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DIVISION OF MINES AND GEOLOGY
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PRELIMINARY REPORT ON THE MINES AND PROSPECTS
OF THE
UPPER METHOW REGION, OKANOGAN AND WHATCOM COUNTIES

By
Ward Carithers

Olympia, Washington
January, 1946

Foreword

This brief summary report on the mines and prospects of the Upper Methow region has been prepared for the use of the Public Utility District of Okanogan County at the request of Mr. Art Garton, Director, Department of Conservation and Development. Its purpose is to catalog the mining properties of the area and to provide, so far as possible, some factual data on each one. It was intended that the State Division of Mines and Geology, in cooperation with the Okanogan County Public Utility District, make a detailed mining survey of the region which would be the basis for a comprehensive report. The project was started in November of 1945 by Mr. Ward Carithers, of the Division staff, and Mr. G. R. Ranney, representing the Public Utility District, but because of early snowfalls it was necessary to postpone the field work until some future time. To compensate in part for this necessary delay and to supply some material that could be of immediate use, the Division of Mines and Geology has drawn on its existing records for the data contained herein. The information is chiefly from field notes and reports prepared during the past 5 years by members of the staffs of the now combined Division of Geology and Division of Mines and Mining. Not all the properties mentioned have been examined, and for several properties the information is incomplete. The report is necessarily a preliminary one and subject to revision or expansion, but it is thought that the information given will prove of service until the original plans can be carried out.

Sheldon L. Glover
Supervisor, Division of Mines and Geology

Preliminary report on the mines and prospects
of the Upper Methow region, Okanogan and Whatcom counties

by

Ward Carithers *

Introduction

The mines and prospects included in this report are in the drainage area of the Methow River north of, or above, the town of Carlton, and in adjacent areas that have, at present, their chief access through this region. Roughly, this includes nearly all the northwest quarter of Okanogan County and also a small part of eastern Whatcom County known as the Slate Creek district. Nearly 2,000 square miles are included in this region, but a large part of it, being rough, relatively inaccessible country, contains few prospects. Most of the mining properties can be grouped into five areas within the broad region: (1) the Twisp area, near the town of Twisp, (2) the Gilbert area, in the upper Twisp River Valley, (3) the Mazama area near the town of Mazama, (4) the Eightmile area at the head of Eightmile Creek, and (5) the Slate Creek area in Whatcom County.

The arterial road of the Upper Methow region is State Highway 16, which leads up the Methow Valley from Pateros on the Okanogan Highway (P.S.N. 19), through Twisp and Winthrop, across the Cascade divide at Harts Pass and into the Slate Creek area. This road is

*Geologist, Division of Mines and Geology.

paved as far as Winthrop. The Loup Loup county road connects Twisp with Okanogan, the county seat, and many secondary county and Forest Service roads extend up main tributary valleys of the Methow. The nearest railroad is the Okanogan branch of the Great Northern Railway, which runs through Pateros and Okanogan. Two incorporated towns are in the region: Twisp (1943 population 477) and Winthrop (365). Post offices and stores are also located at Carlton and Mazama.

The Upper Methow region has the characteristic topography of the northern Cascade Range. It has been deeply dissected by glacial and other erosional processes and so presents a bold relief. Altitudes range from 1,450 feet on the Methow River near Carlton to as much as 8,000 feet on many of the peaks and ridges. Owing to this diversity in altitude, the region has a rather wide variety in climatic conditions. At higher elevations, particularly along the crest of the Cascade Range, the precipitation is considerable, probably as much as 60 or 70 inches annually, and heavy snowfalls occur during the winter. Eastward from the Cascade Divide the precipitation is less, and along the lower Methow River the climate is semi-arid. The Weather Bureau* gives the following climatological data for a station at Winthrop: Average annual precipitation, 13.39 inches; average annual snowfall, 67.4 inches; average annual temperature, 45.2°; average temperature for January, 17.0°; average temperature for July, 69.7°

* U. S. Dept. Agr. Weather Bur., Climatic summary of the United States, sec. 2, Eastern Washington, to 1930. 1931.

Agriculture is the principal industry of the region, and, because of the dry climate during summer months, irrigation is necessary. The chief crops are fruit, peas, cattle, and grains. A sawmill is operated at Twisp; considerable timber, chiefly ponderosa and white pine, grows abundantly in the upper valleys and on hillslopes of the region. However, none of the terrain is excessively covered by brush or timber, and the area, though rough, is fairly open and well adapted to prospecting.

The general features of the geology of the upper Methow region are known, but excepting along the Canadian Boundary, little detailed mapping has been done. The chief formations of the area are a group of granitic rocks - granite, granodiorite, and diorite--which occur mostly in the northeastern and southwestern parts of the area. These are intrusive into earlier sedimentary rocks of marine and continental origins, now metamorphosed, and into a group of altered volcanic rocks, chiefly andesitic in composition. In many places, particularly near contact zones, gneissoid and schistose variants occur. Geologically, the area is particularly favorable for the occurrence of metalliferous ore deposits.

Mining in the Upper Methow region has, for the most part, been an intermittent industry. Development started late in the last century, and from about 1890 to 1900 there was considerable prospecting and some mining. From that time until about 1936 only a small amount of work was done; but from 1936 to 1942 mining again became an important industry in the region, producing metals, chiefly gold, valued at nearly \$1,500,000. Production statistics compiled by the U. S. Geo-

logical Survey were not published for separate districts before 1933, and therefore the production record of the Upper Methow region up to that year is not available. Since 1933, however, the Bureau of Mines, in the Minerals Yearbook, has shown the production of gold, silver, copper, lead, and zinc by districts; so the production figures for the region since that year are available:

Mine production of gold, silver, copper, and lead in the Methow region, 1933-1944,
by districts, in terms of recovered metals^{a/}

