 103.

SKAGIT COUNTY

Anacortes (2)

(see under chromium)

Cypress (1)

Loc: Cypress Is. **Ore:** Platinum. **Deposit:** Platinum is reported to occur in some of the chromite in amounts from 0.006 to 0.245 oz. per ton. **Ref:** 123, p. 65.

SKAMANIA COUNTY

Primary Gold (1)

(see under gold)

SNOHOMISH COUNTY

Le Roy (1)

(see under silver)

POTASSIUM

lence and must be kept under a liquid containing no oxygen, such as petroleum. Alloys of potassium and sodium are liquid at room temperatures. Other properties are shown in the table on page 12.

Uses—Potassium metal is rarely found outside of chemical laboratories. Because of its softness and extreme chemical reactivity, the metal is not suitable for the structural or mechanical uses characteristic of ordinary metals, so uses of potassium metal are based on chemical rather than physical properties. It can be used in synthesis of inorganic potassium compounds, but these compounds ordinarily are not made from the metal but from other potassium salts. The metal can also be used in organic synthesis involving condensation, dehalogenation,

reduction, and polymerization reactions, but there are few, if any, commercial uses for which sodium, which is cheaper, is not equally satisfactory. Potassium salts have a great variety of uses, but more than 90 percent of the consumption is in the form of agricultural fertilizers.

Production—In 1950 there were seven plants producing potash (potassium salts) in the United States, but little, if any, potassium metal was being made. One plant was producing the metal in this country in 1931, but at that time most of the small amount produced in the world came from Germany. No potash or potassium metal has ever been produced in Washington.

Ore minerals and geology—Potassium constitutes 2.7 percent of the earth's crust, and is found in rocks, soils,

sea water, and organic matter. It has worldwide distribution in the form of silicate minerals such as orthoclase, zeolites, leucite, and mica, but production has been almost entirely of soluble salts, some of the most important of which are carnallite, $\text{KCl}\cdot\text{MgCl}_2\cdot 6\text{H}_2\text{O}$; polyhalite, $\text{K}_2\text{SO}_4\cdot\text{MgSO}_4\cdot 2\text{CaSO}_4\cdot 2\text{H}_2\text{O}$; sylvite, KCl ; and kainite, $\text{MgSO}_4\cdot\text{KCl}\cdot 3\text{H}_2\text{O}$. These salts accumulated as thick beds of marine evaporites, as playa deposits, and as brines of saline lakes. The evaporites have furnished the bulk of the material mined, and they carry up to about 35 percent K_2O . The potassium-aluminum sulfate, alunite, $\text{K}_2\text{Al}_6(\text{OH})_{12}(\text{SO}_4)_4$, contains 11.4 percent K_2O ; and should the recovery of aluminum from this mineral—now only in a state of experimental development—ever be put on a commercial basis, potassium might be recovered as a by-product.

OCCURRENCES

Saline lakes in Washington contain some potassium in their brines, but in such small amounts as to preclude their commercial development as a source of potassium.

Alunite occurrences in King and Pierce Counties near Enumclaw are described in Part I of this report.

SELENIUM

Properties—Selenium is a semi-metallic element in the sulfur group. Its compounds resemble very closely those of sulfur, and, like that element, it occurs in several different allotropic forms—crystalline, metallic, and amorphous. The crystalline form is red, and the amorphous variety is a dark-red to black powder. The metallic form is lustrous and steel gray and is the most stable form. It has only slight electrical conductivity, but when exposed to bright light its conductivity increases by as much as 100 times. The element has valences of 2, 4, and 6. Most of its compounds are poisonous, and certain plants growing in soil rich in selenium will take up enough of the element from the soil to render the plants poisonous to cattle. Other properties are shown in the table on page 12.

ores, as flameproofing for fabric covering on wires, and as a powerful solvent.

Uses—In 1950 the most important uses for selenium were in the electrical industry, followed by the glass, rubber, ferroalloy, and pigments industries. The important electrical uses are in selenium rectifiers and in photoelectric cells. Large quantities are used in small percentages to eliminate the green color which iron imparts to glass, and when added in larger percentages it produces pink and ruby glass. Likewise, it is used in pigments for other ceramic products and for rubber. Other uses in rubber are as a substitute for sulfur in certain heavy-duty rubber products and in vulcanizing synthetic rubber. Selenium is added in small percentages to some stainless steels, copper alloys, and invar, where it produces free-machining qualities without impairing non-corrosion properties. As a coating on magnesium alloys it prevents corrosion by sea water. Small quantities of selenium compounds are used in antifouling paint for ship bottoms, as an ingredient in lubricating oils, in photography, insecticides, frothers for flotation treatment of

Production—United States production of selenium comes from the electrolytic copper refineries in Maryland and New Jersey, and averaged about 500,000 pounds per year for the period from 1940 to 1950. Recovery of the element from refinery slimes is difficult, so only enough to satisfy the demand is recovered. Production could be increased readily if the demand should warrant it. No elemental selenium has been produced in Washington, but sodium selenite is recovered as a byproduct at the copper smelter of the American Smelting & Refining Co. at Tacoma.