Year	District	Lode	Placer	Ore sold or treated tons	Gold fine ounces	Silver fine ounces	Copper pounds	Lead pounds	Total value
1933	Slate Creek	2	2	104	123.0	23	454	---	2,371
1934	Upper Methow	1	--	?	?	---	---	---	?
	Slate Creek	2	--	81	27.27	59	---	433	1,007
1935	Upper Methow	2	3	34	36.40	110	366	250	1,385
	Slate Creek	2	--	57	83.40	186	205	1,325	3,146
1936	Methow ^{b/}	3	2	940	483.80	634	2,152	283	17,810
	Slate Creek ^{b/}	3	--	3,635	533.6	173	---	---	18,985
1937	Methow	5	--	94	44.0	199	124	305	1,727
	Slate Creek ^{b/}	3	--	27,975	12,704.0	1,117	---	---	445,504
1938	Methow	5	--	1,570	230.0	399	1,296	174	8,443
	Slate Creek ^{b/}	3	--	26,818	12,256.0	1,335	---	---	429,823
1939	Methow	10	--	14,989	6,557	5,333	133,192	4,149	247,196
	Slate Creek ^{b/}	4	--	5,694	2,748	520	48	213	96,548
1940	Methow ^{b/}	11	1	16,139	3,861	4,240	348,000	2,100	177,579
	Methow ^{b/}	6	--	3,604	908	1,253	54,800	700	39,107
1941	Methow ^{b/}	3	2	280	135	166	800	400	4,960
	Methow ^{b/}	3	--	1,554	212	263	9,000	---	3,696
1942	Methow ^{b/}	2	--	62	23	21	---	---	820
	Methow ^{b/}	--	--	---	---	---	---	---	---
Total, Methow Region				113,230	40,973.47	16,080	550,536	10,932	\$1,505,107

^{a/} U. S. Bureau of Mines, Minerals Yearbook, 1933-1944.

^{b/} Includes mine production from Squaw Creek district, Lower Methow area.

Following are the mines and prospects of the Upper Methow region, grouped alphabetically into the chief areas, or districts, of the region. For the sake of brevity and to facilitate the use of the report, headings are used to introduce the salient features of each property. Also included, at the end of this section, is a list of the known nonmetallic mineral occurrences of the region together with a brief description of each. The numbers in parentheses following the names of the properties correspond to those appearing on the accompanying map.

Twisp area

ALDER MINE (1)

Location: Secs. 25, 26, 35, and 36, (33-21E.), about 5 miles by road southwest of Twisp. Altitude 3,000--3,500 feet.

Owners: Mahlon McCain and S. W. Shafer, Winthrop; Vern LaMotte and Frank Peters, Twisp.

Property: Three patented and seventeen unpatented claims.

Timber: Ample.

Water: A spring provides for camp use.

Geology and mineralization: A siliceous vein-zone in argillite (?) is mineralized by chalcopyrite, pyrite, sphalerite, and pyrrhotite, together with gold and silver. Ore shoots 15 to 75 feet wide occur in the zone.

Development: Three tunnels total several hundred feet. Stoping has been done.

Production and assays: The mine operated from 1939 to 1942, and during the first two years produced about 26,000 tons that had a value, chiefly in gold, of approximately \$350,000. A smaller tonnage (about 4,000) was produced in 1941-1942.

Future: Uncertain; some ore of fair grade is reliably reported to occur in the mine at present, but the available tonnage is not large. Further exploration is warranted to prove and delimit extensions of the vein system.

MINNIE MINE (2)

Location: $W\frac{1}{2}$ sec. 23, (32-22N.), on a fork of Leecher Creek, about $5\frac{1}{2}$ miles northeast of Carlton. Altitude 2,300 feet.

Owner: F. C. Blockson, Twisp.

Property: Four unpatented claims.

Timber: Small amount.

Water: None.

Equipment and buildings: One house; miscellaneous hand mining tools.

Geology and mineralization: A siliceous zone 3 to 15 feet wide occurs in metamorphic rocks. It is considerably leached of a former sulphide content as far as 60 feet below the surface, but contains some gold and silver, together with iron oxides, gypsum, free sulphur, and a little marcasite and scheelite.

Development: A 125-foot drift from which a 25-foot raise and a 32-foot shaft have been driven.

Production and assays: One carload of ore, which reportedly assayed about \$12.00 per ton, was shipped in 1941; another car was shipped in November 1945.

Future: Further development work is warranted to delimit the vein and to explore the ground below the zone of leaching.

NEW JERSEY PROSPECT (3)

Location: SW $\frac{1}{4}$ sec. 33, (33-22E.)

Owner: None known; probably abandoned.

Development: Several tunnels and open-cuts, reportedly caved at present.

RATTLESNAKE PROSPECT (4)

Location: SE $\frac{1}{4}$ sec. 18, (33-22E.), about half a mile south of Twisp.

Altitude 2,000 feet.

Owner: A. T. Scott, Twisp.

Property: Private land.

Timber: None.

Water: None.

Geology and mineralization: Narrow quartz veins containing pyrite, arsenopyrite, galena, sphalerite, and chalcopyrite, together with gold and silver occur in a fracture zone through altered volcanic (?) rock.

Development: A 22-foot shaft, a 20-foot tunnel, and several open-cuts.

Assays: An assay of a 2-inch section of the vein shows: gold, 0.89 ounces per ton; silver, 7.1 ounces per ton; lead, 4.1 percent; zinc, 4.9 percent; and copper, 0.3 percent. Assays of minable widths show a low gold-silver content.

Future: Uncertain.

RED SHIRT MINE (5)

Location: SE $\frac{1}{4}$ sec. 18, (33-23E.), about 6 miles by road southeast of Twisp. Altitude 3,800⁺ feet.

Owners: Mrs. Mile Rapp, Seattle; Mahlon McCain, Winthrop.

Property: One patented and four unpatented claims.

Timber: Scarce

Water: Small amount

Equipment and buildings: One building houses a compressor and a few miscellaneous tools.

Geology and mineralization: A quartz vein 1 to 4 feet thick strikes N. 40°--50° W. and dips 30°--60° through dark green schist. The vein contains pyrite together with chalcopyrite, gold, and silver.

Development: About 100 feet of drift has been driven from a 425-foot crosscut on the lower level; about 375 feet of drift has been driven from a 200-foot crosscut on the upper level, 150 feet elevation above the lower. Stoping has been done on the upper level.

Production and assays: The property has been an intermittent producer for the past 50 years. The latest work was in 1936-1938.

Future possibilities: Uncertain; probably most of the available ore has been mined. At present, the workings are in poor condition.

SPOKANE MINE (GOLD CROWN) (6)

Location: Sec. 12, (33-21E.), about 2 miles west of Twisp on the Twisp River road.

Owner: S. J. Sherwood, Twisp.

Property: Two unpatented claims.

Timber: None.

Water: Twisp River is near the property.

Equipment and buildings: None

Geology and mineralization: An irregular quartz-calcite vein from a

few inches to 3 feet thick, strikes northward and dips steeply westward through volcanic rock (andesite?). In places the vein contains bunches of sphalerite, arsenopyrite, chalcopyrite, pyrite and galena.

Development: Several hundred feet of drifts and crosscuts. A small amount of stoping has been done.

Production and assays: A small production is recorded from the property in 1939 and in 1941. Six tons shipped in 1941 assayed: gold, 0.46 ounces per ton; silver, 20.23 ounces per ton; zinc, 4.5 percent; lead, 3.8 percent.

Future: Small tonnages of fair ore may be shipped intermittently from the property.

TWISP VIEW (7)

Location: N $\frac{1}{2}$ sec. 24, (33-21E.), about 4 miles by road from Twisp.
Altitude 2,800-2,900 feet.

Owner: George Gibson, Twisp.

Property: Two unpatented claims.

Timber: Small amount.

Water: None.

Geology and mineralization: A vein 1 to 3 feet thick strikes northwest and dips 50°-60° through altered volcanic (?) rock. The vein consists of quartz, pyrite, sphalerite, galena, and a little chalcopyrite, together with gold and silver.

Development: One drift about 250 feet in length, another which is caved at the portal, and a 35-foot shaft.

Production and assays: No production known. Assays show 0.09 to 0.18

ounces per ton gold and 1.5 to 13.0 ounces per ton of silver over minable widths.

Future: The prospect may become a small producer of fair grade gold-silver ore.

Gilbert area

ABERNATHY PROSPECT (8)

Location: Sec. 31, (35-18E.), about 5 miles by trail northeast of Gilbert, the terminus of the Twisp River road. Altitude 7,500 \pm feet.

Owner: E. Abernathy, Los Angeles, California.

Geology and mineralization: A 6-foot shear zone strikes N. 60° E. and dips vertically through diorite. On each wall of the zone is a vein, up to 14 inches thick, consisting of quartz containing chiefly arsenopyrite and chalcopyrite.

Development: An open-out, a 40-foot drift, and a shaft.

Future: Not promising.

ASHTON PROPERTY (9)

Location: Sec. 22, (34-18E.). Near South Creek, about 4 miles by trail from the Twisp River road. Altitude 4,500-5,500 feet.

Owner: Bill Johnson, Twisp, Washington.

Property: Five patented claims.

Development: Several tunnels and open-cuts. No other information.

CRESCENT PROSPECT (10)

Location: N. center sec. 15, (34-18E.), about $1\frac{1}{2}$ miles by trail south-

west of the terminus of the Twisp River road at Gilbert.

Altitude 4,500 - 5,000 feet.

Owners: L. L. LaMotte and F. C. Blockson, Twisp.

Property: Two unpatented claims.

Timber: Ample.

Water: A small stream flows across the property.

Geology and mineralization: Metamorphic rocks consisting of graphitic schist, siliceous limestone, and quartzite are highly fractured and, in places, slightly mineralized by pyrite and chalcopyrite.

Development: One tunnel about 1,000 feet in length was driven to tap, at depth, a "showing" of copper mineralization that cropped out at a higher elevation.

Future: Not promising.

GOLD BAR PROSPECT (11)

Location: On South Creek, 4-6 miles from Twisp River road.

Owner: Abandoned; was owned by W. L. LaMotte, Twisp.

MID RAN E MINE (12)

Location: Sec. 34, (35-18E.), at the head of North Creek, about 5 miles by trail north of Gilbert, the terminus of the Twisp River road. Altitude 6,000-7,000 feet.

Owner: Bill Johnson, Winthrop.

Property: Two unpatented claims.

Timber: Ample.

Water: Ample.

Geology and mineralization: Two quartz-sulphide veins strike northwestward and dip 45°-60° through diorite. They contain pyrite, arsenopyrite, pyrrhotite, chalcopyrite, and sphalerite, together with gold and silver.

Development: Several tunnels and open-cuts.

Production and assays: Three small shipments made in 1940 assayed an average of 1.27 ounces per ton of gold, 1.81 ounces per ton of silver, and 0.24 percent copper.

Future: Uncertain; the property is difficult of access and is probably limited to small sporadic shipments.

MOUNTAIN LILY PROSPECT (13)

Location: Near head of South Creek, 4-6 miles from Twisp River road.

Owner: Abandoned; was owned by W. L. LaMotte, Twisp.

PAY DAY PROSPECT (14)

Location: Sec. 11, (34-18E.), just north of Gilbert at the terminus of the Twisp River road. Altitude 4,000 feet.

Owners: F. C. Bleekson, Twisp; Frank R. Heath, Seattle.

Property: Five unpatented claims.

Timber: Ample.

Water: North Creek flows across property.

Equipment and buildings: One cabin at Camp Gilbert.

Geology and mineralization: The property lies chiefly in metamorphosed sedimentary rocks close to a contact with a granitic intrusive (diorite?). The metamorphic rocks are, in places, shattered, somewhat silicified and mineralized with pyrite and pyrrhotite, together with a little chalcopyrite, gold, and silver.

Development: Several short tunnels and open-cuts and one shaft 20-25 feet deep.

Assays: Assays over minable widths show a gold content varying from a trace to 0.03 ounces per ton together with a small amount of copper.

Future: Not promising.

WOLVERINE PROSPECT (15)

Location: Secs. 2 and 11, (34-18E.), on the south side of Gilbert Mountain 1 to 2 miles northwest of the end of the Twisp River road. Altitude 5,500⁺ feet.

Owner: W. L. LaMotte, Twisp.

Property: Eight unpatented claims.

Timber: Scarce.

Water: Scarce; a few small streams.

Geology and mineralization: A number of quartz veins from 1 to as much as 60 inches in thickness, but averaging usually less than a foot, lace through granitic rock (diorite?). In places the veins contain pyrite, pyrrhotite, and chalcopyrite, together with some gold telluride (sylvanite?), free gold, and silver.

Development: Three or four drifts 80-50 feet long and several open-cuts.

Production and assays: A production of a few tons was made in recent years. Assays show erratic gold content from a trace to as much as several ounces per ton over narrow widths.

Future: Probably limited to small intermittent production.

Mazama area

CLAYTON PROSPECT (16)

Location: Sec. 8, (35-20E.)

Owner: Abandoned.

Development: 600-700 feet of tunnel work and one shaft reported.

CLIMAX PROSPECT (17)

Location: SW $\frac{1}{4}$ sec. 14, (36-19E.), about 1 mile northwest of Mazama.

Altitude 2,400 $\frac{1}{2}$ feet.

Owner: Ed Kagel (1938), Mazama.

Property: Five unpatented claims.

Equipment and buildings: Bunkhouse, machine and hoist building.

Geology and mineralization: A fracture in andesite strikes N. 65° W., dips vertically, and is scantily mineralized by quartz, calcite, pyrite, chalcopyrite, and sphalerite, together with some secondary copper minerals.

Development: A 130-foot drift and a shallow shaft sunk near the portal.

Future: Not promising.

ECHO GULCH PROSPECT (18)

Location: Sec. 16, (35-20E.), on southwest side of the Methow Valley about 10 miles northwest of Winthrop.