Prices—The price of selenium remained near \$2 per pound from 1920 to 1950. Black powdered selenium, 99.5 percent purity, sold in New York at \$1.75 per pound in 1946, then rose in 1950 to \$2, and later in the year to \$3.50 per pound. By the end of 1953 the price had risen to \$4.25 per pound, and in June 1955 it was up to \$6.00.

Ore minerals and geology—Selenium is widely distributed, but is never mined for itself alone. It occurs in association with volcanic sulfur and the sulfides, especially pyrite and chalcopyrite. In the form of the selenides of copper, silver, mercury, lead, bismuth, and thallium it is a minor constituent in many important copper-silver-gold and copper-nickel ore bodies. It has been recovered from flue dusts collected in the production of sulfuric acid from pyrite, and also from sludges at electrolytic copper refineries. Blister copper produced in this country carries from 0.03 to 0.14 percent selenium. In Washington only two selenium-bearing minerals have been identified, and both of these occur in the Knob Hill mine at Republic in Ferry County. These are the copper selenide, umangite, Cu_3Se_2 , and the silver selenide, naumannite, Ag_2Se .

OCCURRENCES

The map showing the numbered selenium occurrences is plate 18, on page 47 in volume 2.

FERRY COUNTY

Blaine Republic

(see Republic under gold)

Flag Hill (2)

(see under gold)

Golden Valley

(see Valley under gold)

Lamefoot

(see Valley under gold)

Republic (3)

(see under gold)

Valley (1)

(see under gold)

SILICON

Properties—Although silicon is ordinarily classified as a nonmetallic element, it does possess some metallic properties, and the pure element is commonly called "silicon metal." Massive silicon is crystalline, lustrous, gray black, and metallic appearing. It is brittle and is harder than glass. It is classified as a semi-conductor; that is, it has only slight conductivity for electricity. Silicon has poor mechanical properties, thus it presents a challenge to metallurgists to adapt it to structural uses in order to utilize such desirable characteristics as light weight (lighter than aluminum), corrosion resistance, high melting point, and ease of production. Silicon is almost inert chemically at low temperatures but is active when heated. It closely resembles carbon in its chemical properties and always displays a valence of 4. Other properties are shown in the table on page 12.

Uses—The use of silicon, mostly in the form of ferrosilicon, in making steel is of utmost importance, silicon being used in about 90 percent of the steel made in this country. Normally, just enough silicon is added to each melt to act as a deoxidizer and degasifier, but sometimes enough is added to make silicon-steel alloys, the latter use accounting for about 10 percent of the silicon consumed in this country. Silicon also is used as a scavenger and as an alloy constituent with copper and aluminum alloys. Silicon is used as a heat- and corrosion-resistant coating on other metals, and the pure material is used in transistors, rectifiers, and other electrical equipment. Silicon compounds have many important industrial uses, but few, if any, of these compounds are made from metallic silicon.

Production—In Washington ferrosilicon is produced in electric furnaces at three plants, those of the Keokuk Electro-Metals Co. at Rock Island, the Ohio Ferro-Alloys Co. at Tacoma, and the Pacific Northwest Alloys, Inc. at Mead. Of these, the first two have produced metallic silicon also.

Prices—Silicon of 97 percent purity sold at 20 cents per pound in 1951; in August 1952 the price dropped to 18½ cents, and was still at that figure 3 years later. One pound of extremely pure silicon for electrical use was imported in 1950, and the quoted value was \$517 per pound. Material of similar purity was quoted at \$430 per pound in 1952.

Ore minerals and geology—After oxygen, silicon is the most abundant element and makes up nearly 28 percent of the earth's crust. With the exception of the carbonates, all the common rocks of the earth's crust are siliceous. Although the element is very abundant, it never occurs free but always in combination in a great variety of minerals, mostly silicates, such as feldspars, amphiboles, pyroxenes, micas, and clays. However, the oxide, quartz is the most abundant of all the silicon minerals, and it is the only mineral which serves as an ore of silicon. In spite of the abundance and widespread distribution of quartz, there are few deposits of the mineral suitable as ore of silicon or ferrosilicon. Ore specifications are hard to meet in that they call for extremely high silica content, low iron, phosphorus, and calcium, and for unusual physical properties.

OCCURRENCES

Occurrences of massive quartz, the principal ore of silicon, are described in Part I of this report. Also in Part I are descriptions of occurrences of quartzite, some

of the most pure of which have been mined for the manufacture of ferrosilicon and which might conceivably be mined as ore of silicon.

SILVER

Properties—Silver is a pure-white metal having a brilliant, perfect metallic luster. It is a little harder than gold, and is exceeded only by gold in ductility and malleability. Polished silver reflects visible light as well as, or better than, other metals, is a good reflector of infrared radiation, but is inferior to aluminum and many other metals as a reflector of ultraviolet light. Silver is the best of the metals as a conductor of heat and electricity. The molten metal in air dissolves 22 times its own volume of

oxygen, which, when the melt cools, escapes with a sputtering sound and a flash of light. Silver is not ordinarily oxidized by air, and resists attack by many chemicals, but it tarnishes readily when contacted by sulfur compounds. The element is univalent. Other properties are shown in the table on page 12.

Uses—Silver has been used since earliest times for coins and ornamental articles, and the largest use is still for monetary purposes. Much of it is simply hoarded,