Owner: Abandoned.

FLAG (AMERICAN FLAG, ORIENTAL) MINE (19)

Location: Sec. 30, (36-20E.), on a cliff about 1 mile northeast of Mazama. Altitude 2,600-3,000 feet.

Owner: Mahlon McCain and associates, Winthrop.

Property: Two patented and one unpatented claims.

Timber: Small amount

Water: Small flow from mine workings.

Equipment and buildings: Tram line, bunker, and one shed.

Geology and mineralization: Two veins and one zone of mineralization are known. The Flag vein, 9 to 36 inches thick, consists of a gouge seam containing disseminated pyrite together with gold. The Oriental tunnel vein is reportedly narrower in width but otherwise similar. The Oriental vein is a zone of fracturing mineralized by calcite, quartz, sphalerite, and pyrite, together with a little gold.

Development: On the Flag vein, two tunnels and a sublevel, together with a raise and a winze, total about 1,400 feet. Some stoping has been done. The 260-foot Oriental tunnel, a shaft on the Oriental vein-zone, and several open-cuts comprise the rest of the development.

Production: A few hundred tons of ore were mined from the Flag vein about 40 years ago. A recent small production was reported in 1940.

Future: Uncertain. Ore bodies might be disclosed by exploration work on the veins.

IMPERIAL (CROWN POINT) PROSPECT (20)

Location: NW $\frac{1}{4}$ sec. 16, (36-20E.), on Goat Creek, about 5 miles by road from Mazama. Altitude 3,600-3,800 feet.

Owners: Mahlon McCain and J. A. Stewart, Mazama.

Property: Three unpatented claims.

Timber: Ample.

Water: Ample.

Equipment and buildings: One shed houses a compressor.

Geology and mineralisation: A siliceous zone 20-25 feet wide strikes northeastward and dips 70° SE. through diorite. It contains a quartz-sulphide vein 12 to 42 inches thick that shows considerable arsenopyrite together with pyrite, chalcopyrite, and gold.

Development: About 220 feet of drift and a 50-foot shaft have been driven from a 400-foot crosscut on one level. A 25-foot drift and a 75-foot shaft are 120 feet higher. Two other tunnels, with portals caved, and several open-cuts are also on the property.

Assays: Assays furnished by the owners show the gold content of an ore shoot 150-175 feet long to be from 0.08 to 0.95 ounces per ton over widths of from 15 to 41 inches.

Future: The property may operate on a small scale with the ore available at present. Further exploration is desirable.

KAYWASH PROSPECT (21)

Location: Sec. 8 (?), (35-20E.), on southwest side of the Methow Valley, about 11 miles northwest of Winthrop.

Owner: Abandoned.

LUCKY JIM PROSPECT (22)

Location: Sec. 16, (35-20E.), on the southwest side of the Methow Valley, about 10 miles northwest of Winthrop.

Owner: L. G. Halloway, Winthrop.

Property: Eight patented claims.

Development: One tunnel 750-800 feet long, two shorter tunnels, and one shaft are reported.

LUCKY SUNDAY (23)

Location: SW $\frac{1}{2}$ sec. 16, (36-20E.), on Montana Creek trail, about 1 mile from Goat Creek road.

Owner: Not known.

Property: One claim (?).

Timber: Ample.

Water: None.

Geology and mineralization: A vertically dipping quartz vein 1 foot thick strikes due east through diorite.

Development: One open-cut.

Future: Not promising.

MAZAMA PRIDE (HOTCHKISS) MINE (24)

Location: N $\frac{1}{2}$ sec. 30, (36-20E.), about half a mile north of Mazama. Altitude 2,000-2,800 feet.

Owners: H. A. and Edgar Hotchkiss, Winthrop; D. W. Tomlinson, Mansfield.

Property: Nine unpatented claims.

Timber: Small amount.

Water: Small amount in underground workings.

Equipment and buildings: A shed houses a 10" by 10" compressor, a semi-Diesel engine, and miscellaneous blacksmith tools.

Geology and mineralization: Two or three quartz veins 1 to 3 feet thick strike northward and dip steeply through diorite. They con-

tain arsenopyrite and pyrite, together with a little chalcopyrite and some gold.

Development: A 525-foot crosscut, a 60-foot drift, another 20-foot drift, a 15-foot shaft, and several open-cuts are on the property. A small stop is in the 60-foot drift.

Production and assays: About 37 tons of ore were shipped in 1931 with a reported assay value of 0.7 ounces of gold per ton.

Another shipment was reportedly made in 1939.

Future: Small tonnages of ore may be intermittently shipped from the property.

MAZAMA QUEEN (25)

Location: SE $\frac{1}{4}$ sec. 14, (36-19E.), 3 miles by road northwest of Mazama.

Altitude about 2,600 feet.

Owner: Leybold-Scales, Inc., Puget Sound Bank Building, Tacoma, Washington.

Property: Four (?) unpatented claims.

Timber: Ample.

Water: Goat Wall Creek provides an ample supply.

Equipment and buildings: Complete 50-ton flotation plant excepting for power plant (removed); assay office; camp facilities for 15-20 men.

Geology and mineralization: An 8 to 10-inch quartz-calcite vein strikes N. 16° E. and dips steeply through altered andesite. The vein contains pyrite, sphalerite, chalcopyrite, and galena, together with some gold and silver.

Developments: One drift about 850 feet in length from which two short crosscuts and two raises are driven.

Production and assays: Some production, quantity and value not known, was made in 1938 and 1939.

Future: Not promising. Mill may be used for treating ores from other properties in the vicinity.

MOLLY PROSPECT (26)

Location: NW $\frac{1}{4}$ sec. 20, (36-20E.), near the Goat Creek road, about 3 $\frac{1}{2}$ miles from Mazama. Altitude 3,000-3,500 feet.

Owners: T. C. Luke, Mazama, S. W. Shafer, Winthrop. Property under lease to Leybold-Scales, Inc., Puget Sound Bank Building, Tacoma.

Property: Five unpatented claims.

Timber: Ample.

Water: Small stream; can be developed for mining and camp use.

Equipment and buildings: One cabin is on the property; lessee has complete mining equipment at its disposal.

Geology and mineralization: The property covers an area of altered volcanic (?) rock intruded by bodies of diorite and pegmatite. These rocks are considerably fractured and contain stringers, blebs, and disseminations of pyrite, chalcopyrite, and molybdenite, together with quartz, calcite, and some gold and silver. The structure of the mineralized zone is not known.

Development: Three tunnels, 70, 65, and 45 feet long, respectively, are on the property, and about twenty open-cuts and bulldozed

trenches have been made.

Future: The area appears to be favorable for the occurrence of low-grade deposits of copper-molybdenite-gold-silver ore. However, considerable exploration work is necessary to ascertain their existence.

MONTANA MINE (27)

Location: Sec. 16, (36-20E.), near head of Montana Creek, about 2 miles by trail from the Goat Creek road. Altitude 5,000-5,500 feet.

Owner: None known.

Property: Probably abandoned.

Timber: Ample.

Water: Ample.

Equipment and buildings: Two fair cabins and a mill building are on the property. A small jaw crusher, rolls, and four stamps in the mill are owned by Mahlon McCain, Winthrop.

Geology and mineralization: The workings were caved in 1944, but the dumps show quartz-vein material containing pyrite, pyrrotite, arsenopyrite, and a little chalcopyrite. The country rock is diorite.

Production: U. S. Geological Survey Mineral Resources for 1915 reports that some gold bullion was produced at the property in 1915. No assays are available.

Future: Not promising.

RAINBOW PROSPECT (28)

Location: Sec. 10 (?), (36-19E.), about 5 miles northwest of Mazama.

Owner: T. C. Luke, Mazama.

Geology and mineralisation: Quartz together with some pyrite occurs along a narrow contact zone between conglomerate and a light-colored (felsite?) dike.

Development: A 40-foot drift.

Future: Not promising.

ROSEALIND PROSPECT (29)

Location: N $\frac{1}{2}$ sec. 17, (36-20E.), about 5 miles by the Goat Creek road from Mazama. Altitude about 3,500 feet.

Owner: T. C. Luke, Mazama.

Property: Two (1) unpatented claims.

Timber: Ample.

Water: Whiteface Creek flows across the property.

Geology and mineralisation: A number of narrow fracture zones strike at various directions through diorite. Some of the zones, rarely as wide as 2 feet, are mineralized in places by quartz, pyrite, and arsenopyrite, together with some chalcopyrite and gold.

Development: Two tunnels are on the property. The lower one is branching and has about 400 feet of drifts and crosscuts, and one shaft of unknown depth. The other, about 100 feet in elevation above the lower, totals 94 feet.

Future: Uncertain.

SHAFER AND LUKE PROSPECT (old Wehmyer property) (30)

Location: Sec. 19 (?), (36-20E.), near the Goat Creek road about 4 miles from Mazama.

Owners: S. W. Shafer, Winthrop; T. C. Luke, Mazama.

No other information.

SILVER KING PROSPECT (31)

Location: NW $\frac{1}{4}$ sec. 29, (36-20E.), about 3 miles by the Goat Creek road from Mazama. Elevation 2,700-3,000 feet.

Owner: Alva Sharp, Mazama.

Property: Three (?) unpatented claims.

Timber: Small amount.

Water: Small spring for camp purposes.

Equipment and buildings: One cabin.

Geology and mineralization: An altered granitic or volcanic rock is cut by at least two fracture zones that contain quartz-calcite veins from 2 to 14 inches thick. These show pyrite together with some chalcopyrite, galena, and probably gold.

Development: Two tunnels, one totaling 155 feet and the other 55 feet, and several open-cuts are on the property.

Future: Uncertain.

SOONER PROSPECT (32)

Location: Sec. 17, (36-20E.), about 4 miles by the Goat Creek road from Mazama. Altitude about 3,500 feet.

Owner: T. C. Luke, Mazama.

Property: Two unpatented claims.

Timber: Ample.

Water: None.

Geology and mineralization: Several fracture zones through diorite are mineralized in places by quartz, calcite, and pyrite, together with some chalcopyrite.

Development: A caved shaft, reportedly 100 feet deep, a tunnel caved at the portal, and four or five open-cuts are on the property.

Future: Uncertain.

Eightmile area

BILLY GOAT PROSPECT (33)

Location: Near SE. cor. sec. 15, (33-20E.), at end of Eightmile road.
Altitude 4,500-5,000 feet.

Owners: R. E. Johnson, Mazama; W. F. Berge, Ferd Haase, Clint Hanks, Winthrop, and Della Graff.

Property: Four unpatented claims.

Timber: Ample.

Water: Ample.

Equipment and buildings: One cabin.

Geology and mineralization: A highly altered volcanic rock, probably andesite, is intruded by diorite. The volcanic rock is considerably fractured and in places, silicified. It contains stringers and pockets of pyrite and chalcopyrite, together with some sphalerite, galena, gold, and silver.

Development: Four tunnels, one over 700 feet long and the others 15 to 60 feet long, two shafts 20 to 40 feet deep, and several open-cuts are on the property.

Assays: Copper is irregularly distributed through the rock; in places it is as much as 2 percent over minable widths, but generally less than 1 percent. Gold is likewise irregular, generally low values are encountered, but at least one small shoot of minable width contains as much as 0.5 ounces per ton.

Future: Careful sampling and further exploration work may disclose small sheets of gold ore. Also, the area is favorable for the occurrence of low-grade copper-gold bodies, but considerable large-scale exploration work is necessary.

CAER PROSPECT (34)

Location: Secs. 14 and 15, (38-20E.), adjacent to the Billy Goat prospect. Altitude 5,000-5,500 feet.

Owner: Ralph Kennison, Winthrop.

Property: Four unpatented claims.

Timber: Ample.

Water: Billy Goat Creek flows across the property.

Equipment and buildings: One cabin.

Geology and mineralization: Similar to that of the Billy Goat, q.v.

Development: Two tunnels 10-20 feet long.

Future: Similar to that of the Billy Goat.

COPPER GLANCE PROSPECT (35)

Location: NE $\frac{1}{4}$ sec. 35, (38-20E.), about 2 miles southeast of the Billy Goat group. Altitude 5,500-5,700 feet.

Owner: H. A. Hotchkiss, Winthrop (1939).

Property: Two unpatented claims.

Timber: Ample.

Water: A small spring provides for camp use.

Equipment and buildings: One cabin.

Geology and mineralization: A fracture zone 80-100 feet wide extends northwestward through altered volcanic rock, probably andesite. It is mineralized by quartz, calcite, and pyrite and, in places, by chalcopyrite, chalcoite, barite, and a little gold and silver.

Development: Several open-cuts and two tunnels, one 50 feet long and the other about 250 feet.

Production and assays: About 2 tons of hand-sorted material was shipped to the smelter at one time. Assays show low values in copper, gold, and silver over minable widths.

Future: Not promising.

HANKS PROSPECT (36)

Location: Near NW. cor. sec. 23, (38-20E.), adjacent to the Billy Goat prospect. Altitude 4,500-4,700 feet.

Owner: Clint Hanks, Winthrop.

Property: Three unpatented claims.

Timber: Ample.

Water: Eightmile Creek flows across the property.

Equipment and buildings: One cabin.

Geology and mineralization: Similar to that of the Billy Goat, q.v.

Development: Two adits 20-30 feet long and several open-cuts.

Future: Uncertain, probably the same as that of the Billy Goat.

LEAD HORSE PROSPECT (37)

Location: Near center of sec. 10, (38-20E.), on the southwest slope of Billy Goat Mountain, 2 miles by trail from the end of the Eightmile Creek road. Altitude 6,000 feet.

Owner: Charles Kenney, Winthrop.

Property: Two unpatented claims.

Timber: Scarce.

Water: None.

Geology and mineralization: Two steeply dipping veins 1 to 10 inches thick trend northwestward through altered volcanic agglomerate. They contain irregular masses of quartz, barite, galena, and a little chalcopyrite, together with some secondary lead and copper minerals.

Development: Two open-cuts.

Future: Not promising.

MOUNTAIN BEAVER MINE (38)

Location: $3E\frac{1}{2}$ sec. 15, (38-20E.), adjacent to the Billy Goat prospect. Altitude 4,400-4,800 feet.

Owners: H. A. and Edgar Hotchkiss, Winthrop; D. W. Tomlinson, Mansfield.

Property: Three unpatented claims.

Timber: Ample.

Water: Eightmile Creek crosses the property.

Equipment and buildings: One cabin and one mill building housing a small "homemade" flotation mill.

Geology and mineralization: Similar to that of the Billy Goat, q.v.

Development: Four tunnels are on the property. One, with about 200 feet of work, contains a small overhand and underhand stope. Another, about 275 feet long, is a crosscut driven 50 feet in elevation below the stope in an effort to crosscut the vein. Two other shorter adits are about 1,200 feet to the northeast.

Production and assays: Small shipments were made from this mine in 1922, 1931, 1934, and 1935. Total crude ore shipped amounted to 5.8 tons with an average assay of 3.965 ounces per ton of gold, 3.24 ounces per ton of silver, and 10.71 percent copper. Concentrates shipped amounted to 3.15 tons with an average assay of 1.53 ounces per ton of gold, 1.13 ounces per ton of silver, and 1.81 percent copper.

Future: The property is adjacent to the Billy Goat and has a comparable future. Further work in the adit below the stope may intersect the small gold shoot, in which case a limited tonnage for shipping may become available.

PEACOCK (BORNITE) PROSPECT (39)

Location: NW $\frac{1}{4}$ sec. 10, (38-20E.), on the southwest slope of Billy Goat Mountain about 3 miles by trail from the end of the Eight-mile Creek road. Altitude 6,500-6,800 feet.

Owner: Charles Kenney, Winthrop.

Property: One unpatented claim.

Timber: Scarce.

Water: None.

Geology and mineralization: A steeply dipping fracture zone 2 to 5 feet wide trends northeastward through volcanic rock, probably andesite. The zone is fairly well mineralized by

quartz, calcite, barite, pyrite, and chalcopyrite, together with some silver and gold. Some secondary copper minerals occur in places.

Development: One 60-foot drift.

Production and assays: No production; one specimen of vein material assayed: gold, 0.025 ounces per ton; silver, 4.65 ounces per ton; copper, 3.14 percent.

Future: Not promising. A small tonnage of relatively low-grade material appears to be available, but the prospect is rather unaccessibly located.

Outlying areas - Okanogan County

JONES COPPER-MERCURY PROSPECT (40)

Location: E. center sec. 24, (35-21E.), 3 miles northeast of Winthrop.

Owner: Jack Jones, Winthrop.

Property: Private land.

Timber: None.

Water: Small lake and stream are near by.

Geology and mineralization: Altered, fractured volcanic rock contains siliceous zones and very small quartz-calcite veinlets. Secondary copper minerals, chiefly malachite and chrysocolla, are disseminated through some parts of the siliceous material, and one fracture zone contains a little cinnabar.

Development: One open-cut.

Production and assays: One selected specimen of the material assayed: copper, 0.58 percent, silver, 0.16 ounces per ton; gold, tr. Selected specimens of cinnabar-bearing material are

said to assay 0.3 percent mercury.

Future: Not promising.

HATFIELD TUNGSTEN (WOLFRAMITE) MINE (41)

Location: Sec. 7, (40-22E.), at head of Tungsten Creek, 13 miles by trail from the end of the Chewack River road. Altitude 6,500-7,500 feet.

Owner: John Hatfield, Wenatchee.

Property: Several unpatented claims.

Timber: Scarce.

Water: Tungsten Creek flows across property.

Equipment and buildings: Two cabins, a small jig mill, and a small steam plant.

Geology and mineralization: A series of irregular quartz veins 2 to 18 inches thick dip at low angles through granite. The veins contain disseminations of hubnerite and scheelite.

Development: Eight tunnels, totaling about 1,700 feet of drifts and crosscuts, and fifteen or twenty open-cuts are on the property; stops and raises are in some of the tunnels.

Production and assays: U. S. Geol. Survey Mineral Resources, 1915 and 1917, report a small production of tungsten concentrates from the property for these years; 30 tons are reported by the owners to have been shipped in 1936; and U. S. Bureau of Mines, Minerals Yearbook, 1942, reports that about 1 ton of concentrates was shipped during that year.

Future: The irregularity and small size of the veins and the inaccessibility of the mine will probably limit the property to being a small sporadic producer.

HORSESHOE BASIN MOLYBDENITE PROSPECT (42)

Location: Near Arnold Peak in T. 40 N., R. 23 E.

Owner: R. R. McPhearson.

No other information.

MOLY NOS. 1 AND 2 CLAIMS (43)

Location: Sec. 8, (40-20E.), on east side of Sheep Mountain, in the Ashnola River watershed.

Owners: J. J. Sullivan, Pateros; Orin and Lester Dodd, Wenatchee.

Mineralization: The ore mineral is molybdenite.

No other information.

Slate Creek area - Okanogan County

BOZANZA CHIEF (44)

Location: SE $\frac{1}{4}$ sec. 13, (37-17E.), about 1 $\frac{1}{2}$ miles south of Harts Pass.

Altitude 6,000 $\frac{1}{2}$ feet, on the crest of the Cascade Divide.

Owner: Charles Willman, Winthrop.

Property: One unpatented claim.

Timber: Ample.

Water: Small stream furnishes enough for camp use.

Geology and mineralization: Irregular quartz veins occur along a steeply dipping fracture zone that trends southwestward through sedimentary rocks. Faulting complicates the structure of the veins. They are generally less than a foot thick, but one is 3 to 4 feet thick.

Future: Not promising.

Slate Creek area - Whatcom County

ALLEN BASIN MINE (45)

Location: Sec. 34, (36-17E.), in Allen Basin about 5 miles by road northwest of Harts Pass.

Owner: Slate Creek Mining Co., 145 Horton Street, Seattle.

Property: Fourteen patented claims.

Timber: Ample.

Water: Ample.

Geology and mineralization: At least two steeply dipping quartz veins, 3 to 30 inches thick, trend northeastward through sedimentary and igneous rocks. The veins contain arsenopyrite and pyrite, together with some galena, sphalerite, gold, and silver.

Development: Two shafts, a caved adit, and several open-outs are on the property.

Production and assays: The presence of an old bunker on the property suggests that some ore was shipped in the early days. More recently, in 1940, a few tons were mined by the present owners.

Future: Uncertain; further exploration is desirable to ascertain whether ore exists in minable quantity.

AZURITE MINE (46)

Location: Sec. 30, (37-17E.), on Mill Creek about 15 miles by road southwest of Harts Pass.

Owner: Azurite Gold Co., Mrs. Anna Ballard, President, Twisp.

Property: Forty-two unpatented claims.

Timber: Ample.

Water: Ample.

Equipment and buildings: Mine camp for 50-75 men, mill buildings, power plant, and other equipment.

Geology and mineralization: A 2- to 7-foot quartz vein cuts through argillite and contains, in places, pyrite, pyrrhotite, sphalerite, chalcopyrite, and galena, together with gold and silver. Other undeveloped veins are also reported to occur.

Development: About 3,000 feet of tunnel work has been done, chiefly on two levels. Stopes occur in the drifts.

Production and assays: A small production was made by the owners in 1920, 1930, 1934, and again in 1941. From 1936 to 1939 the property was operated by the Federal Mining and Smelting Co., who produced a total of about 72,500 tons of ore that was valued at nearly \$1,000,000.

Future: Uncertain. It is reported that the body that furnished ore during the period 1936-1939 is depleted, and that further exploration is needed to find more ore. It is considered, however, that such exploration is warranted.

BALTIMORE PROSPECT (47)

Location: NW $\frac{1}{4}$ sec. 27, (38-17E.), at the head of Barron Creek, about 10 miles by road northwest of Harts Pass.

Owner: Baltimore Mines, Inc., E. K. Carlisle, General Manager, 314 Virginia Street, Seattle.

Property: Twenty-two unpatented claims.

Timber: Ample.

Water: Ample.

Equipment and buildings: Mine camp for 10-15 men, complete equipment for small-scale mining.

Geology and mineralization: Quartz veins in quartzite and argillite, containing sulphides together with gold and silver, are said to occur on the property.

Development: One adit, containing about 900 feet of tunnel work, and several open-cuts are on the property.

Future: Uncertain.

GOLD HILL PROSPECT (48)

Location: Sec. 30, (37-17E.), on a tributary of Granite Creek, about 17 miles by trail from the Diablo Dam on Skagit River.
Altitude 5,000 $\frac{1}{2}$ feet.

Owner: Gold Hill Operating Co.

Property: Forty unpatented claims.

Timber: Ample.

Water: Ample.

Equipment and buildings: Several cabins.

Geology and mineralization: Shear zones 2 to 8 feet wide through black argillite are mineralized in places by pyrrhotite, sphalerite, and galena, together with some gold and silver.

Development: Four tunnels totalling about 1,800 feet and several open-cuts have been made.

Production and assays: No production; no assays available.

Future: Uncertain. Development has not progressed far enough to ascertain that a minable tonnage is present.

INDIANA MINE (49)

Location: SW $\frac{1}{4}$ sec. 26, (38-17E.), about 6 miles by road northwest of Harts Pass. Altitude 6,500 $\frac{1}{2}$ feet.

Owner: E. D. Hyde, 75 West Street, New York, N. Y.

Property: Three patented claims.

Timber: Scarce.

Water: Small creek on property.

Equipment and buildings: One cabin, a tool house, equipment for small-scale mining.

Geology and mineralization: A shear zone 1 to 4 feet thick strikes N. 65°-70° E. and dips steeply through argillite. The zone has a network of quartz veins containing pyrite and arsenopyrite, together with galena, sphalerite, gold, and silver.

Development: Two levels about 250 feet in elevation apart contain a total of about 900 feet of drifts and crosscuts. Some stoping has been done on both levels.

Production and assays: During the period 1935 to 1939 a total of 119.4 tons of ore was shipped to the smelter. The average gold and silver recovered and paid for by the smelters was: gold, 9.735 ounces per ton; silver, 3.46 ounces per ton. Other production was made in the early days.

Future: At present a small tonnage of good grade ore appears to occur. Further development may indicate a larger ore body.

HARTS PASS MINE (50)

Location: Sec. 35, (38-17E.), about 5 miles by road northwest of Harts Pass. Elevation 5,500-6,500 feet.

Owner: Harts Pass Mining Co., 308 - 1411 Fourth Avenue Building, Seattle, E. B. Peirson, President.

Property: Five patented and several unpatented claims.

Timber: Ample.

Water: Slate Creek flows across property.

Equipment and buildings: A large bunk-cookhouse and some mining equipment.

Geology and mineralization: A 1- to 3-foot steeply dipping quartz vein strikes northeastward through argillite and quartzite. Pyrite, arsenopyrite, galena, and sphalerite, together with gold and silver, occur in the quartz. Faulting of the vein complicates the structure.

Developments: Three tunnels on the property total about 2,250 feet. Some stoping has been done above and below one of these tunnels.

Production and assays: Prior to 1900 the mine reportedly produced about 15,000 tons of ore valued at approximately \$400,000. Ore was treated in a stamp mill, the remnants of which are remaining on the property.

Future: Further development and sampling may disclose shoots of ore in the vein. This additional work is warranted.

SLATE CREEK MINE (51)

Location: Sec. 27, (38-17E.), about 7 miles by road northwest of

Harts Pass. Altitude 5,500-7,000 feet.

Owner: Slate Creek Mining Co., 145 Horton Street, Seattle.

Property: Sixteen (?) unpatented claims.

Timber: Ample.

Water: Ample.

Equipment and buildings: A bunk-cookhouse and a complete 50- to 75- ton flotation mill.

Geology and mineralization: A zone of fracturing occurs through limy and graphitic argillite and contains interlacing quartz veinlets, graphitic shear zones, and zones of quartz- and sulphide-cemented breccia. Gold occurs in commercial amounts in the graphitic zones and quartz veinlets.

Development: Drifts and crosscuts on six levels total several thousand feet. Several stopes have been made, mostly on the upper levels.

Production and assays: Forty to fifty years ago about 60,000 tons were mined from an ore body that reportedly contained about 1 ounce of gold per ton. Most of this zone is worked out, and recent development is toward opening several graphitic shear zones that contain \$10 to \$25 per ton in gold. In 1940-1942 the property produced several tons of good-grade gold ore.

Future: Several hundred tons of ore are available at present, and the possibilities for finding more are good.

Non metallic mineral occurrences in the Upper Methow region

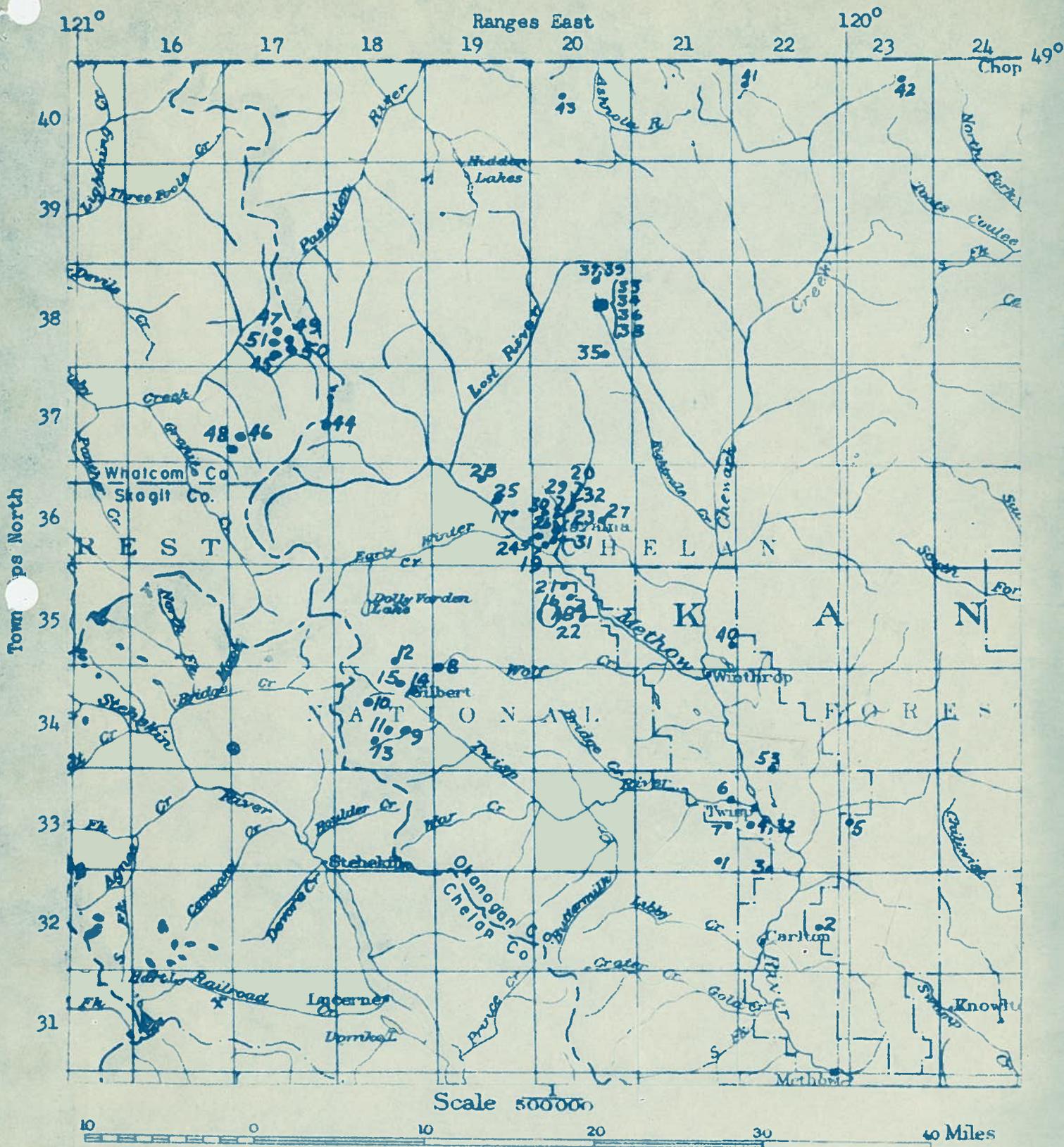
- Asbestos:** An old report tells of a deposit of long white silky-fibered asbestos 14 miles southwest of Twisp.
- Barite:** Barite (barium sulphate) occurs as a gangue mineral at the Lead Horse (37), Peacock (39), and Copper Glance (35) prospects in the Eightmile area. It is not in commercial amounts.
- Clay:** Small deposits of clay suitable for making ordinary building brick occur near Twisp and probably elsewhere in the Valley. At one time several thousand bricks were made at Twisp.
- Gypsum:** Gypsum (impure hydrous calcium sulphate) occurs as a gangue mineral at the Minnie mine (2), in the Twisp area. It is not economically important.
- Marl:** Marl occurs in at least two deposits in the region. One deposit, no. 52, is in sec. 18, (33-22E.) about 1 mile south of Twisp on the A. T. Scott property, where several acres are underlain by the material to a depth of several feet. The other, no. 53, is at Ward (or Bonner) Lake in the SE $\frac{1}{4}$ sec. 32, (34-22E.) about 2 miles northeast of Twisp on the M. R. Scott property. At Ward Lake the marl occurs around the lake to a reported depth of at least 35 feet and is covered by about 2 feet of overburden. Both deposits may at some time be mined.

Quartz crystals: Quartz crystals are said to occur near the head of Windy Creek about 40 miles north of Winthrop and also in the Early Winter Creek vicinity. Specimens seen are as much as 4 or 5 inches long and 1 to 2½ inches thick, but are of the smoky variety and therefore not suitable for use in radio and sound equipment.

Sand and gravel: Considerable sand and gravel occur along the Methow Valley, not only close to the river, but also in benches up to 500 feet in elevation above the valley floor. Deposits are readily accessible, and some of them have been mined in a small way for local use.

Stone: Stone of various types has at times been quarried in the Upper Methow Valley for road surfacing. Granite and similar rocks occur in the region, and some types would be suitable for building and monumental purposes. However, the demand for such material is small and is supplied by highly developed quarries closer to centers of population.

DIVISION OF MINES AND GEOLOGY
 PRELIMINARY REPORT ON THE
 MINES AND PROSPECTS OF UPPER METHOW REGION



Map of part of Washington showing mines and prospects in the Upper Methow region.
 Numbers refer to properties described in the text.